Addictive Behaviors Reports 21 (2025) 100598

Contents lists available at ScienceDirect

Addictive Behaviors Reports

journal homepage: www.elsevier.com/locate/abrep

Psychometric properties of the Reward Deficiency Syndrome Questionnaire among a non-clinical sample and its relationship with the characteristics of potentially addictive behaviors

Eszter Kotyuk [a,*], Zsolt Demetrovics [b,c,a], Róbert Urbán [a], Andrea Czakó [c,a], Kenneth Blum [a,d,e], Mark D. Griffiths [f], Marc N. Potenza [g,h,i], Yaniv Efrati [j]

[a] Institute of Psychology, ELTE Eötvös Lorand University, 46 Izabella Street, Budapest H-1064, Hungary
[b] Flinders University Institute for Mental Health and Wellbeing, College of Education, Psychology and Social Work, Flinders University, Bedford Park, South Australia, Australia
[c] Centre of Excellence in Responsible Gaming, University of Gibraltar, Europa Point Campus, Gibraltar
[d] Center for Sports, Exercise & Mental Health, Western University of Health Sciences, Pomona, CA, USA
[e] Department of Molecular Biology, Adelson School of Medicine, Ariel University, Ariel, Israel
[f] International Gaming Research Unit, Psychology Department, Nottingham Trent University, Nottingham, UK
[g] Departments of Psychiatry, Neuroscience and Child Study Center, Yale University School of Medicine, New Haven, CT, USA
[h] Connecticut Council on Problem Gambling, Wethersfield, CT, USA
[i] Connecticut Mental Health Center, New Haven, CT, USA
[j] Bar-Ilan University, Faculty of Education, Ramat Gan, Israel

ARTICLE INFO

Keywords:
Behavioral addictions
Compulsive buying-shopping disorder
Gambling disorder
Internet gaming disorder
Problematic use of social media use
Reward deficiency syndrome

ABSTRACT

Background and aims: The addiction literature conceptualizes problematic substance use and addictive behaviors (e.g., gambling disorder, gaming disorder) as having shared etiologies and phenomenologies. The reward deficiency syndrome (RDS) model proposes blunted responses to natural rewards that potentially contribute to the development of addictive behaviors. The 29-item Reward Deficiency Syndrome Questionnaire (RDSQ-29) was developed to assess RDS-related psychological-behavioral characteristics. The aim of the present study was to validate the Hebrew version of the RDSQ-29 and to provide empirical evidence for the relevance of RDS in addictive behaviors and related psychological features.
Methods: The sample comprised 961 Jewish Israeli young adults from the general community (age 19–27 years; M = 23.40 years [SD = 1.95]) who were assessed for personality characteristics (attachment styles, RDS, compulsive personality), internet gaming disorder (IGD), problematic use of social media use (PUSM), compulsive buying-shopping disorder (CBSD), and gambling disorder (GD).
Results: The analysis confirmed the validity and factor structure of the RDSQ-29. RDSQ-29 scores showed a significant but weak association with anxiety, avoidance, and compulsive personality. Also, weak to modest relationships were found between RDSQ-29 scores and the severity of the four potential behavioral addictions.
Discussion: The findings suggest that the Hebrew translation of the RDSQ-29 is a psychometrically sound instrument to assess RDS. Given that different potentially addictive and other problematic behaviors are associated with RDS, its assessment might be useful in prevention or screening.

1. Introduction

The addiction literature conceptualizes problematic substance use and behavioral addictions (e.g., gambling disorder, gaming disorder) as having shared etiologies and phenomenologies (e.g. Petry et al., 2014; Di Nicola et al., 2015; Grant, Brewer & Potenza, 2006; Grant, Mancebo, Pinto, Eisen, & Rasmussen, 2006). Empirical and theoretical research examining addictive behaviors has suggested similar psychological and neurological mechanisms (e.g. Andreassen et al., 2013; Walther, Morgenstern, & Hanewinkel, 2012; Ream, Elliott, & Dunlap, 2011; Blum, Febo, et al., 2014; Leeman & Potenza, 2013). Multiple theories and models that have been developed to explain the acquisition,

* Corresponding author.
E-mail address: kotyuk.eszter@ppk.elte.hu (E. Kotyuk).

https://doi.org/10.1016/j.abrep.2025.100598
Received 4 November 2024; Received in revised form 13 March 2025; Accepted 20 March 2025
Available online 24 March 2025

development, and maintenance of addictive behaviors. One model is the reward deficiency syndrome (RDS) model (Blum, Cull, et al., 1996; Blum, Sheridan, et al., 1996). This model proposes that a set of genetic markers (Genetic Addiction Risk Score, GARS; Blum et al., 2014) may predispose individuals to the so-called hyperdopaminergic trait of RDS, which may contribute to the development of addictive, compulsive, and impulsive behaviors. The RDS trait has been linked to transdiagnostic constructs associated with problematic substance use and potential addictive behaviors, such as impulsivity, novelty seeking, and risk-taking personality features, as well as mood characteristics such as anxiety, depression, and anhedonia. The model proposes that a general *"insufficiency of usual feelings of satisfaction"* characterizes RDS (Blum et al., 2012, p. 2). However, empirical studies demonstrating the phenomenological concept of the RDS are lacking, and related psychological factors are currently speculative based on the RDS model.

A recent study (i.e. Kótyuk et al., 2022) initially investigated and described phenomenological characteristics of RDS. The study developed a novel 29-item psychometric instrument (i.e., the Reward Deficiency Syndrome Questionnaire, RDSQ-29) to assess RDS characteristics. The RDSQ-29 includes four factors (limited sexual satisfaction, activity, social concerns, and risk-seeking behavior) and a general reward deficiency factor. The scale showed modest correlations with sensation seeking and impulsivity (Kótyuk et al., 2022), suggesting some similarities with theoretically associated psychological constructs, but the uniqueness of the assessed construct was also suggested. Although this new instrument was an important step in the conceptualization and validation of the RDS, further studies exploring its relationship with potentially addictive behaviors on independent samples are needed to empirically validate and demonstrate the importance of this trait.

The RDSQ-29 is only available in English and Hungarian so far, but translation to different languages would provide an opportunity to conduct cross-cultural studies investigating the background mechanisms of addictions, and the cultural-independent generalizability of the RDS trait. Behavioral addictions are rising in Israel (Efrati & Spada, 2022), yet little research has explored their underlying mechanisms, particularly among young adults (Efrati, 2023). The present study addresses this gap by investigating the role of RDS using a newly translated Hebrew version of the RDSQ-29.

Therefore, the present study aimed to test the factor structure of the Reward Deficiency Questionnaire (RDSQ-29) in Hebrew and assess the relationship between the RDSQ-29 and four specific potentially addictive behaviors (i.e., internet gaming disorder, problematic use of social media (PUSM), compulsive buying-shopping disorder, and gambling disorder) and personality features. These four potentially addictive behaviors have been found to be frequent in multiple studies (Deleuze et al., 2015; Kotyuk et al., 2020). The objectives of the present study were to (i) validate the Hebrew translation of the RDSQ; (ii) carry out explorative analysis investigating the relationship between RDSQ scores and the severity of the assessed four potentially addictive behaviors to examine if higher RDSQ scores correlated with more severe appearances of these behaviors in a young Israeli cohort; and (iii) investigate the possible association between RDSQ scores and several addiction-related personality traits.

2. Methods

2.1. Participants

A convenience sample of 961 Jewish Israeli young adults from the general community participated (372 males, 583 females, and six individuals who did not disclose their gender). The participants were aged 19–27 years (M = 23.40 years, SD = 1.95). The sample was predominantly native Israeli (91 %), with 86.5 % reporting Hebrew as their first language. Regarding socioeconomic status, 1.2 % described their status as "very bad," 8.2 % as "bad," 67.6 % as "good," and 22.9 % as "very good". Moreover, 45 % self-reported as religious individuals, and 55 % as secular.

2.2. Measures

The following measures were employed to assess the study variables. Descriptive statistics (including scale mean, standard deviation, minimum, maximum, Cronbach alpha and cut-off thresholds) of the assessment tools are presented in Supplementary Table 1.

Sociodemographic variables. Participants reported their age, gender (male, female, or undisclosed), religiosity (religious/secular), immigration status (native-born Israeli or immigrant), and socioeconomic status (SES), rated on a four-point scale from 'very bad' to 'very good'.

Experiences in Close Relationships Scale (ERC; Brennan et al., 1998; Hebrew version: Mikulincer & Florian, 2000). The 36-item ECR was used to assess attachment patterns by asking participants to rate the extent to which each item described their feelings in close relationships. Items were rated on a seven-point scale ranging from 1 (*not at all*) to 7 (*very much*). Eighteen items assessed attachment anxiety (e.g., *"I worry about being abandoned"*) and 18 assessed avoidance (e.g., *"I prefer not to show a partner how I feel deep down"*). Both subscales are scored by calculating the mean of the appropriate item scores. Higher scores reflect greater attachment anxiety or avoidance.

Reward Deficiency Syndrome Questionnaire (RDSQ-29; Kotyuk et al., 2022). The 29-item RDSQ-29 (Supplementary Table 2) assesses reward deficiency across five domains: lack of sexual satisfaction (three items, e.g., *"I can never get enough sex"*), activity (five items, e.g., *"I cannot stand inactivity"*), social concerns (two items, e.g., *"My friends and family often worry about my lifestyle"*), risk-seeking behavior (five items, e.g., *"Extreme sports stimulate me"*), and additional items (14 items, e.g., *"I like to be always active"*). Items were rated on a four-point scale (1 = *totally disagree*, 2 = *partly disagree*, 3 = *partly agree*, 4 = *totally agree*). The RDSQ scale is scored by calculating the mean of the 29 items, the scale ranges between 1 and 4, where higher scores on each domain indicate a more pronounced RDS trait. The RDSQ-29 was translated into Hebrew using international guidelines (Wild et al., 2005), involving forward and backward translation, cognitive interviews, and cultural adaptation for Israeli contexts. For the Hebrew translation of the RDSQ-29, see Supplementary Table 3. The Cronbach's α was 0.90 for the RDSQ total scale, 0.716 for the lack of sexual satisfaction subscale, 0.640 for the activity

Table 1
Descriptive statistics of the occurrence of online gaming, social media use, gambling, and shopping.

	Online gaming (n = 958) - n (%)	Social media use (n = 952) - n (%)	Gambling (n = 948) - n (%)	Online Shopping (n = 951) - n (%)
Never	367 (38.2 %)	59 (6.1 %)	740 (77.0 %)	121 (12.6 %)
Once in the last year	58 (6.0 %)	9 (0.9 %)	55 (5.7 %)	67 (7.0 %)
2–6 times in the past year	91 (9.5 %)	11 (1.1 %)	43 (4.5 %)	243 (25.3 %)
7–11 times in the last year	73 (7.6 %)	22 (2.3 %)	20 (2.1 %)	181 (18.8 %)
Once a month	56 (5.8 %)	28 (2.9 %)	32 (3.3 %)	153 (15.9 %)
2–3 times a month	49 (5.1 %)	21 (2.2 %)	27 (2.8 %)	87 (9.1 %)
Once in a week	63 (6.6 %)	24 (2.5 %)	13 (1.4 %)	52 (5.4 %)
2–3 times in a week	70 (7.3 %)	50 (5.2 %)	9 (0.9 %)	24 (2.5 %)
4–5 times in a week	49 (5.1 %)	60 (6.2 %)	3 (0.3 %)	7 (0.7 %)
6–7 times in a week	26 (2.7 %)	88 (9.2 %)	2 (0.2 %)	9 (0.9 %)
More than 7 times in a week	56 (5.8 %)	580 (60.4 %)	4 (0.4 %)	7 (0.7 %)
Missing	3 (0.3 %)	9 (0.9 %)	13 (1.4 %)	10 (1.0 %)

Table 2
Exploratory factor analysis of the RDSQ-29.

Item	Reward deficiency	Lack of sexual satisfaction	Activity	Social concerns	Risk-seeking behavior
I don't receive gratification from everyday life.	**0.136**	−0.006	−0.210	−0.034	−0.122
While doing a task or work, I find myself already planning the next task.	**−0.066**	**0.308**	0.118	−0.122	−0.081
I consistently seek new situations and adventures.	**0.383**	**0.647**	−0.022	0.072	0.025
I like activities that'll give me an adrenaline rush.	**0.176**	**0.672**	0.031	−0.011	0.430
I prefer being active when going out with friends rather than just talking with each other.	**0.279**	0.233	0.208	−0.029	0.180
I can never get enough sex.	**0.394**	0.062	−0.056	0.289	−0.075
I'm almost always active.	**0.216**	0.053	**0.652**	0.012	−0.014
I desire to participate in all aspects of life no matter the limits.	**0.340**	**0.355**	0.129	0.028	−0.002
I've tried many sports in my life.	**0.200**	0.008	0.232	0.034	**0.378**
Others would consider my activities dangerous.	**0.672**	−0.020	−0.060	0.103	0.264
I regularly change my sexual partners.	**0.470**	−0.059	0.029	**0.673**	−0.003
I like to be always active.	**0.306**	0.005	**0.706**	0.048	0.089
My friends and family often worry about my lifestyle.	**0.640**	−0.005	−0.132	0.105	−0.030
I like experimenting with extreme sports.	**0.405**	0.002	0.009	−0.003	**0.825**
I need more stimulation than others.	**0.625**	0.109	−0.040	0.123	0.068
It can happen that I have more than one sexual partner at once.	**0.428**	0.007	0.010	**0.659**	−0.030
I cannot stand inactivity.	**0.413**	−0.113	**0.577**	−0.014	0.042
My friends or my family warned me several times that I overdo my recreational activities.	**0.652**	−0.093	0.014	0.024	0.067
Extreme sports stimulate me.	**0.381**	0.048	0.000	−0.020	**0.739**
No pain or tiredness can deter me from doing something that I am passionate about.	**0.420**	0.095	0.198	−0.026	0.150
If nothing special happens during the day, I feel empty and bored.	**0.404**	0.073	0.237	−0.145	−0.037
Most people think I can't sit still.	**0.543**	−0.004	0.180	−0.071	0.011
I like to live dangerously.	**0.751**	−0.064	−0.094	0.085	0.129
I need more excitement than others.	**0.745**	0.180	−0.041	0.002	−0.018
I often want a good time no matter what I have to do to get it.	**0.760**	0.205	−0.078	0.010	0.015
Being inactive really annoys me.	**0.458**	−0.084	**0.456**	−0.113	−0.018
I look for extreme challenges in my work, sports, or anything else.	**0.651**	−0.015	0.016	−0.018	**0.408**
When I'm doing something pleasurable, I can hardly stop myself.	**0.550**	0.207	0.040	−0.093	−0.059
Often I want to feel stimulated no matter what I have to do to get it.	**0.639**	0.238	0.012	−0.122	−0.069

Note. Emboldened figures indicate the primary factor loadings, where loading > 0.300.

Table 3
Relationships between RDSQ-29 and the assessed personality features.

Assessment tools		RDSQ-29	ERC anxiety	ERC avoidance	CPAS
RDSQ-29 (Reward Deficiency Syndrome Questionnaire)					
ERC (Experiences in Close Relationships Scale)	Anxiety	0.123**			
	Avoidance	0.123**	0.102*		
CPAS (Compulsive Personality Assessment Scale)		0.229**	0.344**	0.129**	

Notes. Pearson correlation values are presented in the cells (*$p < 0.05$; **$p < 0.001$).

subscale, 0.684 for the social concerns subscale, and 0.803 for the risk seeking behavior subscale.

Compulsive Personality Assessment Scale (CPAS; Fineberg et al., 2014, Hebrew translation of the scale: Bőthe et al., 2021). The eight-item CPAS was used to assess participants' compulsive behaviors (e.g., *"Are you preoccupied with details, rules, lists, order, organization or schedules to the extent that the major aim of the activity is lost?"*). Items are rated on a five-point scale from 1 (*not at all characteristic of me*) to 5 (*entirely characteristic of me*). The CPAS score is calculated by summing all of the items. The total scale ranges between 8 and 40, where higher scores indicate more compulsive personality traits. Although the CPAS had a Cronbach's α of 0.59, consistent with previous studies, it remains a widely accepted tool for assessing compulsive personality traits.

Internet Gaming Disorder Scale-Short Form (IGDS9-SF; Pontes & Griffiths, 2015, Hebrew version: Efrati et al., 2021). The nine-item IGDS9-SF was used to assess the severity of IGD over a 12-month period. The nine items are based on the nine DSM-5 criteria for IGD (American Psychiatric Association, 2013), and assess tolerance, withdrawal, displacement, escape, problems, deception, displacement, and conflict. Items (e.g., *"Do you feel more irritability, anxiety or even sadness when you try to either reduce or stop your gaming activity?"*) were rated on a 5-point scale ranging from 1 (*never*) to 5 (*very often*). Total scores are calculated as the sum of item responses. The total score ranges from 9 to 45 and higher scores indicate greater symptomatology. A cut-off of 36 (out of 45) was used to indicate the possible presence of IGD.

Social Media Disorder Scale (SMDS; van den Eijnden et al., 2016, Hebrew version: Efrati et al., 2021). The nine-item SMDS was used to assess PUSM. The scale uses the same criteria used for assessing IGD in the DSM-5, but the items refer to social media use instead of gaming. An example item is *"…tried to spend less time on social networks but failed."* Total scores range from 9 to 54, and higher scores indicate greater symptomatology.

Richmond Compulsive Buying Scale (RCBS; Ridgway et al., 2008; the last author translated the questionnaire into Hebrew using rigorous back-translation, Efrati et al., 2025). The six-item RCBS was used to assess compulsive buying. The scale conceptualizes compulsive buying as a disorder with elements of both impulsivity and compulsivity. This is characterized by an individual's preoccupations with buying, poor control over urges to buy, and that buying aims to reduce anxiety. The scale's items load onto two factors: obsessive–compulsive buying (e.g., "*My closet has unopened shopping bags in it.*") and impulsive buying ("*I buy things I don't need*"). Items are rated on a seven-point Likert scale from 1 (*not true*) to 7 (*completely true*). The Cronbach's α was 0.80 for the obsessive–compulsive buying subscale and 0.79 for the impulsive buying subscale.

Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001, Hebrew version: Gavriel-Fried et al., 2023). The nine-item PGSI was used to assess problem gambling during the past 12 months. Items (e.g., *"Have you bet more than you could afford to lose?"*) are rated on a four-point scale ranging from 0 (*Never*) to 3 (*Almost always*). Scores range from 0 to 27, the Cronbach's α was 0.94.

2.3. Procedure

Young adults aged over 18 years, irrespective of religious affiliation or geographic location, were eligible to participate. The study focused on potentially addictive behaviors among Jewish young adults, and participants were recruited via bulletin board postings and social media platforms, including *Instagram*, in age-appropriate student, leisure, and entertainment groups. Participants were told that the present study was a research project on potential addictive behaviors among Jewish young adults. Upon agreeing to participate, young adults were asked to provide their informed consent. Eligible participants were aged 19–27 years, from a non-clinical population in Israel, and free from any clinical psychiatric diagnosis. To ensure confidentiality and minimize distractions, participants were instructed to complete the survey in a quiet setting at home. Survey items were presented randomly, each with its own instructions. Data were collected between November 2022 and May 2023 using the *Qualtrics* platform. The survey was available in Hebrew, the native language of most participants. Of the 1105 young adults who started completing the survey, 961 completed it. The average completion time for the survey was 24 min. The study received institutional review board (IRB) approval at the Bar-Ilan university, and participants were debriefed electronically after completing the survey.

2.4. Statistical analysis

A confirmatory factor analysis (CFA) was conducted to evaluate the original factor structure of the RDSQ-29. If the CFA model exhibited poor fit, an exploratory factor analysis (EFA) was planned, following recommendations from prior research (Schmitt, 2011) to better understand the structure of the Hebrew version of RDSQ-29. The factor analysis was run in R with the lavaan package. The factor analysis used a bifactor model, as described in the original development of the RDSQ (Kotyuk et al., 2020), and employed robust maximum likelihood (MLR) estimators with bi-geomin rotation. Model fit was assessed using the following criteria (Hu and Bentler, 1999): Root-mean-square error of approximation (RMSEA) < 0.10, Comparative fit index (CFI) > 0.90, Tucker-Lewis index (TLI) > 0.90, Standardized root-mean-square residual (SRMR) < 0.08. If EFA was necessary, Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) were utilized to compare model solutions.. Factor loading thresholds were set at 0.30 as suggested by Comrey and Lee (1992).

3. Results

The prevalence rates of online gaming, social media use, gambling, and shopping are presented in Table 1. While social media use was a daily activity for 61 % of the sample, 38.3 % had never played online videogames and 78 % had not gambled in the past 12 months.

On the IGDS9-SF, 1.04 % of the sample (n = 10) scored higher than 36 (out of 45) and were classified as having disordered online gaming. On the RCBS, 10 % of the sample (n = 96) scored higher than 25 (out of 42) and were classified as having compulsive shopping. On the PGSI, one person had non-problem gambling, 4 % had low-risk problem gambling (n = 39), 84 % had moderate risk problem gambling (n = 805), and 12 % had problem gambling (n = 116). The occurrence of PUSM could not be assessed as there is no available cutoff threshold in the extant literature. Therefore, to estimate the number of participants with PUSM, the mean + 2 x standard deviations was used as a cutoff. The mean of the PUSM was 20.3 (SD = 10.1). Therefore, the threshold was defined as 41 out of 45. Consequently, 1.4 % were classified as having PUSM (n = 13).

3.1. Validity and factor structure of the RDSQ-29

Descriptive statistics of the Hebrew RDSQ-29 factors and items are presented in Supplementary Table 4. The confirmatory factor analysis (CFA) of the Hebrew RDSQ-29 (Supplementary Table 5) yielded the following fit indices: $\chi^2(362) = 2295$, $p < 0.001$; RMSEA = 0.077 (90 % CI [0.075, 0.080]); CFI = 0.783; TLI = 0.775. Because the CFA model did not produce acceptable fit indices, an exploratory factor analysis (EFA) was conducted to further examine the structure of the Hebrew RDSQ-29. Both the Bartlett's test of sphericity ($\chi^2[406] = 10544.578$, $p < 0.001$) and the KMO (KMO = 0.919) confirmed that the data were appropriate for EFA. The EFA was conducted with the potential for 1 to 7 factors. Eigenvalues for each factor were as follows: 7.037, 1.705, 1.538, 1.528, 1.007, 0.916, and 0.557, suggesting a five-factor solution. The first factor accounted for the largest proportion of variance in the variables. Factor loadings for the five-factor solution are presented in Table 2. The fit indices for the five-factor EFA were as follows: AIC = 60316.73, BIC = 61102.49, $\chi^2(271) = 944.437$, $p < 0.001$; CFI = 0.934; RMSEA = 0.053. In this analysis, the originally proposed 'social concerns' factor,

Table 4
Relationships between RDSQ-29 and the severity of the assessed addictive behaviors.

Assessment tools		RDSQ-29	SMDS	RCBS-R Obsessive-compulsive buying	RCBS-R Impulsive buying	PGSI	IGDS9-SF
RDSQ-29 (Reward Deficiency Syndrome Questionnaire)		–					
SMDS (Social Media Disorder Scale)		0.123**	–				
RCBS-R (Richmond Compulsive Buying Scale Revised)	Obsessive-compulsive buying	0.118**	0.330**	–			
	Impulsive buying	0.097*	0.341**	0.724**	–		
PGSI (Problem Gambling Severity Index)		0.148**	0.364**	0.384**	0.278**	–	
IGDS9-SF (Internet Gaming Disorder Scale-Short Form)		0.237**	0.387**	0.282**	0.177**	0.537**	

Notes. Pearson correlation values are presented in the cells (*$p < 0.05$; **$p < 0.001$).

consisting of two items, did not emerge as a separate factor. Instead, the fifth factor was identified as 'experience or sensation seeking,' alongside the four originally proposed factors: 'general factor,' 'activity,' 'lack of sexual satisfaction,' and 'risk seeking behavior.

3.2. Relationship between RDS and the assessed personality features

A positive, weak, but significant relationship was found between RDSQ-29 scores and anxiety (r = 0.123), and avoidance (r = 0.123), and a modest, positive relationship between RDSQ-29 score and compulsivity (r = 0.229) (Table 3).

3.3. Relationships between RDSQ-29 scores and the severity of the addictive behaviors assessed

The relationships between RDSQ-29 scores and the severity of the assessed problematic behaviors were also tested. In most cases, the correlation coefficients were positive and significant (*r*-values ranged between 0.097 and 0.237), albeit weak (see Table 4). However, in the case of the IGD, the correlation was a little stronger, but still modest ($r =$ 0.237).

4. Discussion

The present study aimed to validate the translated Hebrew version of the RDSQ-29 and to investigate its relationship with addictive behaviors to provide a first attempt to validate the RDS trait among a non-clinical sample. An EFA was conducted because the CFA did not have an acceptable model fit. The EFA identified a five-factor solution. However, the original 'social concerns' factor with its two items did not emerge in the EFA, which might be due to the nature of the non-clinical sample or specific cultural context. The new fifth factor of the EFA included items that assessed experience and sensation seeking (the two items loading on this factor were: '*I regularly change my sexual partners.*'; '*It can happen that I have more than one sexual partner at once.*'). This change in the factor structure might suggest that the original social concerns factor, with its two items, might not emerge reliably in independent samples, and that further analysis is needed to clarify this issue. Future studies carrying out CFA on independent samples should verify this newly proposed five-factor solution. The analysis investigating relationships between the RDSQ-29 and attachment features demonstrated weak to modest relationships, which is in line with previous results. A literature review on addiction to social media and attachment styles concluded a significant positive association between insecure attachment (anxious and avoidant) and a more intensive and dysfunctional use of the internet and social media by overviewing the results of 32 studies (D'Arienzo et al., 2019). In the case of internet gaming disorder, a longitudinal study of first-year graduate students found that peer attachment negatively predicted subsequent IGD. However, the findings did not show a bidirectional association between parental attachment and IGD (Teng et al., 2020). Also, a recent study reported an association between adverse childhood experiences (e.g., abuse, neglect), dissociation, and anxiety experienced in relationships and symptoms of gaming disorder, although the predictive power of avoidant attachment on gaming disorder was not found (Grajewski & Dragan, 2020). Individuals with high attachment anxiety may engage more in activities like gaming, shopping, social media use, and gambling as a compensatory mechanism seeking to satisfy their unmet needs for affection and social connection, and their deep-seated need for acceptance and warmth (Estévez et al., 2022). The interplay between attachment styles and addictive behaviors may also be influenced by cultural contexts, because cultural norms shape parental behaviors and, subsequently, children's attachment styles and coping mechanisms, highlighting the variability across different societal frameworks (Mancinelli et al., 2021).

Some studies indicate that emotion dysregulation may mediate the relationship between insecure attachment and excessive gaming (Tang et al., 2024). Similar results have been reported for gambling disorders. For example, a recent review of 13 studies concluded that insecure attachment is a vulnerability factor for gambling behavior and emphasized that insecure attachment affects coping strategies and the ability to identify and regulate emotions (Ghinassi & Casale, 2023). In the case of compulsive buying-shopping disorder (CBSD), studies have shown that preoccupied attachment style is related to a higher risk of CBSD due to emotional dependence (Etxaburu et al., 2024, McLaughlin et al., 2018). Others have found that fearful attachment is associated with CBSD (Topino et al., 2022). Finally, other studies have not reported a direct relationship between attachment styles and excessive tendencies towards shopping but emphasize the importance of defense mechanisms such as splitting, and dissociation routed in attachment styles (Allahvirdie et al., 2023). In sum, studies have shown the relationship between insecure attachment styles and these potentially addictive behaviors, and similarly, the present study demonstrated a relationship between RDS and attachment styles.

As for the compulsive personality trait, the RDSQ-29 score showed a modest relationship with the Compulsive Personality Assessment Scale score. Because the majority of studies exploring the relationship between addictions and compulsivity suggest that compulsivity is a core construct linked to addictive behaviors (Figee et al., 2016; Lee et al., 2019), and the RDS model was proposed to unite addictive, impulsive, and compulsive behaviors and personality disorders (Blum et al., 1995), a positive correlation between scores on the RDSQ-29 and the CPAS was expected. Compulsivity is an important factor in multiple theories proposing integrative models for psychiatric disorders. For example, the Obsessive-Compulsive Spectrum Disorder model (Hollander, 1993; Hollander & Wong, 1995) suggests some shared obsessive–compulsive features in disorders from different diagnostic categories. However, some studies have suggested that compulsivity as a trait might manifest differently in specific types of addictions. For example, one review suggested that IGD is more characterized by impulsivity than compulsivity suggesting that it is more an impulse-control disorder then a behavioral addiction, while compulsivity seems to be an important trait in compulsive buying behavior (Weinstein et al., 2016). Others suggest

that the role of specific personality traits might change at different stages of addiction (Gervasi et al., 2017). Moreover, it should be noted that the internal consistency of the CPAS was low in the present study. This is a limitation, which might be due to the nature of compulsivity in this non-clinical population, even though CPAS has been found to differentiate well on university student sample (Fineberg et al., 2015), as well as various clinical groups of patients (Gecaite-Stonciene et al., 2020; Gadelkarim et al., 2019).

Weak-to-modest relationships were found between RDSQ-29 score and the severity of the assessed addictive behaviors. The IGDS9-SF, assessing the severity of internet gaming symptomology showed the strongest relationship, but even this was modest. These results might suggest a weaker association between the RDS trait and behavioral addictions among non-clinical populations.

The present study is an initial investigation exploring relationships between RDS and four potential behavioral addictions. The findings among the general population of Jewish Israeli young adults in the present study suggested weak to modest relationships between RDS and problematic social media use, shopping, gambling, and gaming. In summary, the Hebrew RDSQ-29 is an adequate tool to assess RDS, although a new 'experience or sensation seeking' factor emerged in the analysis rather than the originally proposed low-item 'social concerns' factor. However, the RDSQ-29 showed only modest relationships with the assessed potentially addictive behaviors and linked personality features among the non-clinical sample. Because the RDS theory argues for a dimensional spectrum approach to addictions, modest relationships could be due to the non-clinical nature of the sample, and the relevance of RDS might be more pronounced among clinical samples. It is important that future research in this arena might want to add the genetic and epigenetic aspects related to "pre-addiction theorem" (Blum et al., 2024) which proposes that evidence based clinical and genetic analysis could help to identify at-risk individuals for addiction.

The present study had a number of limitations. These include the use of a convenience sampling method. Further studies are needed on representative samples as well as on samples with diagnosed addictive behaviors. Another possible limitation was the cut-off thresholds of the included scales used in the present study to define problematic versus non-problematic behaviors. These thresholds were based on statistical calculations, and the clinical relevance of them is currently unclear. A further limitation was that only four potential behavioral addictions were examined in the present study, and there are other potentially addictive behaviors proposed to be linked to RDS that could also be examined in future research (e.g., work addiction, exercise addiction, etc.). Another limitation is the self-report nature of the RDSQ-29, which could be prone to biases such as social desirability or retrospective recall. Future research should incorporate objective measures of addiction (e.g., time spent on devices) to complement self-reports. It also has to be noted that the sample's demographic characteristics (e.g., age, socioeconomic status, religion) were not representative, limiting the generalizability of the findings.

In conclusion, the Hebrew translation of the RDSQ-29 is valid and reliable although there were small changes in the factor structure compared to the original version. The openly available Hebrew translation of the RDSQ-29 is an important contribution to the scientific community because it expands the scope of research on addictive behaviors beyond Western populations. Furthermore, this is the first study exploring the relationship between RDS assessed by the RDSQ-29 and addictive behaviors and linked personality traits.

CRediT authorship contribution statement

Eszter Kotyuk: Writing – original draft, Visualization. **Zsolt Demetrovics:** Writing – review & editing, Supervision, Conceptualization. **Róbert Urbán:** Writing – review & editing, Visualization, Methodology. **Andrea Czakó:** Writing – review & editing, Validation, Project administration, Methodology, Conceptualization. **Kenneth Blum:** Writing – review & editing, Supervision, Conceptualization. **Mark D. Griffiths:** Writing – review & editing, Methodology, Conceptualization. **Marc N. Potenza:** Writing – review & editing. **Yaniv Efrati:** Writing – review & editing, Validation, Project administration, Investigation, Funding acquisition, Data curation.

Funding

Eszter Kotyuk was supported by the Bolyai János research fellowship of the Hungarian Academy of Sciences BO/00099/21, and by the MTA KGYNK (259/2024/KP).

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. MDG has received research funding from *Norsk Tipping* (the gambling operator owned by the Norwegian government). MDG has received funding for a number of research projects in the area of gambling education for young people, social responsibility in gambling and gambling treatment from *Gamble Aware* (formerly the *Responsibility in Gambling Trust*), a charitable body which funds its research program based on donations from the gambling industry. MDG undertakes consultancy for various gambling companies in the area of player protection and social responsibility in gambling. MNP has consulted for Opiant Therapeutics, Game Day Data, Baria-Tek and Boehringer Ingelheim Pharmaceuticals; has been involved in a patent application with Yale University and Novartis; has received research support from Mohegan Sun Casino, Children and Screens and the Connecticut Council on Problem Gambling; has participated in surveys, mailings or telephone consultations related to drug addiction, impulse-control disorders or other health topics; has consulted for and/or advised gambling, non-profit and legal entities on issues related to impulse control, internet use and addictive disorders; has performed grant reviews for research-funding agencies; has edited journals and journal sections; has given academic lectures in grand rounds, CME events and other clinical or scientific venues; and has generated books or book chapters for publishers of mental health texts. Dr. Kenneth Blum holds IP related to RDS. The other authors report no disclosures.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.abrep.2025.100598.

Data availability

Data will be made available upon request to the corresponding author.

References

Allahvirdie, R. S., Ghorbani, N., & Farahani, H. (2023). Mediating role of splitting in relation to attachment styles and shopping addiction. *Frontiers in Psychology, 14*. https://doi.org/10.3389/fpsyg.2023.1249591

Andreassen, C. S., Griffiths, M., Gjertsen, S. R., Krossbakken, E., Kvam, S., & Pallesen, S. (2013). The relationships between behavioral addictions and the five-factor model of personality. *Jounal of Behavioral Addictions, 2*(2), 90–99. https://doi.org/10.1556/JBA.2.2013.003

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.).

Blum, K., Sheridan, P. J., Wood, R. C., Braverman, E. R., Chen, T. J., & Comings, D. E. (1995). Dopamine D2 receptor gene variants: Association and linkage studies in impulsive-addictive-compulsive behaviour. *Pharmacogenetics, 5*(3), 121–141. https://doi.org/10.1097/00008571-199506000-00001

Blum, K., Cull, J., Braverman, E., & Comings, D. (1996). Reward deficiency syndrome. *American Scientist, 84*(2), 132–145.

Blum, K., Sheridan, P. J., Wood, R. C., Braverman, E. R., Chen, T. J., Cull, J. G., & Comings, D. E. (1996). The D2 dopamine receptor gene as a determinant of reward

deficiency syndrome. *Journal of the Royal Society of Medicine, 89*(7), 396–400. https://doi.org/10.1177/014107689608900711
Blum, K., Gardner, E., Oscar-Berman, M., & Gold, M. (2012). "Liking" and "wanting" linked to reward deficiency syndrome (RDS): Hypothesizing differential responsivity in brain reward circuitry. *Current Pharmaceutical Design, 18*(1), 113–118. https://doi.org/10.2174/138161212798919110
Blum, K., Febo, M., McLaughlin, T., Cronje, F. J., Han, D., & Gold, S. M. (2014). Hatching the behavioral addiction egg: Reward Deficiency Solution System (RDSS) as a function of dopaminergic neurogenetics and brain functional connectivity linking all addictions under a common rubric. *Jounal of Behavioral Addictions, 3*(3), 149–156. https://doi.org/10.1556/JBA.3.2014.019
Blum, K., Oscar-Berman, M., Demetrovics, Z., Barh, D., & Gold, M. S. (2014). Genetic Addiction Risk Score (GARS): Molecular neurogenetic evidence for predisposition to reward deficiency syndrome (RDS). *Molecular Neurobiology, 50*(3), 765–796. https://doi.org/10.1007/s12035-014-8726-5
Blum, K., Bowirrat, A., Thanos, P. K., Hanna, C., Khalsa, J., Baron, D., Elman, I., Badgaiyan, R. D., Dennen, C., Braverman, E. R., Carney, P., Lewandrowski, K. U., Sharafshah, A., & Gold, M. S. (2024). Evidence based clinical analytics supporting the Genetic Addiction Risk Severity (GARS) assessment to early identify probands in preaddiction. *EC Psychology and Psychiatry, 13*(1), 1–3.
Bőthe, B., Koós, M., Nagy, L., Kraus, S. W., Potenza, M. N., & Demetrovics, Z. (2021). International Sex Survey: Study protocol of a large, cross-cultural collaborative study in 45 countries. *Journal of Behavioral Addictions, 10*(3), 632–645. https://doi.org/10.1556/2006.2021.00063
Brennan, A., Clark, L., & Shaver, P. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson, & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46–76). Guilford Press.
Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis* (2nd edition). Hillsdale, NJ: Lawrence Erlbaum Associates.
Deleuze, J., Rochat, L., Romo, L., Van der Linden, M., Achab, S., Thorens, G., Khazaal, Y., Zullino, D., Maurage, P., Rothen, S., & Billieux, J. (2015). Prevalence and characteristics of addictive behaviors in a community sample: A latent class analysis. *Addictive Behaviors Reports, 1*, 49–56. https://doi.org/10.1016/j.abrep.2015.04.001
Di Nicola, M., Tedeschi, D., De Risio, L., Pettorruso, M., Martinotti, G., Ruggeri, F., Swierkosz-Lenart, K., Guglielmo, R., Callea, A., Ruggeri, G., Pozzi, G., Di Giannantonio, M., & Janiri, L. (2015). Co-occurrence of alcohol use disorder and behavioral addictions: Relevance of impulsivity and craving. *Drug and Alcohol Dependence, 148*, 118–125. https://doi.org/10.1016/j.drugalcdep.2014.12.028
D'Arienzo, M., C.,, Boursier, V., & Griffiths, M. D. (2019). Addiction to social media and attachment styles: a systematic literature review. International Journal of Mental Health and Addiction, 17(4), 1094-1118. doi: 10.1007/s11469-019-00082-5.
Efrati, Y. (2023). Risk and protective factor profiles predict addictive behavior among adolescents. *Comprehensive Psychiatry, 123*. https://doi.org/10.1016/j.comppsych.2023.152387
Efrati, Y., & Spada, M. M. (2022). Self-perceived substance and behavioral addictions among Jewish Israeli adolescents during the COVID-19 Pandemic. *Addictive Behaviors Report, 15*. https://doi.org/10.1016/j.abrep.2022.100431
Efrati, Y., Kolubinski, D. C., Marino, C., & Spada, M. M. (2021). Modelling the contribution of metacognitions, impulsiveness, and thought suppression to behavioural addictions in adolescents. *International Journal of Environmental Research and Public Health, 18*(7), 3820. https://doi.org/10.3390/ijerph18073820
Efrati, Y., Demetrovics, Z., Horváth, Z., Griffiths, M. D., Potenza, M. N., Blum, K., Czakó, A., & Kotyuk, E. (2025). *Seeking satisfaction: The roles of gratification, compensation, reward deficiency syndrome, and compulsivity in relation to addictive behaviors in Israeli young adults*. Submitted for publication.
Estévez, A., Macía, L., Momene, J., & Etxaburu, N. (2022). Attachment and behavioral addictions. In *Handbook of Substance Misuse and Addictions: From Biology to Public Health* (pp. 1–21). Cham: Springer International Publishing.
Etxaburu, N., Momeñe, J., Herrero, M., Chávez-Vera, M. D., Olave, L., Iruarrizaga, I., & Estévez, A. (2024). Buying-shopping disorder, impulsivity, emotional dependence and attachment in adolescents. *Current Psychology, 43*(2), 1507–1518. https://doi.org/10.1007/s12144-023-04425-3
Ferris, J., & Wynne, H. (2001). The Canadian problem gambling index: Final report. Canadian Centre on. *Substance Abuse*.
Figee, M., Pattij, T., Willuhn, I., Luigjes, J., van den Brink, W., Goudriaan, A., Potenza, M. N., Robbins, T. W., & Denys, D. (2016). Compulsivity in obsessive–compulsive disorder and addictions. *European Neuropsychopharmacology, 26*(5), 856–868. https://doi.org/10.1016/j.euroneuro.2015.12.003
Fineberg, N. A., Sharma, P., Sivakumaran, T., Sahakian, B., & Chamberlain, S. (2014). Does obsessive-compulsive personality disorder belong within the obsessive-compulsive spectrum? *CNS Spectrums, 12*(6), 467–482. https://doi.org/10.1017/S1092852900015340
Fineberg, N. A., Day, G. A., de Koenigswarter, N., Reghunandanan, S., Kolli, S., Jefferies-Sewell, K., & Laws, K. R. (2015). The neuropsychology of obsessive-compulsive personality disorder: A new analysis. *CNS spectrums, 20*(5), 490–499.
Gadelkarim, W., Shahper, S., Reid, J., Wikramanayake, M., Kaur, S., Kolli, S., & Fineberg, N. A. (2019). Overlap of obsessive–compulsive personality disorder and autism spectrum disorder traits among OCD outpatients: An exploratory study. *International Journal of Psychiatry in Clinical Practice, 23*(4), 297–306.
Gavriel-Fried, B., Delfabbro, P., Ricijas, N., Dodig Hundric, D., & Derevensky, J. L. (2023). Cross-national comparisons of the prevalence of gambling, problem gambling in young people and the role of accessibility in higher risk gambling: A study of Australia, Canada. *Croatia and Israel. Current Psychology, 42*(9), 6990–7001. https://doi.org/10.1007/s12144-021-02017-7
Gecaite-Stonciene, J., Fineberg, N. A., Podlipskyte, A., Neverauskas, J., Juskiene, A., Mickuviene, N., & Burkauskas, J. (2020). Mental fatigue, but not other fatigue characteristics, as a candidate feature of obsessive compulsive personality disorder in patients with anxiety and mood disorders—An exploratory study. *International journal of environmental research and public health, 17*(21), 8132.
Gervasi, A. M., La Marca, L., Costanzo, A., et al. (2017). Personality and Internet Gaming Disorder: A Systematic Review of Recent Literature. *Current Addiction Reports, 4*, 293–307. https://doi.org/10.1007/s40429-017-0159-6
Ghinassi, S., & Casale, S. (2023). The role of attachment in gambling behaviors and gambling disorder: A systematic review. *Journal of Gambling Studies, 39*(2), 713–749. https://doi.org/10.1007/s10899-022-10163-1
Grajewski, P., & Dragan, M. (2020). Adverse childhood experiences, dissociation, and anxious attachment style as risk factors of gaming disorder. *Addictive Behaviors Reports, 11*, Article 100269. https://doi.org/10.1016/j.abrep.2020.100269
Grant, J. E., Brewer, J. A., & Potenza, M. N. (2006). The neurobiology of substance and behavioral addictions. *CNS Spectrums, 11*(12), 924–930.
Grant, J. E., Mancebo, M. C., Pinto, A., Eisen, J. L., & Rasmussen, S. A. (2006). Impulse control disorders in adults with obsessive compulsive disorder. *Journal of Psychiatric Research, 40*(6), 494–501. https://doi.org/10.1016/j.jpsychires.2005.11.005
Hollander, E. (1993). Obsessive-compulsive spectrum disorders: An overview. *Psychiatric Annals, 23*(7), 355–358. https://doi.org/10.3928/0048-5713-19930701-05
Hollander, E., & Wong, C. M. (1995). Obsessive-compulsive spectrum disorders. *Journal of Clinical Psychiatry, 56*(Suppl 4), 3–6. http://www.ncbi.nlm.nih.gov/pubmed/7713863.
Lt, Hu., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*, 1–55.
Kotyuk, E., Magi, A., Eisinger, A., Király, O., Vereczkei, A., Barta, C., Griffiths, M. D., Székely, A., Kökönyei, G., Farkas, J., Kun, B., Badgaiyan, R. D., Urbán, R., Blum, K., & Demetrovics, Z. (2020). Co-occurrences of substance use and other potentially addictive behaviors: Epidemiological results from the Psychological and Genetic Factors of the Addictive Behaviors (PGA) Study. *Journal of Behavioral Addictions, 9*(2), 272–288. https://doi.org/10.1556/2006.2020.00033
Kótyuk, E., Urbán, R., Hende, B., Richman, M., Magi, A., Király, O., Barta, C., Griffiths, M. D., Potenza, M. N., Badgaiyan, R. D., Blum, K., & Demetrovics, Z. (2022). Development and validation of the Reward Deficiency Syndrome Questionnaire (RDSQ-29). *Journal of Psychopharmacology, 36*(3), 409–422. https://doi.org/10.1177/02698811211069102
Lee, R. S. C., Hoppenbrouwers, S., & Franken, I. (2019). A systematic meta-review of impulsivity and compulsivity in addictive behaviors. *Neuropsychology Review, 29*(1), 14–26. https://doi.org/10.1007/s11065-019-09402-x
Leeman, R. F., & Potenza, M. N. (2013). A targeted review of the neurobiology and genetics of behavioural addictions: An emerging area of research. *Canadian Journal of Psychiatry, 58*(5), 260–273. https://doi.org/10.1177/070674371305800503
Mancinelli, E., Liberska, H. D., Li, J. B., Espada, J. P., Delvecchio, E., Mazzeschi, C., & Salcuni, S. (2021). A cross-cultural study on attachment and adjustment difficulties in adolescence: The mediating role of self-control in Italy, Spain, China, and Poland. *International Journal of Environmental Research and Public Health, 18*(16), 8827.
McLaughlin, T., Blum, K., Steinberg, B., Modestino, E. J., Fried, L., Baron, D., Siwicki, D., Braverman, E. R., & Badgaiyan, R. D. (2018). Pro-dopamine regulator, KB220Z, attenuates hoarding and shopping behavior in a female, diagnosed with SUD and ADHD. *Journal of behavioral addictions, 7*(1), 192–203. https://doi.org/10.1556/2006.6.2017.081
Mikulincer, M., & Florian, V. (2000). Exploring individual differences in reactions to mortality salience: Does attachment style regulate terror management mechanisms? *Journal of Personality and Social Psychology, 79*(2), 260–273. https://doi.org/10.1037/0022-3514.79.2.260
Petry, N. M., Rehbein, F., Gentile, D. A., Lemmens, J. S., Rumpf, H. J., Mößle, T., Bischof, G., Tao, R., Fung, D. S., Borges, G., Auriacombe, M., González Ibáñez, A., Tam, P., & O'Brien, C. P. (2014). An international consensus for assessing internet gaming disorder using the new DSM-5 approach. *Addiction (Abingdon, England), 109*(9), 1399–1406. https://doi.org/10.1111/add.12457
Pontes, H. M., & Griffiths, M. D. (2015). Measuring DSM-5 internet gaming disorder: Development and validation of a short psychometric scale. *Computers in Human Behavior, 45*, 137–143. https://doi.org/10.1016/j.chb.2014.12.006
Ream, G. L., Elliott, L. C., & Dunlap, E. (2011). Patterns of and motivations for concurrent use of video games and substances. *International Journal of Environmental Research and Public Health, 8*(10), 3999–4012. https://doi.org/10.3390/ijerph8103999
Ridgway, N., M.,, Kukar-Kinney, M., & Monroe, K., B. (2008). An expanded conceptualization and a new measure of compulsive buying. Journal of Consumer Research, 35(4), 622-639. doi: 10.1086/591108.
Schmitt, T. A. (2011). Current Methodological Considerations in Exploratory and Confirmatory Factor Analysis. *Journal of Psychoeducational Assessment, 29*(4), 304–321. https://doi.org/10.1177/0734282911406653
Tang, K. T. Y., Hodgins, D. C., & Schluter, M. G. (2024). Attachment, emotion dysregulation, and video game play: Testing the mediating role of emotion dysregulation in gaming disorder. *International Journal of Mental Health and Addiction, 22*(3), 1063–1077. https://doi.org/10.1007/s11469-022-00913-y
Teng, Z., Griffiths, M. D., Nie, Q., Xiang, G., & Guo, C. (2020). Parent–adolescent attachment and peer attachment associated with internet gaming disorder: A longitudinal study of first-year undergraduate students. *Journal of Behavioral Addictions, 9*(1), 116–128. https://doi.org/10.1556/2006.2020.00011
Topino, E., Cacioppo, M., & Gori, A. (2022). The relationship between attachment styles and compulsive online shopping: The mediating roles of family functioning patterns. *International Journal of Environmental Research and Public Health, 19*(13), 8162. https://doi.org/10.3390/ijerph19138162

van den Eijnden, R. J. J. M., Lemmens, J. S., & Valkenburg, P. M. (2016). The Social Media Disorder Scale. *Computers in Human Behavior, 61*, 478–487. https://doi.org/10.1016/j.chb.2016.03.038

Walther, B., Morgenstern, M., & Hanewinkel, R. (2012). Co-occurrence of addictive behaviours: Personality factors related to substance use, gambling and computer gaming. *European Addiction Research, 18*(4), 167–174. https://doi.org/10.1159/000335662

Weinstein, A., Maraz, A., Griffiths, M. D., Lejoyeux, M., & Demetrovics, Z. (2016). In *Compulsive buying—features and characteristics of addiction* (pp. 993–1007). Academic Press.

Wild, D., Grove, A., Martin, M., Eremenco, S., McElroy, S., Verjee-Lorenz, A., & Erikson, P. (2005). Principles of good practice for the translation and cultural adaptation process for Patient-Reported Outcomes (PRO) measures: Report of the ISPOR task force for translation and cultural adaptation. *Value in Health, 8*, 94–104. https://doi.org/10.1111/j.1524-4733.2005.04054.x