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ORIGINAL RESEARCH

Seeking Satisfaction Among Israeli Young Adults: The Roles of Gratification, Compensation, Reward Deficiency Syndrome, and Compulsivity in Relation to Addictive Behaviors

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Background and Aims: Behavioral addictions, such as problematic use of social media, gaming disorder, gambling disorder, and compulsive buying-shopping disorder, are increasingly common among young adults worldwide. The aim of the present study was to identify distinctive factors of these behavioral addictions, focusing on gratification and compensation, reward deficiency syndrome, and compulsivity among young adults.

Methods: The sample comprised 1459 Jewish Israeli young adults from the general community (36% male, 64% female; aged 19–27 years). Participants were surveyed regarding general and compulsive/problematic engagement in shopping, online gaming, gambling, and social media use. The study also assessed gratification and compensation specific to each behavior, as well as reward deficiency syndrome and compulsivity.

Results: Network analysis of behavioral addiction measures identified three key factors related to buying-shopping, online gaming, and combined gambling and use of social media, with problematic engagement implicated. Gambling disorder acted as an important bridge, connecting different sub-networks and facilitating communication and information flow between them. Subsequently, using structural equation modeling, a higher need for gratification and compensation and more severe reward deficiencies were associated with greater severity across all four addictive behaviors. In contrast, compulsivity was inversely associated with the factor combining gambling and use of social media.

Conclusion: The present study highlights the complex relationship between gratification, reward deficiency, and compulsivity in young adults' addictive behaviors. It suggests a need for interventions that specifically address gratification and compensation, raising the possibility that a targeted approach could potentially mitigate the severity of multiple addictive behaviors.

Keywords: behavioral addictions, network analysis, gratification, compensation, young adults

Highlights

Gratification and compensation relate to behavioral addiction severity.

Gambling disorder serves a critical bridge in the network analysis.

Reward deficiency is associated with to more severe addictive behaviors.

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Behavioral addictions are recognized as distinct and clinically significant disorders that manifest through notable distress or disruptions in personal functioning.[1] These conditions involve persistent engagement in rewarding behaviors despite adverse consequences, akin to substance use in substance use disorders.[2] Previous studies have emphasized the significance of concurrently investigating various behavioral addictions alongside personality, psychological, and cognitive attributes.[3–6] Regarding addictive behaviors, the experiences of gratification and compensation resulting from the specific behavior have been proposed as reinforcing processes involved in the development and maintenance of addictive behaviors.[7–9] To date, studies on addictive behaviors have separately explored gratification[10,11] and compensation.[12] Therefore, the present study investigated both compensation and gratification within four specific potential behavioral addictions involving gaming, social media, buying-shopping, and gambling, while also examining potential roles for reward deficiency syndrome and compulsivity.

Behavioral Addictions

Associations between problematic use of digital technologies and psychological distress, health complications, and impaired functioning have been reported.[4,5,13–17] Baggio et al[14] applied network analysis to examine problematic online behaviors and reported separate constructs with minimal overlap, including online gaming, cyberchondria (ie, when searching the internet for medical information leading to psychological distress and interference in functioning), problematic online gambling, problematic cybersex, problematic online shopping, and problematic use of social media (PUSM). These findings suggest that 'internet addiction' may not encompass all problematic online behaviors and each specific activity warrants consideration.[5,18] Technology-related addictive behaviors, such as PUSM, internet gaming disorder (IGD), gambling disorder (GD) and compulsive buying-shopping disorder (CBSD), may be considered as a spectrum of interconnected yet distinct disorders, potentially influenced by shared and unique underlying factors.[19–22]

In the digital era, online gaming has gained increased popularity as a leisure activity.[23] However, its widespread adoption has also led, for example, to the disruption of individuals' psychological and social well-being.[24,25] The increasing empirical research examining IGD led to its inclusion as a "condition for further study" in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* [DSM-5].[26] More recently, gaming disorder was officially included in the 11th revision of the *International Classification of Diseases*.[2] Gaming disorder/IGD is characterized by enduring patterns of gaming behavior where an individual exhibits impaired control over gaming, places a higher priority on gaming than other life activities, and persists in gaming despite experiencing adverse consequences over a period exceeding 12 months.[2,26] Other behavioral addictions may be diagnosed as "other specified disorders due to addictive behaviors".[20]

PUSM is characterized by interfering patterns of engagement with online networking platforms (eg, *Facebook, Instagram*). Such use negatively impacts personal, social, occupational and/or educational activities, often generating significant impairment and psychological distress.[27,28] While social media platforms serve crucial roles in information sharing and network building without spatial or temporal limits,[29,30] excessive use or misuse may pose significant risks to mental and physical health, especially among adolescents and young adults.[30,31]

GD is categorized as a behavioral addiction and is classified within the section of substance-related and addictive disorders in the DSM-5.[26] It is defined by impaired control over gambling activities, continued gambling despite adverse consequences, and a preoccupation with gambling that results in harm to the affected individual and those around them. Similarities between gambling and substance use disorders exist in diagnostic features, clinical aspects, neurobiological characteristics, and prevention and treatment approaches.[32]

Poorly regulated and disordered use of online shopping platforms has been recognized as a problematic internet-related activity.[4] It is important to note that neither shopping nor buying are classified as the focus of mental health disorders in the ICD-11. Instead, CBSD is cited as an example under "other specific impulse control disorders" in the ICD-11, without distinguishing between online and offline shopping, and "other specified disorders due to addictive behaviors" have also been applied to CBSD.[20] Consequently, the present study employed the term CBSD to specifically refer to problematic online shopping/buying within a clinical context.[1,9]

Reward Deficiency Syndrome

Reward deficiency syndrome (RDS), first proposed and subsequently updated by Blum et al,[33–35] conceptualizes the shared biological underpinnings and psychological factors of various disorders, including addictive, impulsive, and compulsive behaviors, as well as personality disorders. The model suggests that RDS may arise from a combination of environmental stressors, specific genetic variations, and molecular changes resulting from prolonged substance use or habitual behavior. According to the model, such changes can lead to a deficiency in reward mechanisms, leading individuals to seek behaviors that stimulate reward pathways, proposed to involve dopaminergic mechanisms and pre-addiction.

The behaviors associated with RDS include substance use and other potentially addictive or risk-taking behaviors. Building upon the RDS model and its proposed biological correlates, its psychological manifestations may include anhedonia, restlessness, a proclivity for seeking novel experiences and adventures, and a heightened need for stimulation due to the perceived insufficiency of 'normal' rewards. Although the RDS exhibits some conceptual overlap with specific psychological constructs such as impulsivity and sensation-seeking, it exhibits distinct characteristics related to reward and dissatisfaction. Consequently, young adults displaying severe reward deficiencies may be predisposed to behavioral addiction.[36] This perspective suggests the importance of considering both psychological factors and biological mechanisms in understanding and addressing addictive behaviors.

The Experience of Compensation and Gratification

The experience of compensation and gratification may serve as a key factor underlying the development of behavioral addictions. Aligned with the 'self-medication' theory,[37] one core (and repeatedly documented) component of behavioral addictions is the motivation to escape to addictive behaviors for purposes of compensation and gratification in the hope of alleviating negative emotions.[38] In other words, individuals might turn to addictive behaviors (which result in experiences of compensation and gratification) not only because of risky decision-making but also because they are seeking ways to alleviate difficult emotions.

One contemporary model that addresses addictive behaviors is the Interaction of Person-Affect-Cognition-Execution (I-PACE) model.[7,8] In the I-PACE model, interactions among predisposing variables, affective and cognitive responses to stimuli, executive functioning, and inhibitory control are considered. These interactions ultimately lead to engagement in addictive behavior and the experiencing of compensation and gratification. The repetitive cycle of such reinforcing processes may lead to diminished control and addictive engagement. The negative and positive reinforcement mechanisms important to the addiction process encompass experiences of compensation and gratification when using online applications.[11,39] The experience of gratification can be seen as the outcome of fulfilling fundamental psychological needs, such as competence, autonomy, and social belonging, as well as hedonistic aspects in accordance with self-determination theory.[40]

The Uses and Gratifications Theory (UGT);[41,42] originally developed in the field of media psychology, has more recently been applied to online behaviors such as use of social media.[43] Here, individuals select online activities that align with their experience of gratification. These activities, primarily centered around entertainment, information-seeking, and social interactions, lead to repeated use. The UGT contends that gratification is not a one-size-fits-all solution but varies depending on specific media used to meet distinct needs. Consistent with this perspective, Müller and Wölfling[44] emphasized that problematic use of online applications can stem from a combination of subjective stress, maladaptive coping, and particular motivational factors influenced by both negative and positive reinforcement mechanisms. These findings illustrate that during the development of problematic or addictive use, individuals may learn over time that specific applications may alleviate negative emotions, especially when encountering situations in which their needs are unmet or they experience stress.[45]

Considering the aforementioned theories, the present study aimed to identify distinct patterns of IGD, CBSD, PUSM, and GD. Rather than treating these behaviors as fixed diagnostic categories, the study first sought to empirically uncover how symptoms of these four behaviors cluster and relate to one another, reflecting how they are experienced in real life. This step allowed the identification of core and peripheral features of each condition,

offering a more grounded basis for examining psychological predictors. The study then investigated whether individual differences in the need for gratification and compensation, reward deficiency features, and compulsivity could account for variation in these empirically derived patterns of addictive behaviors. In line with theoretical models, it was hypothesized that gratification and compensation, RDS, and compulsivity would each contribute to the severity of these behaviors in distinct and behavior-specific ways. This approach allowed the linking of theoretical frameworks with lived behavioral expressions, clarifying how different psychological needs may drive different forms of behavioral addiction.

Methods

Participants

The sample comprised 1459 young Jewish-Israeli adults from the general community, including 527 males (36%), 922 females (64%), and 10 who did not specify their gender. Participants were aged between 19 and 27 years (M = 23.71 years, SD = 3.34). Most were native Israelis (93%), and 87% reported that Hebrew was their native language. Regarding socioeconomic status, 0.9% described their status as 'very bad', 7.2% as 'bad', 66% as 'good', and 26% as 'very good'. Moreover, 46% reported that they were religious individuals, and 54% reported they were secular individuals.

Initially, the normal distribution of all key study measures was confirmed using a series of Anderson-Darling normality tests. The identification of multivariate outliers was conducted using the minimum covariance determinant method, facilitated by the Routliers R package. The results indicated significant deviations from normality for all measures (all p-values < 5.58^-5 or lower), with data from 337 participants identified as multivariate outliers. Consequently, non-parametric bootstrap statistics were employed to compute standard errors in the primary analyses. Additionally, 8.87% of the data were missing, exhibiting 573 distinct patterns of missingness. The character of the missing data was assessed through Jamshidian and Jalal's non-parametric Missing Completely At Random (MCAR) test. This test indicated that the data were missing at random (MAR), showing a T_{median} of 15.19 and a p_{median} of.117. Consequently, the missing data were managed using the full information maximum likelihood (FIML) approach.

Measures

Sociodemographic Variables

Participants disclosed their sociodemographic details such as age, biological sex (female or male), level of religiosity (religious or secular), country of origin (native-born Israeli or immigrant), and socioeconomic status (SES). Socioeconomic status was self-reported and classified into four categories: "very good", "good", "bad", or 'very bad'.

Reward Deficiency Syndrome Questionnaire (RDSQ-29)

The twenty-nine-item RDSQ-29[46] (Hebrew version)[47] was used to assess reward deficiency. The RDSQ-29 was developed using a bifactor model, assuming that RDS is a general, overarching construct or dimension reflected in different behavioral domains. The four domains of the questionnaire are lack of sexual satisfaction (three items, eg, "I can never get enough sex"); risk-seeking (five items, eg, "I am stimulated by extreme sports"); activity (five items, eg, "Inactivity bothers me"); and, social concerns (two items, eg, "My lifestyle concerns my friends and family"). These domains and the 14 additional items (eg, "Being constantly active is important to me") define RDS in the RDSQ. Items are rated on a four-point scale ranging from 1 (totally disagree) to 4 (totally agree). Higher scores indicate greater severity of RDS. In the present study, Cronbach's alpha values were.90.

Compulsive Personality Assessment Scale (CPAS)

The eight-item CPAS[48] (Hebrew version)[49] was utilized to evaluate compulsive behaviors, specifically the excessive focus on details, rules, or schedules that can undermine the primary objective of an activity. Items (eg, "Would you describe yourself as over-conscientious and inflexible about matters of morality, ethics or values?") are rated on a five-point scale ranging from 0 (not at all characteristic of me) to 4 (entirely characteristic of me). Higher scores indicate greater severity of compulsivity. In the present study, the Cronbach's alpha was.63.

Experience of Compensation Scale (ECS) and Gratification Scale (EGS)

The 6-item EGS and 6-item ECS[9] were used to assess the experiences of compensation and gratification, respectively. Each scale has a two-factor structure: the EGS assesses the gratification of needs (eg, "While playing, I feel close to others") and the experience of pleasure (eg, "While playing, I feel good"), whereas the ECS assesses the compensation of needs (eg, "While playing, I feel less unsuccessful") and relief from negative emotions (eg, "While playing, I feel less insecure") are rated on a five-point scale ranging from 0 (never) to 4 (very often). Higher scores indicate higher needs for gratification and compensation. These scales were applied to four specific behaviors: gaming, social media use, gambling, and shopping. In the present study, the Cronbach's alphas for the ECS were .93 for gaming, 0.90 for social media use, 0.95 for gambling, and .93 for shopping. For the EGS, they were.93 for gaming, 0.88 for social media use, 0.96 for gambling, and.89 for shopping.

Internet Gaming Disorder Scale-Short Form (IGDS9-SF;)

The IGDS9-SF was used to assess IGD[50] (Hebrew version)[51] and is based on the DSM-5 criteria for IGD. Items (eg, "Do you play in order to temporarily escape or relieve a negative mood [eg, helplessness, guilt, anxiety]?") are rated on a five-point scale from 1 (never) to 5 (very often), with a cut-off of 36 used to indicate potential IGD. Higher scores indicate greater severity of IGD symptoms. In the present study, Cronbach's alpha was.94.

Problematic Social Media Disorder Scale (PSMDS)

The nine-item PSMDS[52] (Hebrew version)[3,51] was used to assess PUSM, with the criteria based on the DSM-5 IGD criteria adapted to social media use. Items (eg, "During the past year, have you tried to spend less time on social media but failed?") are rated on a five-point scale from 1 (never) to 5 (very often). Higher scores indicate greater severity of PUSM. In the current study Cronbach's alpha was.92.

Richmond Compulsive Buying Scale (RCBS)

The six-item RCBS[53] was used to assess compulsive buying. The scale has two subscales (impulsive buying and obsessive–compulsive buying) and items (eg, "I buy things I don't need") are rated on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree) for the four items and 1 (never) to 7 (very often) for two items. Scores of 25 or higher indicate compulsive buying behavior. In the present study, the Cronbach's alpha was.78 for the impulsive buying subscale, and.80 for the obsessive–compulsive buying subscale.

Problem Gambling Severity Index (PGSI;)

The nine-item PGSI[54] (Hebrew version)[55] was used to assess problem gambling. Items (eg, "Have you bet more than you could really afford to lose?") are rated on a scale from 0 (never) to 3 (almost always). Risk categories were determined using established thresholds: 8–27 indicates problem gambling; 3–7 indicates moderate-risk gambling; 1–2 indicates low-risk gambling; and a score of 0 indicates non-problem gambling. In the present study, Cronbach's alpha was 0.95.

Procedure

Participation was open to Jewish young adults aged 18 years and older, irrespective of their religious affiliation, level of religiosity, or geographic location within Israel. The study specifically focused on examining engagement in potentially addictive behaviors within this demographic. Participants were drawn from a non-clinical community-based sample, aged between 19 and 27 years, with the study excluding individuals with a known clinical psychiatric diagnosis. The age range and population were selected based on prior research identifying them as representative of emerging adulthood—a developmental period marked by increased autonomy, identity exploration, and susceptibility to behavioral dysregulation. By focusing on this group, the study aimed to capture a nuanced understanding of addictive behavior patterns in a formative and transitional life stage.[56,57]

Recruitment was conducted through bulletin board postings on online forums, where potential participants were informed that the study focused on investigating behavioral addictions among young adults. Those agreeing to participate provided informed consent. For confidentiality, participants were instructed to fill out the survey in a secluded area at home. The survey took an average of 24 minutes to complete, and all questions were presented in Hebrew, accommodating the primary language of most Israeli participants. The research received approval from the institutional review board

(IRB) at Bar-Ilan university (the first author's affiliation) and complied with the Declaration of Helsinki. Upon completing the online survey, participants were digitally briefed on the study's aims and thanked for their participation.

Data Analysis

Descriptive analysis was first conducted on all measures of addictive behaviors, including both frequency and problematic shopping, gambling, online gaming, and use of social media. The Extended Bayesian Information Criterion (EBIC) with Graphical Lasso was used to estimate the polychoric (two ordinal measures), polyserial (a mix of ordinal and continuous measures), and Pearson (two continuous measures) correlation matrices. This estimation was executed using the estimate Network function from the bootnet R package. The resulting network was important for identifying the factorial structure underlying the addictive behaviors scales. Without understanding this structure, subsequent analyses, such as structural equation modeling (SEM), could be biased.

The latent structure of the network was analyzed using the EGAnet R package and the EGA() function, which also facilitated the identification of variable centrality within the network [using the bootEGA() function]. Centrality consists of various metrics that assess each node's (ie, variable's) role within the network. The centrality metrics evaluated included: (i) closeness – This metric measures the rapidity with which information travels from a specific node to other reachable nodes in the network, calculated as the inverse of the sum of all distances from that node to others; (ii) betweenness – This metric quantifies how often a node acts as a connector along the shortest paths between two other nodes, highlighting its influence on the flow of the network, including those not heavily connected; (iii) strength – In network analysis, strength centrality is the total of the weights of the edges connected to a node, crucial for assessing a node's impact in weighted networks; and (iv) expected influence – This measure, used in weighted, directed networks, assesses a node's influence by summing the weights of the outgoing edges and subtracting the weights of the incoming edges, thus providing an in-depth view of a node's centrality with regard to the directionality of relationships.

The network stability was appraised using bootstrapped estimations of the centrality measures (ie, to what extent the centrality indices of the variables remain constant in different subsamples), the factorial construct (ie, to what extent the number of factors changed in different subsamples), and variable stability (ie, to what extent variables switched factors in different subsamples). The first analysis was conducted with the bootnet R package, and the latter two analyses were conducted with the EGAnet R package.

Next, the hypothesis that gratification and compensation of addictive behaviors would be strong statistical predictors was tested using structural equation modeling (SEM). In this model, the outcome measures were the latent factors of addictive behaviors, as shown through the network analysis, which helped capture the true latent structure of these behaviors. More specifically, the latent factors identified involved general and compulsive/problematic: (i) shopping and buying (comprising measures of shopping prevalence, OCD-related shopping, and impulsive buying); (ii) gaming (comprising measures of online gaming prevalence and IGD); and (iii) gambling and use of social media use (comprising measures of gambling prevalence and use of social media, GD, and PUSM).

The use of the network analysis to reflect the latent structure of these behaviors helped to ensure that the SEM was appropriately specified, therefore reducing potential biases in estimating the relationships between gratification, compensation, and addictive behaviors. The statistical predictors were the latent factors of gratification and compensation (comprising the eight measures of gratification and compensation; the measures of gratification and compensation were loaded onto a single latent factor because of the high correlations between the measures), RDS (lack of sexual satisfaction, activity, social concern, risk-seeking), and the exogenous variable of compulsivity. The model also included the covariates of sex, age, socioeconomic status, and religiosity. Significance was determined using bias-corrected bootstrap confidence intervals. Model fit was estimated by the chi-square goodness-of-fit test, comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA) indices. CFI and TLI >0.95 and RMSEA <0.08 indicated an excellent fit to the observed data.

Results

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

Table 1 Descriptive Statistics of the Occurrence of Online Gaming, Use of Social Media, Gambling, and Shopping

	Online Gaming (n=1459) n (%)	Use of Social Media (n=1459) n (%)	Gambling (n=1459) n (%)	Online Shopping (n=1459) n (%)
Never	636 (44%)	93 (6.6%)	1158 (83%)	358 (26%)
Once in the last year	88 (6.1%)	12 (0.9%)	64 (4.6%)	123 (9.0%)
2–6 times in the past year	134 (9.4%)	14 (1.0%)	49 (3.5%)	263 (19%)
7–11 times in the last year	96 (6.7%)	29 (2.1%)	20 (1.4%)	207 (15%)
Once a month	79 (5.5%)	34 (2.4%)	32 (2.3%)	193 (14%)
2–3 times a month	66 (4.6%)	26 (1.9%)	30 (2.1%)	97 (7.1%)
Once in a week	82 (5.7%)	36 (2.6%)	16 (1.1%)	28 (2.0%)
2–3 times in a week	90 (6.3%)	62 (4.4%)	11 (0.8%)	12 (0.9%)
4–5 times in a week	56 (3.9%)	75 (5.3%)	6 (0.4%)	68 (5.0%)
6–7 times in a week	33 (2.3%)	129 (9.2%)	4 (0.3%)	8 (0.6%)
More than 7 times in a week	71 (5.0%)	893 (64%)	7 (0.5%)	10 (0.7%)
Missing	28	56	62	92

Notes: In the study, on the IGDS9-SF scale, 10% of participants (n=143) scored above 36 (out of a possible 45), indicating disordered online gaming. Similarly, on the RCBS scale, 10% (n=133) scored above 25 (out of 42), suggesting compulsive shopping behavior. Regarding gambling behaviors assessed by the PGSI, one individual exhibited non-problem gambling, 87% displayed low-risk problem gambling (n=1031), 3.2% were at moderate risk (n=38), and 10% were categorized as having a gambling problem (n=122). Assessing PUSM proved challenging due to the absence of a defined cutoff in the existing literature; thus, a cutoff was estimated using the mean + 2 x standard deviations, setting the threshold at 41 out of 45. Consequently, 3.9% of the sample (n=54) were identified as having PUSM. Detailed statistics including means, standard deviations, and range for all measures are available in Supplementary Table 1S.

Network Analysis for the Addictive Behaviors Scores

Figure 1 presents the network analysis results, Figure 2 presents the centrality scores, and Supplementary Figure 1 presents the centrality stability. The analysis identified three factors: (i) compulsive buying, (ii) online gaming, and (iii) gambling and use of social media. The 'compulsive buying' factor comprised the measures of the prevalence of shopping (PShop), obsessive-compulsive buying (OCShop), and impulsive buying (ImpShop). The online gaming factor comprised the prevalence of online gaming (Pgame) and IGD. The 'gambling and use of social media factors included the prevalence of gambling (Pgamb) and use of social media (PUSM), as well as PG and SMD. The bootstrapped analyses indicated that the network, factorial construct, and variables showed relatively high stability. More specifically, all centrality scores had stability above 75%, 71.8% of the analyses produced a three-factor solution (95% confidence interval between 2.0 and 4.0), and all variables had stability over 70% (ie, tended not to switch factors in different subsamples).

The network analysis also showed that the most influential variable within the sub-network of (i) 'compulsive buying' was obsessive-compulsive buying, (ii) 'online gaming' was IGD, and (iii) 'gambling and use of social media' was GD. Of note, obsessive-compulsive buying was also the most influential variable in the entire network. Moreover, GD had the highest scores of betweenness and closeness. This implies that GD acts as a critical bridge connecting different sub-networks, facilitating communication and information flow between them. Additionally, its high closeness score indicated that it is centrally located within the network, allowing it to interact with other variables quickly. In comparison, obsessive-compulsive buying was low on betweenness and closeness, signifying that this sub-network was only lightly related to the other parts of the network.

SEM Models for Predicting Addictive Behaviors

The results of the SEM model are summarized in Figure 3. The model adequately fitted the observed data, $\chi^2_{(319)}$ = 1323.2, p <0.01, CFI =0.96, TLI =0.95, RMSEA =0.07 (90% CI.065, 0.075). The gratification and compensation latent factor robustly statistically predicted the latent factors of compulsive buying (b =0.42, 95% confidence interval [CI] =0.29, 0.58, β =0.49), online gaming (b =0.94, 95% CI =0.71, 1.19, β =0.54), and gambling and use of social media (b =

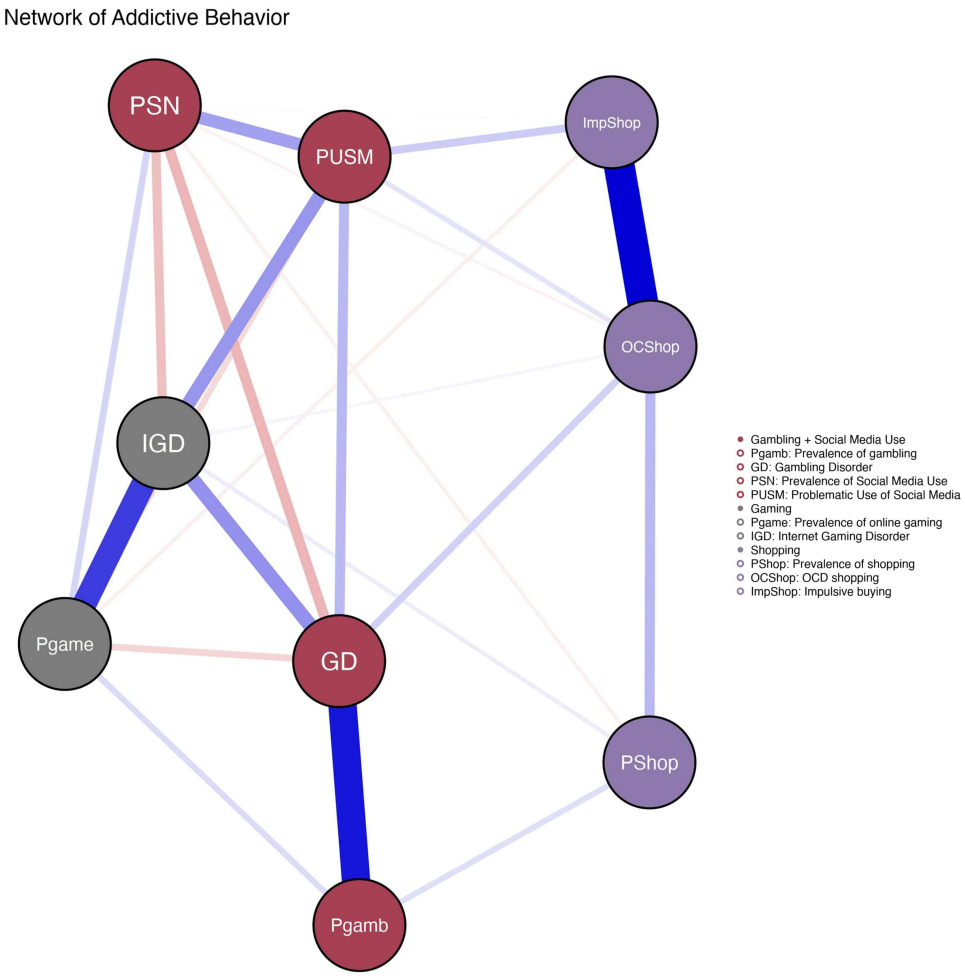

Figure 1 Network analysis of addictive behaviors measures. Blue edges (ie, paths) reflect positive associations, whereas red edges reflect negative associations. The edges' brightness, distance, and width reflect different relative strength indicators. Nodes' colors highlight the detected factors: compulsive buying (purple), online gaming (gray), and gambling and social networks (crimson red).

1.13, 95% CI =0.86, 1.44, β =0.81), such that a higher need for gratification and compensation was associated with more severe addictive behaviors in each instance. Higher RDS also statistically predicted greater severity of each addictive behavior. However, the associations were considerably numerically weaker than those of gratification and compensation (b =0.18, 95% CI =0.06, 0.32, β =0.13 for compulsive buying; b =0.31, 95% CI =0.15, 0.52, β =0.11 for online gaming; and b =0.19, 95% CI =0.04, 0.36, β =0.08 for gambling and use of social media). Regarding compulsivity, the model showed that higher compulsivity was associated with lower gambling and use of social media (b = −0.10, 95% CI = −0.16, −0.05, β = −0.09) and not with the other factors (b =0.01, 95% CI = −0.04, 0.04, β =0.01 for compulsive buying; and b =0.04, 95% CI = −0.03, 0.10, β =0.03 for online gaming).

Regarding covariates, the model only showed significant associations for sex, such that males had more severe online gaming (b =0.23, 95% CI =0.12, 0.37, β =0.11) and gambling and use of social media (b =0.10, 95% CI =0.01, 0.18, β =0.06) than females, and females had more severe compulsive buying (b = −0.20, 95% CI = −0.27, −0.13, β = −0.20) than males. Overall, the model explained 32.5% of the variance in compulsive buying, 35% of the variance in online gaming, and 69.5% of the variance in gambling and use of social media.

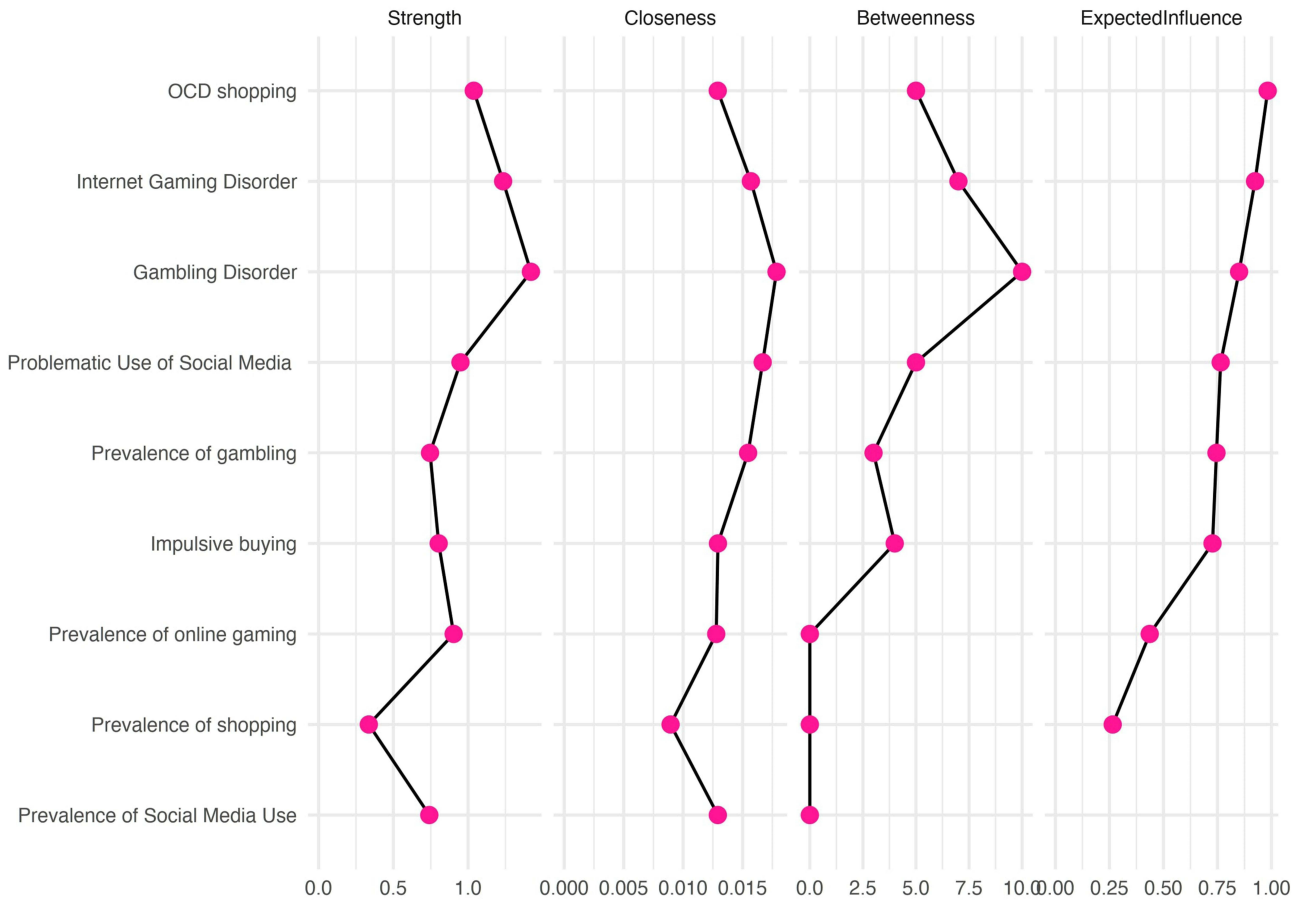

Figure 2 Measures of centrality. The variables in the network are sorted according to their expected influence on the network, with obsessive-compulsive shopping having the most substantial impact on the network and the prevalence of use of social media having the weakest.

Discussion

The present study investigated roles for gratification and compensation, RDS, and compulsivity within behavioral addictions among Israeli young adults. Initially, a network structure was modeled to analyze the factors of four potentially addictive behaviors. Subsequently, SEM was used to examine roles for gratification, compensation, RDS, and compulsivity in relation to the four addictive behaviors. Previous research has primarily focused on separate examinations of gratification[10,11] and compensation,[12] with only a few studies investigating both aspects across specific behaviors (ie, gaming, use of social media, buying-shopping, and gambling), and none alongside RDS and compulsivity.

The findings identified three predominant factors: compulsive buying-shopping, online gaming, and combined gambling and use of social media. Network analysis suggested an important role for problematic engagement in each specific domain. Further analysis using SEM showed that a heightened need for gratification and compensation was associated with increased severity across all addictive behaviors, and RDS also statistically predicted increased severity, albeit seemingly less robustly. Interestingly, higher compulsivity was inversely associated with gambling and the use of social media.

The use of social media engagement and gambling emerged as a single factor in the present study. This finding is consistent with earlier research involving 4416 participants that highlighted a closer association between social media use and gambling than with other activities such as gaming and shopping.[58] Similarly, in a longitudinal study of individuals aged 20 to 24 years, problems with gambling were associated with greater use of social media.[59] This association suggests potential risks and behavioral overlaps between gambling and use of social media, perhaps related to devices (eg, smartphones) on which these behaviors are frequently conducted. From a cultural perspective, young adults in Israel frequently experience high levels of social connection through online platforms, driven by communal norms emphasizing

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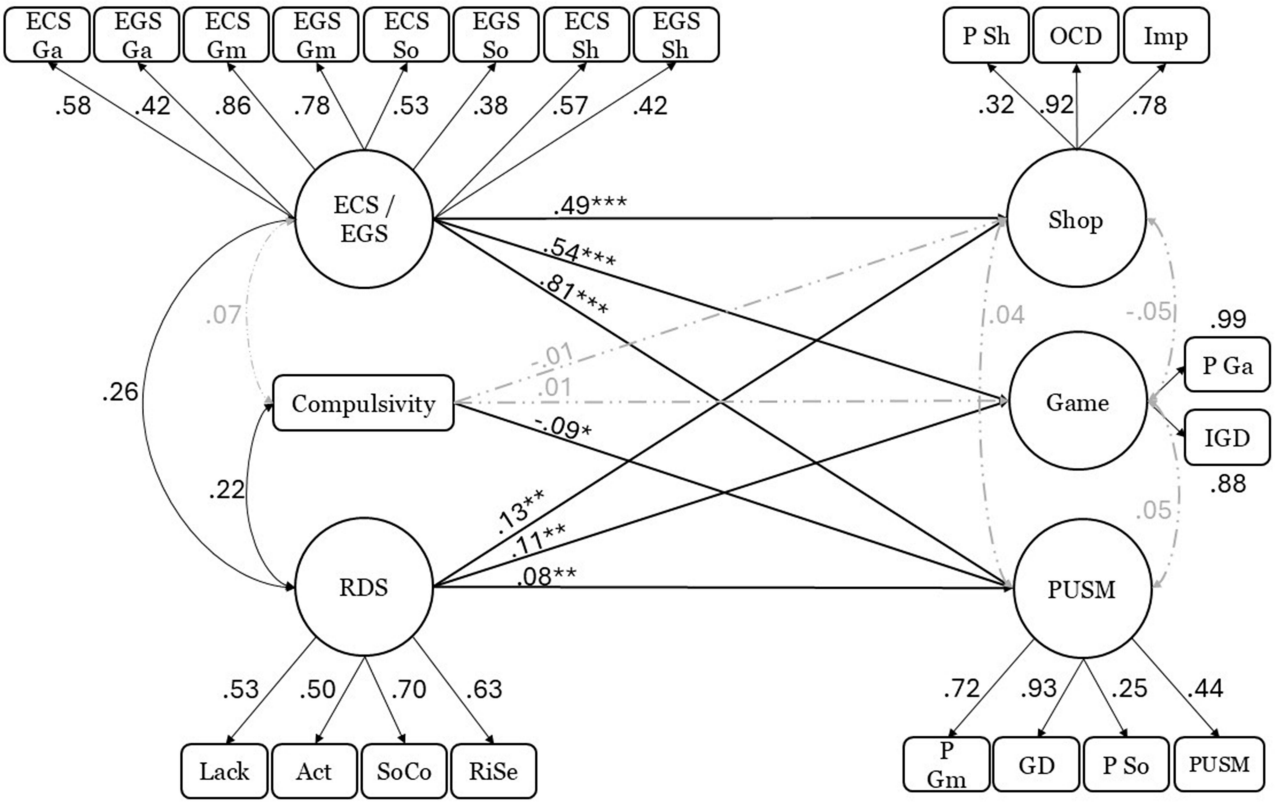

Figure 3 SEM model for predicting addictive behaviors by gratification (EGS) and compensation (ECS), compulsivity, and reward deficiency syndrome (RDS). Solid black lines = significant paths. Dotted gray lines = non-significant paths. *p <0.05, **p <0.01, ***p <0.001.

Abbreviations: Ga, online gaming; Gm, gambling; GD, Gambling Disorder; So, Social Networks; Sh, shopping/buying; OCD, Obsession-compulsion; Imp, Impulsivity; P, Prevalence; Lack, Lack of sexual satisfaction; Act, Activity; SoCo, Social concern; RiSe, Risk seeking; PUSM, Social Media Disorder.

continuous connectivity and peer interactions. Simultaneously, gambling among young adults is increasingly perceived as a socially acceptable recreational activity and a means of social networking, which may further explain the observed overlap between social media use and gambling. Additionally, military service in Israel is mandatory and often characterized by intense social environments and heightened stress. This may further elevate reliance on easily accessible online platforms, amplifying the integration of these behaviors into everyday life. Collectively, these culturally embedded dynamics contribute to the convergence of social media use and gambling into a distinct behavioral pattern among Israeli young adults.

The present study suggested a central role for GD in connecting various sub-networks, facilitating enhanced communication and information flow across these networks. This role may stem from shared psychological pathways, such as thrill-seeking and risk-taking, common to gambling and other addictive behaviors, such as PUSM or IGD.[13]

Gratification and compensation robustly statistically predicted the latent factors of compulsive buying, online gaming, and gambling and use of social media. More specifically, a higher need for gratification and compensation was associated with increased severity of all addictive behaviors. These findings support research that has associated gratification and compensation with a greater severity of addictive behaviors.[10–12] For instance, a recent study involving 439 Germans who play videogames demonstrated that the combined experience of gratification and compensation contributed to reward/relief, physiological responses, and obsessive craving among both casual and at-risk gaming groups.[60]

The present study's results also indicated that higher levels of RDS significantly predicted greater severity across all addictive behaviors, although the associations were notably weaker compared to those involving gratification and compensation. This finding aligns with prior research suggesting that RDS is associated with addictive behaviors.[61,62] One plausible explanation is that RDS may moderate relationships with sensation-seeking and impulsivity,[46] both of which have been implicated in addictive behaviors.[63,64] The seemingly weaker relationship involving RDS compared to

those involving gratification and compensation may be attributed to the context of the present study, which focused on online addictive behaviors.[4,5,14] In such environments, negative coping strategies with regard to everyday reality may manifest as forms of escape through compensation or satisfaction. This finding is particularly relevant because the present study's sample comprised young adults who were not part of a clinical population, possibly indicating different interaction dynamics between these factors. Future studies should explore how compensation and satisfaction compare to RDS among individuals from clinical populations. Such an exploration could help clarify the specific roles that these factors play in different contexts and populations, enhancing the understanding of their mechanisms in addiction.

Regarding compulsivity, the model unexpectedly showed that higher levels of compulsivity were associated with lower involvement in the domain of gambling and use of social media. Previous research has indicated that among behavioral addictions, GD may uniquely show elevated levels of both impulsiveness and compulsivity as symptom severity increases.[65] Traditionally viewed as an impulse-control disorder due to its strong association with impulsivity, GD's classification has evolved. Further examination of impulsivity relative to addictive and compulsive behaviors seems warranted.

Aside from RDS and compulsivity, the findings also indicated observed differences related to sex. Males had more severe online gaming, as well as gambling and use of social media, than females, and females had more severe compulsive buying. These findings align with previous research indicating that GD and IGD are more prevalent among males than females[66] and differ from meta-analyses suggesting that PUSM is more prevalent among females, with some notable jurisdictional exceptions where PUSM was more prevalent among males.[67] Additional previous research has also suggested that women report a higher use of social media and a greater tendency toward developing PUSM,[68] though some studies have found no significant gender differences.[69,70] However, in the present study, perhaps because gambling and social media use were closely associated within the same factor, it was found that males were more likely to have GD[71] and PUSM than females. However, cultural or other factors may also contribute to differences,[67] and these differences warrant additional investigation. As found here, prior studies have also found that females are more likely than males to engage in shopping and develop CBSD.[72]

Overall, the findings of the present study align with the I-PACE model,[7,8,39] which describes the acquisition, development, and maintenance of behavioral addictions. According to this model, engaging in specific behaviors lead to feelings of gratification and compensation. These feelings reinforce the behavior, heightening the likelihood of developing cravings, which may contribute importantly to continued engagement in addictive behaviors, like in substance use disorders.[73]

Limitations

Study limitations warrant mention. The cross-sectional correlational design prevented the determination of causal relationships between study variables. Despite employing network analyses and SEM, the implications for interventions should be interpreted with caution. Additionally, reliance on self-report measures may have introduced response and other biases, particularly in this nonclinical population. The participant pool exclusively comprised Israeli-Jewish young adults, limiting generalizability of the findings. Future research should extend to more diverse ethnic and cultural groups to explore the replicability and generalizability of these results. Finally, despite the statistical significance observed—likely attributable to the large sample size—the actual effect sizes were relatively small. This indicates that the clinical or practical relevance of these associations may be limited. Additional research is required to replicate and extend these findings using varied measures and populations, thereby clarifying their real-world significance and potential utility for intervention development.

Conclusion

Despite its limitations, this study provides novel insights into how experiences of gratification and compensation are associated with addictive behaviors among Israeli young adults. The findings highlight the predictive roles of these motivational factors across diverse addictive behaviors, including PUSM, GD, IGD, and CBSD. Understanding these motivational dynamics may significantly enhance therapists' abilities to support at-risk young adults through person-centered therapeutic approaches, thereby effectively managing addiction-related symptoms.[74] Moreover, the results

underline the necessity of dual-focused interventions aimed at both promoting psychological well-being and preventing behavioral addictions.

More specifically, preventive strategies that address underlying psychological needs for gratification and compensation may proactively reduce individuals' vulnerabilities.[75] Additionally, targeting RDS in prevention initiatives may mitigate risks by encouraging adaptive (rather than maladaptive) forms of gratification.[39] Clinically, the present findings suggest a role for interventions that address unmet psychological needs and strengthen adaptive coping mechanisms, fostering resilience and enhancing mental health outcomes among young adults susceptible to addictive behaviors. These speculative notions warrant further empirical exploration in future research.

Compliance with Ethical Standards

The study received ethical approval from the Institutional Review Board (IRB) of Bar-Ilan University. All information was recorded anonymously, and participants were assured that personal information would be kept confidential.

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