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Systematic Review Overview: Online Preventive Interventions for Suicidal Ideation/Behavior

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Internet addiction (IA) is a public health concern marked by excessive online engagement that disrupts daily functioning. This study examined whether difficulties in emotion regulation mediate the relationship between cognitive, motor, and non-planning impulsivity and IA. A cross-sectional design sampled 600 adults (ages 18–30) using convenience sampling. Participants completed measures of impulsivity (BIS-11), emotion regulation difficulties (DERS), and IA (IAT). Data were analyzed using Pearson's correlation and structural equation modeling with SPSS v25 and Amos v24; mediation was tested via bootstrapping. The structural equation modeling results confirmed the mediating role of emotion regulation difficulties (DERS) in the relationship between impulsivity dimensions and internet addiction (IA). Motor impulsivity (β = .310, $P < .001$) and non-planning impulsivity (β = .229, $P < .001$) significantly predicted greater emotion

dysregulation, which in turn strongly predicted increased IA severity (β = .447, $P < .001$). Cognitive impulsivity directly predicted both DERS (β = .391, $P < .001$) and IA (β = .271, $P < .001$), but its indirect pathway through DERS was non-significant. Bootstrapping analyses revealed significant indirect effects for motor (β = .138, 95% CI [0.074, .294]) and non-planning impulsivity (β = .102, 95% CI [0.031, 0.224]), confirming DERS as a partial mediator. The model demonstrated satisfactory fit (χ^2/df = 2.937, CFI = .928, RMSEA = .06). Emotion regulation difficulties serve as a key mediator between impulsivity—particularly motor and non-planning—and IA. Interventions focused on improving emotion regulation may help mitigate IA risk, especially among understudied groups such as Iranian adults.

Keywords: internet addiction, emotion regulation difficulties, cognitive impulsivity, motor impulsivity, non-planning impulsivity.

The Internet has become a ubiquitous and highly accessible medium among adolescents and young adults, with activities such as online communication and virtual role-playing increasingly integrated into daily routines (Diotaiuti et al., 2022). This pervasive engagement has been linked to psychological problems associated with maladaptive patterns of use, a phenomenon extensively documented in psychological literature (Terroso et al., 2022). The terminology has evolved to reflect its complexity, with descriptors such as computer addiction, compulsive internet use, problematic internet use, and pathological internet use—now commonly referred to as Internet Addiction (IA)—capturing varied dimensions of this behavioral disorder (Salehi et al., 2023).

A critical threshold of maladaptive internet use is established when such behavior disrupts normative developmental tasks in adolescents and young adults, with empirically observed consequences including declining academic performance, severe withdrawal from offline social interactions, persistent

interpersonal conflicts with caregivers and peers, and chronic emotional dysregulation (Jiang et al., 2024; Gioia et al., 2021) . These overt functional impairments signify the transition from normative engagement to clinically significant pathology, underscoring the need for early identification and intervention in cases of escalating internet-related harm (Spytska, 2025). This behavioral pattern is characterized by the systematic deprioritization of activities and interests subjectively acknowledged as salient, alongside persistent engagement in internet use despite adverse psychosocial outcomes. Termed "harmful consumption," this phenomenon exemplifies a clinically significant discrepancy between individuals' cognitive recognition of priorities and their behavioral patterns, consistent with maladaptive engagement frameworks observed in behavioral addiction literature (Spytska, 2025).

Emerging research identifies diminished inhibitory control as a key individual trait associated with Internet Addiction (IA) (Weinstein & Lejoyeux, 2020). Impulsivity, conceptualized as a core neuropsychological construct, reflects a predisposition toward rapid, non-planning reactions to stimuli, irrespective of adverse personal or interpersonal consequences (Terroso et al., 2022). *Cognitive impulsivity* reflects impulsive decision-making, characterized by a preference for immediate rewards over delayed, larger gains, as measured by delay discounting (DD) tasks (Wittmann & Paulus, 2008). In contrast, *motor impulsivity* involves deficits in inhibitory control, assessed via paradigms like the go/no-go (GNG) task, which quantifies the ability to suppress prepotent responses (Caswell et al., 2013). These dimensions are critically implicated in eating disorders and obesity: steeper DD rates are observed in individuals with binge

eating disorder and obesity (Miranda-Olivos et al., 2021). Neuroimaging studies further differentiate their neural substrates, linking cognitive impulsivity to valuation networks (e.g., medial prefrontal cortex, striatum) and motor impulsivity to inhibitory control regions (e.g., right inferior frontal gyrus) (Lempert et al., 2024). Empirical studies demonstrate that individuals with IA exhibit significantly higher levels of impulsivity and reduced inhibitory control compared to non-addicted counterparts (Weinstein & Lejoyeux, 2020; Dieter et al., 2017), with impairments in inhibitory response posited as a perpetuating factor in the escalation of addictive internet-related behaviors (Dieter et al., 2017). Neurobiological evidence further supports this framework, as reduced prefrontal cortex-mediated processing in IA populations aligns with clinical conceptualizations of IA as an impulse control disorder (Şalvarlı & Griffiths, 2019), potentially underpinning deficits in self-regulatory capacity (Weinstein & Lejoyeux, 2020).

Dysregulated emotional responses may exacerbate addictive behaviors by serving as maladaptive coping mechanisms for heightened stress. Research indicates that individuals predisposed to emotional distress demonstrate elevated vulnerability to substance use disorders, evidenced across opioid (Ding et al., 2021), cocaine (Sideli et al., 2023), methamphetamine (Tu et al., 2024), alcohol (Wołyńczyk-Gmaj et al., 2022), and tobacco misuse (González-Roz et al., 2024). Similarly, emotion dysregulation and alexithymia—a deficit in identifying and describing emotions, often classified as an emotional regulation disorder (Ayik et al., 2023)—have been implicated in behavioral addictions, including gambling disorder (Mestre-Bach et al.,

2023), internet addiction (IA) (Quaglieri et al., 2021), gaming addiction (Tang et al., 2024), and problematic internet use (Gioia et al., 2021). These conditions exhibit robust correlations between emotion dysregulation severity and addictive symptomatology (Sideli et al., 2023). Furthermore, emotion dysregulation is associated with impaired relational functioning due to ineffective emotional management and subsequent mood disturbances. Such individuals may perceive online environments as compensatory spaces for self-regulation and interpersonal engagement, perpetuating cycles of maladaptive internet use (Quaglieri et al., 2021).

Emotion regulation capacities are modulated by age, sex, cultural context, and substance use. Empirical evidence highlights age-related disparities, with older adults demonstrating heightened vulnerability to gambling severity (Velotti et al., 2021) and substance use disorders (Weiss et al., 2022). Cross-cultural studies identify elevated ED difficulties in Asian populations, marked by frequent reliance on maladaptive strategies like suppression and rumination (Su et al., 2015), while clinical samples exhibit greater utilization of dysfunctional emotional regulation strategies (e.g., rumination, suppression) compared to non-clinical groups (Chen et al., 2020). Although emotional dysregulation severity correlates with psychiatric symptomatology (Joseph et al., 2024), its role in substance use and behavioral addictions in the Iranian population remains underexplored, underscoring a critical gap in understanding mechanisms linking emotional dysregulation to maladaptive coping behaviors.

While prior research has established impulsivity as a robust predictor of internet addiction (IA) and identified emotion

dysregulation's role in various populations, no study to date has investigated this pathway within an Iranian sociocultural context. Cultural norms, particularly those influencing emotion regulation strategies and digital engagement patterns in Iran, may uniquely modulate these relationships, yet their interplay remains unexplored. Utilizing validated measures of impulsivity (BIS-11), emotion dysregulation (DERS), and internet addiction severity (IAT), this research employs structural equation modeling to elucidate these dynamics. To address this gap in the literature, this study investigates the following research question: Do difficulties in emotion regulation mediate the association between impulsivity and internet addiction among Iranian adults? The proposed research model is illustrated in Figure 1.

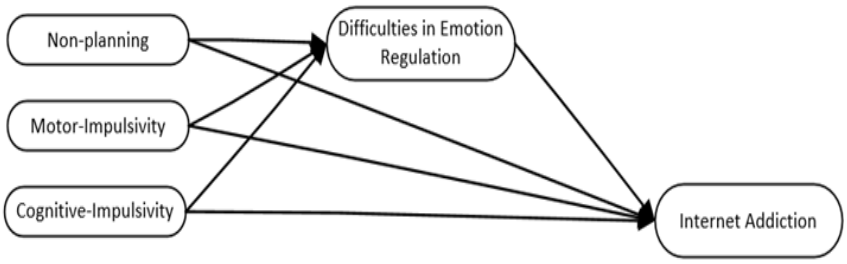

Figure 1. Proposed model

Method

The present study was descriptive, and its design correlational. The research variables were investigated using the structural equation modeling method. The study population was young adults between 18 to 30 years of age living in Urmia, Iran, in the year of 2024-2025. Based on the prior research conducted by

Mohamadi and Eynali (2020), it was estimated that 37 percent of the 879 thousand population residing in Urmia were in the required age range. However, we did not find a precise listing of the statistical population of this research as of 2024. Based on Wolf et al. (2013) suggestions on degerming sample size for structural equation modeling 600 young adults were selected to participate in this study.

Participants were eligible for inclusion if they were Iranian adults aged 18–30 years, proficient in Persian, and actively engaged in internet use (≥3 hours daily). Exclusion criteria comprised a history of severe psychiatric disorders (e.g., schizophrenia, bipolar disorder), neurological conditions, or substance use disorders (excluding nicotine) diagnosed via self-report, as these factors could confound emotion regulation or impulsivity measures. Individuals with incomplete or inconsistent responses to key scales (BIS-11, DERS, IAT) were also excluded to ensure data integrity. Ethical approval and informed consent were obtained, with recruitment focusing on community-dwelling adults to enhance generalizability. These criteria aimed to isolate the interplay between impulsivity, emotion dysregulation, and IA while minimizing extraneous variables.

Instrument

The Barratt Impulsivity Scale (BIS-11)

The Barratt Impulsivity Scale (BIS), initially developed by Ernest Barratt in 1950 and iteratively revised, assesses impulsivity across three subdomains via 30 items on a 4-point Likert scale (Barratt, 1994). Cognitive impulsivity (items 5, 6, 9, 11, 20, 24, 26, 28) captures rapid decision-making, motor impulsivity (items 2- 4, 16, 17, 19, 21–23, 25, 30) reflects action without deliberation, and non-planning impulsivity (items 1, 7, 8,

10, 12–15, 18, 27, 29) measures spontaneity. A total score is derived, with thresholds defining normative (52–71), severe (>71), and low (<52) impulsivity (Patton et al., 1995). Reverse scoring (items 1, 7–10, 12, 13, 15, 20, 29, 30) mitigates response bias. Psychometric evaluations demonstrate acceptable to strong reliability: Someya et al. (2001) reported Cronbach's α = .60–.79 for subscales and test-retest reliability (4-month interval) of r = .71–.84. Javid et al. (2012) found α = .81 for the total score, with subscale α values of .70 (cognitive), .67 (motor), and .80 (non-planning), alongside total-score test-retest reliability of r = .77. Nematolahi et al (2024) demonstrated robust reliability and validity of the Barret Impulsivity Scale in a Persian population; psychometric properties are detailed in Table 1.

The Difficulties in Emotion Regulation Scale (DERS)

The Difficulties in Emotion Regulation Scale is a 36-item self-report instrument assessing multidimensional emotion dysregulation, with items rated on a 5-point Likert scale (1 = never to 5 = always) (Bardeen et al., 2012). Elevated total scores reflect greater impairments in emotion regulation. The DERS demonstrates robust construct validity and test-retest reliability across populations. In a non-clinical Persian sample, internal consistency ranged from Cronbach's α = 0.66 to 0.88, with test-retest reliability (stability) of r = 0.82 and inter-item consistency of α = 0.68 (Khanzadeh et al., 2012). These psychometric properties align with prior validations, supporting its use in culturally diverse contexts. Kermani and Tale (2018) established robust psychometric properties for the Difficulties in

Emotion Regulation Scale in a Persian population, with full metrics detailed in Table 1.

Internet Addiction Test (IAT)

The Internet Addiction Test (IAT) is a 20-item self-report instrument adapted from DSM criteria for substance use and pathological gambling disorders, utilizing a 5-point Likert scale to assess IA severity (Widyanto et al., 2011) Total scores categorize users as normal (20–49), moderate (50–79), or severe (80–100), reflecting escalating risk levels. Empirical validations support its psychometric robustness, including content/convergent validity and internal/external reliability (Widyanto et al, 2011). Amiri and Sepehrianazar (2018) demonstrated robust reliability and validity of the questionnaire in a Persian population; psychometric properties are detailed in Table 1.

Table 1.
Psychometric Properties of Study Measures

Scales	CFI	IFI	RMSEA	Cronbach's α
The Barret Impulsivity Scale	.90	.90	.093	.85
Internet Addiction Scale	.97	.91	.081	.88
The Difficulties in Emotion Regulation Scale	.99	.99	.016	.86

Procedure

To conduct this study, approval from the Department of Psychology of Tehran university's Ethics committee (Ethics code: IR.UT.PSYEDU.REC.1403.102) was obtained. Participants were

recruited through a combination of online platforms (e.g., social media including Telegram and WhatsApp, university-affiliated groups in said social media, such as Islamic Azad University and Urmia University) and community-based settings (e.g., public libraries, cultural centers) to ensure demographic diversity reflective of Iran's urban and semi-urban populations. Prior to enrollment, the research objectives—to investigate the relationship between impulsivity, emotion dysregulation, and internet addiction—were explicitly detailed in both written (via participant information sheets) and verbal formats during orientation sessions. Prospective participants were invited to ask clarifying questions, which were addressed in real-time through virtual Q&A forums or in-person discussions, ensuring comprehension of the study's purpose and procedures. To minimize selection bias, recruitment materials avoided pathologizing language, instead framing the study as an exploration of "digital habits and emotional well-being." Eligible individuals provided informed consent electronically or in writing, with confidentiality assurances.

The final sample (N = 600) comprised adults aged 18–30 balanced across gender and educational backgrounds. Data were analyzed using SPSS v.24 and Amos v.24. Descriptive statistics (means, standard deviations, ranges) and bivariate correlations (Pearson's r) were computed to assess relationships between impulsivity, emotion dysregulation, and internet addiction. To evaluate the hypothesized mediation model, bootstrapping and maximum likelihood in Amos was employed, enabling simultaneous testing of direct and indirect pathways. Bootstrapping with 5,000 resamples assessed the significance of

mediation effects, consistent with methodological precedents (Gogia et al., 2024). All analyses used a two-tailed significance threshold of $p < .05$.

Results

The sample comprised 600 participants (342 females, 57%; 258 males, 43%). Among females, the majority were aged 18–23 years (n = 156, 45.6%), followed by 23–27 years (n = 120, 35.1%) and 27–30 years (n = 66, 19.3%). Most female participants were single (n = 228, 66.7%), with 114 (33.3%) married. Educationally, 52.6% (n = 180) held bachelor's degrees, 24.6% (n = 84) postgraduate degrees, and 22.8% (n = 78) diplomas. Male participants skewed older, with 48.8% (n = 126) aged 27–30 years, 30.2% (n = 78) 23–27 years, and 20.9% (n = 54) 18–23 years. A majority were single (n = 162, 62.8%), while 37.2% (n = 96) were married. Educational attainment among males included 53.5% (n = 138) bachelor's degrees, 34.9% (n = 90) postgraduate qualifications, and 11.6% (n = 30) diplomas, reflecting a higher proportion of advanced degrees compared to females.

Descriptive statistics in table 2 indicated moderate levels of cognitive impulsivity (M = 17.09, SD = 2.21), motor impulsivity (M = 23.01, SD = 5.20), and non-planning impulsivity (M = 24.88, SD = 3.71). Internet addiction (M = 45.52, SD = 13.09) and emotion regulation difficulties (M = 65.71, SD = 13.93) exhibited wider variability. Pearson correlations revealed significant positive associations between motor impulsivity and internet addiction ($r = .270$, $p < .001$), as well as between motor impulsivity and emotion regulation difficulties ($r = .514$, $p < .001$). Cognitive impulsivity correlated moderately with internet addiction ($r = .565$, $p < .001$) and motor impulsivity ($r = .113$, p

< .05). Notably, non-planning impulsivity showed a weak, non-significant relationship with emotion regulation difficulties (r = -.073, p > .05) but a weak correlation with internet addiction (r = .087, p < .05).

Table 2
Mean, Standard deviation, and Pearson correlation coefficient

Variables	Minimum	Maximum	M	SD	(1)	(2)	(3)	(4)	(5)
Internet Addiction (1)	20	76	45.52	13.09	1	.480**	.565**	.270**	.087*
Difficulties in Emotion Regulation (2)	35	92	65.71	13.93		1	.243**	.514**	-.073
Cognitive Impulsivity (3)	8	27	17.09	2.212			1	.113*	.265**
Motor Impulsivity (4)	12	38	23.01	5.207				1	.0874*
Non-planning Impulsivity (5)	17	33	24.88	3.713					1

Prior to model development, key assumptions for structural equation modeling (SEM) in Amos were verified. Univariate normality was confirmed, with skewness and kurtosis values for all variables falling within the acceptable range of −1 to +1 (Kline, 2023). Multivariate normality was assessed using Mardia's coefficient, yielding a critical ratio below 5. Multicollinearity was examined via tolerance and variance inflation factor (VIF) indices; all values were below the conservative threshold of 10, indicating no significant

multicollinearity. Finally, residual independence and linearity assumptions were validated, with Durbin-Watson statistics for regression equations ranging between 1.5 and 2.5. These results confirm that the data met SEM requirements for subsequent analysis.

The alignment of the proposed model with the data was assessed using various fitness indices, including the Chi-Square as an absolute fitness index, Normed Fit Index (NFI), Comparative Fit Index (CFI), Incremental Fit Index (IFI), Goodness of Fit Index (GFI), and Root Mean Square Error of Approximation (RMSEA), as detailed in Table 3. The results indicate that the final model demonstrates a satisfactory fit.

Table 3
Fitness Indicators of the Proposed Model and the Final Model

Indicator	X^2	df	X^2/df	GFI	NFI	CFI	IFI	RMSEA
Final Model	11.75	4	2.937	.963	.921	.928	.951	.06

The direct path effect of cognitive impulsivity, motor impulsivity, non-planning impulsivity to difficulties in emotion regulation and internet addiction are shown in figure 2. Cognitive Impulsivity is identified as a strong predictor of DERS, with a standardized regression weight of .39, and it also significantly contributes to Internet Addiction (.27). Motor Impulsivity and Non-planning Impulsivity show moderate associations with DERS (.31 and 0.22, respectively) and weaker direct effects on Internet Addiction (.16 and .14). Notably, DERS acts as a crucial mediator, positively influencing Internet Addiction (.44).

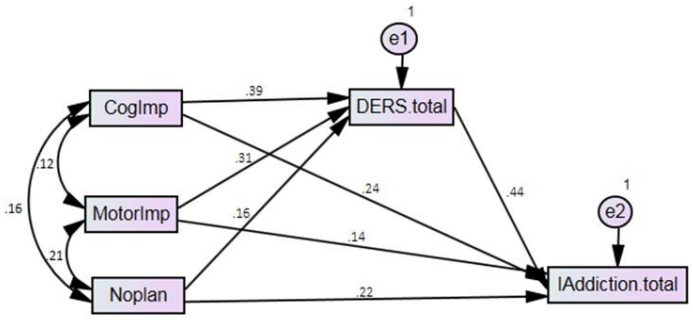

Figure 2. Final Model with standardized estimates

Table 4 presents the standardized regression weights along with the direct and indirect effects of the research variables, highlighting the relationships among Cognitive Impulsivity (CI), Motor Impulsivity (MI), Non-planning Impulsivity (NI), Difficulties in Emotion Regulation (DERS), and Internet Addiction (IA). The results indicate that CI has a significant direct effect on DERS (.391, $p < .001$) and a moderate total effect on IA (.244, $p < .001$. MI demonstrates a direct effect on DERS (.310, $p < .001$) and a total effect on IA of .307 ($p < .05$). NI also shows a direct effect on DERS (.229, $p < .001$) and a total effect on IA of .248 ($p < .05$). Finally, DERS has a significant direct effect on IA (.447, $p < .001$), underscoring its role as a mediator in the relationship between impulsivity types and internet addiction.

Table 4
standardized regression weights and direct and indirect effects of research variables.

Pathway	Standardized Direct Effect	Standardized Total Effect	P-value
CI -> DERS	.391	.391	<.001

CI-> IA	.271	.244	<.001
MI->DERS	.310	.310	<.001
MI-> IA	.169	.307	<.05
NI-> DERS	.229	.229	<.001
NI->IA	.146	.248	<.05
DERS-> IA	.447	.447	<.001

DERS: Difficulties in Emotion Regulation/ IA: Internet Addiction/ CI: Cognitive Impulsivity/ NI: Non-planning Impulsivity/ MI: Motor Impulsivity

In Table 5, Bootstrapping analyses (5,000 resamples) confirmed significant mediating effects of emotion regulation difficulties (DERS) for both motor impulsivity (β = .138, 95% CI [.074, .294]) and non-planning impulsivity (β = .102, 95% CI [.031, .224]) on internet addiction, as their confidence intervals excluded zero. In contrast, the indirect pathway from cognitive impulsivity was non-significant (β = .027, 95% CI [-.134, -.017]). These results demonstrate that DERS partially explains the relationship between internet addiction and specific impulsivity dimensions—particularly motor and non-planning impulsivity.

Table 5
Examining Indirect Effects and the Mediating Role of Variables

Pathway	Standardized Indirect Effect	Lower Bound	Upper Bound
Cognitive Impulsivity-> Difficulties in ER-> Internet Addiction	.027	.134	.017
Motor Impulsivity-> Difficulties in ER-> Internet Addiction	.138	.074	.294
Non-planning Impulsivity-> Difficulties in ER-> Internet Addiction	.102	.031	.224

Discussion

The study identified emotion regulation difficulties as a significant mediator in the relationship between impulsivity and internet addiction (IA), with motor impulsivity and non-planning impulsivity exerting a strong indirect effect through this pathway. Cognitive impulsivity showed no significant direct or indirect associations, underscoring the primacy of motor and non-planning subtypes in driving maladaptive internet use. Notably, the Iranian sociocultural context, marked by unique digital engagement patterns and emotion regulation norms, may amplify these dynamics, as evidenced by the sample's elevated impulsivity scores compared to Western cohorts. These findings align with the I-PACE model while advancing cross-cultural insights into IA's etiology, emphasizing emotion regulation as a critical intervention target for impulsive individuals (Brandtner et al., 2021). Prior research consistently identifies impulsivity as a robust predictor of Internet Addiction (IA), particularly motor impulsivity, which aligns with our findings of its dominant indirect effect via emotion regulation (Cao et al., 2007; Yilbas & Karadeniz, 2022). Studies across diverse populations, including Iranian medical students (Salehi et al., 2023) and Italian young adults (Diotaiuti et al., 2022), report significant correlations between impulsivity subtypes (motor, attentional) and IA severity, mirroring our observed total effect of impulsivity on IA. However, prior works often emphasize direct pathways (Salehi et al., 2023), whereas our model extends this by demonstrating emotion dysregulation as a critical mediator, a mechanism underexplored in existing frameworks. Notably, cognitive impulsivity's non-significant role in our study contrasts with

mixed findings in prior literature (Lee et al., 2012; Salvarli & Griffiths, 2022), suggesting cultural or methodological moderators. Gender disparities in IA susceptibility (males > females) (Yilbas & Karadeniz, 2022) were echoed in our sample, though inhibition deficits uniquely correlated with IA in females, highlighting nuanced gender-specific pathways. These findings underscore the necessity of integrating emotion regulation into impulsivity-IA models, advancing beyond prior focus on direct behavioral linkages.

The study's identification of emotion regulation difficulties as a critical mediator aligns with emerging cross-cultural evidence on behavioral addictions. Quaglieri et al. (2022) demonstrated that emotional dysregulation mediates the pathway between fear of missing out (FoMO), social media addiction, and Internet addiction among Italian young adults, paralleling our findings of motor impulsivity's indirect effect via emotion regulation. While their model emphasized social media-related mediators, our results extend this work by differentiating impulsivity subtypes, revealing motor and non-planning impulsivity as primary drivers of Internet addiction—a distinction absent in previous frameworks. These findings are further supported by Liang et al. (2021), whose study of 716 Chinese adolescents (ages 13–18) identified specific emotion regulation strategies as significant mediators in the relationship between negative emotions and Internet addiction. Their research demonstrated that cognitive reappraisal significantly negatively affected Internet addiction, suggesting that adaptive emotion regulation strategies serve as protective factors against problematic Internet use. Similarly, Gökçearslan et al. (2023) highlighted emotion regulation's role in smartphone addiction and cyberloafing during COVID-19, with

technology usage status directly predicting addiction. In contrast, within our Iranian cohort, emotion regulation mediated impulsivity's effect, a finding that contrasts with the stronger direct effects observed in their Turkish sample and may reflect cultural disparities in digital coping strategies. Notably, cognitive impulsivity's non-significant role in our study diverges from mixed Western findings (Salvarli & Griffiths, 2022), suggesting that sociocultural factors may moderate cognitive control mechanisms, as also observed in cross-national impulsivity studies (Yilbas & Karadeniz, 2022).

Furthermore, Gioia et al. (2021) identified maladaptive Internet use as a compensatory mechanism for emotion regulation difficulties, particularly among individuals with low social support and dysfunctional parent-adolescent dynamics. A longitudinal study by Tsai et al. (2020) examined the bidirectional relationship between emotion regulation difficulties and Internet addiction among college students over one year, indicating that impulse control difficulties—one dimension of emotion regulation—predicted the onset of Internet addiction among male students, although Internet addiction did not predict subsequent changes in emotion regulation capacities. Our results corroborate the predictive importance of impulse control deficits, particularly as indexed by motor impulsivity, which significantly forecasted both emotion dysregulation and Internet addiction while also revealing significant mediated pathways via emotion regulation difficulties. Similarly, the cross-sectional study by Ercengiz & Şar (2017) evaluated the predictive power of emotion regulation on Internet addiction among adolescents, with regression analyses revealing that dysfunctional emotion regulation

strategies—specifically, external non-functional and internal non-functional dimensions—were positively related to Internet addiction, whereas internal functional emotion regulation was negatively associated. These emotion regulation dimensions accounted for approximately 34% of the variance in Internet addiction. In our study, emotion regulation difficulties mediated the relationship between impulsivity (especially motor and non-planning) and Internet addiction, explaining substantial proportions of variance. Taken together, these converging results reinforce the notion that deficits in emotion regulation, particularly when manifested as impulsivity-driven behaviors, are instrumental in developing and maintaining problematic Internet use. Moreover, while both Tsai et al. (2020) and Ercengiz and Şar (2017) provide empirical support for a model in which inadequate impulse control and dysfunctional emotion regulation increase the risk of Internet addiction, our study extends the literature by offering a comprehensive path analytic framework that not only confirms the direct effects of motor impulsivity on Internet addiction but also elucidates the mediating role of emotion dysregulation—a pathway that may serve as a critical intervention target in culturally specific contexts and underscoring the I-PACE model's utility.

This study elucidates the mediating role of emotion regulation difficulties in the relationship between impulsivity and Internet Addiction (IA), with motor and non-planning impulsivity emerging as primary drivers of maladaptive internet use. The structural model explained underscored emotion dysregulation as a pivotal mechanism through which impulsive traits escalate IA risk, particularly within Iran’s sociocultural context. These findings align with prior evidence linking impulsivity to IA

(Salehi et al., 2023) while advancing the field by integrating emotion regulation into the I-PACE framework. Clinically, interventions targeting emotion regulation skills—such as cognitive-behavioral or mindfulness-based therapies—may mitigate IA vulnerability in impulsive individuals. Future research should explore longitudinal pathways and cultural moderators to refine etiological models and inform culturally adapted prevention strategies. By bridging neurocognitive mechanisms with behavioral outcomes, this study contributes critical insights for both theoretical advancement and practical intervention in the evolving landscape of digital addiction.

No research is without limitations, and ours is no exception. The study's cross-sectional design precludes causal inferences about the impulsivity-emotion dysregulation-IA pathway, a limitation echoed in prior research (Diotaiuti et al., 2022; Salehi et al., 2023). Reliance on self-report measures (e.g., DERS, BIS-11) introduces potential response bias, while the homogeneous Iranian sample limits generalizability to diverse cultural contexts. Notably, comorbid conditions (e.g., ADHD, depression), which may confound impulsivity and IA (Yilbas & Günel Karadeniz, 2022), were not assessed. Future studies should adopt longitudinal designs to explore temporal dynamics and incorporate neuroimaging (e.g., fMRI) to validate prefrontal dysfunction mechanisms (Şalvarlı & Griffiths, 2019). Cross-cultural replications, particularly in populations with varying digital engagement norms, are critical to confirm the universality of mediation pathways. Clinically, interventions targeting emotion regulation skills—such as mindfulness-based therapies (Diotaiuti et al., 2022)—should be prioritized for impulsive

individuals, alongside preventive programs addressing cultural-specific stressors (e.g., familial expectations) that may exacerbate maladaptive internet use.

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No potential conflict of interest was reported by the authors.

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