RESEARCH ARTICLE

Internet addiction and maladaptive schemas: The potential role of disconnection/rejection and impaired autonomy/performance

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Abstract

Introduction and objectives: Problematic internet use (PIU) has become public health concern, particularly among adolescents and emerging adults. There is growing interest concerning the potential impacts of early maladaptive schemas (EMSs) on PIU and its most severe manifestation internet addiction (IA). However, a deeper understanding of these relationships is needed regarding of effects of schemas on IA. The purpose of the present study was to explore the role of EMSs among adults.

Methods: The sample comprised 714 Iranian participants who completed a self-report survey comprising sociodemographic variables, the Internet Addiction Test (IAT), and the Young Schema Questionnaire–Short Form (YSQ-SF). The data were analysed using partial least squares structural equation modelling (PLS-SEM).

Results: Findings indicated that there was a positive and significant relationship between EMS domains and IA. The results confirmed that disconnection/rejection schema domains and impaired autonomy/performance schema domains were significantly related with IA. The results of the analysis of convergent validity and discriminant validity were acceptable among the nine reflective constructs.

Conclusion: Findings of the present study indicated that existence of underlying EMSs may be a vulnerability factor for developing IA and adds to the growing body of cyberpsychology literature that has examined the relationships between the EMSs and IA.

KEYWORDS
disconnection, impaired autonomy, internet addiction, maladaptive schemas, problematic internet use, rejection

1 | INTRODUCTION

As technology has advanced, the numbers of individuals accessing the internet has grown significantly. The internet is beneficial in most

people's lives and has penetrated into almost all aspects of life (e.g., work, study, shopping, leisure, and lifestyle). The internet has become an important source for sharing and seeking information, communication and/or online entertainment among most individuals.

However, despite the many benefits of the internet (Wiederhold, 2017), research has indicated that a small minority of individuals overuse the internet and may be at risk of developing internet addiction (Ostovar et al., 2016).

1.1 | Internet addiction

Over the past two decades, the internet has revolutionized the way individuals communicate with each other. Moreover, it has become an integral, popular and essential part of many individual's daily lives (Leung et al., 2020; Gervasi et al., 2017). M. D. Griffiths (1998, 1999) argued that internet addiction is an umbrella term, due to the fact that the vast majority of individuals experiencing problems report that their concerns relate to specific online activities (e.g., online gaming). The advent of smartphones with affordable and instant internet access has expedited individuals' adoption of the internet (Leung et al., 2020). The accessibility of online activities can lead individuals to spend more time online than they originally intend (H. M. Pontes et al., 2015). Increased access and persistent internet use increase the risk of developing online addictive behaviour (Lee et al., 2019) that can negatively impact on psychological development (Chen et al., 2020), physical health, education (e.g., poor grades), and relationships (e.g., interpersonal difficulties), as well as association with other behaviours (e.g., comorbidity with substance addictions; Chi et al., 2020; Kojima et al., 2019).

Between 2000 and 2020, the number of internet users increased almost tenfold worldwide, with an estimated 4.7 billion individual internet users worldwide and 3.2 billion individuals using online social network sites. More than half of current internet users are young individuals from the Middle East (Internet World Stats, 2019). In Asia, there has been a high variation in prevalence of internet use (ranging from 8.1% to 50.9%) among young people and adolescents (Internet World Stats, 2019). In a study on the worldwide prevalence of internet addiction (IA), Xin et al. (2018) reported that in Europe and the United States, rates of IA ranged from 7.9% to 25.2% among adolescents, whereas prevalence rates of IA in the Middle East (ME) and Africa ranged from 17.3% to 23.6%. Asia had a higher variation of IA among young individuals and adolescents, ranging from 8.1% to 50.9% (Hassan et al., 2020). In developed countries, internet penetration is 81% among the population, compared with 40% in developing countries and 15% in the least developed countries (International Telecommunication Union, 2016).

In 2016, some experts reported that IA had become a serious issue in Iran (Shajari et al., 2016) and there was internet overuse among different groups of Iranian cohorts (i.e., adolescent, youth and adults; Shajari et al., 2016). Iran is one of the developing countries where internet and social networks have markedly increased (Yarahmadi et al., 2020). In first quarter of 2017, the use of internet tripled, and more than 67.6 million Iranians in the population (80.5%) were using internet and social media sites (Internet World Stats, 2019). Consequently, increasing numbers of young and adult individuals in Iran are believed to be addicted to internet use.

Addiction is a complex behaviour and hard to identify particularly if it is a behavioural addiction (Griffiths & Larkin, 2004). Acquisition,

Key Practitioner Messages

- Problematic internet use and internet addiction (IA) are an issue of concern among youth.
- Early maladaptive schemas (EMSs) are important contributory factors in IA.
- Practitioners could use schema therapy in helping to overcome IA.
- Practitioners should target specific EMSs (disconnection/rejection and impaired autonomy/performance).

development and maintenance of addictive behaviours result from the interplay between many different interacting factors (M. D. Griffiths, 2005) including the psychological and biological factors related to the individual including beliefs, attitudes, personality traits, genetic predispositions, and unconscious motivations, as well as the social environment in which the individual lives and the activity itself (Parke & Griffiths, 2006). The phenomenon of IA has been debated since the mid-1990s (M.D. Griffiths, , 1995, 1996) and has often been used interchangeably with terms such as 'problematic internet use' (PIU; Caplan, 2002), 'internet addiction disorder' (IAD; Jiang, 2014), 'pathological internet use' (Davis, 2001), 'excessive Internet use' (Douglas et al., 2008), 'internet dependency' (ID; Mafe & Blas, 2006), and 'compulsive internet use' (CIU; Meerkerk et al., 2009). The present authors view IA as a more extreme manifestation of PIU (i.e., all internet addicts are problematic internet users but not all problematic internet users are internet addicts).

In general, these terms share conceptual notions of underlying pathology, although it is related to specific diagnostic criteria (Petry et al., 2014). Several diagnostic criteria for IA have been proposed such as salience and total preoccupation with the internet, obsessive thoughts about the internet, withdrawal symptoms when unable to use the internet, compromising of relationships, education and/or occupation because of excessive internet use, loss of interest in other activities due to spending too much time on the internet, and use of the internet to escape or relieve dysphoric mood states (M. Griffiths, 2000, 2005; Tao et al., 2010).

IA is also characterized by loss of control (e.g., impulse-control disorder and/or a behavioural addiction) and continued usage despite negative consequences (Shapira et al., 2003). One theoretical model that has received empirical support to explain PIU and IA is the cognitive–behavioural model (CBM; Davis, 2001; Montag et al., 2015) and associated components (Gámez-Guadix et al., 2013). These components comprise a preference for online social relationships, mood regulation through internet use, deficient self-regulation, and negative consequences. Also, the CBM drew a distinction between specific problematic internet use (SPIU) and generalized (GPIU) problematic internet use (GPIU) and identified the role of maladaptive cognitions (MCs) in the development of pathways to GPIU.

According to Davis' model, IA is related to maladaptive cognitions and social issues (such as obsessive thoughts or cognitive distortions,

depression, loneliness, social isolation, and lack of social support). Maladaptive cognitions lead an individual to believe that through online existence, they can realize the reinforcement and social contact lacking in their offline lives. The need for social contact and reinforcement obtained online produces an increased desire to remain within a virtual social world (Davis, 2001). Furthermore, MCs describe those distortions in thoughts about the self or the world which bring about ruminations and constant thinking that relate to the individual's internet use (Davis, 2001). SPIU is viewed as the overuse of specific online activities such as online gambling (M. Brand, Young, & Laier, 2014), online pornography use and online gaming (M. Brand et al., 2016; Griffiths et al., 2016). Moreover, the behaviour is assumed to be the consequence of pre-existing psychopathology that is related to online activity. Research has identified that individuals who are psychologically vulnerable are especially at high risk of using the internet in a problematic way (M. Brand et al., 2014, 2016).

Previous studies have demonstrated the potential negative effects that arise from excessive use and abuse of the internet on psychological health (H.M. Pontes & Griffiths, 2017) as well as physical consequences such as vision problems, decreased physical fitness and obesity, musculoskeletal problems, sleep deprivation, etc. Individuals with IA exhibit similar signs and symptoms to those of more established addictions (e.g., addiction to drugs, alcohol and gambling) and that IA has significant negative effects on individuals' daily lives (H.M. Pontes & Griffiths, 2017). In addition, IA appears to be more prevalent among the adolescents and emerging adults and can accompany or play a role in other psychiatric disorders (Öztürk et al., 2015). IA is also associated with sleep disorders (Alimoradi et al., 2019; Wong et al., 2020), comorbid symptoms (e.g., depression, increased sense of loneliness, anxiety, mania, emotions, general psychopathology, mental health problems; Lu et al., 2017) and psychosocial problems (e.g., poor family and interpersonal relationships, social isolation, and poor educational and/or occupational performance; Demir & Kutlu, 2018). Evidence also suggests that excessive internet use is positively associated with IA, social media addiction, narcissism, psychoticism, depression, anxiety, stress and aggressive tendencies (Griffiths et al., 2016; Hussain & Pontes, 2018; Ostovar et al., 2016).

Moreover, recent studies have noted that IA (compared with those without IA) (i) impacts negatively on adolescents' psychological well-being (e.g., low self-esteem), (ii) is associated with psychosocial risk (e.g., low perceived social support; Feng et al., 2019; Sharma & Sharma, 2018; Yavuz, 2019), and (iii) is associated with greater difficulty in communication, as well as cognitive and emotion regulation. Many studies have indicated that among several factors associated with IA, personality traits stand out as one of the most important factors (Chang et al., 2019; Shi & Du, 2019). Individuals with personality disorders (such as obsessive–compulsive, schizoid, antisocial, borderline, histrionic, narcissistic, and schizotypal disorders) show higher levels of IA than individuals without such personality disorders (Zadra et al., 2016). Research into has found that individuals with Cluster B personality disorders and IA is more likely due to impulsivity and that individuals Cluster C personality disorders and IA is more likely due to low self-esteem (Zadra et al., 2016). Moreover, other studies have reported a relationship between IA and borderline personality disorders (Choudhary & Gupta, 2020).

1.2 | Early maladaptive schemas

One factor that may influence the aetiology of IA is early maladaptive schemas (EMSs). Such wasted time interferes with daily functioning and/or the carrying out of responsibilities, resulting in psychological pressures. Among other influential psychological variables in an individual's life, EMSs are of a great importance (Harris & Curtin, 2002). EMSs operate at the deepest level of cognition and are defined as broad, extremely stable and enduring themes or cognitive patterns regarding the individual self and an individual's relationships with others (J.E. Young et al., 2003). The concept of a schema is grounded in Beck's (1987) cognitive theory, which noted that maladaptive schemas can lead to a vulnerability to psychological distress (directly or indirectly). Schemas concern what to expect from experiences and situations and how to behave with respect to the self, others and the world (Baldwin, 1999). As described by J.E. Young et al. (2003), schemas are formed from early life and affect individuals throughout their lifespan and (when maladaptive) are dysfunctional to a significant degree. Individuals with noxious and negative schema distort their view of events in their lives in order to maintain the validity of their schemas (K.S. Young, 2003). Furthermore, EMSs remain dormant until they are activated by situations relevant to that particular schema (Idrissi et al., 2018). However, EMSs are not necessarily activated at every moment (H.M. Nordahl & Thimm, 2012). Typically, EMSs are activated by unpleasant and negative situations (Barazandeh et al., 2016) which can lead to negative mood states (such as depression and anxiety), interpersonal difficulties, dysfunctional reactions and emotional disorders (Flink et al., 2018; Kunst et al., 2020).

J.E. Young et al. (2003) posited that there are 18 EMSs across five domains: (i) *disconnection/rejection* (abandonment/instability (AB), mistrust/abuse (MA), emotional deprivation (ED), social isolation/alienation (SI) and defectiveness/shame (DS); (ii) *impaired autonomy/performance* (dependence/incompetence [DI], vulnerability to harm or illness [VH], enmeshment/undeveloped self [EM], failure [FA]); (iii) *impaired limits* (entitlement/grandiosity [ET], insufficient self-control/self-discipline [IS]); (iv) *other directedness* (subjugation [SB], self-sacrifice [SS], approval-seeking/recognition-seeking [AS]) and (v) *over vigilance/inhibition* (negativity/pessimism [NP], emotional inhibition [EI], unrelenting standards/hypocriticalness [US] and punitiveness [UP]). Table 1 outlines each of the EMSs domains and individual schemata.

Young et al. (2003) argued that maladaptive schemas provide the foundation upon which mental health problems are formed, underlying the development and maintenance of psychological disorders. A previous study reported that individuals with positive EMSs are at lower risk of experiencing physical or psychological domestic violence because they experience more positive emotions, and when they encounter problems, they have more strength in coping with maladaptive situations (Simpson et al., 2018; Yount & Li, 2010).

TABLE 1 Hypothesis test of the significance of the correlation between schema domains and the specific EMSs and internet addiction of this study

Hypothesis schema domain and the specific EMSs 1: Disconnection/rejection has a positive association with internet addiction			
(H1) AB→CON	(H6) AB→BHV	(H11) AB→TIM	(H16) AB→EMO
(H2) MA→CON	(H7) MA→BHV	(H12) MA→TIM	(H17) MA→EMO
(H3) SI→CON	(H8) SI→BHV	(H13) SI→TIM	(H18) SI→EMO
(H4) ED→CON	(H9) ED→BHV	(H14) ED→TIM	(H19) ED→EMO
(H5) DS→CON	(H10) DS→BHV	(H15) DS→TIM	(H20) DS→EMO
Hypothesis schema domain and the specific EMSs 2: Impaired autonomy/performance has a positive association with internet addiction			
(H21) DI→CON	(H25) DI→BHV	(H29) DI→TIM	(H33) DI→EMO
(H22) VH→CON	(H26) VH→BHV	(H30) VH→ TIM	(H34) VH→ EMO
(H23)EM→CON	(H27)EM→BHV	(H31)EM→ TIM	(H35)EM→ EMO
(H24) FA→CON	(H28) FA→BHV	(H32) FA→ TIM	(H36) FA→ EMO

Abbreviations: AB, abandonment; BEH, concealing problematic behaviour; CON, lack of control; DI, dependence/incompetence; Domain_1, disconnection/rejection of YSQ-S3; Domain_2, impaired autonomy and performance of YSQ-S3; DS, defectiveness/shame; ED, emotional deprivation; EM, enmeshment/undeveloped self; EMO, social withdrawal and emotional conflict; FA, failure to achieve; IA, internet addiction; MA, mistrust/abuse; SI, social isolation; TIM, time management problems; VH, vulnerability to harm and illness.

Spending time on the internet may be an escape from feelings that would otherwise be emotionally painful (Bakhshi Bojed & Nikmanesh, 2013). Moderate and high internet use could be employed as a way to cope with or relieve psychological distress symptoms (such as depression and anxiety; Dalbudak et al., 2013). Excessive internet use and maladaptive behaviours may also result in further psychological symptoms (Tonioni et al., 2012). Davis (2001) argued that GPIU is rooted in proximal contextual factors (e.g., specific maladaptive cognitions) and that poor psychosocial health was an important factor contributing to GPIU.

Individuals with this problem may use the internet to forget about their responsibilities and have problems with procrastination. Moreover, anxiety and depression may serve to mediate the relationship between IA and mental aspects of life such as abandonment and social isolation. In schema therapy, EMSs and maladaptive coping responses are proposed to underlie personality disorders and some recurrent or chronic disorders (e.g., depression, anxiety and substance abuse), as well as milder psychological distress (e.g., poor relationship or problems at work; J. E. Young, 1990). Flink et al. (2018) also found that EMSs were associated with a broad range of psychiatric diagnoses and psychological distress, particularly personality disorders.

Likewise, when EMSs become active, they can lead to several cognitive and behavioural problems such as anger symptoms, neuroticism, social phobia, low academic achievement, substance abuse, addiction, interpersonal conflicts, and psychosomatic disorders (Estévez et al., 2019; Gómez-Odriozola & Calvete, 2020; Kunst et al., 2020; Vasilopoulou et al., 2020). Lacking adaptive strategies with the negative affect inherent in EMSs, individuals have difficulties regulating negative emotions and, over time, might perceive them as intolerable (Eslampanah et al., 2020; Marengo et al., 2019). J. E. Young et al. (2003) posit that EMSs often generate high levels of negative affect and self-defeating behavioural patterns, which are believed to underlie the development of a range of mental health problems.

However, individuals with positive schemas have more capabilities in coping with mental issues, and when they encounter stressful events, they suffer less from mental disorders and drug dependencies (Saddichha et al., 2012).

Recently, studies specifically targeting the role of MSs on many risky behaviours have been carried out (e.g., drug abuse, addiction, heavy drinking, sexual issues, and illegal behaviour), particularly among women (Marengo et al., 2019). The research to date has noted that individuals drinking alcohol can be a means of coping with the suffering triggered and sustained by MS symptoms (Chodkiewicz & Gruszczyńska, 2018) and that the schemas concerning female substance use tend to exhibit more pronounced dysfunctionality than those of male substance use (Shorey et al., 2015). Shaghaghi et al. (2011) noted that MSs among substance users are higher than healthy individuals. Research examining alcohol dependence has shown that most individuals with alcohol use disorder have more MSs in comparison to those without the disorder (Karami et al., 2015). An accumulating body of research has established that drug abuse (Riso et al., 2006) and IA (Bakhshi Bojed & Nikmanesh, 2013) are among the coping strategies that individuals use to avoid negative effects of the activated EMSs. Therefore, a significant number of individuals with IA have some psychopathology and dysfunctional beliefs that result in excessive internet use (Taymur et al., 2016).

Bakhshi Bojed and Nikmanesh (2013) demonstrated that specific individual differences show a significant positive correlation with addictive potential (defined as 'the beliefs and attitudes of people about drugs, and the negative and positive outcomes of using them' [p. 72]). They reported a significant positive correlation between addiction potential and all of the five domains of EMSs (disconnection/rejection, impaired autonomy and performance, impaired limits, other-directedness and over vigilance/inhibition). According to these authors, family interactions in early life establish MSs because individuals copy the schemas of their parents, family and/or peers (Bakhshi

Bojed & Nikmanesh, 2013). Recently, Arpaci (2019) examined the effect of EMSs on smartphone addiction and found a positive relationship between individuals with EMSs and smartphone addiction. It has also been found that borderline personality disorder (BPD) has a relationship with more severe endorsement compared with major depression (MD), particularly in the disconnection/rejection domain (Barazandeh et al., 2016), and that the severity of these EMSs has been suggested to be specific to BPD (Cohen et al., 2016). Zamirinejad et al. (2018) demonstrated that EMSs can predict opioid use (i.e., the more maladaptive the schema, the greater the likelihood of opioid use). To date, the present authors have found few studies directly investigating the relationship between EMSs and IA among clinical or non-clinical samples. It is still debatable as to whether EMSs are associated with IA or not. Understanding the relative impact of a specific EMS domain among individuals with IA could support the conceptualization of EMSs as an underlying mechanism for the comorbidity between different disorders such as IA, personality disorder, mental disorders, and risk-taking behaviours.

2 | THEORETICAL BACKGROUND AND RESEARCH HYPOTHESES

The present study developed a theoretical model based on cognitive theories. More specifically, it utilizes schema theory (ST; J. E. Young et al., 2003) and the cognitive-behavioural model of PIU (Davis, 2001) to explain psychological mechanisms underlying IA. Figure 1 shows the theoretical model of the relationships between early maladaptive schemas and IA utilized in the present study (variance and latent models are presented without item parcels or error terms, for ease of understanding). The proposed model investigated the relationships between EMSs and IA among adults. Based on the literature review

and the conceptual framework, the study tested 36 hypotheses (H_s) as presented in Table 1. Based on this discussion, the following overarching hypotheses were formulated:

H_1 to H_{20} Disconnection/rejection domain and the specific EMSs will be positively associated with IA.

H_{21} to H_{36} Impaired autonomy/performance and the specific EMSs will be positively associated with IA.

3 | METHOD

3.1 | Participants and procedure

The sample comprised 714 participants (301 males and 413 females) from 19 provinces in Iran. Maximum sampling error in the present study was ± 3.36%. Data were gathered using a survey hosted on an online survey platform (*Google Forms*). Before completing the survey, all participants were informed about the aim of this study, as well as guidelines on how to answer the questions. The questionnaire was in simple Persian language. The survey took approximately 15 minutes to complete. The mean age of the participants was 36.13 years (ranging from 18 to 68 years). All participants spoke Persian as their native language, and all were regular internet users (i.e., at least 10 hours use per week). Originally, 727 participants started the online survey. Thirteen participants had missing data so were removed from the analysis, leaving a final sample of 714. Among the participants, 42.15% were male and 57.85% were female and over half had a bachelors or postgraduate degree (52%). More than half of the participants were Fars (57.1%; see Table 2 for characteristics). The only exclusion criterion was that those individuals who had history of psychological disorders or psychiatric referral were not included (e.g., severe depression, bipolar disorder).
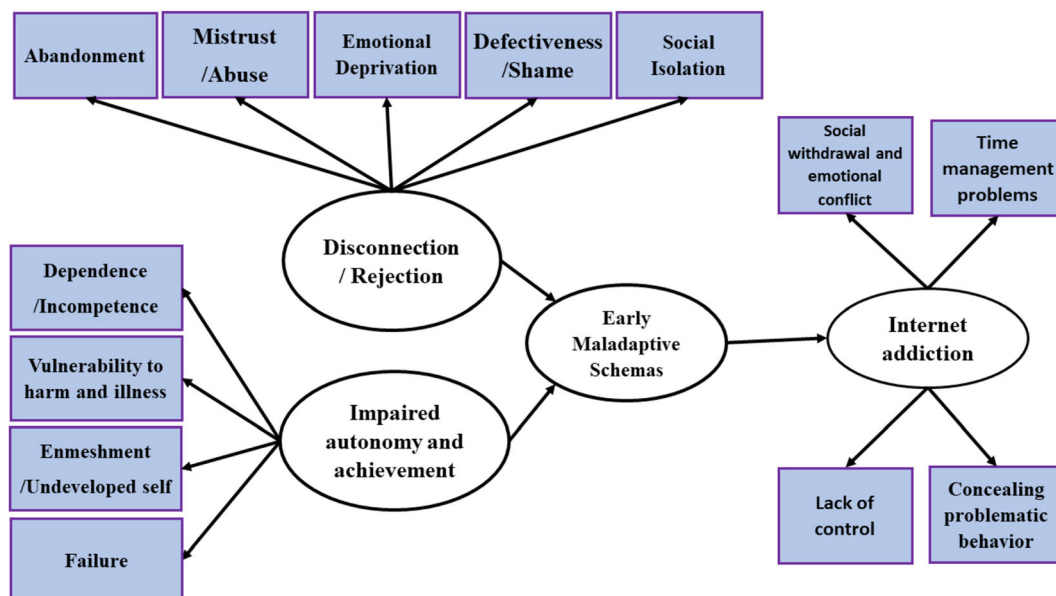

FIGURE 1 Hypothetical model of disconnection/rejection and impaired autonomy/performance domains with internet addiction

Characteristic		Frequency (N)	Percentage (%)
Gender			
	Male	301	48.6
	Female	413	57.85
Age			
	19–45 years	594	32.7
	45 years or older	120	53.1
Ethnicity			
	Fars	408	57.1
	Kurd	145	20.3
	Turk	80	11.2
	Lur	58	8.1
	Arab	16	2.3
	No response	7	1
Education			
	Basic education	167	23.4
	Bachelors or postgraduate degree	503	70.5
	No response	43	6.1

TABLE 2 Sociodemographic profile of the participants

3.2 | Measures

3.2.1 | Demographics

Information from participants was collected regarding demographic factors including age, gender, state of residence, education level and ethnic background. In addition to demographic characteristics, questions were also asked about the amount of time individuals spent on the internet use during weekdays and weekends, the average and longest duration of weekly internet use and the types of social media used.

3.2.2 | Early maladaptive schemas

The Young Schema Questionnaire Short Form (YSQ-SF) comprises 75 items (as opposed to 205 items in the original scale). The YSQ-SF assesses 15 subscales, with five items per EMS. Table 3 briefly describes the 15 YSQ-SF schemas and their main domains. Participants rate the degree to which they agree with the statements on a scale from 1 (*completely untrue of me*) to 6 (*describes me perfectly*). A higher score represents higher endorsement of the specific EMS (D. Nordahl et al., 2019). Only two domains (with nine schemas out of 15) were examined in the present study. Cronbach alphas were calculated for two domains and nine schemas for the present study: disconnection/rejection = .92 (abandonment/instability [AB] = .89, mistrust/abuse [MA] = .82, emotional deprivation [ED] = .90, social isolation/alienation [SI] = .79, defectiveness/shame [DS] = .83) and impaired autonomy/performance = .90 (dependence/incompetence [DI] = .86, vulnerability to harm of illness [VH] = .91, enmeshment/undeveloped [EM] = .84 and failure [FA] = .92). McDonald's omega coefficients (ω)

were also calculated for two domains and nine schemas: disconnection/rejection ω = .94, AB_ω = .91, MA_ω = .88, ED_ω = .92, SI_ω = .84, DS_ω = .86) and impaired autonomy/performance $_\omega$ = .92 (DI_ω = .86, VH_ω = .94, EM_ω = .89 and FA_ω = .95).

3.2.3 | Internet Addiction Scale

The IAS comprises 20 items and contains four subscales: lack of control (CON: 'How often do you find yourself saying "just a few more minutes" when on line?'), social withdrawal and emotional conflict (EMO: 'How often do you check your email before something else that you need to do?'), time management problems (TIM: 'How often do others in your life complain to you about the amount of time you spend on-line?'), and concealing problematic behaviour (BEH: 'How often do you try to hide how long you've been on-line?') which result in mild, moderate, and severe levels of IA (Samaha et al., 2018). Items are rated on a five-point response scale from 1 (*never*) to 5 (*always*). The total score is calculated by summing up the scores of the 20 items ranging from 20 to 100. Here, scores of 20–49 = no IA; 50–79 = mild IA, and 70–100 = severe IA. In the present study, the Cronbach's alpha and omega coefficient (ω) were .93 and .94 respectively (Young, 1998).

3.3 | Analytical method

Partial least squares path modelling (i.e., PLS-PM) or partial least squares structural equation modelling (i.e., PLS-SEM) was employed to explore the relationship among the targeted variables (Astrachan et al., 2014). A recent methodological advance is the use of a

TABLE 3 Description of schema domains and their expression

Schema domain	Early maladaptive schemas	Description
Disconnection/rejection	• Abandonment/instability • Mistrust/abuse • Emotional deprivation • Defectiveness/shame • Social isolation/alienation	Individual's belief that any close relationship they form will soon come to an end. Expectation that safety, stability, security, empathy, nurturance and sharing of feelings will not be predictably met.
Impaired autonomy/performance	• Dependence/incompetence • Vulnerability to harm or illness • Enmeshment/undeveloped self • Failure	Individual's belief that they have limited capacity to function independently. Subsequently, these individuals are very reliant on others. Expectation that person is unable to survive, perform successfully.
Impaired limits	• Entitlement/grandiosity • Insufficient self-control/self-discipline	Individual's belief that difficulty in respecting social norms and the rights of others. Failure to meet common goals and targets. A lack of internal limits, ability to form long-term goals and low responsibility to others.
Other—directedness	• Subjugation • Self-sacrifice	Individual more focus on meeting and desires the needs of other individual in order to get approval and emotional connection.
Over vigilance/inhibition	• emotional inhibition • unrelenting standards/hypercriticalness	Individual more focus on suppressing or meeting the needs of others at the expense of one's own needs and well-being. Expectation that person must suppress feelings and impulses; rigid standards of performance and behaviour.

consistent PLS (PLSc) algorithm which is an advancement of conventional PLS (Dijkstra & Henseler, 2015). PLSc 'solves the consistency problem, path coefficients, construct correlations, and indicator loadings and even avoids the issue of overestimation and underestimation of parameters' (Alonso Dos Santos et al., 2016, p. 1003). It is best suited for complex models especially when the primary objective is prediction, and the focus is on explaining variance of large number of constructs. In the present study, the complex model robustly explained variances of 13 latent variables and 65 indicators utilizing 714 participants' data. Also, PLS is applied in studies especially when there are limited samples and that the data distribution is skewed. The present study's sample was considered large (>200) but the multivariate normal distribution was not established. J. F. Hair et al. (2017) stated that PLS-SEM is suitable for reflective, formative measurement models and second-order models. Therefore, structural equation modelling (SEM) using the WarpPLS v7.0 software was conducted to analyse the conceptual model.

All 36 hypotheses shown in Figure 1 were tested. In the present study, a non-parametric bootstrapping analysis with 5,000 re-samples was used to test the significance of path coefficients, coefficient of determination (R^2; Hair, Sarstedt, Ringle, & Mena, 2017). Conventionally, reliability coefficients, such as the omega coefficients (ω) and their confidence intervals (bias-corrected 95% confidence intervals), are calculated using the IBM SPSS Statistics 26 (Hayes & Coutts, 2020) for the analysis of the reliability of the scales.

There are many different methods that can be used to examine relationships between constructs when the analysis comprises several exogenous (independent) and endogenous (dependent) variables, as in the present study. However, the best method is using a structural equation model (SEM; García-Alcaraz et al., 2014). Partial least squares path modelling (PLS-PM) is a useful method to identify the relationships and to analyse the influence of the different aspects of the complex analysed. Using the second order or higher-order constructs helps researchers to extend the PLS-PM to more advanced and complex models. The PLS-PM approach allows researchers to estimate and test the higher-order in reflective and formative type models (Crocetta et al., 2020). The analysis was carried out to identify the relationships among these variables to test the hypotheses. The proposed framework included nine exogenous constructs and four were characterized as an endogenous composite construct.

4 | RESULTS

Initially, by using the expectation maximization (EM) method from SPSS 26, there were no missing data found. The normality of data distribution was checked based on skewness and kurtosis values. The high value of kurtosis influences the result of analysis and the data need to have variability to ensure the partial least square methods is valid to apply. The skewness and kurtosis values were larger than ±2 (Ryu, 2011). In addition, the histograms indicated the data were relatively skewed. Specifying the measurement and structural models, the PLS-SEM method using a path-weighting scheme was conducted to assess the reliability and validity of the construct measures in the inner model. In the present study, the model included 65 items describing thirteen constructs (including two domains out of five

domains; nine schemas out of 15 schemas). The two domains were (i) disconnection/rejection and (ii) impaired autonomy. The nine EMSs latent constructs were: abandonment (AB), mistrust/abuse (MA), emotional deprivation (ED), social isolation/alienation (SI), defectiveness/shame (DS), dependence/incompetence (DI), vulnerability to harm and illness (VH), enmeshment/undeveloped self (EM) and failure to achieve (FA). The four-internet addiction (IA) latent constructs were: lack of control (CON), social withdrawal and emotional conflict (EMO), time management problems (TIM) and concealing problematic behaviour (BEH; see Figure 2).

The measurement model was assessed based on the criteria of model fit, internal consistency, convergent validity, and discriminant validity. Convergent validity was assessed using factor loadings, composite reliability (CR), and average variance extracted (AVE; J. F. Hair et al., 2010; Tables 4 and 5). J. F. Hair et al. (2014) noted that when the outer loadings are between 0.4 and 0.7, the items 'should be considered for removal from the scale only when deleting the indicators lead to an increase in the composite reliability (or AVE) above the suggested threshold value' (p. 103). In the first step of the strength of the measurement model analysis, the reliability was determined by using the indicator's outer loading and internal consistency reliability. The outer loadings of all indicators of constructs ranged between .71 and .93 and were significant (Table 6). Therefore, the indicator reliability was statistically established. Moreover, the CR of the constructs EMSs and IA were established; AB, MA, ED, SI and DS (.88, .83, .91, .82 and 81), DI, VH, EM and FA (.85, .92, .83 and .93 and CON, BHE, TIM and EMO (.79, 81, .83 and .78). In the present study, the CR (>0.7) and AVE (>0.5) values were well above the minimum threshold
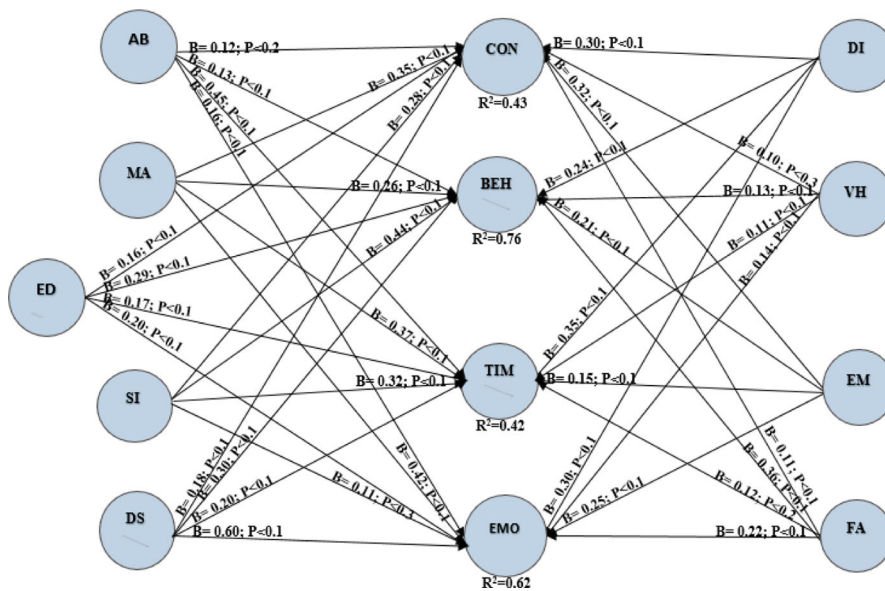

FIGURE 2 Conceptual model results of disconnection/rejection and impaired autonomy/performance domains with internet addiction. AB, abandonment; DI, dependence/incompetence; DS, defectiveness/shame; ED, emotional deprivation; EM, enmeshment/undeveloped self; FA, failure to achieve; MA, mistrust/abuse; SI, social isolation/alienation; VH,vulnerability to harm and illness. The four-internet addiction (IA) latent constructs were Lack of control (CON), social withdrawal and emotional conflict (EMO), time management problems (TIM) and concealing problematic behaviour (BEH)

TABLE 4 Discriminant validity assessment of the constructs modelled as common factor (Fornell-Larcker criterion)

Variable	AB	MA	ED	DS	SI	DI	VH	EM	FA	CON	BHV	TIM	EMO
AB													
MA	.629												
ED	.766	.503											
DS	.602	.446	.770										
SI	.512	.410	.656	.591									
DI	.625	.521	.781	.580	.622								
VH	.671	.672	.786	.675	.657	.432							
EM	.457	.494	.573	.483	.614	.417	.761						
FA	.643	.638	.614	.557	.536	.686	.555	.516					
CON	.468	.396	.425	.470	.501	.459	.496	.462	.637				
BHV	.523	.478	.566	.482	.618	.563	.572	.438	.436	.415			
TIM	.497	.526	.534	.569	.465	.475	.499	.612	.619	.463	.548		
EMO	.474	.387	.402	.511	.416	.396	.510	.406	.550	.449	.503	.448	

TABLE 5 Discriminant validity assessment of the constructs modelled as common factors (HTMT)

Variable	AB	MA	ED	DS	SI	DI	VH	EM	FA	CON	BHV	TIM	EMO
AB	.852												
MA	.622	.811											
ED	.754	.511	.824										
DS	.599	.432	.667	.809									
SI	.526	.527	.656	.610	.711								
DI	.630	.566	.714	.571	.622	.848							
VH	.674	.654	.775	.633	.657	.817	.802						
EM	.533	.444	.552	.511	.614	.669	.676	.786					
FA	.651	.650	.659	.484	.536	.651	.616	.529	.840				
CON	.528	.499	.441	.501	.501	.534	.524	.615	.493	.817			
BHV	.616	.511	.601	.479	.618	.576	.682	.431	.533	.602	.798		
TIM	.481	.604	.512	.560	.465	.557	.580	.587	.590	.420	.446	.833	
EMO	.435	.393	.407	.522	.416	.408	.499	.406	.326	.344	.311	.410	.775

value, therefore no factors (F1-F13) were deleted. Consequently, the measurement model was shown to have convergent validity (see Table 6).

Moreover, J. Hair et al. (1998) noted that discriminant validity (DV) assesses the extent to which a measure is not related to the other constructs from which it is supposed to differ. Discriminant validity was calculated using the Fornell-Larcker criterion (J. F. Hair et al., 2017). J. F. Hair, Ringle, and Sarstedt (2011) recommended that loadings of indicators of individual constructs should be greater than its cross-loading. In the present study, Table 4 shows that all the values on the diagonals were higher than the threshold value, adequate that DV was established (J. F. Hair et al., 2011) and that DV was confirmed and statistically sufficient to support the model in the present study.

There is also another approach to assess the discriminant validity as posited by J. Henseler et al. (2015) through multitrait and multi-method matrix, namely the Heterotrait-Monotrait Ratio (HTMT). Two methods of using the HTMT value can be used to test the discriminant validity: (i) when using it as a criterion, if HTMT value is greater than 0.85 (J. Henseler et al., 2015; Kline, 2011) or 0.90 (Gold et al., 2001), then there is a problem with discriminant validity, and (ii) when using statistical test to assess the HTMT ratio inference, if the confidence interval of HTMT ratio for the structural paths contains the value of 1, it indicates a lack of discriminant validity (J. Henseler et al., 2016). If the value of 1 falls outside the interval's range, it suggests that the constructs are empirically distinct. The HTMT ratios of correlation results are shown in Table 5. Based on the results in Table 5, all HTMT values were lower than the required threshold value of HTMT .85 suggested by Kline (2011). This indicates that discriminant validity was acceptable for the present study. The results demonstrate that neither lower or higher confidence intervals included a value of 1.

Table 7 and Figure 2 show the significant structural relationships among the research variables and the standardized path coefficients

with their respective significance levels. In the present study, all 36 hypotheses proposed (from H_1 to H_{36}) were found to be significant and therefore all were supported. In relation to IA, the proposed model explained substantial variance in lack of control ($R^2 = 0.43$), social withdrawal and emotional conflict ($R^2 = 0.62$), time management problems ($R^2 = 0.42$), and concealing problematic behaviour ($R^2 = 0.76$).

5 | DISCUSSION

According to Young's schema theory (YST), early maladaptive schemas (EMSs) are hypothesized as arising due to the violation of core emotional needs during early childhood or adolescence and are elaborated throughout the individual's lifetime. EMSs have extremely stable and durable pattern, have negative affect on all areas of an individual's life (e.g., emotions, cognitions, and bodily sensations; J. E. Young et al., 2003). The goal of the present study was to assess the role of early maladaptive schemas in relation to internet addiction. Few investigations have been conducted to examine such relationships, and few researchers have proposed theories to explain this phenomenon.

Accordingly, schema therapy (ST) by organizing the cognitions and modifying the underlying schemas of those with substance addiction neutralizes the damages caused by these MSs to an acceptable level, and this results in increased personal problems. Cross-sectional and prospective studies have illustrated associations between EMSs and measures of attachment/childhood traumas (Blissett et al., 2006; Simard et al., 2011), personality pathology (B. Bach et al., 2016; B. Bach et al., 2017), play a mediating role between childhood adversities and personality disorders (Carr & Francis, 2010), directly or indirectly impacting psychological and psychosomatic distress, and can result in alcoholism and/or substance abuse disorder as a response to such schemas. According to Young's schema theory, EMSs can have a

TABLE 6 Convergent validity and measurement model

Second-order constructs		Loading range	CR	AVE	Cronbach's alpha (α)	VIFs	Type
Domain 1: Disconnection/rejection							
Abandonment/instability			.886	.721	.891		Reflective
	Item 1	.856**					
	Item 2	.836**					
	Item 3	.902**					
	Item 4	.848**					
	Item 5	.717**					
Mistrust/abuse			.834	.658	.828		Reflective
	Item 6	.935**					
	Item 7	.869**					
	Item 8	.913**					
	Item 9	.863**					
	Item 10	.823**					
Emotional deprivation			.918	.813	.909		Reflective
	Item 11	.785**					
	Item 12	.875**					
	Item 13	.823**					
	Item 14	.857**					
	Item 15	.861**					
Defectiveness/shame			.811	.596	.793		Reflective
	Item 16	.931**					
	Item 17	.826**					
	Item 18	.865**					
	Item 19	.893**					
	Item 20	.925**					
Social isolation/alienation			.827	.632	.830		Reflective
	Item 21	.882**					
	Item 22	.907**					
	Item 23	.794**					
	Item 24	.816**					
	Item 25	.895**					
Domain 2: Impaired autonomy performance							
Dependence/incompetence			.852	.712	.863		Reflective
	Item 26	.920**					
	Item 27	.787**					
	Item 28	.912**					
	Item 29	.724**					
	Item 30	.871**					
Vulnerability to harm and illness			.921	.815	.913		Reflective
	Item 31	.809**					
	Item 32	.942**					
	Item 33	.734**					
	Item 34	.756**					
	Item 35	.826**					
Enmeshment/undeveloped self			.834	.674	.841		Reflective
	Item 36	.861**					

TABLE 6 (Continued)

Second-order constructs		Loading range	CR	AVE	Cronbach's alpha (α)	VIFs	Type
	Item 37	.774**					
	Item 38	.910**					
	Item 39	.851**					
	Item 40	.835**					
Failure			.933	.834	.923		Reflective
	Item 41	.910**					
	Item 42	.927**					
	Item 43	.884**					
	Item 44	.902**					
	Item 45	.817**					
Internet addiction (IA)							
Control (CON)			.791	.516	.782		Reflective
	Item 11	.861**					
	Item 12	.693**					
	Item 13	.728**					
	Item 16	.845**					
	Item 17	.763**					
Behaviour (BEH)			.817	.623	.820		Reflective
	Item 3	.706**					
	Item 4	.712**					
	Item 14	.748**					
	Item 15	.725**					
	Item 18	.844**					
	Item 19	.762**					
	Item 20	.771**					
Time (TIM)			.839	.678	.845		Reflective
	Item 1	.937**					
	Item 2	.860**					
	Item 5	.814**					
	Item 6	.906**					
	Item 8	.932**					
Emotional (EMO)			.788	.515	.771		Reflective
	Item 7	.758**					
	Item 9	.795**					
	Item 10	.869**					

Abbreviation: AVE, average variance explained.
**<.01.

negative impact such as the development of addictions (Aloi et al., 2020). EMSs are important issues which cause various physical, social, and educational problems (Bakhshi Bojed & Nikmanesh, 2013; Janovsky et al., 2020). The present study followed the new guidelines for estimation and evaluation of models containing constructs modelled as composite and common factors. Nevertheless, the findings of this study show that EMSs are predictors of IA among individuals. As hypothesized, this study found that maladaptive schemas had a positive influence on IA. This finding supports the results of several earlier studies (Arpaci, 2019; Bakhshi Bojed & Nikmanesh, 2013) and is consistent with cognitive-behavioural theory and Young's schema theory. According to these theories, when individuals become aware of negative childhood experiences, they experience discomfort, which prompts efforts to reduce, change, and forget this experience by adapting self-perceptions, attitudes, and behaviours until their problems are resolved (Kaya Tezel et al., 2015). Most individuals can successfully adjust their thinking and behaviour to reduce or change this distress.

Therefore, the findings here supported and extended the assumptions of the schema therapy model. As noted by J. E. Young

TABLE 7 Results of hypothesis testing

Hypothesis Domain 1: Disconnection/rejection has a positive effect on internet addiction

		Path coefficient	*p* value	Supported
H1	AB→CON	0.12	<0.02	Yes
H2	MA→CON	0.35	<0.01	Yes
H3	ED→CON	0.16	<0.01	Yes
H4	SI→CON	0.28	<0.01	Yes
H5	DS→CON	0.18	<0.01	Yes
H6	AB→BHV	0.13	<0.01	Yes
H7	MA→BHV	0.26	<0.01	Yes
H8	ED→BHV	0.29	<0.01	Yes
H9	SI→BHV	0.44	<0.01	Yes
H10	DS→BHV	0.36	<0.01	Yes
H11	AB→TIM	0.45	<0.01	Yes
H12	MA→TIM	0.37	<0.01	Yes
H13	ED→TIM	0.17	<0.01	Yes
H14	SI→TIM	0.32	<0.01	Yes
H15	DS→TIM	0.20	<0.01	Yes
H16	AB→EMO	0.16	<0.01	Yes
H17	MA→EMO	0.42	<0.01	Yes
H18	ED→EMO	0.20	<0.01	Yes
H19	SI→EMO	0.11	<0.03	Yes
H20	DS→EMO	0.60	<0.01	Yes

Hypothesis Domain 2: Impaired autonomy and performance has a positive effect on internet addiction

		Path coefficient	*p* value	Supported
H21	DI→CON	0.30	<0.01	Yes
H22	VH→CON	0.10	<0.03	Yes
H23	EM→CON	0.32	<0.01	Yes
H24	FA→CON	0.14	<0.01	Yes
H25	DI→BHV	0.24	<0.01	Yes
H26	VH→BHV	0.13	<0.01	Yes
H27	EM→BHV	0.21	<0.01	Yes
H28	FA→BHV	0.36	<0.01	Yes
H29	DI→TIM	0.35	<0.01	Yes
H30	VH→ TIM	0.11	<0.01	Yes
H31	EM→ TIM	0.15	<0.01	Yes
H32	FA→ TIM	0.12	<0.02	Yes
H33	DI→EMO	0.30	<0.01	Yes
H34	VH→ EMO	0.14	<0.01	Yes
H35	EM→ EMO	0.25	<0.01	Yes
H36	FA→ EMO	0.22	<0.01	Yes

et al. (2003), individuals who have schemas on the Disconnection and Rejection and impaired autonomy/performance domains are thought to have a negative and unpleasant childhood history. Previous studies indicated that the stronger the negative MSs, the higher the probability of addiction to substance use, internet use, or obsessive behaviours (Bakhshi Bojed & Nikmanesh, 2013). More recently, the impact of EMSs on a range of mental disorders (OCD; Sunde et al., 2019) and

addiction (substance and opioid addiction; Brummett, 2007; Shaghaghi et al., 2011; Zamirinejad et al., 2018). J. E. Young et al. (2003) identified that MSs are predictive of significant interpersonal maladjustment.

The WarpPLS analysis supported the existence of statistically significant and positive relationships among two areas of EMSs: (i) disconnection/rejection domains (e.g., abandonment, mistrust/

abuse, social isolation, emotional deprivation and defectiveness/ shame areas) and (ii) impaired autonomy/performance schema domains (e.g., dependence/incompetence, vulnerability to harm and illness, enmeshment/undeveloped self and failure to achieve area) with internet addiction. Disconnection/rejection domains and impaired autonomy/performance had high prediction of the potential variance in IA.

Based on the results, all constructs fulfil the guidelines of the confidence test that is based on composite reliability (CR) greater than 0.70 (J. F. Hair et al., 2017) and Cronbach's alpha greater than 0.70 (Nunnally & Bernstein, 1994). The results of the analysis of convergent (AVE) and discriminant (HTMT) validity for each construct were assessed. From the table shown, convergent validity and all discriminant validity tests fulfilled the conditions and support the convergent and discriminant validity analysis that exist among the nine reflective constructs. Previously, the Fornell-Larcker value and cross-loading test were pre-requisites generally accepted in analysing the relationship between latent for structural equation modelling (SEM). Therefore, the relationship of each one of the nine areas of the EMSs and IA were positive and significant. These findings are compatible with Arpaci's (2019) study which was conducted among individuals with smartphone addiction and EMSs and Bakhshi Bojed and Nikmanesh (2013) who reported a positive association between five schema domains and the specific EMSs and IA.

6 | CONCLUSION

IA is a growing problem in the field of addictive behaviour. The present study offers further empirical evidence that there is a relationship between early maladaptive schemas and internet addiction. A better knowledge of the relationship between EMSs and IA can lead to better understanding of the aetiology and pathogenesis of this addictive behaviour. It provides new insights into the development of specific psychological and psychosocial approaches aimed at the prevention and treatment of IA. Moreover, the findings suggest that specific schemas, namely, abandonment, mistrust/abuse, emotional deprivation, social isolation/alienation, defective/shame, dependence/incompetence, vulnerability to harm and illness, enmeshment/undeveloped self, and failure with internet addiction. These results are consistent with J. E. Young et al.'s (2003) conceptualization framework of the association between EMSs with chronic psychological distress, as well as preliminary evidence of differential patterns of cognitive biases. The present study has a number of limitations that provide opportunities and challenges for future research. First, the risk of internet addiction was assessed at only one time-point over a relatively short time. Therefore, long-term developmental tendency of the behaviour cannot be established. Second, similar to most studies concerning EMSs and IA, this study was based on self-reports of participants to assess EMSs and IA, and this may result in increased associations between measures. Future research should examine rigorously the role of EMSs by means of structured interviews. This would allow assessing

the role of EMSs in behavioural addictions such as IA. Third, the study was conducted in Iran so the findings cannot necessarily be generalized to other parts of the world. Fourth, the sample consisted of a non-clinical sample of adults, and replication in clinical samples is required. Nevertheless, clinical samples are not without problems and both types of studies (e.g., clinical vs. non-clinical research) may complement each other. Fifth, the research design of the study was cross-sectional. A longitudinal research design would provide more reliable and profound information pertaining to the relationships addressed in the study. Despite these limitations, results of the study are useful for researchers to understand underlying psychological mechanisms between Internet addiction and EMSs. Further research related to early maladaptive schemas will contribute to theories of psychopathology and may enhance our understanding of the important cognitive processes to attend to when treating these disorders. As the present study was exploratory in nature, the results suggest that schema therapy (ST) can be used by psychotherapist and clinicians as a treatment method for IA disorder.

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