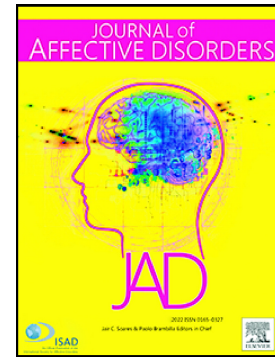


Journal Pre-proof

A structural equation model of the impact of maladaptive personality traits on problematic internet use: The serial mediating effects of metacognitions and emotion dysregulation

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PII: S0165-0327(25)01266-2

DOI: <https://doi.org/10.1016/j.jad.2025.119824>

Reference: JAD 119824

To appear in:

Received date: 26 May 2024

Revised date: 29 June 2025

Accepted date: 2 July 2025

Please cite this article as: M. Zemestani, A. Jafari, S.M. Ahmadi, et al., A structural equation model of the impact of maladaptive personality traits on problematic internet use: The serial mediating effects of metacognitions and emotion dysregulation, (2024), <https://doi.org/10.1016/j.jad.2025.119824>

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A structural equation model of the impact of maladaptive personality traits on problematic internet use: The serial mediating effects of metacognitions and emotion dysregulation

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Abstract

Background: Although the relationship between personality traits and problematic internet use (PIU) has been established, the underlying mechanisms that may account for this association remains unclear. Metacognitions and emotion dysregulation may partly explain this association. Therefore, the present study examined the serial mediating role of metacognitions and emotion dysregulation in the association between DSM-5 pathological personality domains and PIU.

Method: A total of 610 university students completed the Personality Inventory for the DSM-5-Brief Form (PID-5-BF), Metacognitions Questionnaire-30 (MCQ-30), Difficulties in Emotion Regulation Scale (DERS), and Internet Addiction Test (IAT). Structural equation modeling (SEM) was used to test the hypothesized model.

Results: The structural model provided a good fit to the data. Significant positive correlations were found between DSM-5 pathological personality domains and PIU. Metacognitions and emotion dysregulation negligibly and serially mediated the association between DSM-5 pathological personality domains and PIU symptoms.

Limitations: This was a cross-sectional study which could not infer causality.

Conclusion: The findings showed that metacognitions and emotion dysregulation may partly explain the association between maladaptive personality traits and PIU. The present study contributes to understanding the mechanisms that underlie the complex effects of maladaptive personality traits on PIU.

Keywords: Emotion dysregulation; Metacognition; Problematic internet use; Personality traits; DSM-5 alternative model of personality disorders (AMPD)

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1. Introduction

The early 21st century is characterized by the widespread use of communication and information technology. With the development of information technology, the internet has brought convenience, yet it has also introduced challenges (Kuss, 2025), particularly for young adults in their university years (Sanchez-Fernandez et al., 2023). The university years are a developmentally crucial period for young people in which they transition from late adolescence to emerging adulthood (Liang et al., 2021). Problematic internet use (PIU) – a maladaptive pattern of internet use characterized by cognitive preoccupation, lack of regulation over internet use, and negative outcomes – is often observed during emerging adulthood and university years (Huang, 2006; Kuss et al., 2013). PIU is not recognized by official diagnostic systems (e.g., the *Diagnostic and Statistical Manual of Mental Disorders, International Classification of Diseases*) but it is widely recognized that PIU may impair everyday functioning in social, academic/professional, and personal life (American Psychiatric Association, 2013). In particular, young adults in the university years are prone to PIU, which has shown to affect their physical health (Alaca, 2020), mental well-being (Lebni et al., 2020), and academic performance (Romero-López et al., 2021).

The Interaction of Person-Affect-Cognition-Execution ([I-PACE] Model; Brand et al., 2016) is a theoretical framework for the processes underlying the development and persistence of PIU. In keeping with previous perspectives (i.e., Davis, 20021), the I-PACE distinguishes between generalized and specific forms of PIU. Generalized PIU (GPIU) refers to general multidimensional problematic overuse of the internet and is frequently associated with communicative applications of the internet and a lack of social support in real life, as well as feelings of social isolation or loneliness (Davis, 2001). Specific PIU (SPIU) refers to an addictive use of one specific online application, such as gaming, gambling, pornography/cybersex, shopping, social networking, or

communication (Brand et al., 2016). In this model, both forms of PIU are considered to be the consequence of interactions between predisposing factors (such as neurobiological constitutions and dysfunctional personality traits), moderators (such as coping styles and internet-related cognitive biases), and mediators (i.e., affective and cognitive responses to situational triggers such as urge for mood regulation).

Among predisposing factors, personality traits have been increasingly studied (Kuss et al., 2014; Marino et al., 2020; Sanchez-Fernandez et al., 2023), and many studies have shown associations between PIU and high neuroticism or emotional instability (Hasani et al., 2024; Liao et al., 2020; Marino et al., 2016), high impulsivity (Şalvarlı & Griffiths, 2022), low conscientiousness (Kököneyi et al., 2019; Liao, et al., 2020), high extraversion (Hasani et al., 2024), and low self-directedness (Zemestani et al., 2023). However, some authors argue that scientific attention should be given to recent models of personality pathology as they might help to reach a more comprehensive understanding of the development and/or maintenance of behavioral addictions (Gervasi et al., 2017; Zemestani et al., 2023). In particular, research concerning the DSM-5 alternative model appears to be promising because it assesses extreme or atypical levels of basic personality traits that are not captured by traditional approaches in the study of personality.

1.1. Dysfunctional personality traits and problematic internet use

The DSM-5 alternative model for personality disorders (AMPD) which was included within Section III of DSM-5 (American Psychiatric Association, 2013; 2022), focuses on maladaptive variants of the five domains of the well-known Five Factor Model (FFM), and consists of five broad domains of negative affectivity, detachment, psychoticism, antagonism, and disinhibition that are aligned with the FFM domains of neuroticism, extraversion, openness, low agreeableness,

and conscientiousness, respectively (Krueger et al., 2012; Krueger & Hobbs, 2020; Widiger & Costa 2012; Widiger et al., 2017; Widiger & McCabe, 2020). High levels of antagonism and disinhibition have been found associated with substance use disorders (Creswell et al., 2016), and several studies in Iranian society (where the present study was conducted) have shown the role of pathological personality dimensions with respect to the tendency to substance use among university students (e.g., Pour Rajabali Moafi et al., 2018). Although there is still a paucity of research regarding PIU, one study (Rogier et al., 2023) reported that aggression and negative affectivity positively predicted problematic *Facebook* use (i.e., one specific form of PIU), and another study (Laier et al., 2018) found that high levels of negative affectivity, disinhibition, and psychoticism domains had predictive roles in the development and maintenance of internet gaming disorder (i.e., another specific PIU). Similarly, GPIU has been associated with negative affectivity, disinhibition, and psychoticism among university students (Gervasi et al., 2016).

1.2. Emotion dysregulation and problematic internet use

Within the aforementioned I-PACE model, the effect of personality traits on the development of PIU is considered to be indirect and in interaction with other individual factors, and empirical studies support the contention that the association between personality traits and PIU may be mediated by various cognitive and emotional factors (Andreassen et al., 2013, 2017; Laier et al., 2018; Suhr & Tsanadis, 2007; Throuvala et al., 2019; Spada & Marino, 2017; Zemestani et al., 2023). Because the most influential theoretical models of PIU suggest that disorders stemming from addictive behaviors are the result of interactions between core personal characteristics (e.g., personality dimensions) and various moderating and mediating variables (Andreassen et al., 2013, 2017; Laier et al., 2018; Suhr & Tsanadis, 2007; Throuvala et al., 2019; Spada & Marino, 2017;

Zemestani et al, 2023), further research is needed to identify the potential factors involved in this relationship. Such efforts are crucial to guide the design of interventions aimed at preventing PIU.

A possible explanation as to how pathological personality traits and PIU may relate with each other lies in internet use taking the form of a maladaptive emotion regulation strategy (Billieux & Van der Linden 2012; La Rose et al., 2003; Spada et al. 2008), because it is well-established that several dysfunctional personality traits are related to difficulties in the capacity of individuals to regulate their emotional states (e.g., Garofalo et al., 2018). If PIU arises from difficulties in emotion regulation, it follows that the emotion regulation paradigm may be of relevance in furthering the understanding of such difficulties (Philippot & Feldman 2013; Spada & Marino, 2017). This aligns with the aforementioned I-PACE model, which proposes that the effect of personality traits on PIU is indirect and in interaction with other cognitive and emotional factors.

Many studies have found that emotion dysregulation is strongly associated with PIU (e.g., Casale et al., 2016; Extremera et al., 2019; Hasani et al., 2024; Hormes et al., 2014; Liang et al., 2021; Marino et al., 2016; Mo et al., 2018; Rozgonjuk & Elhai, 2019; Spada & Marino, 2017). Individuals with PIU often report experiencing more frequent and intense negative emotions (Li et al., 2020; Wang et al., 2025; Wolniewicz et al., 2018), and it has been reported that some individuals with PIU use the medium of internet-based communication to escape from negative emotions (Laier et al., 2018; McNicol & Thorsteinsson, 2017; Montag et al., 2016). Previous studies among university students in Taiwan (Tsai et al, 2020), and adolescents in China (Mo et al., 2018) reported that individuals who overuse the internet were more likely to regulate their emotion by suppression and escape via PIU. Because internet use may provide a platform for (i) escaping from (or minimizing) negative emotions and/or alleviating distressing feelings, it is

plausible that individuals who have problems with emotional regulation are more likely to use the internet as a strategy to regulate their negative emotions, leading to PIU (Mo et al., 2018).

To the best of the authors' knowledge, only one previous study (i.e., Rogier et al., 2023) has examined the mediating role of emotion dysregulation in the association between pathological personality traits and a specific form of PIU (i.e., problematic Facebook use [PFU]). The study showed that only the negative affect domain of the PID-5 was a significant predictor of PFU, and the association was partially mediated by emotion dysregulation.

1.3. Dysfunctional personality traits, emotion dysregulation and problematic internet use: A metacognitive account

The metacognitive model of psychopathology proposes that metacognitions play a fundamental role in all psychological disorders (for a review, see Wells, 2013). In their Self-Regulatory Executive Function (S-REF) model of psychopathology, Wells and Matthews (1994) proposed that beliefs about cognitive-affective experiences and ways of controlling these cognitive-affective experiences (namely 'metacognitions' and also referred to as 'metacognitive beliefs') are involved in the activation and maintenance of maladaptive coping styles (e.g., worry and rumination) that maintain psychological dysfunctions (Wells, 2002; 2009; 2013). This model has also been applied to explain the development and maintenance of PIU (Akbari et al 2021; Casale et al., 2021; Lin et al., 2023; Spada & Caselli, 2017).

It has also been suggested that metacognitions could be a process that helps in explaining the association between personality traits and PIU (Casale et al., 2021; Marino et al., 2016; Spada et al., 2015), because personality traits represent salient ways in which individuals differ in their metacognitive style (Marino et al., 2018). Personality traits pertaining to the affective domain (e.g., emotional stability) and the cognitive domain (e.g., conscientiousness) might be more strongly

associated to the need to control one's own thoughts (Wells & Davies 1994), and cognitive self-consciousness (Trapnell & Campbell 1999). The very few studies that have been conducted in this regard (e.g., Marino et al., 2018) report that different personality traits lead to the activation of different metacognitions. However, this link might be indirect.

Metacognition has a role in the development and perpetuation of emotion dysregulation (Spada et al., 2009, 2013, 2015; Spada & Marino, 2017; Spada & Wells, 2005, 2009; Ünal-Aydın et al., 2021), because it fulfills an executive function with regard to cognitive processing (Wells, 2002). Within this framework, metacognitions predict PIU because they lead to an escalation in negative emotions (through the activation of maladaptive coping strategies such as worry and rumination) which, in turn, increases the likelihood of utilizing the internet as a compensatory mechanism for regulating negative emotions (Spada et al., 2008; Casale et al., 2016). In other words, from a metacognitive standpoint, it is plausible that specific maladaptive personality traits may trigger the activation of dysfunctional metacognitions. These, in turn, exacerbate emotional dysregulation, ultimately leading to excessive use of the internet as a strategy to alleviate distressing feelings (Casale et al., 2016; Marino et al., 2016).

Previous studies suggest that some maladaptive personality traits significantly influence both metacognitions and emotion dysregulation, and, in turn, PIU (e.g., Marino et al., 2016). Individuals with maladaptive personality traits (e.g., emotional instability) may develop positive metacognitive beliefs about worry (e.g., *"worrying helps me cope"*) and/or negative metacognitive beliefs about thoughts concerning uncontrollability and danger and cognitive confidence (e.g., *"I cannot stop thinking about internet use"*) which, in turn, affect PIU (Marino et al., 2016). In other words, internet use may act as a maladaptive coping strategy to escape from the negative emotions which arise from these metacognitive beliefs (Kardefelt-Winther, 2014; Laier et al., 2018; van den

Eijnden et al., 2008). Therefore, theoretical accounts and the limited available data support the potential contribution of metacognitions and emotion dysregulation to PIU, both directly influencing such problematic behavior and serially mediating the relationship between personality traits and PIU.

1.4. Aim of present study

Despite well-established associations between FFM dimensions of personality and PIU, limited research has examined the relationship between DSM-5 pathological personality domains and PIU, particularly with regard to potential mechanisms that may explain these associations. Therefore, the aim of the present cross-sectional study was to contribute to the increasing understanding of PIU by exploring the indirect relationship between DSM-5 pathological personality domains and PIU via metacognitions and emotion dysregulation. To the best of the authors' knowledge, the present study is the first to examine whether metacognitions and emotion dysregulation serially mediate the association between DSM-5 pathological personality domains and PIU symptoms. Based on the aforementioned prior literature it was hypothesized that: (i) there would be significant relationship between DSM-5 pathological personality domains (i.e., negative affectivity, detachment, antagonism, disinhibition, and psychoticism) and PIU (H_1); and (ii) metacognitions and emotion dysregulation would serially mediate the relationship between pathological personality domains and PIU symptoms (H_2).

2. Method

2.1. Participants and procedure

A total of 610 Iranian university students were recruited from five universities in the Kermanshah, Iran. The study employed a convenience sampling method, where participants

were approached in common university campus areas, classes, and dormitories to take part in the study. The ‘paper-and-pencil’ survey contained self-report measures that participants completed in-person and included basic socio-demographic information (i.e., age, gender, education, social media applications used, type of internet use, and device for internet use) and other psychometric measures related to the study. The inclusion criterion was being a university student and the exclusion criterion was unwillingness to participate in the study and not providing informed consent to participate in the study.

2.2. Measures

2.2.1. Socio-demographic information and internet use

The participants provided basic socio-demographic information (i.e., age, gender, education) and other information related to the study including type of internet use (academic use, online gaming, downloading videos or songs, and engaging in forms of entertainment) and type of social media applications used (*Instagram, Telegram, Facebook, YouTube, Twitter, and WhatsApp*), and devices used for accessing the internet (i.e., smartphone, laptop, tablet, and/or PC). Data regarding online gambling and online pornography were not collected as these are illegal in Iran.

2.2.2. Internet Addiction Test (IAT)

The IAT (Young, 1998; Persian version: Alavi et al, 2010) is a 20-item self-report measure designed to assess the severity and frequency of PIU symptoms over the past week. Each item (e.g., “*How often does your job performance or productivity suffer because of the internet?*”) is rated on a five-point Likert scale from 0 (*rarely*) to 5 (*always*). Total scores that range from 0 to 30 are considered to reflect a normal level of internet use, scores of 31 to 49 indicate a mild level of problematic internet use; 50 to 79 indicate a moderate level of problematic internet use, and scores of 80 to 100 indicate severe problematic internet use. The IAT has been translated and

validated in many countries, and has demonstrated good internal consistency and reliability in many studies (Faraci et al. 2013, Gervasi et al, 2017; Ha et al. 2006, Widyanto & McMurran 2004).

In the present study, the internal consistency of the IAT was very good (Cronbach's $\alpha = 0.83$).

2.2.3. Personality Inventory for the DSM-5 Brief Form (PID-5-BF)

The PID-5-BF (Krueger et al., 2012; Persian version: Athar & Ebrahimi, 2023) is a 25-item self-report measure comprising five domain scales (that assess the five domains of DSM-5 AMPD by five items each) and 25 trait facets: negative affectivity (e.g., *"I get irritated easily by all sorts of things"*), detachment (e.g., *"I'm not interested in making friends"*), antagonism (e.g., *"It's no big deal if I hurt other peoples' feelings"*), disinhibition (e.g., *"Even though I know better, I can't stop making rash decisions"*), and psychoticism (e.g., *"My thoughts often don't make sense to others"*). Items are rated on a four-point Likert scale, ranging from 0 (*very false or often false*) to 3 (*very true or often true*). Each domain ranges in score from 0 to 15. The PID-5-BF yields a total score for the overall measure. The total score has a range of scores from 0 to 75, with higher scores indicating a greater overall personality dysfunction. The PID-5-BF has been translated and validated in different countries (e.g., Anderson et al., 2018; Fossati et al, 2017; Krueger et al., 2012; Thomas et al., 2013). In the present study, the PID-5-BF indicated very good internal consistency (with Cronbach's α ranging between 0.80 and 0.89 for all subscales).

2.2.4. Metacognitions Questionnaire-30 (MCQ-30)

The MCQ-30 (Wells & Cartwright, 2004; Persian version: Shirinzadeh et al., 2009) was used to assess metacognitions. The scale comprises five dimensions of metacognition assessed by six items each: positive beliefs about worry (e.g., *"Worrying helps me cope"*); negative beliefs about uncontrollability and danger (e.g., *"When I start worrying I cannot stop"*); cognitive confidence (e.g., *"I have a poor memory"*); cognitive self-consciousness (e.g., *"I pay close*

attention to the way my mind works”); and need to control thoughts (e.g., *“Not being able to control my thoughts is a sign of weakness”*). Each item is rated on a four-point Likert scale, ranging from 1 (*definitely disagree*) to 4 (*definitely agree*). Higher scores indicate higher levels of maladaptive metacognitions. The MCQ-30 possesses good psychometric properties (Spada et al., 2008). In the present study, the MCQ-30 indicated very good internal consistency (Cronbach’s α ranging between 0.80 and 0.89 for all subscales).

2.2.5. Difficulties in Emotion Regulation Scale (DERS)

The DERS (Gratz & Roemer, 2004; Persian version: Mazaheri, 2015) was used to assess emotion regulation. The scale comprises 36 items assessing problems in six domains of emotion regulation including non-acceptance of emotional responses (six items; e.g., *“When I’m upset, I become embarrassed for feeling that way”*), difficulties engaging in goal directed behavior (five items; e.g., *“When I’m upset, I have difficulty focusing on other things”*), impulse control difficulties (six items; e.g., *“When I’m upset, I have difficulty controlling my behaviors”*), lack of emotional awareness (six items; e.g., *“I pay attention to how I feel”* reverse-scored), limited access to emotion regulation strategies (eight items; e.g., *“When I’m upset, I believe that I will remain that way for a long time”*), and lack of emotional clarity (five items; e.g., *“I have no idea how I am feeling”*). Items are rated on a five-point Likert scale from 1 (*almost never*) to 5 (*almost always*) with higher scores reflecting greater emotion regulation difficulties. The instrument developers reported high internal consistency for total score (Cronbach’s $\alpha = 0.93$) and two-month test-retest reliability ($r = 0.88$) (Gratz & Roemer, 2004). In the present study, the DERS indicated very good internal consistency (Cronbach’s α ranging between 0.80 and 0.89 for all subscales).

2.3 Ethics

The study was approved by the University of Kurdistan's ethics committee (Ref: IR.UOK.REC.1398.020). All study procedures complied with the Declaration of Helsinki regarding research on human participants. The ethical conditions of participation including voluntary participation, privacy, anonymity, and confidentiality were explained to the participants.

2.4 Statistical analysis

Statistical analyses were carried out using IBM SPSS-27 Statistics for Windows, and IBM AMOS-26 software (IBM Corp., Armonk, New York). Survey responses were initially checked for missing data; 86 questionnaires (11.4%) were removed due to missing data. Outliers ($n = 54$) were also removed using the boxplots method, leaving data from 610 participants in the final model analysis. Descriptive statistics were used to calculate demographic and other selected characteristics of the participants. Pearson's correlation analysis calculated to analyze bivariate correlations between study variables. To interpret the correlation coefficients, effect sizes were using based on Cohen et al. (1988), where $r \geq 0.10$ to 0.29 indicates a low effect, $r \geq 0.30$ to 0.49 indicates a medium effect, and $r \geq 0.50$ and above indicates a high effect. Structural equation modeling (SEM) was utilized to examine how DSM-5 pathological personality domains related to PIU via metacognitive beliefs and emotion regulation difficulties. Bootstrapping analysis (iteration number = 5000) were used to test the serial mediating effects of metacognitive beliefs and emotion regulation difficulties in the relationship between DSM-5 pathological personality domains and PIU. Prior to conducting the SEM, the data were assessed for potential violations of assumptions of normality. The maximum likelihood (ML) estimation method was used for SEM. The evaluation of the model fits of the SEM was based on several fit indices, including chi-square test (CMIN), chi-square divided by its degrees of freedom (CMIN/DF), comparative fit index (CFI), goodness of fit index (GFI), normed fit index (NFI), Tucker–Lewis index (TLI), and root mean square error

of approximation (RMSEA). A non-significant chi-square test is indicative of a well-fitting model. For the CMIN/DF a value < 5 , for the CFI, GFI, and NFI, values ≥ 0.90 , and for the RMSEA a value < 0.07 , indicate acceptable fits with the data (Hu & Bentler, 1999; Klein, 2011; Xia & Yang, 2019).

3. Results

3.1. Descriptive statistics

The results of the descriptive findings are presented in Table 1. Results showed that the majority of participants were bachelor's students (83.6%). The results also showed that 90.8% used *Telegram*, 68.0% *Instagram*, 46.5% *WhatsApp*, 10.9% *YouTube*, 8.3% *Facebook*, and 6.5% *Twitter*. Also, 54.7% of the participants used the internet for music/video downloading, 36.8% for educational purposes, and 17.8% for gaming. To access the internet, 96.7% used smartphones, 29.3% used laptops, 17.2% used PCs, and 7.8% used tablets. Finally, for the severity of internet use, approximately 38.8% of the participants had a mild level ($n = 237$), 55.2% of them had a moderate level ($n = 337$), and 7.8% of them had a severe level ($n = 36$) as recommended using IAT cutoff scores (Young, 1998).

Table 1

3.2. Correlations between the study variables

The results of univariate and multivariate skewness and kurtosis analysis indicated that all variables were normally distributed. More specifically, skewness values ranged from -0.35 to 0.01, and kurtosis values ranged from -0.65 to 0.10, all within the acceptable normal range. Means,

standard deviations, skewness and kurtosis values, and correlation matrix are presented in Table 2. Pearson correlations showed that all DSM-5 pathological personality domains—negative affectivity, detachment, antagonism, disinhibition, and psychoticism—were moderately and positively associated with PIU symptoms. Regarding metacognitions, all dimensions of the MCQ were positively correlated with PIU symptoms. Similarly, all dimensions of the DERS, which measure emotion dysregulation, were also positively correlated with PIU symptoms. Additionally, correlations between the MCQ and DERS dimensions were positive and significant across all measures (all p -values < 0.01).

Table 2

3.3. Model fit indices

In the mediation analysis, DSM-5 pathological personality domains were the predictor variables, metacognitions and emotion dysregulation were the serial mediator variables, and PIU severity was the criterion variable. As shown in Table 3, the initial SEM model showed a poor fit to the data ($\chi^2=1483.877$, $df=107$, $\chi^2/df=13.868$ [$p<0.001$], CFI = 0.682, GFI = 0.681, NFI = 0.666, TLI = 0.594, and RMSEA = 0.144 [90% CI = 0.137 to 0.150]). To improve the fit, the model was modified by adjusting the covariance between residual errors. The modified model showed a good fit to the data ($\chi^2= 256.640$, $df = 89$, $\chi^2/df = 2.98$ [$p<0.001$]; CFI = 0.957, GFI = 0.949, NFI = 0.937, TLI = 0.934, and RMSEA = 0.057 [90% CI = 0.049 to 0.065]).

Table 3

3.4. Standardized direct effects of study variables

As shown in Table 4 and Figure 1, the direct paths between DSM-5 pathological personality domains of antagonism ($\beta = 0.097$, $t = 2.28$, $p = 0.022$), disinhibition ($\beta = 0.166$, $t = 4.09$, $p = 0.010$), psychoticism ($\beta = 0.134$, $t = 2.91$, $p = 0.004$) and PIU were significant, whereas the direct paths between DSM-5 pathological personality domains of negative affectivity ($\beta = 0.044$, $t = 1.03$, $p = 0.302$), detachment ($\beta = -0.016$, $t = -0.41$, $p = 0.679$) and PIU were non-significant.

The direct paths between all DSM-5 pathological personality domains of negative affectivity ($\beta = 0.279$, $t = 5.76$, $p = 0.010$), detachment ($\beta = 0.125$, $t = 2.80$, $p = 0.005$), antagonism ($\beta = 0.146$, $t = 3.00$, $p = 0.003$), disinhibition ($\beta = 0.144$, $t = 3.09$, $p = 0.002$), psychoticism ($\beta = 0.135$, $t = 2.55$, $p = 0.011$) and the MCQ were significant. Maladaptive metacognitions were found to directly predict emotion dysregulation ($\beta = 0.642$, $t = 7.71$, $p = 0.010$), and PIU symptoms ($\beta = 0.160$, $t = 2.18$, $p = 0.029$).

The direct path between DSM-5 pathological personality domain of negative affectivity ($\beta = 0.096$, $t = 2.22$, $p = 0.026$), antagonism ($\beta = 0.090$, $t = 2.11$, $p = 0.034$), detachment ($\beta = -0.010$, $t = -0.18$, $p = 0.851$), disinhibition ($\beta = 0.083$, $t = 2.05$, $p = 0.040$) and the DERS were significant. Whereas the direct effects of DSM-5 pathological personality domains of detachment ($\beta = 0.002$, $t = 0.051$, $p = 0.960$), psychoticism ($\beta = -0.036$, $t = -0.78$, $p = 0.432$) and DERS were non-significant. All standardized direct effects of DSM-5 pathological personality domains on PIU via metacognitions and emotional dysregulation are shown in Figure 1.

Table 4

3.5 Bootstrapping to test the serial mediating role of metacognitions and emotion dysregulation on PIU

To investigate the serial mediating role of metacognitions and emotion dysregulation in the relationship between the DSM-5 pathological personality domains with PIU, bootstrapping analysis (with 5000 iterations) was performed. As shown in Table 5, bootstrapping mediation analyses indicated that the indirect paths from all DSM-5 pathological personality domains of negative affectivity ($\beta = 0.044$, 95% CI = [0.008, 0.304], $p = 0.046$), detachment ($\beta = 0.019$, 95% CI = [0.003, 0.144], $p = 0.035$), antagonism ($\beta = 0.022$, 95% CI = [0.004, 0.201], $p = 0.038$), disinhibition ($\beta = 0.023$, 95% CI = [0.001, 0.154], $p = 0.042$), psychoticism ($\beta = 0.020$, 95% CI = [0.009, 0.185], $p = 0.036$), to PIU via metacognitions were significant. Moreover, the indirect paths from DSM-5 pathological personality domains of negative affectivity ($\beta = 0.016$, 95% CI = [0.009, 0.280], $p = 0.047$), antagonism ($\beta = 0.015$, 95% CI = [0.001, 0.173], $p = 0.043$), disinhibition ($\beta = 0.014$, 95% CI = [0.009, 0.184], $p = 0.011$), to PIU via emotion dysregulation were significant. However, the indirect paths from DSM-5 pathological personality domains of detachment ($\beta = 0.000$, 95% CI = [-0.084, 0.054], $p = 0.911$), psychoticism ($\beta = -0.006$, 95% CI = [-0.129, 0.054], $p = 0.727$), to PIU via emotion dysregulation were non-significant.

Moreover, in accordance with the hypotheses, the serial mediating effect between DSM-5 pathological personality domains and PIU via metacognitions and emotion dysregulation were significant. However, the results indicated that metacognitions and emotion dysregulation only negligibly mediated the relationship between DSM-5 pathological personality domains of (i) negative affectivity and PIU ($\beta = 0.029$, 95% CI = [0.009, 0.211], $p = 0.006$), (ii) detachment and PIU ($\beta = 0.013$, 95% CI = [0.010, 0.105], $p = 0.010$), (iii) antagonism and PIU ($\beta = 0.015$, 95% CI

= [0.008, 0.104], $p = 0.012$), (iv) disinhibition and PIU ($\beta = 0.016$, 95% CI = [0.004, 0.111], $p = 0.028$), and (v) psychoticism and PIU ($\beta = 0.014$, 95% CI = [0.002, 0.115], $p = 0.004$).

Table 5 and Figure 1

4. Discussion

The aim of the present study was to examine the serial mediation effects of metacognitions and emotion dysregulation in the association between DSM-5 pathological personality domains and PIU symptoms among university students. It was hypothesized that: (i) there would be significant relationship between DSM-5 pathological personality domains (i.e., negative affectivity, detachment, antagonism, disinhibition, and psychoticism) and PIU (H_1); and (ii) metacognitions and emotion dysregulation would serially mediate the relationship between pathological personality domains and PIU symptoms (H_2). The findings supported H_1 and showed that, as expected, DSM-5 pathological personality domains of negative affectivity, detachment, antagonism, disinhibition, and psychoticism were all moderately and positively associated with PIU symptoms. These findings are consistent with previous studies (Gervasi et al, 2017; Laier, Wegmann, & Brand, 2018) which reported that maladaptive personality domains of negative affectivity, disinhibition, and psychoticism play predictive roles in the development and maintenance of PIU symptoms. Personality traits have been suggested as basic factors in explanations concerning the contributory factors to PIU, and appear to be important determinants in the enduring disposition of PIU. Within the context of DSM-5 alternative model, negative affectivity or neuroticism, defined as the tendency for frequent and intense negative emotions, is considered as one of the key personality traits involved in the overuse and addictive use of the internet (Maltby et al., 2010), and high levels of this trait have a strong association with PIU

symptoms (Gervasi et al, 2017; Laier et al., 2018). In explaining this association, it can be said that neurotic individuals with characteristics such as nervousness, anxiousness, and sadness have less power in dealing with negative emotions and stressful life events. For individuals with high scores in the negative affectivity domain, excessive internet use may be a maladaptive coping strategy serving to downregulate or escape from negative emotions (Kardefelt-Winther, 2014, van den Eijnden et al. 2008), and/or to overcome stressful life events (e.g., a traumatic event; Schimmenti et al. 2012, 2017; Schimmenti & Caretti 2010).

In the present study, antagonism was another pathological personality domain related to increased PIU symptoms. Antagonism, as the extreme end of agreeableness, is defined as immorality, militancy, grandiosity, and hostility (Lynam & Miller, 2019). Those who are agreeable do not like to get involved in competitive behavior and do not involve themselves in conflicts. Those who are agreeable use tolerance and forgiveness strategies and avoid putting pressure on others. In contrast, dissenters pay more attention to their own needs than to the needs of others in relationships. Such individuals are narcissistic, antisocial, and domineering (McCrae & Costa, 1987). Various studies have shown a consistent negative relationship between high agreeableness and healthy internet use (e.g., Landers & Lounsbury, 2006; Roos & Kazemi, 2021). In contrast, individuals with low levels of agreeableness tend to use the internet unhealthily (Puerta-Cortes & Carbonell, 2013; Randler et al., 2014; Servidio, 2014). In explaining this relationship, it can be said that individuals with low levels of agreeableness as a result of incompatibility with the outside world turn to problematic use of the internet. These individuals are less threatened in the virtual world, and by creating false and ideal characters, they can be popular in this space. Individuals in the virtual world do not need to try to improve their relationships and behave and think as they like (Van der Aa et al., 2009).

Disinhibition was another pathological personality domain associated with increased symptoms of PIU. Disinhibition, as the extreme end of low conscientiousness, is defined by characteristics such as impulsivity and sensation seeking (Thomas et al., 2013). The present study's finding is consistent with a large body of evidence that has linked problematic internet use to poor self-control and traits such as impulsivity and sensation seeking (Billieux et al., 2012; Li et al., 2021). Individuals with high levels of conscientiousness are characterized by two characteristics: the ability to control impulse and the use of plans and programs to achieve goals. In contrast, individuals with low levels of conscientiousness have characteristics such as lack of self-control, lack of adherence to ethical principles, and lack of accuracy in doing things (Costa & McCrae, 1992). This lack of self-regulation makes them more prone to problematic internet use because they do not have control over the activity and can easily spend many hours on the internet without controlling how long they spend on it (Frangos & Fragkos, 2011). The anonymity of the internet may offer a safer space for individuals with low conscientiousness to act on their impulsive tendencies, helping them cope with negative emotions through impulsive behaviors, such as quickly engaging in new online relationships (Billieux & Van der Linden, 2012).

Finally, psychoticism significantly predicted the symptoms of PIU. This finding is consistent with previous studies that have identified psychoticism as a risk factor for increased PIU (Zhou et al., 2018). It has been suggested that internet use may provide an opportunity to integrate the inner and outer worlds of individuals characterized by psychotic traits (Rosegrant, 2012). Schimmenti and Caretti (2010) noted that virtual reality allows individuals to explore and express different self-states that often are not expressed in the real world (for example, due to feelings of shame or fear of social disapproval). For those individuals who are less integrated on the emotional and cognitive levels, the internet may appear as a place where reality and an illusionary world can

merge (Rosegrant, 2012), and a place where the nonintegrated states of consciousness or fantasies that cannot be expressed in reality can find a “bonding agent”. This helps these young people not to fall to pieces, preventing fragmentation in their personalities (Gervasi et al, 2017).

Previous research (Puerta-Cortes & Carbonell, 2013; Casale, et al., 2016) has shown that metacognitions and emotion dysregulation can play a mediating role in the relationship between individual characteristics and PIU. Consistent with H₂, the present study’s findings showed that metacognitions and emotion dysregulation serially mediated the relationship between DSM-5 pathological personality domains and PIU symptoms. However, it should be noted that although this serial mediation was significant, the range of indirect standardized effects was low, indicating that the associations were only negligibly mediated by metacognitions and emotion dysregulation and only weakly support the findings of previous research.

The findings also showed that emotion dysregulation negligibly mediated the relationship between DSM-5 pathological personality domains and PIU. This finding is again weakly consistent with previous research (Mo et al., 2018; Rogier et al., 2023) showing that difficulties in emotion regulation can have a mediating role in the relationship between personality traits and PIU. It is plausible that emotion dysregulation is tied to specific personality domains, with specific traits predisposing individuals to respond to and regulate their emotions in particular ways (Pollock et al., 2016). There are substantial individual differences in the capacity to identify, access, and utilize emotion regulation strategies in a flexible and effective manner (e.g., Cole et al., 1994). These individual differences in emotion regulation have been found to be related to various pathological personality domains. For example, findings from a study in the context of DSM-5 alternative model showed that specific DSM-5 pathological personality domains such as negative

affectivity and antagonism were associated with specific aspects of emotion dysregulation—namely, difficulties with impulse control and limited access to effective emotion regulation strategies (Pollock et al., 2016).

The potential serial mediating role of metacognitions and emotion dysregulation in the relationship between DSM-5 pathological personality domains and PIU can be better understood by considering the emotional experiences of individuals struggling with PIU. Research shows that individuals with PIU symptoms often report more frequent and intense negative emotions compared to others (Li et al., 2020; Wolniewicz et al., 2018). Those with maladaptive personality traits (i.e., negative affectivity), are more prone to developing dysfunctional metacognitive beliefs (e.g., “*Worrying helps me cope*”) and/or about uncontrollability and danger (e.g., “*When I start worrying I cannot stop*”). These beliefs can create a vicious cycle, intensifying emotional distress and making it harder to regulate emotions effectively.

In this context, internet-based communication and social media use can act as a maladaptive coping mechanism to escape from these overwhelming negative emotions and the metacognitive beliefs fueling them (Kardefelt-Winther, 2014; Laier et al., 2018; van den Eijnden et al., 2008). Specifically, dysfunctional metacognitive beliefs have been identified as key factors in the development and maintenance of emotional regulation difficulties (Spada et al., 2015; Spada & Marino, 2017; Spada & Wells, 2009; Ünal-Aydın et al., 2021). These difficulties, in turn, may push individuals toward PIU as a maladaptive compensatory strategy to manage or alleviate their negative emotions. From a metacognitive perspective, the internet may serve as a means for individuals to escape or reduce negative emotions, which is particularly relevant for those with

maladaptive personality traits. These individuals may turn to the internet as a way to regulate distressing emotions, potentially contributing to PIU (Marino et al., 2016).

As aforementioned, individuals with maladaptive personality traits may hold dysfunctional positive metacognitive beliefs about emotions (e.g., *“Worrying helps me cope”*) and internet use (e.g., *“Using internet will help me clear my mind”*) and/or negative beliefs about the uncontrollability of thoughts and cognitive confidence (e.g., *“I cannot stop thinking about internet use”*). Such metacognitive patterns are thought to play a central role in motivating addictive behaviors such as PIU, where internet use functions as a maladaptive strategy to regulate difficult emotions (Kardefelt-Winther, 2014; Laier et al., 2018; Marino et al., 2016). By examining this complex pathway, the present study adds to the findings regarding maladaptive metacognitive beliefs and emotion dysregulation in therapeutic interventions aimed at reducing PIU. This dual focus could help individuals develop healthier ways of managing negative emotions and, ultimately, break free from the vicious cycle of maladaptive coping.

4.1. Limitations and empirical implications

Several limitations of the present study should be noted. First, due to the cross-sectional nature of the data, causal and temporal inferences cannot be drawn from this mediation analysis. While the present authors acknowledge the challenges of testing fully causal and temporal processes with cross-sectional data, careful statistical modeling and interpretation can still provide insights into the potential pathways through which pathological personality traits, metacognitions, and emotion dysregulation may contribute to PIU. Therefore, future studies should adopt longitudinal designs to more accurately capture the temporal dynamics underlying these relationships. Second, although the findings showed that metacognitions and emotion

dysregulation serially mediated the relationship between DSM-5 pathological personality domains and PIU symptoms, it should be noted that the range of indirect standardized effects was low, indicating that these associations were only negligibly mediated by metacognitions and emotion dysregulation. Third, while the study provides a helpful framework for understanding the potential serial mediating role of metacognitions and emotion dysregulation between maladaptive personality traits and PIU, there are limitations regarding the potential reciprocal association between these factors. One major limitation is the assumption of a unidirectional causal pathway, from maladaptive personality traits to metacognitions and emotion dysregulation, which then serially mediate PIU. However, there could be a bidirectional or reciprocal relationship between metacognitions and emotion dysregulation. For example, emotion dysregulation might influence the way an individual think about their own cognitive processes, which in turn may exacerbate maladaptive metacognitive beliefs. Similarly, maladaptive personality traits such as emotional instability or negative affectivity could influence both emotional dysregulation and metacognitive processes in ways that reinforce each other over time. Without considering these alternative explanations, the study might oversimplify the mediating role of these factors and overlook how they dynamically interact to influence PIU. Fourth, a self-report method was used to collect the data which is prone to several biases (e.g., socio-cultural bias, recall bias, social desirability bias, etc.). Future studies could use different methods such as clinical interviews and third-party corroboration to provide more accurate data sources. Fifth, data were collected from Iranian university students utilizing convenience sampling which is a non-randomized sampling strategy. Therefore, the generalization of the results is limited to Iranian university students. Future studies could utilize a randomized sampling strategy from different populations other than students and use more nationally representative samples both in and outside of Iran. Future research could also

replicate findings within other cognitive-behavioral models. For example, the I-PACE model (Brand et al., 2016) suggests that an interaction of potentially predisposing personality traits with dysfunctional use of emotional-cognitive coping styles could be one of several important processes facilitating the development of specific internet-use disorders.

5. Conclusions

Despite these limitations, the present study contributed to the understanding of the psychological processes by which dysfunctional personality traits – as conceptualized in the DSM-5 alternative model – could facilitate PIU. The findings contribute to the knowledge in the field and support the proposed models showing pathological personality traits, metacognitions, and emotion dysregulation appear to have important roles in addictive behaviors such as PIU. The findings from the present study have the potential to enrich current theoretical frameworks and could have implications for the nosology, prevention, and treatment of PIU. While the present study focused on generalized PIU—which may limit the development of highly tailored clinical recommendations for specific PIU subtypes—the observed positive associations between DSM-5 pathological personality domains and PIU highlight the importance of exploring additional psychological mechanisms involved in this relationship. More specifically, the findings indicate that metacognitions and emotion dysregulation act serially to connect these personality traits to PIU. A deeper understanding of these mechanisms holds significant potential for personalizing prevention and treatment strategies. The results highlight the benefits of targeting maladaptive metacognitive beliefs and difficulties in emotion regulation within therapeutic interventions aimed at reducing PIU. For mental health professionals working with university students, focusing on

these key mediating factors could foster the development of more tailored and effective interventions for those struggling with PIU.

Funding

This study did not receive funding from any sources.

CRediT authorship contribution statement

Mehdi Zemestani: Supervision, Conceptualization, Investigation, Methodology, Writing - original draft - review & editing. **Ayat Jafari:** Literature searches, Investigation, Project administration, Data curation, Formal analysis, Validation. **Seyed Mojtaba Ahmadi:** Methodology, Formal analysis, Validation. **Silvia Casale:** Writing - review & editing. **Mark D. Griffiths:** Writing - review & editing.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author upon reasonable request.

Declaration of interest

None of the authors declare conflict of interests related to this manuscript.

Acknowledgements

The authors wish to thank all of the participants and those who have cooperated in the study.

Ethical Approval

The study was approved by the University of Kurdistan's ethics committee coded as IR.UOK.REC.1398.020. All study procedures complied with the Declaration of Helsinki regarding research on human participants. The ethical conditions of participation including voluntary participation, privacy, anonymity and confidentiality were explained to the participants.

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Table 1. Demographics and descriptive statistics (N= 610)

Variable	n %
<i>Education Level</i>	
Bachelor degree	510 (83.60)
Master's degree	91 (14.91)
Doctoral degree	9 (1.47)
<i>Social media applications</i>	
Telegram	554 (90.81)
Instagram	415 (68.03)
WhatsApp	284 (46.55)
YouTube	67 (10.98)
Facebook	51 (8.36)
Twitter	40 (6.55)
<i>Type of internet use</i>	
Music/video use	334 (54.75)
Academic use	225 (36.88)
Gaming	109 (17.86)
<i>Device for internet use</i>	
Mobile	590 (96.72)
Laptop	179 (29.34)
PC	105 (17.21)
Tablet	48 (7.86)
<i>Severity of internet use *</i>	
Mild level	237 (38.85)
Moderate level	337 (55.24)
Sever level	36 (5.90)

Note: *Based on Internet Addiction Test scores (Young, 1998)

Table 2. Means, standard deviations, and correlation matrix for the study variables.

Variables	Mean	SD	Skewness	Kurtosis	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. PIU	40.88	14.20	.56	-.44	1																
2. PID-5- NA	5.52	2.65	.01	-.49	.38**	1															
3. PID-5- De	5.07	2.86	.29	-.51	.26**	.31**	1														
4. PID-5- A	3.59	2.58	.69	.10	.38**	.42**	.39**	1													
5. PID-5- Di	3.98	2.59	.31	-.57	.42**	.42**	.31**	.35**	1												
6. PID-5- P	4.33	2.74	.40	-.37	.43**	.48**	.44**	.55**	.49**	1											
7. MCQ- PB	11.12	3.25	.31	-.65	.40**	.35**	.27**	.33**	.27**	.35**	1										
8. MCQ- NB	13.40	3.80	.07	-.58	.31**	.45**	.23**	.23**	.25**	.30**	.38**	1									
9. MCQ- CC	11.26	3.55	.46	-.35	.36**	.30**	.28**	.32**	.38**	.32**	.45**	.44**	1								
10. MCQ- CS	12.97	3.09	.12	-.40	.26**	.30**	.23**	.34**	.26**	.33**	.46**	.52**	.49**	1							
11. MCQ- CT	14.98	3.36	-.10	-.08	.17**	.24**	.12**	.10**	.08*	.17**	.30**	.37**	.19**	.36**	1						
12. DERS- N	7.81	4.84	.19	-.71	.37**	.35**	.30**	.36**	.34**	.36**	.41**	.46**	.47**	.43**	.26**	1					
13. DERS- G	8.45	3.71	.08	-.55	.29**	.33**	.21**	.21**	.24**	.25**	.25**	.42**	.30**	.37**	.23**	.52**	1				
14. DERS- I	8.89	4.09	.20	-.32	.37**	.40**	.21**	.32**	.33**	.32**	.33**	.45**	.38**	.39**	.25**	.60**	.72**	1			
15. DERS- A	11.50	4.60	-.35	-.46	.13**	.20**	.10**	.11**	.13**	.11**	.10**	.29**	.17**	.23**	.21**	.30**	.48**	.47**	1		
16. DERS- S	11.22	6.17	.15	-.59	.38**	.42**	.27**	.35**	.34**	.31**	.37**	.50**	.42**	.39**	.21**	.66**	.63**	.68**	.47**	1	
17. DERS- C	7.26	2.68	.21	.50	.27**	.17**	.09*	.20**	.15**	.21**	.18**	.21**	.26**	.26**	.18**	.31**	.31**	.39**	.36**	.27**	1

Note: PIU= problematic internet use; PID-5 = Personality Inventory for the DSM-5; NA = negative affectivity; De = detachment; A = antagonism; Di = disinhibition; P = psychoticism; MCQ = Metacognitions Questionnaire; PB = positive beliefs about worry; NB = negative beliefs about worry; CC = cognitive confidence; CS = cognitive self-consciousness; CT = need to control thoughts; DERS = Difficulties in Emotion Regulation Scale; N = non-acceptance of emotional responses; G = difficulties engaging in goal directed behavior; I = impulse control difficulties; A= lack of emotional awareness; S = limited access to emotion regulation strategies; C = lack of emotional clarity. * $p < 0.05$; ** $p < 0.01$

Table 3. Fit indices of the model

Fit category	χ^2	df	χ^2/df	p	CFI	GFI	NFI	TLI	RMSEA	90% CI	
										Lower	Upper
Initial model	1483.877	107	13.868	0.001	0.682	0.681	0.666	0.594	0.144	0.137	0.150
Modified model	256.640	89	2.98	0.001	0.957	0.949	0.937	0.934	0.057	0.049	0.065

Note: χ^2 = chi-square; df= degrees of freedom; χ^2/df = chi-square divided by its degrees of freedom; CFI= comparative fit index; GFI= goodness of fit index; NFI= normed fit index; TLI = Tucker–Lewis Index; RMSEA= root mean square error of approximation; CI= confidence interval.

Table 4. Standardized direct effects of the latent variables.

Predictor variable	Criterion variable	β	t	SE	95% CI		p
					Upper	Lower	
PID-5-NA	PIU	.044	1.03	.228	-.027	.120	.302
PID-5-De	PIU	-.016	-.41	.191	-.091	.038	.679
PID-5-A	PIU	.097	2.28	.233	.027	.169	.022*
PID-5-Di	PIU	.166	4.09	.221	.089	.235	.010**
PID-5-P	PIU	.134	2.91	.238	.059	.215	.004**
PID-5-NA	MCQ	.279	5.76	.038	.200	.360	.010**
PID-5-De	MCQ	.125	2.80	.032	.055	.209	.005**
PID-5-A	MCQ	.146	3.00	.039	.067	.227	.003**
PID-5-Di	MCQ	.144	3.09	.037	.054	.239	.002**
PID-5-P	MCQ	.135	2.55	.040	.048	.212	.011**
PID-5-NA	DERS	.096	2.22	.020	.027	.165	.026*
PID-5-De	DERS	.002	.051	.016	-.056	.057	.960
PID-5-A	DERS	.090	2.11	.020	.017	.156	.034*
PID-5-Di	DERS	.083	2.05	.019	.004	.144	.040*
PID-5-P	DERS	-.036	-.78	.020	-.112	.035	.432
MCQ	DERS	.642	7.71	.048	.566	.727	.010**
MCQ	PIU	.160	2.18	.503	.015	.277	.029**
DERS	PIU	.178	2.66	.788	.077	.303	.008**

Note: PID-5 = Personality Inventory for the DSM-5; NA = negative affectivity; De = detachment; A = antagonism; Di = disinhibition; P = psychoticism; PIU= problematic internet use; MCQ = Metacognitions Questionnaire; DERS = Difficulties in Emotion Regulation Scale.

* $p < 0.05$; ** $p < 0.01$

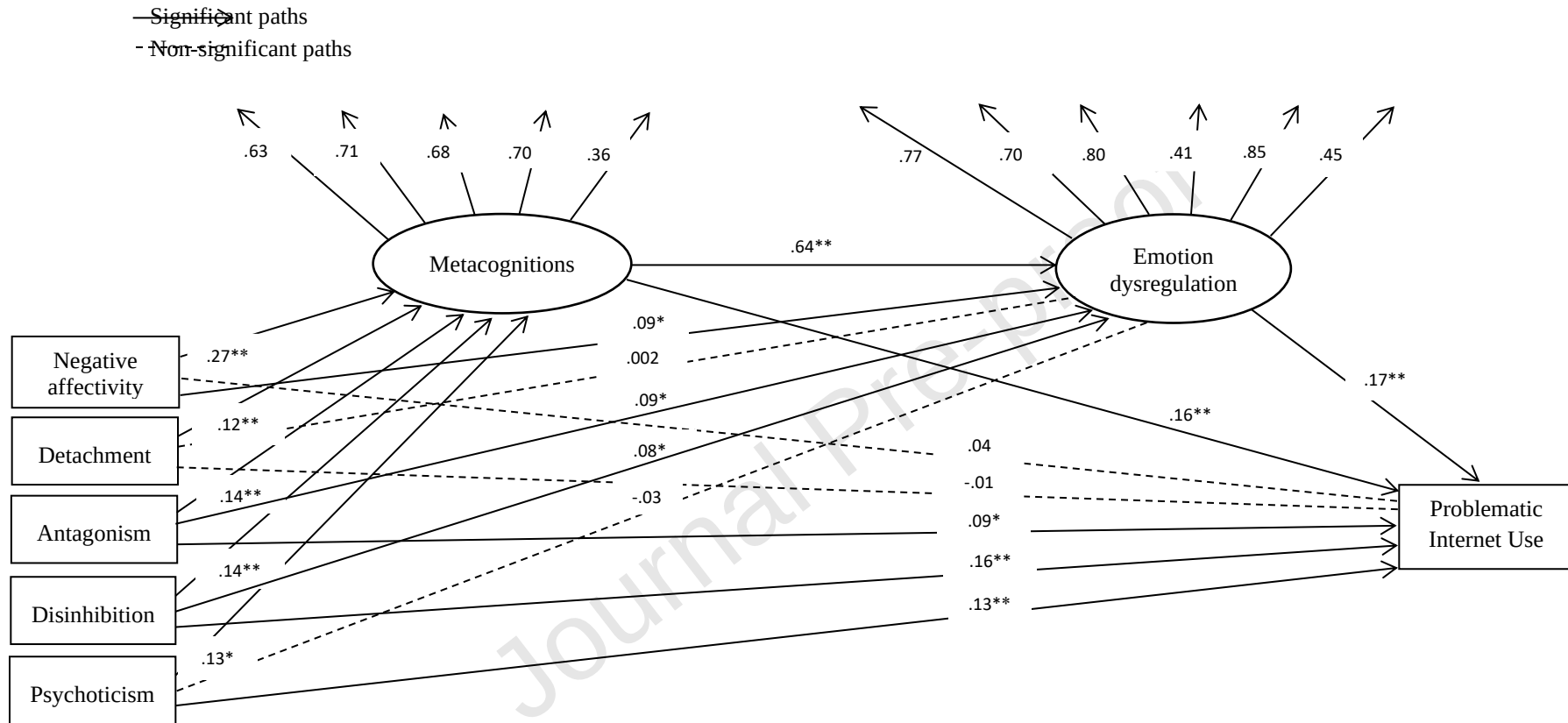
Table 5. Standardized indirect effects using bootstrapping with 5000 resamples to examine the serial mediating role of metacognitions and emotion dysregulation.

Predictor variable	Mediator variable	Criterion variable	β	95% CI		<i>P</i>
				Lower	Upper	
PID-5-NA	MCQ	PIU	.044	.008	.304	.046*
PID-5-De	MCQ	PIU	.019	.003	.144	.035*
PID-5-A	MCQ	PIU	.022	.004	.201	.038*
PID-5-Di	MCQ	PIU	.023	.001	.154	.042*
PID-5-P	MCQ	PIU	.020	.009	.185	.036*
PID-5-NA	DERS	PIU	.016	.009	.280	.047*
PID-5-De	DERS	PIU	.000	-.084	.054	.911
PID-5-A	DERS	PIU	.015	.001	.173	.043*
PID-5-Di	DERS	PIU	.014	.009	.184	.011*
PID-5-P	DERS	PIU	-.006	-.129	.054	.727
MCQ	DERS	PIU	.113	.087	.221	.001**
PID-5-NA	MCQ → DERS	PIU	.029	.009	.211	.006**
PID-5-De	MCQ → DERS	PIU	.013	.010	.105	.010*
PID-5-A	MCQ → DERS	PIU	.015	.008	.104	.012*
PID-5-Di	MCQ → DERS	PIU	.016	.004	.111	.028*
PID-5-P	MCQ → DERS	PIU	.014	.002	.115	.004**

Note: PID-5 = Personality Inventory for the DSM-5; NA = negative affectivity; De = detachment; A = antagonism; Di = disinhibition; P = psychoticism; PIU= problematic internet use; MCQ= Metacognitions Questionnaire; DERS = Difficulties in Emotion Regulation Scale.

* $p < 0.05$; ** $p < 0.01$

Figure 1. Results of SEM analysis examining the impact of pathological personality domains on PIU via serial mediating effects of metacognitions and emotion dysregulation. * $p < 0.05$; ** $p < 0.01$



Highlights

- Significant positive correlations were found between DSM-5 pathological personality traits and PIU.
- Metacognitions and emotion dysregulation may serve as explanatory mechanisms in this association.
- Metacognitions and emotion dysregulation negligibly and serially mediated the association between DSM-5 pathological personality traits and PIU.
- Findings suggest important connections between DSM-5 pathological personality traits, metacognitions, and emotion dysregulation that may shed light on the PIU.
- Findings contribute to understanding the mechanisms that underlie the complex effects of maladaptive personality traits on PIU.