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Aspects of individuation in relation to parents, dark triad and problematic internet use in emerging adults

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Abstract
The prevalence of the internet in modern society poses challenges, such as addiction and problematic internet use. Several authors suggest that the internet contributes to rising mental health issues among youth. Despite family dysfunction being a well-documented risk factor for problematic internet use, there is limited research on individuation—an intrapsychic process focused on attaining autonomy while maintaining connectedness with parents. An additional noteworthy risk factor is dark personality traits. Based on the importance of these variables in the occurrence of problematic internet use, we examined two path models (separately for mothers and fathers) in which two aspects of individuation (connectedness and parental intrusiveness) along with the three dark triad traits were proposed to predict the deficient self-regulatory aspects of problematic internet use (compulsive use and withdrawal). Furthermore, we hypothesized that the relationship between the aspects of individuation and deficient self-regulation would be moderated by the dark triad traits. Our sample comprised 392 emerging adults, aged 19 to 30 years (M = 22.67, SD = 2.88), with 74.5% being female. The models demonstrated satisfactory fit to the data concerning both mothers and fathers, and psychopathy emerged as a significant moderator in the relationship between paternal intrusiveness and withdrawal. The models elucidated moderate proportions of the variance in outcome variables (R^2*s* ranging between 0.10 and 0.18) and substantiated the expectations derived from theory regarding the contribution of personality and relational factors in predicting deficient self-regulation in internet use.

Keywords Individuation · Problematic internet use · Dark triad · Emerging adults · Path analysis

Introduction

Prevalence of problematic internet use

The internet plays a fundamental role in today's society with around two thirds of the global population or more than 5.3 billion individuals actively using it (Petrosyan, 2023). This ubiquity has resulted in a dramatic increase in the amount of time people, especially adolescents and young adults, spend online. By 2016, the average U.S. adolescent spent 6 hours a day texting, online, and on social media (Twenge et al., 2019), with studies from others parts of the world, for example Europe (Eurostat, 2023) and Asia (ITU, 2021) reporting similar findings. This trend seems to be continuing as more recent data suggests that nearly half of adolescents report being online "almost constantly" (Pew, 2023). Some authors propose that the overuse of technology, which includes the internet and smart phones is a leading factor in the observed decline in mental health to the point where it has been deemed a public health issue (Chung et al., 2019). This decline in mental health is especially pronounced in adolescents and young adults (Twenge, 2020), and research from cross-generational cohort studies revealed a linear relationship between the rise in adolescent mental health difficulties and generational differences in screen time (Twenge et al., 2018). These difficulties include lower overall psychological well-being (Twenge & Campbell, 2019), reduced life satisfaction (Booker et al., 2015), decreased happiness (Twenge et al., 2018), heightened feelings of loneliness and social isolation (Primack et al., 2018), and an elevated incidence of depression (Kelly et al., 2018; Lin et al., 2016; Twenge & Campbell, 2019).

Conceptually, heavy usage of the internet has been defined through various terms, including internet dependency

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(Sherer, 1997), pathological internet use (Davis, 2001), and problematic internet use (Caplan, 2003). For the purpose of this study, we will focus on the problematic internet use model proposed by Caplan (2003), which draws upon Davis's cognitive-behavioral model of generalized problematic internet use (GPIUS; Davis, 2001). In this model problematic internet use is viewed as a maladaptive coping mechanism that stems from more extensive psychosocial vulnerabilities. Psychosocial problems present a predisposition for individuals to form dysfunctional thought patterns, causing difficulties in the control of behavioral impulses, and ultimately resulting in negative consequences related to their internet usage. Caplan (2010) suggests that deficient self-regulation is a major dimension of problematic internet use. Caplan conceptualized deficient self-regulation as a higher-order construct composed of two interrelated subdimensions: compulsive use (which involves having trouble in controlling, decreasing, or discontinuing online activities, and is accompanied by feelings of guilt regarding the time spent online) and withdrawal (cognitive preoccupation with the internet when not being online). Consequently, we will focus specifically on these two aspects of problematic internet use in the present study.

A number of individual and contextual factors have been identified as predictors of PIU, such as gender (Chi et al., 2020), family dysfunction (Cetinkaya, 2019; Chi et al., 2020; Lukavska et al., 2020), and personality traits, particularly socially aversive traits like those encompassed in the dark triad (Lee, 2019). Family dysfunction, such as poor communication, lack of emotional warmth, excessive control, or high conflict, has been identified as a significant contextual risk factor for problematic internet use (Cetinkaya, 2019; Chi et al., 2020; Lukavska et al., 2020). In emerging adulthood, the impact of family relationships is often reflected in how young people experience emotional connectedness and psychological boundaries with their parents, core factors shaping the individuation process. The dark triad is a cluster of three subclinical, yet socially malevolent personality traits: Machiavellianism (manipulativeness and strategic exploitation of others), narcissism (grandiosity and a sense of entitlement), and psychopathy (impulsivity and lack of empathy) (Paulhus & Williams, 2002). Despite being theoretically distinct, these traits often co-occur and are associated with difficulties in emotional regulation, interpersonal relationships, and impulsive behavior (Jonason & Tost, 2010; Moshagen et al., 2018). Individuals high in dark triad traits may turn to the internet to fulfill unmet social needs or engage in behavior that aligns with their interpersonal style, increasing their susceptibility to PIU (Shi & Du, 2019). Based on the outlined background, the aim of this paper will be to explore how the interplay between relevant contextual factors such as aspects of individuation and dark triad traits may contribute to problematic internet use in contemporary emerging adults.

Individuation and problematic internet use

The separation-individuation process is an important developmental aspect of the parent-child relationship that begins in early childhood and involves the reciprocal processes of differentiation of the self from the other (separation) and development of one's own individual characteristics (individuation) (Mahler et al., 1975). Separation-individuation takes place from early childhood (Mahler, 1963) through adolescence (Blos, 1967) and has more recently also been examined in emerging adults (ages 18–30) (Komidar et al., 2016). Emerging adulthood is a developmental period that extends between the ages of 18 and 30 and has been identified especially in modern post-industrial societies, where young adults are postponing the responsibilities and obligations expected of adults (Arnett, 2006; Douglass, 2007). To assess separation-individuation in emerging adulthood, Komidar and colleagues (Komidar et al., 2014; Komidar et al., 2016) tested a theoretical model which includes five dimensions of separation-individuation in relation to parents. These are *connectedness*, *support seeking, perceived intrusiveness, fear of disappointing the parent,* and *self-reliance.*

Individuation in adolescence and emerging adulthood is typically conceptualized as the negotiation between two competing needs: the need for psychological autonomy and the need for continued emotional closeness (Beyers & Goossens, 2003; Komidar et al., 2016). In this study, we focus on two central relational dimensions that reflect this tension: connectedness and parental intrusiveness. Connectedness refers to the young person's perceived emotional closeness, warmth, and trust in the relationship with a parent (Beyers & Goossens, 2003; Buhl, 2008; Komidar et al., 2016). Parental intrusiveness, by contrast, refers to perceived overcontrol, and boundary violations, which hinder the development of autonomy (Mayseless & Scharf, 2009). Among the factors assessed by measures of separation-individuation in emerging adults (Komidar et al., 2016) that are most likely linked to problematic internet use are parental connectedness and intrusiveness. Connectedness with parents (characterized by mutual understanding, respect, and open communication) is associated with interpersonal warmth within the family (Komidar et al., 2014). On the other hand, perceived intrusiveness (psychological intrusiveness and control) is a construct associated with psychological control (Komidar et al., 2014). These two are the most likely aspects of separation-individuation to be related to problematic internet use due to their similarity with previously researched variables such as attachment styles (Eichenberg et al., 2017), as well as parental warmth and parental control (Lukavska et al., 2020; Martins et al., 2020).

Dysfunctional separation-individuation can lead to difficulties in psychosocial functioning which include psychological maladjustment, depressive symptoms, interpersonal problems, self-esteem problems, anxiety, and stress (Holmbeck & Leake, 1999; Kins et al., 2013; Stey et al., 2014). Furthermore, constructs related to connectedness and intrusiveness have often been found to be related to problematic internet use (Cetinkaya, 2019; Lukavska et al., 2020). For example, (Cetinkaya, 2019) found that parental psychological control accounted for 18% of the variability observed in internet addiction of adolescents aged 14–18. The aforementioned study underscored the greater significance of maternal psychological control compared to paternal control (Cetinkaya, 2019), which is in line with findings that mothers and fathers have distinct roles in the individuation of their children (Amato & Rivera, 1999; Lieberman et al., 1999). Concerning connectedness with parents and parental warmth, a recent study found low maternal responsiveness to be a significant risk factor for problematic internet use in adolescents (Lukavska et al., 2020).

According to some authors, the addictions that individuals experience in their youth are believed to be linked to the anxiety provoked in the family by the adolescent's pursuit of individuation (Knauth et al., 2006). Relatedly, when parents disapprove of an emerging adult's inclination to assert their individuality, which is reflected in difficulties in the separation-individuation process, this can potentially undermine the emerging adult's capacity for emotional stability, autonomy, and the establishment of intimate connections with others (Skowron & Dendy, 2004). In addition to the associations with psychosocial dimensions, child-parent relationships affect various aspects of everyday life and functioning (Burke et al., 2018; Lippold et al., 2024). Indeed, numerous studies underscore the close association between the quality of the father-mother-child relationship and individual internet usage patterns (Lei & Wu, 2007; Liu et al., 2012; Liu et al., 2013; Yang et al., 2016). Young people who cultivate a positive and high-quality family relationship tend to avoid excessive internet use, experience a reduction in social withdrawal, and exhibit a more balanced approach to internet utilization (Ang et al., 2012; Tao et al., 2010).

Dark triad and problematic internet use (deficient self-regulation)

In addition to unfavorable aspects of parenting (Lei & Wu, 2007; Liu et al., 2012; Liu et al., 2013; Yang et al., 2016), various personality traits – in particular the dark triad – have also been identified as significant risk factors for problematic internet use. The dark triad is a constellation of three socially averse traits, namely psychopathy, Machiavellianism and narcissism (Paulhus & Williams, 2002), which show significant interrelationships despite being initially conceptualized as distinct (Muris et al., 2017; Paulhus & Williams, 2002). Individuals with high levels of these traits exhibit lower self-control (Jonason & Tost, 2010), engage in more superficial relationships (Jonason et al., 2010), and are prone to manipulation and callousness (Jones & Figueredo, 2013). They may also have an increased susceptibility to problematic internet use as they tend to exploit their social relationships (Jonason & Schmitt, 2012; Moshagen et al., 2018; Moshagen et al., 2020). As a result of these interpersonal difficulties, they may be more inclined to use the internet as a means of satisfying unmet social needs (Shi & Du, 2019). Another reason why individuals with dark triad traits may be at higher risk for problematic internet use is their reported predisposition to impulsivity and the resulting difficulties with self-regulation (Crysel et al., 2013; Jonason & Tost, 2010; Jones & Paulhus, 2011; Malesza & Ostaszewski, 2016). In existing studies, high impulsivity has been found to be a significant predictor of problematic internet use (Kircaburun & Griffiths, 2018), and individuals with dark triad are actually more prone to various addictions, including substance use, problematic internet use and problematic social media use (Chung et al., 2019; Jauk & Dieterich, 2019; Lee, 2019; Stenason & Vernon, 2016). While there is significant overlap between the dark triad traits, each also possesses unique characteristics that may differentially influence internet use (Casale & Banchi, 2020). For example, narcissists crave social gratification; Machiavellians engage in strategic manipulation; and psychopaths are more often covertly aggressive, lacking empathy and remorse (Paulhus & Williams, 2002).

The dark triad traits may be even more pronounced as risk factors for deficient self-regulation when combined with aspects of less warm and intrusive parenting. As outlined in the previous section, negative aspects of parenting have been identified both as a risk factor for the development of problematic internet use and other addictive behaviors (Lukavska et al., 2020; Tao et al., 2010). Furthermore, family-related factors are also associated with the emergence of dark triad traits, particularly among individuals with a genetic predisposition (Sadeh et al., 2010; Vernon et al., 2008). Traits linked to the dark triad have been shown to be shaped by early socioecological conditions, including dysfunctional or inconsistent parenting (Frazier et al., 2019; Jonason & Schmitt, 2012; Luyckx et al., 2011; McDonald et al., 2012). Building on this, it is plausible that the effects of problematic family relationships on internet use may not be uniform across individuals but may vary depending on their personality profiles. Specifically, individuals high in dark triad traits may be more reactive to lower connectedness with parents or intrusive parenting. Consequently, the effects of dark triad predispositions and aspects of family

relationships may interact to further increase susceptibility to problematic internet use. The presented findings support the notion that individuals with high dark traits have greater difficulties in regulating internet use (Flexon et al., 2016).

Present study

Based on the theoretical and empirical background outlined above, we explored how aspects of individuation and dark triad traits are related to problematic internet use in emerging adults. Based on the literature review, we formulated several hypotheses. First, we hypothesized that low levels of connectedness with parents and high levels of parental intrusiveness, would predict problematic internet use – more specifically, the aspects of self-regulation that include compulsive use and withdrawal. Second, we proposed that dark triad traits predicted higher levels of problematic internet use (deficient self-regulation) due to high levels of impulsivity and the need to fulfil unmet social needs in the online context.

Previous research has identified both family-related and personality-related factors as important contributors to problematic internet use. However, few studies have examined how these domains may interact. In the present study, we hypothesize that dark triad traits moderate the association between individuation-related variables (connectedness and intrusiveness) and deficient self-regulation in internet use. This moderation hypothesis is based on the assumption that individuals with higher levels of dark triad traits are more prone to impulsivity, lower empathy, and externalizing coping styles (Jonason & Tost, 2010; Paulhus & Williams, 2002). These traits may be intensified by the effects of perceived parental intrusiveness or low connectedness, leading to increased vulnerability to maladaptive online behaviors. For instance, individuals high in dark triad traits may react more strongly to controlling or emotionally distant parenting by withdrawing into virtual environments that offer immediate gratification and ego reinforcement. Thus, the negative effects of individuation-related difficulties may be amplified in individuals with high dark triad traits.

Because mothers and fathers are thought to play distinct roles in developmental outcomes, we tested two separate models, one examining individuation dimensions in relation to mothers and the other in relation to fathers.

Method

Participants and procedure

The study was conducted between October and December 2021. Most participants were students from various study programs at the three major Slovenian public universities, the University of Ljubljana, the University of Maribor, and the University of Primorska. Additionally, we advertised the study on various social networks (Facebook groups, online forums) and invited those between the ages of 19 and 30 to participate. After participants agreed to the consent form, they were asked to begin completing the survey. The sample consisted of 392 emerging adults, of whom 24.2% were male, 74.5% were female, and 1.3% identified as non-binary. Participants were between 19 and 30 years old (M = 22.67, SD = 2.88). Most commonly they reported living with their parents (141 or 36.0%), 184 (46.9%) reported living semi-independently (for example staying with parents over the weekend and living alone during the week) and 67 reported living independently (17.1%). Most of the participants were undergraduate (42.6%) and graduate (38.5%) students, a small proportion of the sample consisted of PhD students (2.3%), while the rest of the sample consisted of employed (13.5%) and unemployed (3.1%) emerging adults not in education.

Measures

To assess aspects of separation-individuation we used The Individuation Test for Emerging Adults – Short Form (ITEA-SF; Komidar et al., 2016). The ITEA-SF is a 21-item self-report measure which measures five dimensions of individuation in relation to mothers and fathers separately. These are: support seeking, connectedness, intrusiveness, self-reliance, and fear of disappointing the parent. Participants respond to each of the items using a 5-point rating scale with answers ranging from 1 (completely untrue) to 5 (completely true). The psychometric properties of the measure has previously been shown to be satisfactory (Komidar et al., 2016). More precisely, the measure's construct validity has been shown to be good (Komidar et al., 2016), and it has shown full metric invariance across gender (Komidar et al., 2014) as well as full metric and partial scalar invariance across Slovenian and US samples (Komidar et al., 2016). The aspects of separation-individuation have also shown full convergence with measures of separation-individuation in earlier developmental periods such as adolescence (Hoffman, 1984). Due to the proposed theoretical relevance of the two constructs in relation to internet addiction and the dark triad traits, we used only the connectedness and intrusiveness subscales in this study. Connectedness consists of 4 items and refers to the experience of mutual understanding, trust, and respect between an emerging adult and the parent (e.g., "He/she respects my wishes") (α=.87/.88, respectively for the father and mother form). Intrusiveness consists of 5 items and refers to the perception of parental intrusion

into the individual's privacy (i.e., "I think he/she wants to know too much about me") (α=.86/.90, respectively for the father and mother form).

For examining aspects of problematic internet use we employed the Generalized Problematic Internet Use Scale (GPIUS; Caplan, 2002), which is a questionnaire based on cognitive-behavioral theory of problematic internet use (Davis, 2001). The measure was developed with the intention of assessing the degree of the individual's experiences of cognitions, behaviors, and negative outcomes relating to problematic internet use. The GPIUS consists of 29 items, which form seven factors. Participants respond using a 5-point rating scale with answers ranging from 1 (completely untrue) to 5 (completely true). Due to the proposed relevance of the constructs, we only included Compulsive use and Withdrawal in our study, which together form a factor of Deficient Self-Regulation in the new iteration of the GPIUS – GPIUS2 (Caplan, 2010). In our study, the alpha coefficients for the two Deficient Self-Regulation scales were: Compulsive use (α=.81) and Withdrawal (α=.73). Because GPIUS2 is yet to be validated in Slovenia, we used the GPIUS (Caplan, 2002) which has previously been used in Slovenian studies. We conducted a confirmatory factor analysis on the Deficient Self-Regulation factor which is composed of Compulsive Use and Withdrawal scales. Our findings show good construct validity for the scale (χ^2 =61.775, *df* =19, *p* <.001, CFI=.94, TLI=.92, RMSEA=.076, 90% *CI* [.057,.095], SRMR=.054).

To assess the dark triad traits, we implemented the Dirty Dozen, a short form scale for measuring dark triad traits. It is composed of 12 items that measure 3 personality traits: narcissism, Machiavellianism and psychopathy in the general population (Jonason & Webster, 2010). In our study, we used the 9-point rating scale from 1 (strongly disagree) to 9 (strongly agree) (Kuefner et al., 2015). While the three traits are conceptually distinct, they share variance. Results of the scale can be interpreted as separate factors or using a composite scale as argued by (Kajonius et al., 2016). In Kajonius et al.'s study, a bi-factor model comprising a latent dark triad factor with the three additional traits was found to show the best model fit. The three-factor solution did not fit the data well in our sample (χ^2 =293.04, *df* =51, *p* <.001, CFI=.88, TLI=.85, RMSEA=.110, 90% *CI* [.098,.122], SRMR=.077). Instead, we assessed a bi-factor model comprised of a superordinate dark triad factor and the three separate dark triad factors. The bi-factor model showed good fit to the data (χ^2 =58.491, *df* =66, *p* <0.01, CFI=.98 TLI=.97, RMSEA=.040, 90% *CI* [.023,.056]. SRMR=.030). In the present study we used three-factor model in the subsequent path analyses. The alpha coefficient of the dark triad composite in our sample was α =.87, while for the individual factors the internal consistency scores were: α=.85 (Machiavellianism), α=.66 (Psychopathy) and α=.84 (Narcissism). The mean scores on the three respective Dirty Dozen scales were 2.72 (Machiavellianism), 2.45 (Psychopathy) and 3.92 (Narcissism).

Results

Before testing the proposed path model, we examined the pairwise correlations between the analyzed variables. Table 1 shows that the correlations are mostly significant and therefore warrant further analyses. Connectedness in relation to mothers was negatively associated with Machiavellianism and narcissism and withdrawal symptoms when not being online, while connectedness with fathers was not associated with dark triad traits and problematic internet use. Perceived maternal intrusiveness was significantly associated with all included variables and perceived paternal intrusiveness was positively associated with psychopathy and withdrawal.

Table 1 Bivariate Correlations Between the Included Measures

	Conn (M)	Intrus (M)	Conn (F)	Intrus (F)	Machia	Psych	Narcis	Withdr	ComU
Connectedness (M)	–								
Intrusiveness (M)	−.569**	–							
Connectedness (F)	.313**	−.156**	–						
Intrusiveness (F)	−.248**	.456**	−.156**	–					
Machiavellianism	−.101*	.135**	−.082	.101	–				
Psychopathy	−.082	.144**	−.090	.162**	.428**	–			
Narcissism	−.173**	.151**	−.067	.102	.614**	.362**	–		
Withdrawal	−.107*	.267**	−.087	.165**	.232**	.251**	.293**	–	
Compulsive use	−.049	.205**	.028	.044	.095	.126*	.212**	.500**	–

Conn (M) Connectedness in relation to mothers, *Conn (F)* Connectedness in relation to fathers, *Intrus (M)* Perceived intrusiveness in relation to mothers, *Intrus (F)* Perceived intrusiveness in relation to fathers, *Machia* Machiavellianism, *Psych* Psychopathy, *Narcis* Narcissism, *Withdr* Withdrawal, *ComU* Compulsive use. Pearson's correlation coefficients were calculated. *p <0.05, **p <0.01

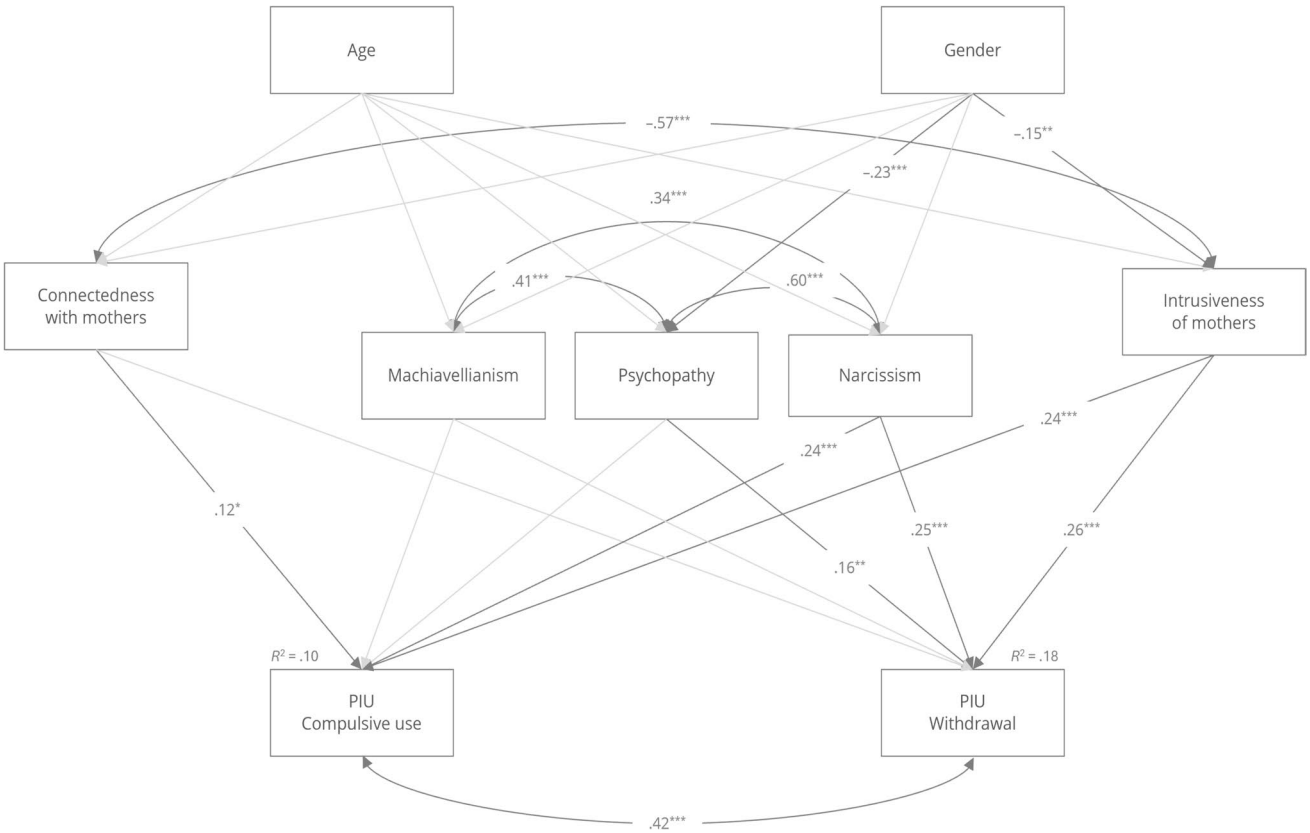

Fig. 1 Model of Two Individuation Dimensions in Relation to Mothers, Dark Triad and Problematic Internet Use (PIU) while controlling for age and gender. *Note*s. All estimated direct pathways are presented, but only significant coefficients are shown in the figure. We also estimated all the moderated effects of individuation and dark triad traits on problematic internet use; for clarity, only significant coefficients are presented in the figure. $^{*}p$ <.05, $^{**}p$ <.01, $^{***}p$ <.001

Path analysis

Consistent with the proposed model, the path analysis included connectedness and intrusiveness in relation to parents (examined in the two models separately for mothers and fathers) and the three dark triad traits as predictors, and withdrawal and compulsive use as outcome variables.[1] The three dark triad traits were also inserted in the model as proposed moderators of the relationship between the two individuation dimensions and the two dimensions of problematic internet use. Two separate models were tested, the first with intrusiveness and connectedness in relation to mothers as exogenous variables and the second with intrusiveness and connectedness in relation to fathers as exogenous variables. Both models showed a good fit to the data based on the most common cut-off criteria for structural equation modelling (TLI and CFI≥.90, RMSEA ≤.06 and SRMR ≤.08, Hu & Bentler, 1998).

The model in relation to mothers (χ^2 =44.403, *df* =40, *p* =.328, CFI=.99, TLI=.98, RMSEA=.020, 90% CI [.000,.053], SRMR=.036) is presented in Fig. 1. It indicates that connectedness to mothers was predictive of compulsive use (β=.12, *p* =.040) but not withdrawal (β=.09, *p* =.132). Conversely, perceived maternal intrusiveness was predictive of higher compulsive use (β=.24, *p* <.001) as well as withdrawal (β=.26, *p* <.001). Among the dark triad traits, psychopathy (β=.16, *p* <.001) and narcissism (β=.26, *p* <.001) showed significant direct effects on withdrawal. None of the dark triad traits, however, moderated any of the relationships between the aspects of individuation in relation to mothers and problematic internet use. Overall, the first model accounted for a modest proportion of the variance in both aspects of problematic internet use: compulsive use (R^2 =.10) and withdrawal (R^2 =0.18).

The model in relation to fathers (χ^2 =40.45, *df* =40, *p* =.451, CFI=.99, TLI=.99, RMSEA=.008, 90% CI [.000,.051], SRMR=.040), presented in Fig. 2, indicates that connectedness to fathers was not significantly associated with neither compulsive use (β=.05, *p* =.405) nor withdrawal (β=−.04, *p* =.376). Intrusiveness in relation to fathers was significantly linked to withdrawal (β=.10, *p* =.033) but did not predict compulsive use (β=.01,

[1] Data were analyzed using the SPSS 25 statistical package. Path analysis was performed in R version 4.1.2 using the package *lavaan*.

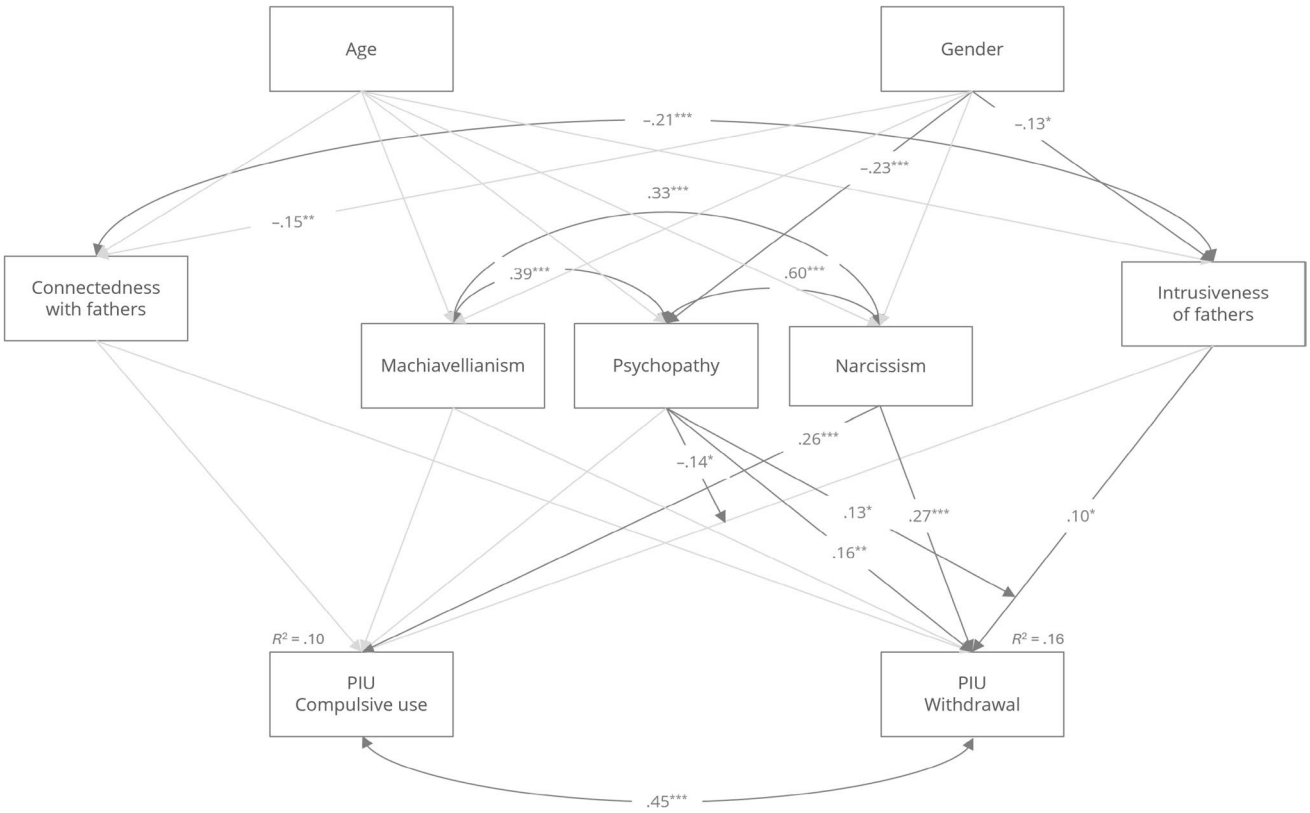

Fig. 2 Model of Two Individuation Dimensions in Relation to Fathers, Dark Triad and Problematic Internet Use (PIU) while controlling for age and gender. *Notes*. All estimated direct pathways are presented, but only significant coefficients are shown in the figure. We also estimated all the moderated effects of individuation and dark triad traits on problematic internet use; for clarity, only significant coefficients are presented in the figure. $^{*}p$ <.05, $^{**}p$ <.01, $^{***}p$ <.001

p =.763). In exploring the potential moderation effects of the three dark triad traits, psychopathy was found to moderate the relationship between paternal intrusiveness and withdrawal (β=.13, p =.040). Specifically, the relationship between the constructs was stronger in those emerging adults high on psychopathy (+1*SD*; β=.29, p =.012, 95% *CI* [.05;.44]), compared to those who scored average (β=.17, p =.042, 95% *CI* [.01;.28]) on this trait. In those who scored below average on psychopathy, paternal intrusiveness and withdrawal were not related (–1*SD*, β=.04, p =.61, 95% *CI* [−.11;.18]).

Another moderation can be observed in the data: while the pathway between paternal intrusiveness and compulsive use of internet was not statistically significant overall, a negative moderation effect was observed (β=−.14, p =.015). When looking into this relationship more specifically, however, we found that slopes describing the strength of the proposed relationship was not significantly different from zero in either those scoring below average (−1*SD*, β=.08, p =.342, 95% *CI* [−.10;.29]), average (β=−.053, p =.612, 95% *CI* [−.29;.17]) or above average on psychopathy (+1*SD*, β=−.19, p =.191, 95% *CI* [−.54;.11]), even if we can observe a shift from a positive to a negative relationship between paternal intrusiveness and compulsive internet use. All other proposed moderation effects were insignificant. This model also explained a modest proportion of variance in both compulsive use (R^2 =.10) and withdrawal (R^2 =.16).

Discussion

Previous research has found that the family developmental environment (Lei & Wu, 2007; Liu et al., 2012; Liu et al., 2013; Yang et al., 2016) and aspects of personality, such as dark triad traits (Jauk & Dieterich, 2019; Kircaburun & Griffiths, 2018; Sindermann et al., 2018), are potential risk factors for the etiology of problematic internet use (Lukavska et al., 2020). One of the protective factors for problematic internet use could be successful psychological individuation. Therefore, the aim of this study was to examine the complex interplay between separation-individuation, the three dark triad traits and the deficient self-regulation in problematic internet use in a sample of Slovenian emerging adults.

Perceived connectedness and intrusiveness in relation to parents and deficient self-regulation in internet use

When examining connectedness to parents and parental intrusiveness as predictors of compulsive internet use and withdrawal, we found that connectedness with mother was a positive predictor of compulsive internet use, while maternal intrusiveness was a positive predictor of both compulsive internet use and withdrawal symptoms when not being online. On the other hand, paternal intrusiveness was a positive predictor of only withdrawal but not compulsive internet use in emerging adults. These results were observed even when controlling for gender and age.

Our results suggest different dynamics between mothers and fathers in relation to problematic internet use. More specifically, our results show that aspects of the relationship with fathers play a smaller role in relation to compulsive internet use and withdrawal in emerging adults than the relationship with mothers. Differences in the roles of fathers and mothers have already been discussed, as mothers are more often responsible for providing care and tenderness, while fathers more often embody authority and discipline (Lei & Wu, 2007). Previous findings have suggested that maternal warmth is more relevant to child's self-regulation capacities than that of fathers (Choe et al., 2013; Von Suchodoletz et al., 2011). This is also in line with psychodynamic conceptualizations of child development and those described in attachment theory (Bowlby, 1973; Kernberg, 1976; Mahler et al., 1975; Schore & Schore, 2008). Compulsive use might thus have more to do with self-regulation failures than withdrawal and the nature of the relationship between children and mothers is thought to have a stronger role in the development of self-regulation capacities than between children and fathers (Schore & Schore, 2008).

Still, connectedness with mothers appeared to be a relevant positive predictor of emerging adults' compulsive use internet use. This finding is somewhat surprising, as previous studies have found the importance of parental warmth and responsiveness for self-regulation skills (Orehek et al., 2017). However, such studies have predominantly focused on these dynamics in children (Bakermans-Kranenburg et al., 2003). Consequently, a possible explanation for the weak but significant effect of connectedness in relation to mothers on compulsive use in the present study is that connectedness between parents and emerging adults decreases in this developmental period (Zupančič et al., 2014) and therefore might not have as important of an effect on the self-regulation of internet use among emerging adults.

As the existing literature suggests, parental psychological control and intrusive parenting can hinder the development of the child's psychological distance from the parent (Barber & Harmon, 2002). Intrusive parenting commonly also entails less closeness, lower attachment quality, less autonomy support, and less emotional support from the parent (Ensign et al., 1998; Krishnakumar & Black, 2003). This can have a negative impact on the child's identity and developmental progress (Erel & Burman, 1995; Shek, 1998) and intrusive parenting can cause an individual to develop emotional and self-regulatory difficulties (Ensign et al., 1998; Krishnakumar & Black, 2003) and consequently lead to problematic internet use. Overall, these results seem to indicate that more direct negative aspects of parental influence, e.g. in the form of parental intrusiveness, are a more notable risk factor for the development of problematic internet use in emerging adults than connectedness with parents.

In a study that examined both paternal and maternal factors, maternal psychological control was more strongly associated with internet addiction than paternal psychological control (Cetinkaya, 2019). In another study examining the differential effects of parental responsiveness and strictness, the authors found that low maternal responsiveness (defined as low warmth) was a stronger predictor of problematic internet use in adolescents than low paternal responsiveness. In the same study, maternal strictness, but not paternal strictness, was significantly associated with problematic internet use (Lukavska et al., 2020). More studies on the differential effects of mothers and fathers on child's problematic internet use are therefore needed before definitive conclusions can be drawn about parent-specific effects.

The relationship between dark triad traits and deficient self-regulation

Looking into dark triad traits, in both models, narcissism was a significant predictor of both withdrawal and compulsive use, while psychopathy was only a significant predictor of withdrawal. This is consistent with the theoretical assumption that individuals higher in these traits are more likely to engage in problematic internet use for several reasons. The first reason is the identified difficulties in self-regulation and high impulsivity, which are more pronounced in individuals with these characteristics and generally predispose them to higher levels of dependence (Cao et al., 2007; Crysel et al., 2013; Hopley & Brunelle, 2012; Malesza & Ostaszewski, 2016; Stenason & Vernon, 2016). Impulsivity is characterized by a lack of ability to restrain inappropriate behaviors, delay reward and carry out actions in a considered manner (Barratt, 1983; Eysenck & Eysenck, 1985). Impulsivity has also been found to be associated with various addictive behaviors such as substance use (Flexon et al., 2016; Hopley & Brunelle, 2012; Stenason & Vernon, 2016) and behavioral addictions, including internet addiction (Brand

et al., 2016; Cao et al., 2007) and social media addiction (Chung et al., 2019; Lee, 2019). Increased impulsivity is a characteristic of both individuals higher in psychopathy as well as narcissism (Miller et al., 2009; Morgan et al., 2011; Vazire & Funder, 2006) and high impulsivity is related to online self-regulation difficulties (Billieux & Van der Linden, 2012). Relatedly, in a study examining all three dark triad traits in relation to impulsivity, both psychopathy and narcissism were strongly positively associated with impulsivity, while no association was found with Machiavellianism (Malesza & Ostaszewski, 2016). This is in line with the characteristics of trait Machiavellianism which include strategic long-term planning to achieve personal goals through manipulation e.g. strategic-calculating orientation and which are at odds with high impulsivity (Jones & Paulhus, 2014).

As our study showed differing relationships between psychopathy and narcissism in relation to deficient self-regulation, diverging characteristics of the two dark triad traits seem to also be playing a distinct role. The association between narcissism and compulsive use in both mothers and fathers could be explained by findings that individuals higher in narcissism are especially prone to seek gratification online, triggering their internet addiction (Jin et al., 2019). The internet offers people various opportunities to engage in behaviors associated with dark triad traits. The cognitive-behavioral model of problematic internet use proposed by Davis (2001) is of great importance as it assumes that certain forms of internet addiction can be traced back to pre-existing psychopathologies in the offline world, which are transferred to the online world, where those affected experience direct reinforcement. Accordingly, online social interactions provide opportunities for narcissistic gratification (Jin et al., 2019; Leung, 2013). Among the types of gratifications examined in a recent meta-analysis, self-presentation showed the strongest effect size in relation to problematic internet use (Wei et al., 2024) and active self-presentation is a key feature of some aspects of narcissism (Paulhus, 1998). Considering Davis's (2001) model, these studies suggest that the characteristics of the dark triad can be linked to their respective online counterparts of offline activities.

Another reason why individuals higher in dark triad traits are more likely to engage in problematic internet use, as observed in our study, could be related to the consequences of the difficulties in interpersonal relationships that these individuals face. Individuals with dark triad characteristics are more likely to exploit others (Jonason & Schmitt, 2012; Moshagen et al., 2018; Moshagen et al., 2020), more likely to inflict violence on others (Jones & Neria, 2015; Pailing et al., 2014) and more likely to engage in superficial relationships (Jonason et al., 2010). The covert aggressive behaviors, such as physical aggression are especially characteristic of individuals higher in psychopathy (Jones & Neria, 2015). These characteristics are also present in those low on agreeableness. Moreover, individuals who are highly disagreeable are more likely to use the internet, mainly because they are less likely to socialize with peers due to interpersonal difficulties (Andreassen et al., 2013; Landers & Lounsbury, 2006; Servidio, 2014). Conversely, individuals higher in narcissism seem to report lower levels of loneliness compared to individuals higher in psychopathy (Zhang et al., 2015) and more narcissistic individuals even show higher peer-rated m has even been found to be positively associated with likeability and popularity (Szabó et al., 2024). Withdrawal, which is characterized by a cognitive preoccupation when not being online, could therefore be more prominent in psychopathy prone individuals, due to their unmet social needs (Shi & Du, 2019). The differential results in relation to psychopathy and withdrawal might also be a consequence of differences in how individuals higher in narcissism and psychopathy use the internet. For example, psychopaths have been reported to more commonly participate in aggressive online behavior such as trolling (March, 2019) and use social media to spy on others, compared to narcissists (Stiff, 2019). Research on differences in online behavior among the dark triad traits, however, is relatively recent, and these associations require further examination.

Moderation effect of psychopathy

In examining potential moderation effects, psychopathy was found to moderate the relationship between paternal intrusiveness and emerging adults' withdrawal when not being online. Paternal intrusiveness and withdrawal were positively related in those emerging adults with average and above-average (+1*SD*) psychopathy scores, but not in those with below-average scores. In building upon the argument that individuals higher in trait psychopathy might withdraw to the internet due to unmet real world social needs, studies have shown that intrusive paternal parenting leads to decreases in the child's social skills (Stevenson & Crnic, 2013). This relationship is especially pronounced when the child's behavioral dysregulation was high (Stevenson & Crnic, 2013) and behavioral dysregulation is a key feature of psychopathic individuals (Beauchaine, 2012). Furthermore, psychopathy is often characterized by reduced concern for social norms and callousness which may buffer them from some aspects of adverse parenting, but not others. The impact of perceived paternal intrusiveness on behavioral outcomes appears to depend on individual personality traits, with psychopathy shaping whether intrusive parenting fosters compulsive engagement or withdrawal. A

recent study on a sample similar to ours of emerging adults reported that the relationship between helicopter parenting (a type of intrusive parenting) and problematic internet use was dependent on the type of defense mechanisms employed be the emerging adults (Carone et al., 2023). Less mature defense mechanisms such as those typical of individuals with psychopathic traits increased the likelihood of problematic internet use (Perry et al., 2013). Our findings seem to suggest that there might be variability in the type of problematic internet use that is manifested in these relationships e.g. withdrawal instead of compulsive use.

Given that research on problematic internet use and the potential moderating role of dark triad traits is still in its infancy, the present findings offer novel evidence that psychopathy may uniquely shape how intrusive parenting translates into withdrawal, underscoring the importance of further investigation into these mechanisms.

Limitations

The present study has several limitations. One notable limitation is that a relatively small sample was used. This could affect the generalizability of the results, as the reported regression paths may be less stable (some coefficients were close to the chosen threshold for significance). Therefore, studies with larger samples could help to validate and replicate our results. Another limitation is the use of self-report measures. The use of a multi-informant approach for example could increase the robustness of the findings i.e., employing additional measures for the parents to rate their emerging adult's dark triad traits and internet use. Additionally, other measures of the child-parent interaction would aid in elucidating the complex etiology of problematic internet use. Furthermore, the cross-sectional design of the study precluded any conclusions about the causality of the relationship. For example, while we hypothesized that dark triad traits directly influence aspects of problematic internet use, causality could also run in the opposite direction, with higher levels of compulsive use reinforcing aspects of dark triad traits (e.g., narcissism through online social validation). Future studies should therefore conduct longitudinal studies to investigate how the dynamic changes in family relationships in combination with more stable personality traits become risk factors for problematic internet use.

Conclusions

This study sheds light on the complex interplay between aspects of individuation in relation to mothers and fathers, dark triad traits, and problematic internet use. The results of the path analyses showed that both models explained a significant, although small to moderate proportion of the variance in the two aspects of self-regulation in problematic internet use. Connectedness to mothers, but not to fathers predicted compulsive use. Perceived maternal intrusiveness positively predicted both compulsive internet use and withdrawal, whereas perceived paternal intrusiveness only predicted higher levels of withdrawal. Among the dark triad traits, narcissism was a predictor of compulsive use and withdrawal, while psychopathy was a predictor of withdrawal only. Additionally, psychopathy moderated the relationship between paternal intrusiveness and withdrawal. While the amount of variance explained in the two aspects of problematic internet use was significant, much variance remained unexplained by the models, highlighting the need for further studies examining the complex dynamics between parenting, personality and problematic internet use. Overall, the study is an important step toward understanding the relationship between personal and relational variables and problematic internet use at a time when internet use is increasing and causing societal problems. Future studies should aim to develop interventions that address the risk factors in the parent-child relationship that are related to the development of dark triad traits and self-regulation problems. For example, family therapy which focuses broadly on enhancing family relationships and quality of interaction and which involves strengthening communication between parents and emerging adults to fulfilling social and emotion needs within the family environment instead of on the internet has been found to aid in ameliorating problematic internet use (Shek et al., 2009; Xu et al., 2021; Zhong et al., 2011). Both during emerging adulthood and before, when internet use patterns are established, satisfying the child's emotional needs that arise from increasing the communication, closeness (connectedness) and an increased respect for the child's competence and autonomy is considered to be a key mechanism in this context (Liu et al., 2015). Thus, such developmental interventions could focus on teaching parents emotional and communication skills to create a stable, less intrusive family environment for adolescents and emerging adults.

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Data availability Dataset available at: https://osf.io/m24nb/

Compliance with ethical standards

Ethical approval The study was approved by the Ethics Committee of the Faculty of Arts, University of Ljubljana, and conducted in accordance with the Code of the Declaration of Helsinki and its subsequent amendments. All participants were provided with an informed consent form before their participation.

Conflict of Interest Statement The authors declare that the research was conducted in the absence of any commercial or financial incentive that could be construed as a potential conflict of interest.

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