AN EXPLORATORY STUDY ON PROBLEMATIC INTERNET USE PREDICTORS: WHICH ROLE FOR ATTACHMENT AND DISSOCIATION?

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Abstract

Objective: Problematic Internet use (PIU) and its relation to psychopathology is an emergent but disputed issue in literature. In the current study, we explored the relationship between psychiatric symptoms, dissociative processes, adult attachment styles and PIU.

Method: A community sample of 261 adults completed self-report questionnaires assessing Internet addiction symptoms (Internet Addiction Test – IAT), psychiatric symptoms (Symptom Checklist-90 Revised, SCL-90-R), dissociation (Dissociative Experiences Scale-II, DES-II), and adult attachment styles (Relationship Questionnaire, RQ). Socio-demographic data were also collected. Linear and logistic regression analyses were performed to explore the role of the hypothesized predictors on PIU.

Results: Attachment styles did not predict PIU, which was predicted instead by male gender, dissociative experiences and depressive symptoms.

Conclusions: Adult attachment styles may be not sufficent in explaining PIU when psychiatric symptoms and dissociative processes are taken into account. This is in line with previous research suggesting that negative affectivity and dissociation are more strictly related to the development and maintenance of the condition, especially among males.

Key words: problematic Internet use, dissociation, attachment styles, depression

Declaration of interest: none

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Introduction

Problematic Internet use (PIU) is one of the most disputed issues in current psychiatric research. The use of the Internet has dramatically increased and spread among daily activities (Kaess et al. 2014) in the last 20 years, so that understanding when it is problematic or not is still under discussion (Musetti et al. 2016a). As claimed in a recent debate paper by Aarseth et al. (2016) "… it is far from clear that these problems can or should be attributed to a new disorder, and the empirical basis for such a proposal suffers from several fundamental issues" (p. 268). Currently, PIU is especially conceptualized as a behavioral addiction construct, made up of symptoms such as preoccupation with the Internet, urgency in its use, use for longer than expected periods, withdrawal and tolerance symptoms, and significant distress and impairment in life (Widyanto and Griffiths 2006). However, strong criticisms have been raised against this conceptualization, with several scholars claiming that misuses of the Internet may widely vary in their manifestations and underlying psychological processes (Schimmenti et al. 2017a).

In fact, the association between PIU and the presence and severity of psychiatric symptoms is well documented (see Musetti et al. 2017, for a review) but it still not completely understood. Significant associations were observed between PIU and ADHD (Ho et al. 2014, Ko et al. 2012), anxiety and depression (Caplan 2002, Ebeling-Witte et al. 2007, Ho et al. 2014, Ko et al. 2012, Young and Rodgers 1998), sleeping disorders (Cheung and Wong 2011), obsessive-compulsive symptoms (Dong et al. 2011), and social phobia (Yen et al. 2007), thus suggesting that PIU may be related to both internalizing and externalizing symptoms. Different expressions of symptom profiles associated with PIU may also be related to different personality features. For example, Gervasi and colleagues (2017) explored the relationship between PIU and maladaptive personality domains (negative affectivity, detachment, antagonism, disinhibition, and psychoticism) according to the Alternative Model for Personality Disorder of the DSM-5 (APA 2013) in a sample of young adults, and they observed that negative affectivity, disinhibition and psychoticism strongly predicted PIU scores. The authors stated that PIU can be intended as a dysfunctional strategy to cope with distressing experiences and emotional dysregulation. Another interesting interpretation reported in that study concerned the role of psychoticism in PIU. Gervasi and colleagues interpreted their finding on psychoticism predicting PIU score under a psychodynamic light. They followed Schimmenti and Caretti's (2010) original idea that the Internet allows individuals to express dissociative or non-integrated states of minds that they have not processed on the cognitive level and have not learned to emotionally regulate in offline interpersonal

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relationships. According to this interpretation, virtual reality can become a sort of "bonding agent" for non-integrated self-states (Rosegrant 2012, Schimmenti et al. 2012). The hypothesis of the relationship between non-integrated self-states and PIU is supported by previous empirical and clinical literature, in which dissociation and PIU were found to be significantly associated (Dalbudak et al. 2014, Schimmenti and Caretti 2017). In this respect, Schimmenti and Caretti (2017) described an extreme clinical syndrome named video-terminal dissociative trance (VDT) that implies disturbances in consciousness, identity, memory, self-awareness and self-integrity, in which the sense of personal identity can precipitate into a dissociated virtual identity.

Further empirical findings suggest that difficulties with emotional understanding and processing are significant predictors of PIU (Schimmenti et al. 2017b, Scimeca et al. 2014), which is consistent with the view that PIU may derive from non-integrated mental states that obstruct emotional regulation and foster an excessive use of the Internet as a maladaptive coping strategy for painful or otherwise distressing experiences.

Capacities for emotional regulation and for integration of self-states, in turn, have been linked to experiences with caregivers during childhood and resulting attachment styles (Schimmenti 2016). In this respect, the majority of studies on attachment styles and PIU show that insecure attachment styles are linked to PIU (Eichenberg et al. 2017; Monacis et al. 2017; Senormanci et al. 2014; Schimmenti et al. 2012, 2014), similarly to what has been observed in people who suffer from substance use disorder (Corsano et al. 2014, Musetti et al. 2016b). For example, in the study by Monacis et al. (2017), secure attachment negatively predicted different aspects of PIU, such as problematic online gaming and excessive use of social media addiction, and in the study by Schimmenti et al. (2014) preoccupied attachment (an insecure attachment style characterized by a negative view of self in the relationship) was a significant predictor of PIU.

The aim of the current study was to examine the relationships among psychiatric symptoms, attachment styles, dissociation, and Internet addiction symptoms to better understand whether attachment styles and dissociation would predict PIU in the sample.

We expected that psychiatric symptoms such as anxiety, depression, hostility, and psychoticism would predict PIU scores, and that dissociation and insecure attachment styles would add to these predictions.

Methods

Participants and procedure

The study involved 261 participants (88 males, 34%; 173 females, 66%) aged 18 to 63 years old (M = 31.88 years, SD = 13.88). They were recruited from three cities in Sicily (Italy) through public advertisements (flyers in public places and universities). All participants signed an informed consent to participate in the study and completed a module with sociodemographic information (gender, age, marital status, and years of education) and the given self-report questionnaires. Participants did not take any compensation for their involvement in the study. At the end of the study, they were debriefed and thanked. The study was designed and carried out according to the ethical codes of the Italian Association of Psychology (AIP) and the American Psychological Association (APA), and it was approved by the Internal Review Board for psychological research of the last author's university.

Measures
Problematic Internet Use

The Internet Addiction Test (IAT; Young 1998) is a self-report questionnaire composed of 20 items rated on a 5-point Likert scale from 1 (*never*) to 5 (*always*) leading to a maximum score of 100. The questionnaire quantifies the severity of PIU. The higher the score, the higher the severity of Internet addiction symptoms.

Symptoms

The Symptom Checklist-90-R (SCL-90-R; Derogatis 1994) is a self-report questionnaire measuring a wide range of psychopathologic symptoms on 90 items rated on a 5-point Likert scale from 0 (*not at all*) to 4 (*extremely*) that refer to the last 7 days. It is composed by nine subscales (Somatization, Obsessive-compulsive, Interpersonal sensitivity, Depression, Anxiety, Hostility, Phobic anxiety, Paranoid ideation, and Psychoticism), with seven further item assessing appetite and sleep symptoms.

Attachment style

The Relationship Questionnaire (RQ; Bartholomew and Horowitz 1991) is a self-report questionnaire that identifies adult attachment styles. Four sentences are presented that describe prototypical configurations of attachment styles as they can be observed in close relationships (secure, dismissing, preoccupied, and fearful), and participants are required to indicate how much they agree or disagree with each of these sentences on a 7-point Likert scale.

Dissociation

The Dissociative Experience Scale-II (DES-II; Carlson and Putnam 1993) is a self-report questionnaire for the assessment of dissociative processes. It is composed of 28 items rating the percentage of time that individuals experience dissociative-related phenomena. Scores range from 0% to 100%, and the global score is obtained by summing up the item scores and dividing that sum by 28.

Statistical analyses

Descriptive statistics were computed for all the observed variables. Student's t-test (two-tailed) was used to assess gender differences. A hierarchical linear regression analysis was performed to examine whether the hypothesized predictors were significantly associated with IAT scores. Furthermore, a stepwise logistic regression analysis was performed to identify the best fitting model for classifying participants as non-pathological Internet users (IAT of 50 or below) or problematic Internet users (IAT of 51 or above), according to the widely used cut-off values identified for Internet addiction in relevant literature (Schimmenti et al. 2014, Young 1998).

Results

Descriptive statistics and differences between groups

Descriptive statistics are displayed in **table 1**. Thirty-three participants (12.6%) reported IAT scores of 51 or above, indicating risk for PIU according to the IAT cut-off value.

No gender differences were found for age ($t_{(259)}$ = 0.59, p = 0.56) and years of education ($t_{(259)}$ = –0.57, p = 0.57) of participants, whereas significant differences were found for IAT score, with males showing higher Internet addiction symptoms than females (males = 38.45 ± 13.79, females = 32.87 ± 10.81; $t_{(259)}$ = 3.58, $p < 0.001$). As for the symptomatic scales of the SCL-90-R, males and females showed significantly different scores in somatization, depression, anxiety, and paranoid ideation. Females obtained higher score for all these scales but paranoid ideation, in which males displayed higher scores ($2.45 > t_{(259)} < 2.58$, $p < 0.05$ for all comparisons). Males also showed higher attachment security than females at the RQ ($t_{(259)}$ = 2.07, $p < 0.05$), whereas females were more fearful ($t_{(259)}$ = –2.55, $p <$ 0.02).

Regression models

A hierarchical linear regression analysis was performed to examine whether SCL-90-R scores, RQ scores and DES-II scores predicted IAT scores. Four steps were entered in the regression analysis in the following order: Step 1 included socio-demographic variables (gender, age, marital status, and years of education) as predictors; Step 2 added SCL-90-R scales (somatization, obsessive–compulsive disorder, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism, and sleep disorder) as predictors; Step 3 added RQ scores (secure, avoidant, preoccupied, and fearful) as predictors; finally, Step 4 added DES-II scores as predictor. The results of this analysis are reported in **table 2**.

The hierarchical linear regression analysis revealed that male gender and younger age were predictive of IAT scores in all steps, whereas marital status and years of education did not predict IAT scores. When SCL-90-R symptom scores were added in Step 2, the explained variance in the regression model increased, but none of the symptom scores added to the prediction. When attachment styles were added in Step 3, the explained variance did not increase significantly, and none of the attachment style scores predicted IAT scores. In contrast, the inclusion of DES-II scores in Step 4 significantly increased the explained variance, with DES-II scores also being significant predictors of IAT scores.

Finally, we performed a stepwise logistic regression

Table 1. *Descriptive statistics*

Variables		Frequencies	Percentage
Gender			
Male		88	34%
Female		173	66%
Marital status			
Not married		198	76%
Married		63	24%
Attachment (RQ classification)			
Secure		95	36%
Avoidant		87	33%
Preoccupied		27	10%
Fearful		51	19%
	Range	**Mean**	**Standard deviation**
Age	18-63	31.9	13.9
Years of education	5-23	15.2	2.8
Problematic Internet Use (PIU)			
IAT total score	0-86	34.7	12.2
Symptoms (SCL-90-R scales)			
Global severity index	0.04-3.20	0.90	0.56
Somatization	0.00-3.83	0.87	0.63
Obsessive-compulsive	0.00-4.80	1.19	0.71
Interpersonal sensitivity	0.00-3.22	0.93	0.71
Depression	0.00-3.38	1.04	0.72
Anxiety	0.00-3.80	0.93	0.70
Hostility	0.00-4.00	0.87	0.78
Phobic anxiety	0.00-2.57	0.35	0.48
Paranoid ideation	0.00-3.50	1.13	0.76
Psycoticism	0.00-3.10	0.56	0.56
Sleep disorder	0.00-4.00	1.08	0.96
Dissociation (DES-II)	0.00-64.29	15.32	11.87

Legenda. Frequencies and percentage for categorial variables (Gender, Marital status and Attachment) and ranges, means and standard deviations for continuous variables (Age – in years, Years of education – in years, problematic internet use as IAT score, Symptoms as SCL-90-R scales scores and Dissociation as DES-II score).

Table 2. *Hierarchical linear regression analysis*

Variable	ΔR^2	R^2	*B*	*Lower bound*	*Upper bound*	*β*
Step-1	0.22***	0.22				
Gender			-6.03	-8.82	-3.24	-0.23***
Age			-0.40	-0.55	-0.26	-0.46***
Marital status			2.24	-2.50	6.98	0.08
Years of education			0.39	-0.10	0.87	0.09
Step-2	0.13***	0.35				
Gender			-5.13	-8.05	-2.21	-0.20**
Age			-0.33	-0.46	-0.19	-0.37***
Marital status			0.78	-3.74	5.31	0.03
Years of education			0.36	-0.10	0.83	0.09
Somatization			2.66	-0.47	5.80	0.14
Obsessive-compulsive			-1.24	-4.17	1.74	-0.07
Interpersonal sensitivity			1.50	-1.65	4.64	-0.09
Depression			0.81	-2.79	4.40	0.05
Anxiety			-1.38	-4.87	2.12	-0.08
Hostility			0.46	-2.09	3.01	0.03
Phobic anxiety			-2.91	-6.68	0.86	-0.11
Paranoid ideation			2.81	-0.27	5.89	0.18
Psychoticism			3.52	-0.74	7.79	0.16
Sleep disorders			0.11	-1.48	1.70	0.01
Step-3	0.01	0.36				
Gender			-4.91	-7.90	-1.92	-0.19**
Age			-0.34	-0.48	-0.20	-0.39***
Marital status			0.99	-3.59	5.58	0.03
Years of education			0.38	-0.09	0.85	0.09
Somatization			2.52	-0.70	5.75	0.13
Obsessive-compulsive			-1.19	-4.21	1.83	-0.07
Interpersonal sensitivity			-1.43	-1.80	4.67	0.08
Depression			0.98	-2.68	4.65	0.06
Anxiety			-1.51	-5.04	2.03	-0.09
Hostility			0.38	-2.21	2.97	0.02
Phobic anxiety			-2.73	-6.54	1.08	-0.11
Paranoid ideation			3.02	-0.17	6.22	0.19
Psychoticism			3.35	-0.97	7.68	0.15
Sleep disorders			0.15	-1.47	1.77	0.01
Secure			0.20	-0.51	0.90	0.03
Avoidant			-0.04	-0.67	0.59	-0.01
Preoccupied			0.24	-0.56	1.04	0.04
Fearful			-0.19	-0.95	0.57	-0.03
Step-4	0.03***	0.39				
Gender			-5.41	-8.35	-2.48	-0.21***
Age			-0.30	-0.44	-0.16	-0.34***
Marital status			1.19	-3.29	5.67	0.04
Years of education			0.43	-0.03	0.89	0.10
Somatization			1.54	-1.65	4.74	0.08
Obsessive-compulsive			-2.05	-5.04	0.94	-0.12
Interpersonal sensitivity			1.98	-1.20	5.16	0.11
Depression			1.92	-1.70	5.54	0.11
Anxiety			-0.99	-4.46	2.47	-0.06
Hostility			-0.53	-3.11	2.05	-0.03
Phobic anxiety			-2.57	-6.29	1.15	-0.10
Paranoid ideation			2.29	-0.86	5.44	0.14
Psychoticism			2.03	-2.25	6.31	0.09
Sleep disorders			0.10	-1.48	1.68	0.01
Secure			0.07	-0.62	0.77	0.01
Avoidant			-0.11	-0.72	0.51	-0.02
Preoccupied			0.16	-0.62	0.99	0.02
Fearful			-0.21	-0.96	0.53	-0.04
Dissociation			0.24	0.11	0.38	0.24***

Note: **table 2** shows ΔR^2, R^2, B, Lower bound, Upper bound of the 95% confidence interval for B and β coefficients for all predictors; Male coded as 1, female coded as 2; **$p < .01$, ***$p < .001$.

analysis to explore which predictors would enter in the best fitting model for predicting classification of participants into the group at risk for PIU. Male gender, younger age, depressive symptoms, and dissociation resulted in being predictive of PIU classification in the final model. This model was significant (Omnibus test $\chi^2 = 44.12$, $p < .001$), it explained 29% of pseudo-variance in PIU classification (Nagelkerke's Pseudo-R^2 = .29), and it correctly classified 86.2% of the sample, increasing the correct classification of people at risk for PIU of 6%.

Discussion

We explored the role of psychiatric symptoms, attachment styles and dissociation in PIU among adults. Our mixed findings generally support the conceptualization of PIU in terms of a dissociative escapism in virtual worlds (Schimmenti and Caretti 2010, Schimmenti et al. 2012), whereas we did not find evidence that attachment styles are involved in problematic behaviors in the Internet.

An important result concerns the role of male gender and younger age in PIU, as evidenced in the regression analyses. The fact that males are more likely than women to become problematic Internet users has been abundantly observed in literature (Bakken et al. 2009, Ho et al. 2014, Kormas et al. 2011). Despite an increasing use of the Internet by females in the last decade, males seem to remain more prone than females to use the Internet for entertainment and leisure activities (Weiser 2004), and this predisposition might lead in some cases to an addictive or otherwise maladaptive use of Internet applications. Also, the predictive role of younger age on Internet addiction scores can be explained as a greater exposition and familiarity with Internet applications among young adults.

In contrast, we did not find evidence that psychiatric symptom domains were predictive of Internet addiction scores, and only depressive symptoms entered in the logistic model for identifying cases at risk for PIU. These findings are in contrast with previous studies demonstrating significant associations between PIU and a wide range of psychiatric symptoms (see Ho et al. 2014 for a review). However, as our study was conducted with a community sample, it is possible to interpret our results in terms of depressive symptoms generally leading to an excessive and compensatory use of the Internet to avoid negative affect. In fact, the role of depression in PIU has been often identified in literature, especially in its components of loneliness (Ceyhan and Ceyhan 2008) and social isolation (Young and Rodgers 1998). Existing models also help to explain the causal effect of depression on PIU. Davis (2001) and Caplan (2007) agreed that depression, loneliness and poor social skills are domains of a circular model explaining the development, maintenance, and effects of PIU. To summarize their model, being depressed may induce some individuals to perceive online interactions as easier than real communication. The preference for online communication would increase loneliness and would reduce the development of social skills. The reduction of real-life social interaction would increase or maintain depression and PIU. In an interesting study by Kim and colleagues (2009) based on this model, authors added that the entertainment offered by the Internet can also reinforce, in a vicious circle, the probability of its problematic use.

The lack of significant predictive effect of attachment styles on PIU is deeply in contrast with our original hypothesis. The majority of previous studies found a relationship between insecure attachment styles and PIU (Eichenbergl et al. 2017, Monacis et al. 2017, Schimmenti et al. 2012, 2014, Senormanci et al. 2014). The relationship between insecure attachment styles and PIU seemed established, but inconsistencies in studies are found on which insecure style (preoccupied, fearful, or avoidant) is the most involved and why (Jia and Jia 2016). Such inconsistencies make the issue even more complex. It is noteworthy that in the present study we assessed perceived attachment styles in close relationships, and not participants' attachment representations. So, it is possible that an interview-based assessment of implicit attachment representations (which remains the gold-standard procedures to assess mental and behavioral states concerning attachment; see Baldoni et al. 2018) could have led to different results. This important limitation is shared with many other studies and might be even more critical when considering that during psychosocial development from childhood to adulthood, interpersonal attitudes toward attachment relationships can evolve (Fraley and Shaver 2000, Terrone et al. 2016) following different trajectories based on relational and ecological factors (Corsano et al. 2016, Musetti et al. 2016c). However, our findings did not support previous researchers' findings in which adult attachment styles predicted PIU.

Our findings confirmed the predictive role of dissociation in PIU. This is in line with our hypothesis that PIU is linked with the presence of mental states that are not integrated in the consciousness and that are projected and enacted in the Internet (Schimmenti et al. 2012, Schimmenti and Caretti 2017). So, the results of regression analyses tend to reinforce our idea that an alteration in the process of integrating identity, memory, and bodily states, as measured by DES-II, may distally predispose to interact with technologies that are used as a sort of "virtual prosthesis" to achieve feelings of self-integrity.

The present study comes with a number of limitations. The study was conducted with a group of individuals from the normal population. So, the average scores of symptom domains, dissociation, and Internet addiction are substantially low, and also the majority of the participants in our group reported a secure attachment style, as it is typical for the general population. Therefore, the lack of clinical problems in the vast majority of the sample could have covered some expected associations. Moreover, we only used self-reported measures to investigate psychopathology, dissociation, attachment styles, and PIU. The additional use of clinical and informant measures would have generated more reliable findings. Also, despite inclusion of symptom domains, dissociation, and attachment styles as predictors in the regression models that have been invoked based on theory, the cross-sectional nature of our findings does not allow us to conclude that dissociation and depression, together with younger age and male gender, had a causal role in the development of PIU among our participants, and longitudinal studies are needed to better ascertain the relationship between the investigated variables.

Even considering these limitations, our study supports the view that dissociation can be conceived of as an important psychological variable for a comprehensive understanding of PIU.

Conclusion

Our results confirmed that male gender, depression, and dissociation are linked to PIU. In contrast with previous literature, attachment styles did not result in significant predictors of PIU in our study. Therefore, future studies could further explore the role of attachment in PIU, also to clarify whether our unexpected finding should be attributed to measurement problems or rather indicate that the association between attachment styles and PIU is weak and potentially not significant when other psychosocial, clinical, or environmental variables are taken into account (Kardefelth-Winther 2014). Moreover, it would be interesting to expand research on how the dissociative processes may foster the development and maintenance of PIU and which are the key factors that lead individuals to use the Internet as a dissociative escape. On a more clinical level, our findings point out that depression and dissociation may be related to PIU. This suggests that clinical interventions on PIU should not focus only on PIU symptom elimination, but also on the affective and emotional processes that generated PIU.

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