INTERNET OUT OF CONTROL: THE ROLE OF SELF-ESTEEM AND PERSONALITY TRAITS IN PATHOLOGICAL INTERNET USE

Lucia Sideli, Caterina La Cascia, Crocettarachele Sartorio, Giada Tripoli, Alice Mulè, Luciana Taffaro, Irene Ruggirello, Davide Mangiapane, Ettore Piro, Michele Inguglia, Daniele La Barbera

Abstract

Objective: Young people seem particularly likely to develop pathological Internet use (PIU) with the use of social networks, chat, and videos. Sensation-seeking, neuroticism, introversion, and low self-esteem are personality features frequently associated with the disease. The aim of this study was to replicate and to extend previous findings by exploring the combined effect of personality traits and self-esteem on PIU.

Method: A sample of 652 male students attending vocational technical schools in Palermo (Southern Italy) was assessed using the following measures: the Zuckerman-Kuhlman Personality Questionnaire to evaluate personality traits; the Multidimensional Self-Concept Scale to assess self-esteem; the Tech Style Behavior to investigate PIU.

Results: Pathological Internet Use was associated to age, feelings of low self-esteem and inadequate competence, impulsivity/sensation seeking, aggression-hostility, and sociability. However, in a multiple linear regression model, only sociability, aggression-hostility, competence, and age demonstrated a significant effect in the prediction of PIU.

Conclusions: Expanding previous research, the findings suggest that low self-esteem, high aggression-hostility, and high sociability are significant risk factors for PIU. Therefore, primary prevention programmes should include interventions aimed at promoting self-competence, enhancing emotional skills, and developing effective coping strategies.

Key words: pathologic Internet use, aggressiveness, self-esteem, sociability, adolescence

Sideli Lucia[1*], La Cascia Caterina[1*], Sartorio Crocettarachele[1], Tripoli Giada[1], Mulè Alice[2], Taffaro Luciana[1], Ruggirello Irene[1], Mangiapane Davide[2], Piro Ettore[3], Inguglia Michele[4*], La Barbera Daniele[1*]

[1] Department of Experimental Biomedicine and Clinical Neuroscience, section of Psychiatry, University of Palermo, Palermo (Italy)

[2] Operative Unit of Psychiatry, University Hospital "P. Giaccone", Palermo (Italy)

[3] Department of Sciences for Health Promotion and Mother and Child Care "Giuseppe D'Alessandro", University of Palermo, Palermo (Italy)

[4] Department of Mental Health, Azienda Sanitaria Provinciale di Palermo, Palermo (Italy)

* These authors equally contributed to this work.

Corresponding author

Lucia Sideli

Section of Psychiatry, Department of Experimental Biomedicine and Clinical Neuroscience

via G. La Loggia, 1, 90129 Palermo (Italy)

Tel: +39916555170, fax: 39916555165

Email: lucia.sideli@gmail.com

Introduction

In the last two decades, the increased accessibility of Internet devices and the launch of social networking websites have significantly promoted Internet use among youths. A survey carried out by the Italian Society of Pediatrics showed that the percentage of teenagers using Internet every day increased from 42% in 2008 to 70% in 2012, and up to 81% in 2014. This mounting trend is partially dependent on the spread of portable Internet devices, such as tablets or smartphones. In fact, in 2008 less than 1% of Italian adolescents were able to be connected on the Web by their smartphones, but the rate increased to 65% in 2012 and to 92.6% in 2014 (SIP 2014).

Although Internet Addiction Disorder (IAD) has been studied since the mid '90s of the past century (Young 1996), it was only recently that Internet Gaming Disorder was included in Section III of the Diagnostic and Statistical Manual for Mental Disorders, fifth edition (DSM 5; APA 2013). Indeed, during the past two decades, several definitions have been used to describe the excessive and maladaptive use of Internet, including "Internet Addiction", "Pathological Internet Use", or "Compulsive Internet Use" (La Barbera and Sideli 2006, 2007). The majority of these terms include some features that are common with other addictive behaviours (e.g., pathological gambling and substance use disorder), such as: compulsive Internet use, persistent involvement in Internet despite adverse

consequences, appetitive urge or craving, and poor self-control or failed attempts to reduce or quit Internet use (Kuss et al. 2015, Potenza 2015). However, carefulness is needed to avoid oversimplification of excessive behaviours, such as Pathological Internet Use (PIU), particularly in youths, since these conducts may assume different psychopathological meanings according to the underlying psychological motives, the type of onset and course, and the amount of personal disease and functional impairment experienced by the individual (Billieux et al. 2015, Schimmenti et al. 2014).

According to a large European mental health survey (n=12.395), the Saving and Empowering Young Lives in Europe (SEYLE), 4.4% European adolescents are involved in PIU, with significant differences between countries. Youths with PIU tend to spend excessive time online, particularly watching videos, chatting, and using social networking websites (Durkee et al. 2012). The study found that PIU was related to several social factors, including male gender, living in a highly urbanised area, and family problems, such as low parental involvement or parental unemployment (Durkee et al. 2012). The findings were consistently replicated at a local level in our region (Sicily, Southern Italy); in fact, according to a recent study, the prevalence of PIU in a high school sample was estimated to be 3.9 %, with male gender associated to higher risk (Bruno et al. 2014).

Besides social risk factors, several personality traits were related to PIU or Internet Addiction. Neuroticism, narcissism, self-esteem, disagreeableness, and sensation seeking are some of the factors mostly investigated over time. According to a recent review (Floros et al. 2014), PIU is positively correlated with traits of psychoticism, sensation seeking, and neuroticism, while showing negative correlations with extraversion, conscientiousness, reward dependence, agreeableness, and self-directedness.

Self-concept and self-esteem tend also to affect Internet use: teenagers with low self-esteem might be attracted by the Internet because they can present themselves in a more positive way (i.e., selecting personal information they want to share), they may get appreciation by their peers for specific abilities (i.e., in relation to gaming online), and they can expand their social network using various apps and websites (Armstrong et al. 2000, Aydin and Volkan Sari 2011, Skues et al. 2012). In addition, low self-esteem may increase the risk for Problematic Internet Use by reducing users' self-control on online activities (Kim and Davis 2009).

An interesting research line has explored the role of personality traits in the risk for specific types of technological abuse. For instance, Ehrenberg and colleagues (2008) found that university students with addictive tendencies towards instant messaging services were characterised by disagreeableness and low self-esteem, while the risk of pathological use of mobile phone was related to higher extraversion and neuroticism. Other studies investigated the pathological use of social networking sites, such as Facebook (FB). A study on a large sample of undergraduate students analysing the effect of several personality features (i.e., extraversion, neuroticism, openness, self-esteem, and narcissism) on FB use reported that both openness and loneliness predicted the number of FB friends, but only the former predicted the duration of FB use (Skues et al. 2012). According to the authors, this suggests that higher levels of Facebook use might be determined by different motivations, such as keeping contact with several people sharing similar interests (openness)

or compensating for lack of social contact in real life (loneliness). The compensatory role of Internet use was also pointed out by studies on pathological use of gaming online. For example, a study on a youth sample of Korean Massive Multiplayer Online Role-Playing Game (MMORPG) players found that online game addiction was associated with irritability, aggressiveness, low self-control, and narcissistic personality traits, as well as with occupational and relational difficulties. The study suggested that, for some teenagers, online gaming might represent a more fulfilling alternative to real life, in order to express their aggressive impulses and narcissistic needs (Kim et al. 2008).

In light of these findings, the aim of this study was to evaluate the combined effect of personality traits and self-esteem on pathological Internet behaviours in a sample of Italian teenagers.

Methods

Sample

The original sample consisted of 1185 students attending vocational technical schools of Palermo (South Italy). Given the low prevalence of female students in these courses (n=28, 2.2%), analyses were limited only to male students. To further guarantee response validity, participants who scored higher than a 3 on the Lie scale of the Zuckerman-Kuhlman Personality Questionnaire were also excluded (n=505, 42.6%). Therefore, the final sample was made of 652 students. A formal authorization was provided by the principals of n 8 vocational-technical schools. The study aims and methods were fully explained by the researchers, and the participants gave informed consent and completed the self-report questionnaires described below.

Measures

The Zuckerman-Kuhlman Personality Questionnaire (ZKPQ) (De Pascalis and Russo 2003, Zuckerman et al. 1993, Zuckerman et al. 2002) is a self-report questionnaire designed to assess basic personality dimensions. ZKPQ consists of 99 dichotomous items (true-false) grouped in five content scales: 1. impulsive-sensation seeking (19 items, e.g. "I often do things on impulse"; "I sometimes do 'crazy' things just for fun"); 2. neuroticism-anxiety (19 items, e.g. "I sometimes feel edgy and tense"; "I often have trouble trying to make choices"); 3. activity (17 items, e.g. "I like to keep busy all the time"; "I like a challenging task more than a routine one"); 4. sociability (17 items, e.g. "I tend to start conversations at parties"; "I would not mind being socially isolated in some place for some period of time"); 5. aggression-hostility (17 items, e.g. "It is natural for me to curse when I am mad"; "If people annoy me I do not hesitate to tell them so"). A further scale, infrequency, is a validity scale designed to reveal inattention while responding to the questions or strong social desirability (Zuckerman et al. 1993). The Italian ZKPQ showed good internal consistency (Cronbach's alpha: 0.70-0.86) and internal validity (intraclass correlation 0.17-0.31, correlation with the Eysenk Personality Questionnaire 0.38-0.76) (De Pascalis and Russo 2003).

The Multidimensional Self-Concept Scale (MSCS) (Bracken 1992, Beatrice and Bracken 2005) is a self-

report questionnaire assessing six different components of self-esteem. The questionnaire consists of 150 items rated on a 4-point Likert scale (from totally true to totally false) grouped in six scales: 1. social (e.g. "I am too shy"; "I often feel like I am left out of things"); 2. competence (e.g. "I am very self-confident"; "I give people good reason to trust me"); 3. affect (e.g. "I enjoy life"; "I feel like a failure"); 4. academic (e.g. "I am proud of my school work"; "My teachers have a low opinion of me"); 5. family (e.g. "My family makes me feel loved"; "Nothing I do seems to please my parents"); 6. physical (e.g. "I am attractive"; "I feel good about how I look"). The MSCS demonstrated excellent internal consistency (Chronbach's alpha 0.96 for overall scale and 0.82-0.89 for subscales) and concurrent validity (correlation with Culture Free Self-esteem Inventory Pearson's r: 0.52-0.71) (Beatrice and Bracken 2005).

The Tech Style Behavior (TSB) is a self-report questionnaire designed to investigate pathological use of new technologies (Mezzatesta et al. 2006). It consists of 32 items, rated on a 4-point Likert scale (from "never" to "always"), which explore behavioural and psychological correlates of pathological use of new technologies, such as Internet and video games. Analysis of variance identified five factors explaining 31% of variance. For this study, only the TSB Online behaviours scale was used. It explores feelings and behaviours related to Pathological Internet Use (e.g., "Using Internet makes me feeling better"; "When I am online, sometimes I say: just a moment, and I am going to quit"). The scale showed good internal consistency (Chronbach's alpha 0.82) and explained 15.0% of the TSB variance (Mezzatesta et al. 2006).

Statistical analysis

All variables were reasonably normally distributed. The relation between the dependent variable (Pathological Internet Use) and the independent variables (age, personality traits, and self-esteem components) was firstly assessed using Pearson's correlation test. Next, independent variables showing a significant relation were entered into a hierarchical linear regression model in order to assess their effect on the dependent variable. Analyses were carried out using Statistical Package for Social Science (SPSS) ver. 18.

Results

Mean scores on the Zuckerman-Kuhlman Personality Questionnaire, the Multidimensional Self-Concept Scale, and the TSB online behaviour are shown in **Table 1**. PIU was related to younger age ($r = -0.145$, $p < 0.001$), and low self-esteem was related to the MSCS Competence ($r = -0.152$, $p < 0.001$) and Affect subscales ($r = -0.115$, $p = 0.003$). Furthermore, higher Internet involvement correlated with higher levels of ZKPQ impulsivity, sensation-seeking ($r = 0.090$, $p = 0.022$), aggression-hostility ($r = 0.134$, $p = 0.001$), and sociability ($r = 0.147$, $p < 0.001$).

All of the above variables were entered into a hierarchical linear regression model in order to assess their effect on PIU; personality traits were entered into the first block, self-esteem dimensions were entered in the second block, and age was entered in the third block (see **table 2**). After controlling for the effect of the other explanatory variables, the only variables demonstrating a significant effect on pathological Internet behaviour were sociability, aggression-hostility, competence, and age. The model was statically significant ($F = 8.822$, $p < 0.001$) and explained about 8% of the variance of Pathological Internet Use ($R^2 = 0.076$).

Discussion

Adolescence is regarded as a period of change, characterised by deep physiological and psychological transformations defining the transition to adulthood; these transformations imply the abandonment of childhood values and behaviours and the openness to new ones. During this period, teenagers have to face several developmental tasks, including the differentiation from significant others and the construction of their personal identity (Erikson 1968). In contemporary Western societies, characterised by social instability, weakened social bonds, and a strong technological development, adolescents may be exposed to a number of pathological behaviours – such as Internet use, gambling, or substance misuse – that in some cases may require psychiatric care.

In this study, we found that PIU was associated with age, feelings of low self-esteem and insufficient competence, and traits of sensation-seeking-impulsivity, aggression-hostility, and sociability. We found that younger adolescents tend to show greater pathological

Table 1. *Mean scores of the samples at the clinical scales*

	Mean (standard deviation)	Range min-max
Zuckerman-Kuhlman Personality Questionnaire		
Impulsive-Sensation Seeking	10.64 (3.99)	0-19
Sociability	11.30 (4.19)	1-21
Aggression-Hostility	8.35 (3.19)	0-16
Neuroticism-Anxiety	8.53 (3.49)	0-18
Activity	8.78 (2.98)	0-16
Multidimensional Self Concept Scale		
Social	30.88 (4.63)	14-40
Affect	28.50 (5.03)	10-36
Academic	28.54 (4.86)	14-43
Competence	26.16 (3.57)	12-36
Family	31.08 (5.37)	10-36
Physical	25.76 (4.25)	0-36
***Tech Style Behavior*, Online Behavior**	2.24 (0.60)	0-4

Table 2. *Results of the hierarchical linear regression*

	B (95% CI)	Beta	t (p value)	F (p value)	Difference in F (p value)	R²	Adj. R²
Model 1				7.025 (< 0.001)	7.025 (< 0.001)	0.031	0.027
Constant	1.885(1.719-2.052)		22.200 (<0.001)				
Impulsive-Sensation Seeking	-0.001(-0.014-0.013)	-0.004	-0.079 (0.937)				
Aggression-Hostility	**0.020 (0.004-0.035)**	**0.104**	**2.466 (0.014)**				
Sociability	**0.017 (0.005-0.030)**	**0.122**	**2.816 (0.005)**				
Model 2				8.035 (< 0.001)	9.280 (< 0.001)	0.059	0.051
Constant	2.637 (2.255-3.018)		13.580 (<0.001)				
Impulsive-Sensation Seeking	-0.001(-0.014-0.013)	-0.004	-0.009 (0.921)				
Aggression-Hostility	**0.021 (0.005-0.036)**	**0.109**	**2.616 (0.009)**				
Sociability	**0.018 (0.006-0.030)**	**0.124**	**2.897 (0.004)**				
Competence	**-0.020 (-0.035- -0.006)**	**-0.121**	**-2.753 (0.006)**				
Affect	-0.008 (-0.018-0.002)	-0.068	-1.541 (0.124)				
Model 3				8.822 (<0.001)	12.071 (0.001)	0.076	0.067
Constant	3.406 (2.830-3.983)		11.607 (<0.001)				
Impulsive-Sensation Seeking	-0.001(-0.013-0.013)	0.001	-0.013 (0.990)				
Aggression-Hostility	**0.022 (0.006-0.037)**	**0.115**	**2.775 (0.006)**				
Sociability	**0.017 (0.005-0.029)**	**0.120**	**2.849 (0.005)**				
Competence	**-0.019 (-0.033- -0.004)**	**-0.111**	**-2.556 (0.011)**				
Affect	-0.007 (-0.017-0.004)	-0.056	-1.284 (0.199)				
Age	-0.052 (0.081-0.023)	-0.133	-3.474 (0.001)				

Significant predictors in bold.

Internet use than older ones. This is consistent with the literature on the general population claiming a negative correlation between Internet addiction and age (Kuss et al. 2014). Younger teens might experience greater attractiveness towards new technologies, along with poor self-control over their behaviours, which might be explained by the imbalanced development of their nucleus accumbens and their orbito-frontal cortex (Galvan et al. 2006). Indeed, this study showed that adolescents with higher levels of pathological Internet use had higher impulsivity-sensation-seeking, aggression-hostility, and sociability traits, although the effect of the impulsivity/sensation-seeking became non-significant once we controlled for the effect of the latter explanatory factors.

A large body of literature identified in sensation-seeking, impulsivity, and low self-control the personality traits more strongly related to Internet misuse, particularly among male adolescents (Kuss et al. 2014, Livingstone and Smith 2014). For instance, two studies on Taiwanese adolescents attending high school (Ko et al. 2009) and college (Yen et al. 2011) found that aggressive behaviours in the previous year were related to higher levels of Internet addiction, daily Internet use, and being online for more than 20 hours per week; these associations were stronger for junior high school students than for those attending senior high school. Furthermore, a Greek study reported that college students affected by Internet addiction showed higher levels of impulsivity and aggression-hostility than healthy controls, suggesting that they might overindulge in Internet use in order to vent their negative emotions, such as anger and frustration (Floros et al. 2015). Finally, a recent study on a sample of Indian students aged 18 to 24 years (Kumar and Singh 2015) found that youths with high levels of impulsive-sensation-seeking and aggression-hostility were more at risk for Internet addiction.

In addition to aggression-hostility, we found that PIU was predicted by high levels of sociability. This is inconsistent with a previous study that reported a negative association between Internet addiction and sociability (Kumar and Singh 2015) and with a review by Floros and Siomos (2014) stating that extroverted people are at a lower risk of PIU, also because they are less attracted by instant sources of gratification. On the other hand, Kuss and Griffiths (2011) suggested that extrovert teenagers may be at no less risk of heavy Internet use than introvert ones: extrovert personalities may develop excessive Internet use in order to maintain social relationships that had been already established offline, while introvert personalities may be strongly attracted by the Web to compensate for the paucity and dissatisfaction of their real-life connections. Therefore, it is possible that, in line with some previous studies, in this sample adolescents with high sociability and high impulsivity-sensation seeking are prone to PIU because they see the Internet as a way to enhance social relationships and facilitate exchange of interests with their peers (Douglas et al. 2008, Skues et al. 2012).

Furthermore, we found a negative association between PIU and the self-esteem domains of affect

and competence, but only the latter predicted Internet behaviour once the effects of other predictors were taken in account. Competence refers to the feeling of control and mastery on the individual's life and environment, including the perception of efficacy in problem solving and goal attainment. Indeed, the primary developmental task of adolescence is to develop a positive sense of self that is flexible enough to adapt to new situations and challenges, yet stable enough to provide a sense of the continuity of the self. Several studies have shown that low self-esteem has a negative impact on several domains of functioning, such as mood (depression, anxiety, anger, hostility), relationships (distrust, avoidance), goals (low expectations, fear of change), and behaviours (risk-taking, substance use) (Ralph et al. 1998), including PIU in adolescence (Ehrenberg et al. 2008, Kuss et al. 2014). The relation between PIU and self-esteem has been widely investigated in literature, and a negative relationship between these two variables has been reported (Armstrong et al. 2000, Aydin and Volkan Sari 2011, Ehrenberg et al. 2008, Kim and Davis 2009). Furthermore, Internet addiction has been associated with locus of control, a construct that partially overlaps with sense of competence. For instance, Chak and Leung (2004) found that young Internet users (aged 12-26 years old) who believe that powerful others or the fate have control over their lives (i.e., external locus of control) were found to be less successful in controlling their Internet use, staying online longer than originally intended. In their meta-synthesis of qualitative studies, Douglas and colleagues (2008) suggested that anonymity of the Internet might be a great attraction for people with a negative self-image and poor self-confidence, providing a sense of mastery and social recognition that they do not experience at school or at home while facilitating social relationships. In this perspective, the Internet represents for most adolescents a "technological extension of the self" where they can transfer parts of their identity and their needs for relationships and control (La Barbera and Sideli 2007, Turkle 1995).

In summary, expanding previous studies investigating the independent effect of personality trait and self-esteem on PIU, this study analysed the combined effect of these variables on a large sample of students from Southern Italy. We found that younger age, aggression-hostility, sociability, and low self-competence predicted increased involvement in pathological Internet behaviours. This is in line with a previous study showing that aggressiveness and narcissism predicted online gaming addiction (Kim et al. 2008) and suggests that the effects of aggressiveness and low self-esteem may not be limited to gaming online but also to broadly defined Internet use.

This study has several limitations: participants were boys attending only vocational schools, thus limiting generalizability of the findings to the source population (i.e., it did not assess girls and students attending other types of secondary school). Moreover, although protocols with higher scores on the ZKPQ Infrequency scale were not included in the analyses, reporting bias cannot be fully excluded. Also, we were unable to control the analyses for potential confounding factors such as socio-economic status, parental bonding and parental attitude towards Internet use, life events, and psychiatric comorbidities. Finally, the cross-sectional design entails particular caution in drawing conclusion about direction of causality.

Despite these limitations, the study contributes to the discussion about the risk factors for PIU in adolescence and, consequently, to identify potential targets of prevention programme. These may include educational programmes for students, aimed at promoting self-competence, enhancing emotional skills, and developing effective coping strategies. Moreover, in terms of secondary prevention, psychological consultation should be offered in schools in order to identify youths at greater risk for PIU and to deliver early intervention programmes aimed at modifying addictive behaviours and preventing more severe forms of Internet-related disease.

References

American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)*. American Psychiatric Publishing, Arlington.

Armstrong L, Phillips JG, Saling LL (2000). Potential determinants of heavier internet usage. *International Journal Human-Computer Studies* 53, 537-550.

Aydin B, Volkan Sari S (2011). Internet addiction among adolescents: the role of self-esteem. *Procedia Social and Behavioral Sciences* 15, 3500-3505.

Beatrice V, Bracken BA (2005). *TMA. Test multidimensionale dell'autostima*. Erickson Editore, Trento.

Billieux J, Schimmenti A, Khazaal Y, Maurage P, Heeren A (2015). Are we overpathologizing everyday life? A tenable blueprint for behavioral addiction research. *Journal of Behavioral Addictions* 4, 3, 119-123.

Bracken BA (1992). Multidimensional Self-Concept Scale. Pro-Ed, Austin TX.

Bruno A, Scimeca G, Cava L, Pandolfo G, Zoccali RA, Muscatello MRA (2014). Prevalence of Internet Addiction in a Sample of Southern Italian High School Students. *International Journal Mental Health Addiction* 12, 708-715.

Chak K, Leung L (2004). Shyness and locus of control as predictors of internet addiction and internet use. *CyberPsychology and Behavior* 7, 5, 559-570.

De Pascalis V, Russo PM (2003). Zuckerman-Kuhlman Personality Questionnaire: Preliminary results of the Italian version. *Psychological Reports* 92, 3, 965-974.

Douglas AC, Mills JE, Niang M, Stepchenkova S, Byun S, Ruffini C, Lee SK, Loutfi J, Lee JK, Atallah M, Blanton M (2008). Internet addiction: Meta-synthesis of qualitative research for the decade 1996-2006. *Computers in Human Behavior* 24, 3027-3044.

Durkee T, Kaess M, Carli V, Parzer P, Wasserman C, Floderus B, Brunner R (2012). Prevalence of pathological internet use among adolescents in Europe: demographic and social factors. *Addiction* 107, 12, 2210-2222.

Ehrenberg A, Juckes S, White KM, Walsh SP (2008). Personality and self-esteem as predictors of young people's technology use. *CyberPsychology and Behavior* 11, 6, 739-741.

Erikson E (1968). *Identity Youth and Crisis*. Norton and Company, New York.

Floros G, Siomos K (2014). Excessive Internet use and personality traits. *Current Behavioral Neuroscience Reports* 1, 19-26.

Floros G, Siomos K, Antoniadis D, Bozikas VP, Hyphantis T, Garyfallos G (2015). Examining personality factors and character defenses assists in the differentiation between college students with Internet addiction and unaffected controls. *Personality and Individual Differences* 86, 238-242.

Galvan A, Hare TA, Parra CE, Penn J, Voss H, Glover G, Casey BJ (2006). Earlier development of the accumbens relative to orbitofrontal cortex might underlie risk-taking behavior in adolescents. *The Journal of Neuroscience* 26, 25, 6885-6892.

Kim HH, Davis KE (2009). Toward a comprehensive theory of problematic Internet use: Evaluating the role of self-esteem, anxiety, flow, and the self-rated importance of Internet activities. *Computers in Human Behavior* 25, 490-500.

Kim EJ, Namkoong K, Ku T, Kim SJ (2008). The relationship between online game addiction and aggression, self-control and narcissistic personality traits. *European Psychiatry* 23, 3, 212-218.

Ko CH, Yen JY, Liu SC, Huang CF, Yen CF (2009). The associations between aggressive behaviors and Internet addiction and online activities in adolescents. *Journal of Adolescent Health* 44, 6, 598-605.

Kumar P, Singh U (2014). Internet addiction in relation to personality factors of Zuckerman's alternative five factor model. *Indian Journal of Health and Wellbeing* 5, 4, 500.

Kuss DJ, Griffiths MD (2011). Online Social Networking and Addiction. A Review of the Psychological Literature. *International Journal of Environment and Public Health* 8, 3528-3552.

Kuss DJ, Griffiths MD, Karila L, Billieux J (2014). Internet addiction: a systematic review of epidemiological research for the last decade. *Current Pharmaceutical Design* 20, 25, 4026-4052.

La Barbera D, Sideli L (2006). La dipendenza da internet. In T Albano, L Gulimanoska (eds) *In-Dipendenza: un percorso verso l'autonomia*, pp. 160-203. FrancoAngeli, Milano.

La Barbera D, Sideli L (2007). La Psichiatria e l'Information and Communication Tecnology (ICT): Le risorse e i rischi. In M Balestrieri, C Bellantuono, D Berardi, M Di Giannantonio, M Rigatelli, A Siracusano, et al. (eds) *Manuale di Psichiatria*, pp. 945-965. Il Pensiero Scientifico Editore, Roma.

Livingstone S, Smith PK (2014). Annual research review: Harms experienced by child users of online and mobile technologies: The nature, prevalence and management of sexual and aggressive risks in the digital age. *Journal of Child Psychology and Psychiatry* 55, 6, 635-654.

Mezzatesta C, Perricone V, La Cascia C, La Barbera D (2006). Uno strumento di indagine per valutare i nuovi stili di comportamento adolescenziale: TSB (Tech Style Behavior). *Psicotech* 2, 57-68.

Potenza MN (2015). Commentary on: Are we overpathologizing everyday life? A tenable blueprint for behavioral addiction research. Defining and classifying non-substance or behavioral addictions. *Journal of Behavioral Addictions* 4, 3, 139-41.

Ralph JA, Mineka S (1998). Attributional style and self-esteem: The prediction of emotional distress following a midterm exam. *Journal of Abnormal Psychology* 107, 203-215.

Schimmenti A, Caretti V, La Barbera D. (2014). Internet Gaming Disorder or Internet Addiction? A plea for conceptual clarity. *Clinical Neuropsychiatry* 11, 5, 145-146.

Skues JL, Williams B, Wise L (2012). The effects of personality traits, self-esteem, loneliness, and narcissism on Facebook use among university students. *Computers in Human Behavior* 28, 6, 2414-2419.

Società Italiana di Pediatria (2014). *Abitudini e stili di vita degli adolescenti italiani*. Anno 2013-2014, XVI ed.

Turkle S (1995). *Life on the Screen: Identity in the Age of the Internet*. Simon and Schuster, NY.

Yen JY, Yen CF, Wu HY, Huang CJ, Ko CH (2011). Hostility in the real world and online: the effect of internet addiction, depression, and online activity. *Cyberpsychology, Behavior, and Social Networking* 14, 11, 649-655.

Young KS (1996). Internet addiction: The emergence of a new clinical disorder. *Cyberpsychology, Behavior and Social Networking* 1, 3, 237-244.

Zuckerman M (2002). Zuckerman–Kuhlman Personality Questionnaire (ZKPQ): An alternative five-factorial model. In B De Raad, M Perugini (eds) *Big five assessment*, pp. 377-396. Hogrefe and Huber, Seattle.

Zuckerman M, Kuhlman DM, Joireman J, Teta P, Kraft M (1993). A comparison of three structural models for personality: The Big Three, the Big Five, and the Alternative Five. *Journal of Personality and Social Psychology* 65, 757-768.