

# Problematic Internet Use among Adolescents

Paul Raj<sup>1</sup>, C. S. Elizabeth<sup>2</sup>, Payel Roy<sup>3</sup>, and P. Padmakumari<sup>4</sup>

<sup>1</sup>(Lecturer, Department of Psychology, Jyoti Nivas College Autonomous, Bengaluru, Karnataka, India)

<sup>2</sup>(Associate Professor, Jyoti Nivas College Autonomous, Bengaluru, Karnataka, India)

<sup>3</sup>(Department of Psychology, Jyoti Nivas College Autonomous, Bengaluru, Karnataka, India)

<sup>4</sup>(Associate Professor, Department of Psychology, Christ University, Bengaluru, Karnataka, India)

---

**Abstract:** *There is no consensus among researchers regarding problematic internet use. However, majority of them agree on the fact that problematic internet use is characterised by extreme or poorly controlled preoccupations concerning the excessive use of internet that leads to normal functional impairment or distress. This paper attempts to describe what is known from the empirical literature on problematic internet use and its causes and consequences. This review is organised in three major sections. The introduction part covers prevalence of problematic internet use, use of terminology and the importance of problematic internet use among adolescents. The second section contains review of research studies published since year 2001, focusing on psychological vulnerabilities, contextual factors and content-related internet use factors. The third section concludes that problematic internet use among adolescents leads to various personal, social, interpersonal, emotional and psychological problems and it is caused by multiple factors such as personality, contextual and content-related to internet.*

**Keywords:** *Problematic internet use, Psychological vulnerabilities, Adolescents*

---

Unlike in the past, where the internet was considered a luxury, the use of internet has grown exponentially to be perceived as one of the necessities of everyone's life (Anderson, Steen & Stavropoulos, 2016), especially for the adolescents. It has exposed them to a world which provides immense opportunity to have global communication at their fingertips, easy and abundant access to information, and unlimited provision for entertainment. As the technical literacy is pivotal in work/study life as well as leisure activities, the internet has become central within adolescent period (Aslanidou & Menexes, 2008; Thorsteinsson & Davey, 2014; Wallace, 2014). Today's adolescents of internets, smartphones and tablets are rightly called as 'Digital Natives.' (Stahl, 2017; Crone & Konijn, 2018).

According to Pew Research Center (2014) as many as 85% of the Americans use internet for their daily communication. The scenario is different in developing (Asian) countries like India. In 2001, there were mere seven million internet users in India (Rao, 2015). But by January 2017, according to the Statistic Portal, there were as many as 462.1 million active internet users which accounted for about 35% of the entire population. This data shows a significant increase in internet usage when compared to the year 2011 when the recorded internet users was a mere 10% of the population. Furthermore, about 71% of men use internet as against 29% women (Digital Population in India, 2017). According to the Internet and Mobile Association of India (IAMAI), by June 2018, the number of internet users in India is expected to reach 500 million, making it second largest internet-use population in the world (Rao, 2015). In December 2017 the internet penetration in urban India was 64.84% as compared to 60.6% in December 2016. In comparison, the rural internet penetration has gone up from 18% to 20.26% during the same period (Agarwal, 2018). These data highlight the rapid growth of the internet among Indian population.

A review based on 103 studies showed that the internet addiction among male college students was 12% while it was 5% among female students (Lau, 2011).. Another longitudinal study conducted in Hong Kong revealed that as many as 26.7% high students reported of internet addiction (Yu, & Shek, 2013). It seems in developed countries the internet has already penetrated all facets of life. This clearly shows that the developing countries, nevertheless, catching up with the rest of the world rapidly highlighting the need for holistic understanding of the field.

Internet has immensely helped people in decision making, replacing expensive offline activities by cost-effective online activities, easy and fast communication and in improved livelihood. While the internet has brought lots of advantages to the masses, it's problematic use has brought lot of negativities too. The excessive and inappropriate use of it can result in loss of control and unhealthy lifestyles (Jelenchick et al., 2014; Jelenchick, Hawk, & Moreno, 2016). Its negative impacts can be described in the form of access to illegal and inappropriate information at ease to even children and adolescents, increase in financial and heinous crimes, creation of virtual world at the cost of real world and increase in time spent online. Various studies agree on the view that addiction of internet or problematic use of internet among different populations including adolescents is causing personal, professional, religious and social problems (Impact of Internet on Society, 2013).

The difference between internet use and problematic internet use is not clear with the latter being the focus of much of the research in the area (American Psychiatric Association, 2013). While there is consensus among researchers regarding the existence of problematic internet use, there is no agreeable definition for this nomenclature. However, according to majority of them, internet use is perceived to be problematic when one experiences inability to control the time spent online and when it leads to significant distress and/or functional impairment (Ha et al., 2006; Mitchell, 2000; Pies, 2009; Gámez-Guadix, Orue, Smith, & Calvete, 2013; Mittal, Dean, & Pelletier, 2013; Gámez-Guadix, 2014; Gámez-Guadix, Calvete, Orue, & Havas, 2015). The cognitive behavioural model which has received more attention empirically as an explanation for problematic internet use proposes that problematic internet use encompasses a range of cognitive processes such as ruminative thoughts or cognitive distortions and dysfunctional behaviours such as use of internet as a medium of alleviation to emotional distress. All these can lead to a range of negative life consequences during adolescence (Gámez-Guadix, 2014).

Some studies espouse the idea that the issue is not the internet as a medium during adolescence period but those unhealthy activities and insalubrious applications promoted by it (Meerkerk, Van Den Eijnden, & Garretsen, 2006; van Rooij, Schoenmakers, van de Eijnden, & van de Mheen, 2010; Van Rooij, Schoenmakers, Vermulst, Van Den Eijnden, & Van De Mheen, 2011; Sun et al., 2012; Ciarrochi et al., 2016). Therefore, problematic internet use during adolescence period may be understood as a compulsive internet use with lack of control over certain internet activities (Van Den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, 2008; Van Den Eijnden, Spijkerman, Vermulst, Van Rooij, & Engels, 2010; Thorsteinsson & Davey, 2014) including excessive time spent online at the cost of daily activities. It relates to a host of wide range of negative consequences. Among adolescents, it significantly affects their daily functioning, their interpersonal communication and their psychological and emotional wellbeing (Anderson, 2001; Hsu, Wen, & Wu, 2009; Ko, Yen, Chen, Yeh, & Yen, 2009; Akin, 2012).

There is no consensus among the researchers on the diagnostic criteria for problematic internet use. Some authors seem to emphasis on the likenesses between facets of problematic internet use and addictive behaviours and suggest the mixed method to explain the problematic internet use based on the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) diagnostic criteria for substance use disorders, gambling disorder and internet gaming disorder (Sun et al., 2012; Yen et al., 2012; Cho, Sung, Shin, Lim, & Shin, 2013; Yu & Shek, 2013; Mittal et al., 2013; Chen, Chen, & Gau, 2015; Stavropoulos, Kuss, Griffiths, Wilson & Motti-Stefanidi, 2015; Li, O'Brien, Snyder, & Howard, 2016). Therefore, many do not consider it as a separate mental disorder as it believed to exist as a high comorbid condition with other psychopathological issues (Byun et al., 2009; Shaw & Black, 2008).

The Douglas' Internet Addiction Model (IAM) conceptualizes problematic internet use as a consequence of the interaction between an adolescent's 'push' and 'pull' aspects. The 'push' aspects are those factors which help adolescent fulfil the basic needs and motivations, which otherwise may not be met, such as escapism, neutrality and the virtual aspects of the internet. On the other hand, the 'pull' aspects are those factors and attributes that make the internet more addictive, such as, a low-cost affair, easy to access and communicate user convenience and anonymity, and opportunity to forget social isolation. These pull and push factors together regulate adolescents' internet use and/or problematic internet use (Douglas et al., 2008). According to this model, internet addiction refers to person's failure to regulate internet use which can lead to the feelings of anxiety and functional disruption of daily activities.

The problematic internet use and the related psychological vulnerabilities is particularly relevant to adolescents since they appear to overuse the internet compared to any other age group (Pew Research Center, 2012) and are more prone to develop functional and other impairments. Further, it's important that the problematic internet use and the related psychological vulnerabilities should not go unnoticed during this important developmental period, as unnoticed and untreated addictive behaviours can go a long way into impacting the person into his/her adulthood (Coffey, Carlin, Lynskey, Li, & Patton, 2003; Anderson, Steen & Stavropoulos, 2016). The potential negative implications of problematic internet use and the irreversible negative role of psychological vulnerabilities during this predominantly evolving period of adolescence, demonstrate the importance of research in this area and this present review.

#### **Psychological vulnerabilities and problematic internet use**

An adolescent knowing what makes them, 'them,' can lead to more satisfactory life, better life choices, and overall success. But the world of social media, an adolescent is exposed to today and global migration have paved way for pool of possibilities and avail information at his/her fingertips. Therefore, without a clear idea of one's own honest and real preferences, making the 'right choice' of the social world can be extremely difficult and confusing for an adolescent.

Most adolescents use internet to spend time online than socialize. One the one hand, excessive internet use was related to games, dating sites, and web browsing and on the other hand, social phobia connected to games, homework, and online browsing (Yayan, Arikan, Saban, Baş, & Özcan, 2017). Some findings conclude

that social anxiety could be a possible risk factor for developing problematic internet use. They also advocate that problematic internet use, on the other hand, could possibly result in social phobia and avoidance of face-to-face social interactions (Lee & Stapinski, 2012; Weinstein, Dorani, Elhadif, Bukovza, Yarmulnik, & Dannon, 2015).

There are some studies which show that problematic internet use may lead to mood disorders such as bipolar disorder (Shapira et al., 2000). It has been also noted that people diagnosed for bipolar disorder seem to have higher incidences of compulsive gambling (McIntyre et al., 2007; Matthews et al., 2009; Di Nicola et al., 2010) with symptoms such as compulsive behaviour and poor impulsive control (Mitchell, 2000) and thus ending up in problematic internet use, when exposed. This can have negative impact in different areas of one's life including academics (Usman, Alavi, & Shafeq, 2014).

There are studies providing research evidence for a possible relationship between depression and problematic internet use (Gámez-Guadix, 2014). The existence of prior depressive symptoms subjugates a person to develop problematic internet use. An excessive internet use can be a consequence of depressive symptoms. Such adolescents might use internet excessively to assuage emotional distress and thus experience the more exciting virtual world. At times, these depressive moods may neutralize the cognitive processes that facilitate effective self-regulation, which in turn can increase the internet use into problematic internet use (Davis, 2001; Caplan, 2002; LaRose, Lin, & Eastin, 2003). A study on Chinese adolescents showed that around 8.1% of the subjects who had problematic internet use also had negative emotional and behavioural symptoms (Cao, Sun, Wan, Hao & Tao, 2011).

According to Crone & Konijn (2018), the subcortical regions of the brain undergo profound changes during adolescent period. Evidence proves that the density of grey matter volume in amygdala is associated with emotional processing. The same structure is significantly associated with larger offline social networks as well as larger online social networks. This proves the point that there is an interplay between actual social experience and the brain development during adolescence and thus one can find the difference in amygdala like negative emotional experience and excessive internet use.

Caplan (2002) found that depressive mood was related to a strong preference for online social interactions, which in turn was related to problematic internet use. Low self-esteem found to be an important predictor of compulsive internet use (Meerkerk, Van den Eijnden, Franken, Garretsen, 2010). The impressive relationship between problematic internet use and social anxiety, depression and loneliness was studied by Tokunaga and Rains (2016). Among these variables, they found a strong correlation between depression and problematic internet use. Most of these studies, though had adolescents as participants, were cross-sectional. The study that was conducted by Van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, (2008) on adolescents concluded that depressive symptoms and obsessive internet use did not display significant correlation after a period of 6 months. According to Gámez-Guadix (2014), those adolescents who experience difficulties in academics, family, interpersonal and social level are at higher risk for developing problematic internet use as a coping mechanism.

Another study claims that people who were internet addicts were more prone to depression, loneliness and obsessive compulsion (Whang, Lee, Chang, 2004). Contradicting this, one research finding was published where the subjects were studied at three intervals proved that depression and loneliness decreases with the use of internet and increases self-esteem and social support (Shaw, & Gant, 2004). The validity of this study is still hazy since it does not specify whether it is applicable to problematic internet usage or not. On the other hand, another study suggests that alexithymia which is one's inability to express emotions along with low self-esteem can be a cause for problematic internet use (Berardis, et. al., 2009). This further proves that problematic internet use and psychological vulnerabilities are both highly interconnected.

Suicide, or ending one's own life, is a tragic event that follows depression and other psychiatric factors and it precedes by strong emotional repercussions for its survivors and for families of its victims. Studies also show that one of the familiar comorbid condition resulting from problematic internet use is depression and suicidal ideation (Tsai and Lin, 2003; Whang, Lee & Chang, 2003; Ha et al., 2007; Yen, Ko, Yen, Wu, & Yang, 2007; Yen, Ko, Yen, Chang, & Cheng, 2009; Jang, Hwang, & Choi, 2008; Van Den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, 2008). There is a stout association between problematic internet use and suicidal ideation that is preceded by depression (Allison, Roeger, Martin, Keeves, 2001; Kim et al., 2006; Fu, Chan, Wong, Yip, 2010) among subjects with problematic internet use than among the controls. Park, Hong, Park, Ha, & Yoo (2015) found a strong correlation between the problematic internet use and the depressive symptoms and suicidal ideation. A study on Chinese adolescents also supported the fact that problematic internet usage tends to reduce life satisfaction in individuals (Cao, Sun, Wan, Hao & Tao, 2011), which could further act as a cause of suicide.

Various studies shed light on the fact that problematic internet use seems to increase the risk of depression among adolescents who were addicted over six months (Van Den Eijnden et al., 2008; Nimrod,

2013).). On the other hand, adolescents with depression over 2 years, were more vulnerable to internet addiction (Ha, Yoo, Cho, Chin, Shin, & Kim, 2006; Ko et al., 2009b).

Depression seems to predict the problematic internet use. Most of the studies analysed here support this view. Further, these reviews also suggest that addictive internet use could be upheld by negative reinforcements, such as a means to assuage distress or sadness (Gámez-Guadix, 2014). Continuous depression can lead an adolescent to a problematic internet use. This might be because those highly depressed might employ poor coping mechanisms (e.g., such as not seeking social support or professional help) which in turn could increase the maladaptive internet use.

The above analysis shows that it is possible that depressive symptoms like inclination for social isolation and negative self-perception force an individual to opt for face-to-face day-to-day communication in place of online virtual communication as the latter, according to them, is perceived as more secure and less threatening to ego mechanisms. It can be conclusively said that the relationship between problematic internet use and psychological vulnerabilities (such as depression) is bidirectional in nature. Thus, depressive symptoms might increase the internet use and vice versa.

People with problematic internet use show the symptoms of severe substance use disorders such as high tolerance towards the internet use, withdrawal symptoms and preoccupation with the internet (Mitchell, 2000; O'Reilly, 1996; Wannan & Fombonne, 1998). However, another three studies, studied the relationship between substance use and problematic internet use amongst adolescents came to conclude that there is no predictive or protective relationships (Sun et al., 2012; Gámez-Guadix, Orue, Smith, & Calvete, 2013; Gámez-Guadix, Calvete, Orue, & Havas, 2015).

An adolescent's academic disposition was found to be related to his/her level of problematic internet use. According to the review done by Anderson, Steen, and Stavropoulos (2016), an adolescent's academic performance and problematic internet use had bidirectional implications. Poor academic performance was found to predict problematic internet use among a group of Taiwanese adolescents (Chen et al., 2015). On the other hand, another finding (Yu, Li and Zhang, 2015) supported the idea school engagement operated as protective factor for problematic internet use. In consensus with the bidirectional relationship between these two variables one study among Singaporean adolescents concluded that problematic internet usage was a significant predictor of poor academic performance among adolescents (Gentile et al., 2011).

There are number of longitudinal studies connecting personality factors and problematic internet use (Anderson, Steen & Stavropoulos, 2016). Certain personality attributes have been believed to be at risk as well as protective factors of problematic internet use. It was also found that people who are high in extraversion, impulsivity and are members of multiple online groups are more prone to problematic internet use (Mottram & Fleming, 2009). Those two personality traits advocated by NEO-5 assessment tool, extroversion and neuroticism or emotional stability have been found to relate to problematic internet use over time. One study shows that introverts use internet less compared to extroverts (Thorsteinsson & Davey, 2014). But there seems to be a pattern that those scoring higher on measures of excessive internet use, also score higher on basic personality traits such as neuroticism, psychoticism and excitement seeking behaviour and lower scores on extraversion, conscientiousness, agreeableness, reward dependence and self-directedness (Floros, & Siomos, 2014). Another study on problematic internet use and personality traits concluded that Cluster-A and Cluster-B personality types played important role in problematic internet use compared to Cluster-C personality type among men. There were differences in activities engaged by men and women. While the latter used more of communication websites while online, the former group used more of erotic, gambling and shopping websites (Laconi, Andréoletti, Chauchard, Rodgers, & Chabrol, 2016) and the gender difference could be attributed to this according to the authors.

In lieu with this thought, it is found that adolescents with high neuroticism or lack of emotional stability end up in problematic internet use (Jackson, Von Eye, Biocca, Barbatsis, Fitzgerald, & Zhao, 2003). Adolescents high on impulsivity are more prone to high internet use leading to problems. Poor impulsivity and poor emotional regulation also were found to be predictors of high internet use among Korean and Singaporean adolescents (Gentile et al., 2011; Hong, You, Kim, & No, 2014). Attractive offers provided by the internet at various Forums and the different and arousing experiences that this virtual world provides attract the users high in impulsivity in no time (Ko et al., 2007; Yen et al., 2012). A Korean study found that hostility to be the most significant predictor of problematic internet use (Ko, Liu, et al., 2009a).

Adolescents who feel like reducing stress levels seem to turn their attention towards internet. They spend considerably longer time online with applications related to entertainment, gaming, social applications and sex. They may meet new friends and make new partners (Hinic, Jovic, & Ignjatovic Ristic, 2016). Research has concluded that physically active adolescents were less likely feel stress in their lives and less likely become problematic internet users compared to physically inactive adolescents (Park, 2014; Lee, et al., 2017).

There is no consensus apropos gender differences in problematic internet use. Majority of the studies (seven out of twelve) across different cultures in one review (Anderson, Steen & Stavropoulos, 2016) converged

with the idea that males are at a higher risk and the difference between adolescent males and females regarding internet use and problematic internet use is widening over time (Willoughby, 2008; Gentile et al., 2011; Haagsma, King, Pieterse, & Peters, 2013; Yu & Shek, 2013; Hong et al., 2014; Chen et al., 2015; Choo, Sim, Liau, Gentile, & Khoo, 2015). Unlike the earlier studies that documented higher levels of problematic internet use in males as compared to females (Yoo et al., 2004; Ha et al., 2006, 2007; McIntyre et al., 2007), later studies have concluded that there are no gender differences when it comes to problematic internet use (Siomos, Dafouli, Braimiotis, Mouzas, & Angelopoulos, 2008; Park, Hong, Park, Ha, & Yoo, 2015; Weinstein, Dorani, Elhadif, Bukovza, Yarmulnik, & Dannon, 2015; Lee et al., 2017). However, there seems to be gender differences regarding problematic internet use vulnerability. Due to challenging family dynamics, according to one finding, females exhibit less effective stress management and it in turn, leads them to showing more severe symptoms of online gaming-related problematic internet use (Coyne et al., 2015).

#### **Contextual factors and problematic internet use**

Besides individual factors that have been discussed so far, we must turn our attention to various contextual factors such as family background, peer relationships, and classroom environments that might play an important role in the problematic internet use (Anderson, Steen & Stavropoulos, 2016). Studies suggest that certain family factors such as conflicts between adolescents and parents, alcohol addiction of siblings and/or parents and lack of family functions can lead to problematic internet use in the adolescent (Yen, et al., 2007). In a healthy home environment where there is a good communication between parents and teenagers about internet use was shown to lower risk factors for adolescents' problematic internet use (Van Den Eijnden et al., 2010; Yu & Shek, 2013). Poor communication between parents and children (Ko et al., 2007), lower parental education, troubles and divorced family backgrounds, less positively related parental couples, and less protective parenting style and troubled parental relationships (Chen, Chen & Gau, 2015; Ko et al., 2007; Chen et al., 2015; Choo et al., 2015) were found to predict problematic internet use. Further research can deepen the knowledge in this field with more findings on other aspects of family relationships (Willoughby, 2008; Gámez-Guadix et al., 2013; Thorsteinsson & Davey, 2014; Chen et al., 2015). The same can be done with the role of peer relationships and classroom factors with internet use.

Adolescence is a transitional period in which parental influences decrease and peer influence become important. Being accepted or rejected by peers is very significant during this period. There is a strong need to fit into the peer group. During this stage it is important to understand how adolescents process the online content and their peers' feedback provided on such occasions. Viewing online content together, sharing and discussing media content with friends is an integral part of adolescents' daily lives. For example, adolescent girls share pictures and comment on ideal body image of the models they see on social media with their peers (Crone & Konijn, 2018).

According to Tang, Chen, Yang, Chung, & Lee (2016), Facebook offers three important types of support to its users – informative support, social support and emotional support. A positive feedback from online peers helps adolescent build self-confidence and self-concept. On the other hand, negative feedback is associated with searching and making new contacts which is a risk factor in itself, as it can lead to making friendships with unknown people and dangerous self-representation (publishing photos with sexual nature). Often such adolescents perceive that such an online behaviour is normal (Cookingham & Ryan, 2015; Koutamanis, Vossen & Valken-burg, 2015; Kalibová & Milková, 2016).

Some studies converge on the fact that positive peer relationships acted as protective problematic internet use factors, signifying that internet use may result in both promotion and disadvantage of socialization, depending on personal characteristics of the individual (Willoughby, 2008; Gámez-Guadix, Orue, Smith & Calvete, 2013; Thorsteinsson & Davey, 2014; Chen et al., 2015; Anderson, Steen & Stavropoulos, 2016).

Students who have shared interests or online activities such as watching the same TV programs, watching same sports/games online and playing them, had brought them together reducing isolation and increasing social interactions. According to some studies, adolescents who experienced opportunities and decision-making space provided by their teachers, were less likely to get addicted in online gaming or problematic internet use (Yu et al., 2015; Anderson, Steen & Stavropoulos, 2016).

#### **Internet-use related factors and problematic internet use**

Amongst, individual and contextual factors, measures related to internet use also seem to be playing important role in problematic internet use. Adolescents who use internet for non-communicative purposes seem to experience problematic internet use compared to those who use internet as primary mode for communicating with their friends and social networking thorough instant messaging and video calling (Anderson, Steen & Stavropoulos, 2016). However, another study by Van Den Eijnden et al. (2008) found that chat room use associated with problematic internet use six months later (Thorsteinsson & Davey, 2014). However, there seems to be dearth of research in this area to explain the impact of online content on development of problematic internet use (Anderson, Steen & Stavropoulos, 2016). Empirical research shows that there is a link between problematic internet use and using the internet for chatting, playing games, dating, shopping, downloading,

viewing video content and adult content, with erotica found to have the highest probability to predicting problematic internet use a year later (Meerkerk et al., 2006).

Finally, with regard to the internet-related factors, the online gaming has been a point of much research when it comes to problematic internet use (Meerkerk et al., 2006; Ko et al., 2007; Van Den Eijnden et al., 2008; Van Rooij et al., 2010; Delfabbro, King, & Griffiths, 2013; Stavropoulos et al., 2015). Future research can focus on the relationship between using internet for social networking and its use for non-communicative purposes as this area needs more clarity in order for the stakeholder to plan preventive and remedial programs (van den Eijnden et al., 2008; Thorsteinsson & Davey, 2014).

Of late, there are number of studies that have turned their focus on the impacts of internet as well as problematic internet use during adolescence and emerging adulthood periods showing the increasing importance these two developmental periods received. However, there is an ambiguity in understanding the terminology of problematic internet use, even though the existing literature supports the view that problematic internet use leads to negative behavioural outcomes during adolescence and early adulthood periods. Therefore, it calls for a formulation of a unifying definition of problematic internet use. Without an agreeable definition of terminology among experts, any remedial measures planned to intervene could be ineffective.

The above analysis clearly indicates that problematic internet use is a multi-dimensional construct. The present review illuminates the following potential possibilities that subjects with problematic internet use may be predisposed to developing depression and suicidal ideation. Psychological vulnerabilities can be a strong precursor to problematic internet use and problematic internet use can predict psychological vulnerabilities as some of these variables are identified as outcomes of problematic internet use. Those with prior psychological vulnerabilities are highly susceptible to development of problematic internet use possibly as a coping mechanism to buoy up mood or to avoid taxing life experiences connected with depression and suicidal ideation. This bidirectional relationship between these variables could be further examined by future longitudinal research covering adolescence and emerging adulthood.

The association between personality related factors like extroversion, neuroticism, impulsivity, self-control and hostility are empirically established in previous researches. From the reviews mentioned earlier here on personality factors and internet use, we can say that for adolescents, the virtual world seems to be giving a platform for an adolescent to express hostility and aggression in ways that would be improper in the real world. The internet seems to provide a physically harmless milieu for adolescents to experience and experiment and express their hostility, while developing a new sense of self-identity (Ko et al, 2007). Gender differences in personality traits as per personality disorder clusters are attributed to the difference in the kind of online activities chosen by both the genders. Finally, the nature of problematic internet use may vary between men and women.

Some of the studies on gender differences and problematic internet use found that males are at risk when compared to females. Recent studies have concluded that there are no gender differences with regard to internet use. Therefore, there is scope for future studies to look for justifiable conclusions regarding the gender differences in problematic internet use and the possible contributors of it.

The role of contextual factors such as classroom environment, academic performance and peer relationships in problematic internet, though established in separate studies, are not conducted longitudinally in the adolescent population and this could be probed further. Many studies have elucidated the importance of family related factors in problematic internet use among adolescents. The findings that healthy family environment and positive parenting acted as protective factors and dysfunctional families predicted problematic internet use could further be verified using personality related factors as moderators in this association. The studies focusing on the purpose of internet usage came to the conclusion that excessive use of it for non-communicative purposes like online gaming, shopping and chats with erotica resulted in problematic internet use. However, these researches are lacking clarity in explaining the role of these factors in impacting the development of problematic internet use.

It can be concluded that there are very few studies which use a holistic approach to understand the role of internal as well as external factors in problematic internet usage. Majority of the studies conducted over the years have focused mainly on psychological vulnerability factors as possible causes of problematic internet use and less concentrated on the importance of contextual and internet activity-related factors. A more balanced approach across individual, contextual and internet-related factors needs to be followed in future researches in the field, to get a comprehensive insight into the problem. Such an approach could help in preventive and intervention policies in order to maximise the benefits and minimize the negative repercussions of problematic internet use. Future research should focus on all the developmental stages consisting of childhood through adulthood across multiple time periods as such an approach could give a good understanding into the trajectories of these issues and their relationship with problematic internet use.

## REFERENCES

- [1] Agarwal, S. (2018, February 20). *Internet users in India expected to reach 500 million by June: IAMAI*. *The Economic Times*. Retrieved from <https://economictimes.indiatimes.com/tech/internet/internet-users-in-india-expected-to-reach-500-million-by-june-iamai/articleshow/63000198.cms>
- [2] Akin, A. (2012). *The relationships between Internet addiction, subjective vitality, and subjective happiness*. *Cyber Psychology, Behavior, and Social Networking*, 15, 404–410. doi:10.1089/cyber.2011.0609
- [3] Allison, S., Roeger, L., Martin, G., Keeves, J. (2001). *Gender differences in the relationship between depression and suicidal ideation in young adolescents*. *Australian and New Zealand Journal of Psychiatry*, 35(4), 498–503.
- [4] American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Washington, DC: Author.
- [5] Anderson, K. J. (2001). *Internet use among college students: An exploratory study*. *Journal of American College Health*, 50, 21–26. doi:10.1080/07448480109595707
- [6] Anderson, E. L., Steen, E., & Stavropoulos, V., (2016). *Internet use and Problematic Internet Use: a systematic review of longitudinal research trends in adolescence and emergent adulthood*. *International Journal of Adolescence and Youth*, 22(4), 430-454. DOI:10.1080/02673843.2016.1227716
- [7] Aslanidou, S., & Menexes, G. (2008). *Youth and the Internet: Uses and practices in the home*. *Computers & Education*, 51, 1375–1391. doi:10.1016/j.compedu.2007.12.003
- [8] Berardis, D. D., D'Albenzio, A., Gambi, F., Sepede, G., Valchera, A., Conti, C. M., ... Ferro, F. M. (2009, February 10). *Alexithymia and Its Relationships with Dissociative Experiences and Internet Addiction in a Nonclinical Sample*. Retrieved from <https://www.liebertpub.com/doi/abs/10.1089/cpb.2008.0108>
- [9] Byun, S., Ruffini, C., Mills, J. E., Douglas, A. C., Niang, M., Stepchenkova, S., ... Blanton, M. (2009). *Internet addiction: Metasynthesis of 1996–2006 quantitative research*. *Cyberpsychology and Behavior*, 12(2), 203–207.
- [10] Cao, H., Sun, Y., Wan, Y., Hao, J., & Tao, F. (2011, October 14). *Problematic Internet use in Chinese adolescents and its relation to psychosomatic symptoms and life satisfaction*. Retrieved from [bmcpublichealth.biomedcentral.com: https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-11-802](https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-11-802)
- [11] Caplan, S. E. (2002). *Problematic Internet use and psychosocial well-being: development of a theory-based cognitive-behavioral measurement instrument*. *Computers in Human Behavior*, 18, 553–575.
- [12] Chen, Y. L., Chen, S. H., & Gau, S. F. S. (2015). *ADHD and autistic traits, family function, parenting style, and social adjustment for Internet addiction among children and adolescents in Taiwan: A longitudinal study*. *Research in Developmental Disabilities*, 39, 20–31. doi:10.1016/j.ridd.2014.12.025
- [13] Cho, S. M., Sung, M. J., Shin, K. M., Lim, K. Y., & Shin, Y. M. (2013). *Does psychopathology in childhood predict Internet addiction in male adolescents? Child Psychiatry & Human Development*, 44, 549–555. doi:10.1007/s10578-012-0348-4
- [14] Choo, H., Sim, T., Liau, A. K. F., Gentile, D. A., & Khoo, A. (2015). *Parental influences on pathological symptoms of videogaming among children and adolescents: A prospective study*. *Journal of Child and Family Studies*, 24, 1429–1441. doi:10.1007/s10826-014-9949-9
- [15] Ciarrochi, J., Parker, P., Sahdra, B., Marshall, S., Jackson, C., Gloster, A. T., & Heaven, P. (2016). *The development of compulsive Internet use and mental health: A four-year study of adolescence*. *Developmental Psychology*, 52, 271–283. doi:10.1037/dev0000070
- [16] Coffey, C., Carlin, J. B., Lynskey, M., Li, N., & Patton, G. C. (2003). *Adolescent precursors of cannabis dependence: Findings from the Victorian Adolescent Health Cohort Study*. *The British Journal of Psychiatry*, 182, 330–336. doi:10.1192/bjp.182.4.279-a15
- [17] Cookingham, L. M., & Ryan, G. L. (2015). *The Impact of Social Media on the Sexual and Social Wellness of Adolescents*. *Journal of Paediatrics and Adolescent Gynaecology*, 28(1), 2015. pp. 2–5.
- [18] Coyne, S. M., Dyer, W. J., Densley, R., Money, N. M., Day, R. D., & Harper, J. M. (2015). *Physiological indicators of pathologic video game use in adolescence*. *Journal of Adolescent Health*, 56, 307–313. doi:10.1016/j.jadohealth.2014.10.271
- [19] Crone, E. A., & Konijn, E. A. (2018). *Media use and brain development during adolescence*. *Nature Communications*, 9, 588. DOI: 10.1038/s41467-018-03126-x
- [20] Davis, R. A. (2001). *A cognitive-behavioral model of pathological Internet use*. *Computers in Human Behavior*, 17, 187–195.
- [21] Delfabbro, P., King, D., & Griffiths, M. (2013). *From adolescent to adult gambling: An analysis of longitudinal gambling patterns in South Australia*. *Journal of Gambling Studies*, 1–17. doi:10.1007/s10899-013-9384-7.
- [22] *Digital population in India as of January 2017 (in millions)*. (2017, January). Retrieved from <https://www.statista.com/statistics/309866/india-digital-population/>
- [23] Di Nicola, M., Martinotti, G., Mazza, M., Tedeschi, D., Pozzi, G., & Janiri, L. (2010). *Quetiapine as add-on treatment for bipolar I disorder with comorbid buying and physical exercise addiction*. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, 34, 713–714. doi:10.1016/j.pnpbp.2010.03.013
- [24] Douglas A. C., Mills J. E., Niang M., Stepchenkova S., Byun S., Ruffinia C., ... Blanton, M. (2008). *Internet addiction: meta-synthesis of qualitative research for the decade 1996–2006*. *Computers in Human Behavior*, 24, 3027–3044. doi:10.1016/j.chb.2008.05.009
- [25] Floros, G. & Siomos, K. (2014). *Excessive internet use and personality traits*. *Current Behavioral Neuroscience Reports*, 1(1), 19-26. <https://doi.org/10.1007/s40473-014-0006-1>.
- [26] Fu, K.W., Chan, W.S., Wong, P.W., Yip, P. S. (2010). *Internet addiction: Prevalence, discriminant validity and correlates among adolescents in Hong Kong*. *British Journal of Psychiatry*, 196(6), 486–492. doi: 10.1192/bjp.bp.109.075002.
- [27] Gámez-Guadix, M. (2014). *Depressive symptoms and problematic internet use among adolescents: Analysis of the longitudinal relationships from the cognitive-behavioral model*. *Cyberpsychology, Behavior and Social Networking*, 17(11), 714–719. Doi:10.1089/cyber.2014.0226
- [28] Gámez-Guadix, M., Calvete, E., Orue, I., & Havas, C. L. (2015). *Problematic Internet use and problematic alcohol use from the cognitive-behavioral model: A longitudinal study among adolescents*. *Addictive Behaviours*, 40, 109–114. doi:10.1016/j.addbeh.2014.09.009
- [29] Gámez-Guadix, M., Orue, I., Smith, P. K., & Calvete, E. (2013). *Longitudinal and reciprocal relations of cyberbullying with depression, substance use, and problematic Internet use among adolescents*. *Journal of Adolescent Health*, 53, 446–452. doi:10.1016/j.jadohealth.2013.03.030
- [30] Gentile, D. A., Choo, H., Liau, A., Sim, T., Li, D., Fung, D., & Khoo, A. (2011). *Pathological video game use among youths: A two-year longitudinal study*. *Pediatrics*, 127, e319–e329. doi:10.1542/peds.2010-1353.
- [31] Gudjonsson, G. H. (2003). *The psychology of interrogations and confessions: A handbook*. Chichester, UK: Wiley.

- [32] Ha, J. H., Kim, S. Y., Bae, S. C., Bae, S., Kim, H., Sim, M., ... Cho, S. C. (2007). Depression and Internet addiction in adolescents. *Psychopathology*, 40, 424–430. Doi: 10.1159/000107426
- [33] Ha, J. H., Yoo, H. J., Cho, I. H., Chin, B., Shin, D., & Kim, J. H. (2006). Psychiatric comorbidity assessed in Korean children and adolescents who screen positive for Internet addiction. *Journal of Clinical Psychiatry*, 67, 821–826.
- [34] Haagsma, M. C., King, D. L., Pieterse, M. E., & Peters, O. (2013). Assessing problematic video gaming using the theory of planned behavior – A longitudinal study of Dutch young people. *International Journal of Mental Health Addiction*, 11, 172–185. doi:10.1007/s11469-012-9407-0
- [35] Hinic, D., Jovic, J., & Ignjatovic Ristic, D. (2016). Characteristics of internet use as a means of perceived stress reduction in health care students. *Specijalna edukacija i rehabilitacija (Beograd)*, 15(3), 305-327.
- [36] Hong, S., You, S., Kim, E., & No, U. (2014). A group-based modeling approach to estimating longitudinal trajectories of Korean adolescents' on-line game time. *Personality and Individual Differences*, 59, 9–15. doi:10.1016/j.paid.2013.10.018
- [37] Hsu, S. H., Wen, M. H., & Wu, M. C. (2009). Exploring user experiences as predictors of MMORPG addiction. *Computers & Education*, 53, 990–999. doi:10.1016/j.compedu.2009.05.016
- [38] Impact of Internet on Society: Positive And Negative. (2013, September 11). Retrieved from <http://mydailyalerts.com/impact-internet-society-positive-negative>
- [39] Jackson, L. A., Von Eye, A., Biocca, F., Barbatsis, G., Fitzgerald, H., & Zhao, Y. (2003). Personality, cognitive style, demographic characteristics and Internet use: Findings from the HomeNetToo. *Swiss Journal of Psychology*, 62, 79–90. doi:10.1024//1421-0185.62.2.79
- [40] Jang, K. S., Hwang, S. Y., & Choi, J. Y. (2008). Internet addiction and psychiatric symptoms among Korean adolescents. *Journal of School Health*, 78, 165–171.
- [41] Jelenchick, L.A., Eickhoff, J., Christakis, D.A., Brown, R. L., Zhang, C., Benson, M., & Moreno, M. A. (2014). The problematic and risky internet use screening scale (PRIUSS) for adolescents and young adults: scale development and refinement. *Computers in Human Behavior*, 35, 171–178.
- [42] Jelenchick, L. A., Hawk, S. T., & Moreno, M. A. (2016). Problematic internet use and social networking site use among Dutch adolescents. *International Journal of Adolescent Medical Health*, 28(1), 119-121. doi: 10.1515/ijamh-2014-0068.
- [43] Kalibová, P., & Milková, E. (2016). Internet Addictive Behaviour of Adolescents. *International Journal of Education and Information Technologies*, 10, 139-143.
- [44] Kim, K., Ryu, E., Chon, M. Y., Yeun, E. J., Choi, S. Y., Seo, J. S., & Nam, B. W. (2006). Internet addiction in Korean adolescents and its relation to depression and suicidal ideation: A questionnaire survey. *International Journal of Nursing Studies*, 43(2), 185–192. DOI: 10.1016/j.ijnurstu.2005.02.005
- [45] King, D. L., Delfabbro, P. H., & Griffiths, M. D. (2013). Trajectories of problem video gaming among adult regular gamers: An 18-month longitudinal study. *Cyber Psychology, Behavior, and Social Networking*, 16, 72–76. doi:10.1089/cyber.2012.0062
- [46] Ko, C. H., Liu, G. C., Hsiao, S., Yen, J. Y., Yang, M. J., Lin, W. C., ... Chen, C. S. (2009a). Brain activities associated with gaming urge of online gaming addiction. *Journal of Psychiatric Research*, 43, 739–747. doi:10.1016/j.jpsychires.2008.09.012
- [47] Ko, C. H., Yen, J. Y., Chen, C. S., Yeh, Y. C., & Yen, C. F. (2009b). Predictive values of psychiatric symptoms for Internet addiction in adolescents: A 2-year prospective study. *Archives of Pediatric and Adolescent Medical*, 163, 937–943. doi:10.1001/archpediatrics.2009.159
- [48] Ko, C. H., Yen, J. Y., Yen, C. F., Lin, H. C., & Yang, M. J. (2007). Factors predictive for incidence and remission of Internet addiction in young adolescents: A prospective study. *Cyber Psychology & Behavior*, 10, 545–551. doi:10.1089/cpb.2007.9992
- [49] Koutamanis, M., Vossen, H. G. M., & Valken-burg, P. M. (2015). Adolescents' comments in social media: Why do adolescents receive negative feedback and who is most at risk? *Computers in Human Behavior*, 53, 486–494.
- [50] Laconi, S., Andréoletti, A., Chauchard, E., Rodgers, R. F., & Chabrol, H. (2016). Problematic Internet use, time spent online and personality traits. *Encephale*, 42(3), 214-218. doi: 10.1016/j.encep.2015.12.017.
- [51] LaRose, R., Lin, C. A., & Eastin, M. S. (2003). Unregulated Internet usage: addiction, habit, or deficient self-regulation? *Media Psychology*, 5, 225–253.
- [52] Lau, C. H. (2011). Internet addiction among university students in china: Risk factors and health outcomes. (Order No. 3500835, The Chinese University of Hong Kong (Hong Kong)). ProQuest Dissertations and Theses, 274. Retrieved from <http://search.proquest.com/docview/927748136?accountid=11752>.
- [53] Lee, B. W., & Stapinski, L. A. (2012). Seeking safety on the internet: Relationship between social anxiety and problematic internet use. *Journal of Anxiety Disorders*, 26, 197-205.
- [54] Lee, T. K., Kim, J., Kim, E. J., Kim, G., Lee, S., Kang, Y. J., ... Young-Mi, K. (2017). Problematic Internet use and associated mental health issues in South Korean Internet users. *European Psychiatry*, 41, S868. doi:10.1016/j.eurpsy.2017.01.1741
- [55] Li, W., O'Brien, J. E., Snyder, S. M., & Howard, M. O. (2016). Diagnostic Criteria for Problematic Internet Use among U.S. University Students: A Mixed-Methods Evaluation. *PLoS ONE*, 11(1), e0145981. <http://doi.org/10.1371/journal.pone.0145981>
- [56] Matthews, N., Farnsworth, B. and Griffiths, M. D. (2009). A pilot study of problem gambling among student online gamblers: Mood states as predictors of problematic behavior. *Cyberpsychology and Behavior*, 12, 741–745.
- [57] McGinn, M. C. (2014). Predicting Factors for Use of Texting and Driving Applications and the Effect on Changing Behaviors (Master's Thesis). ProQuest Publishing, UMI no. 1557636.
- [58] McIntyre, R. S., McElroy, S. L., Konarski, J. Z., Soczynska, J. K., Wilkins, K., & Kennedy, S.H. (2007). Problem gambling in bipolar disorder: Results from the Canadian Community Health Survey. *Journal of Affective Disorders*, 102, 27–34.
- [59] Meerkkerk, G. J., Van Den Eijnden, R. J., & Garretsen, H. F. (2006). Predicting compulsive Internet use: It's all about sex!. *Cyber Psychology & Behavior*, 9, 95–103. doi:10.1089/cpb.2006.9.95
- [60] Meerkkerk, G. J., Van den Eijnden, R. J. J. M., Franken, I. H. A., & Garretsen, H. F.L. (2010). Is compulsive Internet use related to sensitivity to reward and punishment, and impulsivity?. *Computers in Human Behavior*, 26(4), 729–735. <https://doi.org/10.1016/j.chb.2010.01.009>
- [61] Mitchell, P. (2000). Internet addiction: Genuine diagnosis or not? *Lancet* 355: 632.
- [62] Mittal, V. A., Dean, D. J., & Pelletier, A. (2013). Internet addiction, reality substitution and longitudinal changes in psychotic-like experiences in young adults. *Early Intervention Psychiatry*, 7, 261–269. doi:10.1111/j.1751-7893.2012.00390.x
- [63] Mottram, A. J., & Fleming, M. J. (2009, June 05). Extraversion, Impulsivity, and Online Group Membership as Predictors of Problematic Internet Use. Retrieved from [liebertpub.com](http://liebertpub.com): <https://www.liebertpub.com/doi/abs/10.1089/cpb.2007.0170>
- [64] Nimrod, G. (2013). Challenging the Internet Paradox: Online Depression Communities and Well-Being. *International Journal of Internet Science*, 8 (1), 30–48.
- [65] O'Reilly, M. (1996). Internet addiction: A new disorder enters the medical lexicon. *Canadian Medical Association Journal*, 154, 1882–1883.

- [66] Park, S. (2014). Association of physical activity with sleep satisfaction, perceived stress, and problematic internet use in Korean adolescents. *BMC Public Health*, 14, 1143. doi: 10.1186/1471-2458-14-1143.
- [67] Park, S., Hong, K., Park, E. J., Ha, K. S., & Yoo, H. J. (2015). The association between problematic internet use and depression, suicidal ideation and bipolar disorder symptoms in Korean adolescents, *Australian & New Zealand Journal of Psychiatry*, 47(2) 153–159. DOI: 10.1177/0004867412463613
- [68] Pew Research Center. (2014). Internet use over time. Retrieved from <http://www.pewinternet.org/data-trend/internet-use/internet-use-over-time/>
- [69] Pies, R. (2009). Should DSM-V designate 'Internet Addiction' a mental disorder? *Psychiatry*, 6, 31–37.
- [70] Rao, M. (2015, February 10). Internet growth, impacts and success: what will India be like with 550 million users in 2018? Retrieved from <https://yourstory.com/2015/02/internet-india-2018/>
- [71] Shaw, M., & Black, D. W. (2008). Internet addiction: Definition, assessment, epidemiology and clinical management. *CNS Drugs*, 22, 353–365.
- [72] Shaw, L. H., & Gant, L. M. (2004, July 05). In Defense of the Internet: The Relationship between Internet Communication and Depression, Loneliness, Self-Esteem, and Perceived Social Support. Retrieved from: <https://www.liebertpub.com/doi/abs/10.1089/109493102753770552>
- [73] Shapira, N. A., Goldsmith, T. D., Keck, P. E. Jr., Khosla, U. M., & McElroy, S. L. (2000). Psychiatric features of individuals with problematic internet use. *Journal of Affective Disorders*, 57(1-3), 267–272.
- [74] Siomos, K. E., Dafouli, E. D., Braimiotis, D. A., Mouzas, O. D., & Angelopoulos, N. V. (2008, December 11). Internet Addiction among Greek Adolescent Students. Retrieved from <https://www.liebertpub.com/doi/abs/10.1089/cpb.2008.0088>
- [75] Ståhl, T. (2017). How ICT savvy are digital natives actually? *Nord. J. Digit. Lit.* 12, 89–108.
- [76] Stavropoulos, V., Kuss, D. J., Griffiths, M. D., Wilson, P., & Motti-Stefanidi, F. (2015). MMORPG gaming and hostility predict Internet addiction symptoms in adolescents: An empirical multilevel longitudinal study. *Addictive Behaviours*, doi:10.1016/j.addbeh.2015.09.001
- [77] Sun, P., Johnson, C. A., Palmer, P., Arpawong, T. E., Unger, J. B., Xie, B., ... Sussman, S. (2012). Concurrent and predictive relationships between compulsive Internet use and substance use: Findings from vocational high school students in China and the USA. *International Journal of Environmental Research and Public Health*, 9, 660–673. doi:10.3390/ijerph9030660
- [78] Tang, J., Chen, M., Yang, C., Chung, T., & Lee, Y. (2016). Personality traits, interpersonal relationships, online social support, and Facebook addiction. *Telematics and Informatics*, 33(1), 102–108. DOI : 10.1016/j.tele.2015.06.003
- [79] Thorsteinsson, E. B., & Davey, L. (2014). Adolescents' compulsive Internet use and depression: A longitudinal study. *Open Journal of Depression*, 3, 13–17. doi:10.4236/ojd.2014.31005
- [80] Tokunaga, R. S., & Rains, S. A. (2016). A Review and Meta-Analysis Examining Conceptual and Operational Definitions of Problematic Internet Use. *Human Communication Research*, 42(2), 165–199. DOI: 10.1111/hcre.12075
- [81] Tsai, C. C., & Lin, S. S. (2003). Internet addiction of adolescents in Taiwan: An interview study. *Cyberpsychology and Behavior*, 6, 649–652.
- [82] Usman, N. H., Alavi, M. & Shafeq, S. M.(2014). Relationship between Internet Addiction and Academic Performance among Foreign Undergraduate Students. *Procedia - Social and Behavioral Sciences*, 114, 845-851. doi.org/10.1016/j.sbspro.2013.12.795
- [83] Van Den Eijnden, R. J., Meerkerk, G.J., Vermulst, A. A., Spijkerman, R., & Engels, R. C. (2008). Online communication, compulsive Internet use, and psychosocial well-being among adolescents: A longitudinal study. *Developmental Psychology*, 44(3), 655–665. doi:10.1037/0012-1649.44.3.655.
- [84] Van Den Eijnden, R. J., Spijkerman, R., Vermulst, A. A., Van Rooij, T. J., & Engels, R. C. (2010). Compulsive Internet use among adolescents: Bidirectional parent–child relationships. *Journal of Abnormal Child Psychology*, 38, 77–89. doi:10.1007/s10802-009-9347-8.
- [85] Van Rooij, A. J., Schoenmakers, T. M., van de Eijnden, R. J., & Van de Mheen, D. (2010). Compulsive Internet use: The role of online gaming and other Internet applications. *Journal of Adolescent Health*, 47, 51–57. doi:10.1016/j.jadohealth.2009.12.021
- [86] Van den Eijnden, R. J., Spijkerman, R., Vermulst, A. A., Van Rooij, T. J., & Engels, R. C. (2010). Compulsive Internet use among adolescents: Bidirectional parent–child relationships. *Journal of Abnormal Child Psychology*, 38, 77–89. doi:10.1007/s10802-009-9347-8
- [87] Van Rooij, A. J., Schoenmakers, T. M., Vermulst, A. A., Van Den Eijnden, R. J., & Van De Mheen, D. (2011). Online video game addiction: Identification of addicted adolescent gamers. *Addiction*, 106, 205–212. doi:10.1111/j.1360-0443.2010.03104.x
- [88] Wallace, P. (2014). Internet addiction disorder and youth. *Science and Society*, 15(1), 12–16. doi.org/10.1002/embr.201338222
- [89] Wannan, G., & Fombonne, E. (1998). Gender differences in rates and correlates of suicidal behaviour amongst child psychiatric outpatients. *Journal of Adolescence*, 21, 371–381.
- [90] Weinstein, A., Dorani, D., Elhadif, R., Bukovza, Y., Yarmulnik, A., & Dannon, P. (2015). Internet addiction is associated with social anxiety in young adults. *Ann Clin Psychiatry*, 27(1), 4–9.
- [91] Whang, L. S., Lee, S., & Chang, G. (2003). Internet over-users' psychological profiles: A behavior sampling analysis on internet addiction. *Cyberpsychology and Behavior*, 6, 143–150.
- [92] Whang, L. S., Lee, S., Chang, G. (2004, July 04). Internet Over-Users' Psychological Profiles: A Behavior Sampling Analysis on Internet Addiction. Retrieved from <https://www.liebertpub.com/doi/pdf/10.1089/109493103321640338>
- [93] Willoughby, T. (2008). A short-term longitudinal study of Internet and computer game use by adolescent boys and girls: Prevalence, frequency of use, and psychosocial predictors. *Developmental Psychology*, 44, 195–204. doi:10.1037/0012-1649.44.1.195
- [94] Yayan, E. H., Arikan, D., Saban, F., Baş, N. G., & Özcan, O. O. (2017). Examination of the Correlation Between Internet Addiction and Social Phobia in Adolescents. *Western Journal of Nursing Research*, 39(9), 1–15. doi:10.1177/0193945916665820
- [95] Yen, J. Y., Cheng-Fang, Y., Chen, C. S., Chang, Y. H., Yeh, Y. C., & Ko, C. H. (2012). The bidirectional interactions between addiction, behaviour approach and behaviour inhibition systems among adolescents in a prospective study. *Psychiatry Research*, 200, 588–592. doi:10.1016/j.psychres.2012.03.015
- [96] Yen, C. F., Ko, C. H., Yen, J. Y., Chang, Y. P., & Cheng, C. P. (2009). Multi-dimensional discriminative factors for internet addiction among adolescents regarding gender and age. *Psychiatry and Clinical Neurosciences*, 63(3), 357–364. DOI: 10.1111/j.1440-1819.2009.01969.x
- [97] Yen, J. Y., Ko, C. H., Yen, C. F., Wu, H. Y., & Yang, M. J. (2007). The comorbid psychiatric symptoms of Internet addiction: Attention deficit and hyperactivity disorder (ADHD), depression, social phobia, and hostility. *Journal of Adolescent Health*, 41, 93–98.

- [98] Yen, Y. J., Yen, C. F., Chen, C. C., Chen, S. H., Ko, C. H. (2007, June 26). *Family Factors of Internet Addiction and Substance Use Experience in Taiwanese Adolescents*. Retrieved from [liebertpub.com](http://liebertpub.com): <https://www.liebertpub.com/doi/abs/10.1089/cpb.2006.9948>
- [99] Yoo, H. J., Cho, S. C., Ha, J., Yune, S. K., Kim, S. J., Hwang, J., Lyoo, I. K. (2004). *Attention deficit hyperactivity symptoms and internet addiction*. *Psychiatry and Clinical Neurosciences* 58, 487–494.
- [100] Yu, C., Li, X., & Zhang, W. (2015). *Predicting adolescent problematic online game use from teacher autonomy support, basic psychological needs satisfaction, and school engagement: A 2-year longitudinal study*. *Cyber Psychology, Behavior, and Social Networking*, 18, 228–233. doi:10.1089/cyber.2014.0385.
- [101] Yu, L., & Shek, D. T. (2013). *Internet addiction in Hong Kong adolescents: A three-year longitudinal study*. *Journal of Pediatric & Adolescent Gynecology*, 26(3), 10–17. doi:10.1016/j.jpag.2013.03.010