

Problematic Internet Use among Adolescents: A Review of Influencing Factors and Coping Strategies

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Abstract: Currently, the Internet is deeply embedded in human life, and adolescent problematic Internet use has become a global public health challenge. This review explores the influencing factors and coping strategies of adolescent problematic Internet use. Theoretical models such as I-PACE, Internet Compensation Theory, Attachment Theory, and Socio-Psychophysiological Model are involved. Macro to micro factors is analyzed: internet anonymity, family and school environment, personality, self-control and emotional problems. Point out the physiological, psychological, and behavioral effects of problematic use. Propose prevention and intervention strategies such as cognitive-behavioral therapy, family therapy, and exercise interventions to support adolescents in overcoming problematic Internet use challenges.

Keywords: Problematic Internet Use; Adolescents; Influencing Factors; Coping Strategies.

1. Overview of Problematic Internet Use among Adolescents

1.1. The Concept of Problematic Internet Use

Nowadays, the Internet has become a key and indispensable pillar in today's society, greatly facilitating information exchange, innovation and global connectivity. The magnitude of its impact is remarkable, changing people's behavioral patterns and lifestyles [1]. Appropriate Internet use can promote personal development, broaden knowledge, and improve physical and mental health. However, problematic Internet use can have negative consequences, especially for psychologically immature adolescents. Greenfield and Yan (2006) stated that adolescents are the most frequent Internet users among all age groups and are most affected by problematic Internet use [2]. Many studies have also shown that adolescent problematic Internet use has become a major global public health issue, especially in Asian countries such as China [3].

Definition of Problematic Internet use (PIU for short): Young (1998) defined it as an impulse control disorder based on pathological gambling, and a similar model of addiction has been used for addiction to online games, electronics dependence, etc. [4]. Domestic researchers define problematic Internet use as Internet dependence, overuse, or pathological use, referring to online behaviors that negatively affect an individual's mind, body, behavior, and lifestyle [5]. It is manifested as repeated dependent use of the Internet, which causes users to feel a huge gap between real life and the online world, and thus keep cycling back to the Internet.

1.2. Theories Related to Problematic Internet Use

1.2.1. Individual Effects-cognition-execution Model (I-PACE)

The Person-Affect-Cognition-Execution Model (PACE), which emphasizes the interaction between individual traits, affect, cognition, and behavior, attempts to explain the mechanisms of development and maintenance of specific Internet use disorders. Individual dispositional variables

interacting with specific contexts can lead to problematic behaviors and addictions [6], and this interaction brings about gratification and compensatory experiences associated with specific online behaviors. At the same time, affective and cognitive responses influence the choice of Internet technology and may lead to adaptive or dysfunctional behaviors. For example, to reduce real-world stress, loneliness, or to pursue happy emotions, people may rely on smartphones. These expectations not only influence behavior but also the use of specific Internet/smartphone applications [7].

1.2.2. Internet Compensation Theory

Internet compensation theory suggests that if an individual is often in a negative and negative state in real life, that individual is prone to turn to the Internet to escape from real life problems or to alleviate negative emotions [8]. For some individuals, the Internet is a platform for stress reduction and maintaining social relationships. Faced with parent-child or peer relationship problems or academic pressures, adolescents may use the Internet to escape reality, leading to problematic use.

1.2.3. Socio-psycho-physiological Model

According to the socio-psycho-physiological model, a behavioral phenomenon arises from a combination of different psychological, physiological, and social factors [9], and problematic Internet use (PIU) among adolescents is closely related to individual psychological, physiological, and social environments. Social factors, such as suboptimal family and school environments and poor peer relationships, can drive adolescents to the Internet for emotional fulfillment. Psychological problems, including low self-esteem and poor socialization skills, can also lead them to spend long hours online and isolate themselves from reality. The anonymity and sense of security provided by the Internet attracts these users. In addition, prolonged Internet use increases dopamine levels in the brain, leading to dependence and obsession with the Internet.

2. Factors Influencing Adolescents' Problematic Internet Use

The causes of problematic Internet use among adolescents are complex and varied, and a comprehensive understanding of the influencing factors is needed for effective intervention. From the perspective of ecosystem theory, the influencing factors are categorized into macro, meso and micro levels: the macro level involves the digital economy and the policy environment; the meso level includes the characteristics of the Internet and the influences of the society, family and school; and the micro level covers the personal traits, self-control and emotional problems.

2.1. Macro Factors

In the last decade, the proliferation of smartphones has led to an increase in excessive Internet use among adolescents. With the increase in online social and recreational behaviors, especially during the COVID-19 epidemic, online learning has led to uncontrolled use of electronic devices and a rise in the risk of problematic Internet use among adolescents. It has been shown that the novel coronavirus pneumonia (COVID-19) outbreak affected adolescents' Internet use habits, with an increase in overuse, a change in purpose of use, and increased use of the Internet by girls to connect to social media and by boys to play games [10]. The epidemic can be seen as a negative environmental factor that exacerbates problematic use and psychological effects.

From the latest 52nd Statistical Report on Internet Development in China released by China Internet Network Information Center (CNNIC), it can be seen that as of June 2023, the number of Internet users in China reached 1.079 billion, of which the proportion of Internet users under 10 years old and those between 10 and 19 years old accounted for 3.8% and 13.9%, and the number of teenage Internet users was nearly 200 million. The number of youth Internet users is nearly 200 million. In the survey of the Blue Book of Youth: China's Minors' Internet Use Report (2023), the surveyed minors have had Internet access in the past six months, indicating that the Internet penetration rate of minors is almost saturated [11].

2.2. Meso-factors

2.2.1. The Anonymity of the Network Itself

Cyberspace knows no borders, allows anonymous interaction, and its virtual, anonymous and hidden nature allows adolescents to transcend the limitations of time and space. For adolescents who are dissatisfied or stressed in real life, the Internet provides a platform for equal communication and an escape from reality. Such features make the Internet a popular form of entertainment, but they also make it easy for adolescents to become addicted and lead to problematic use. For example, online games, which some studies have shown have become one of the most popular leisure activities in the past decades [12].

2.2.2. Family Environment

Numerous studies have shown that negative family environments are strongly associated with adolescent PIU. Parental conflict, for example, can produce negative emotions and lead to problematic Internet use (PIU) in adolescents. Adolescents who are chronically in disruptive environments may be emotionally disturbed and insecure, which affects emotional regulation and expressiveness and leads to problematic behaviors such as Internet addiction [13].

Psychological control, lack of emotional warmth, communication and understanding, and excessive interference in a child's personal space are not conducive to fostering healthy Internet use behaviors [14]. All of the above studies confirm to us that a poor family environment is one of the most important reasons for the development of problematic Internet use among adolescents.

2.2.3. School Environment

Adolescents who are unable to establish friendly peer relationships at school and are emotionally unfulfilled are likely to go to the online world for peer support and social fulfillment. In a 2017 study by Yanzhen Zhang et al. on the relationship between peer aggression and gaming addiction in middle school students, it was shown that peer aggression was a significant risk factor for gaming addiction in middle school students [15]. Yi Juan (2016) et al. found that stress also has an effect on PIU. The more pressure adolescents face, the greater the likelihood of inducing PIU [16]. The intensely competitive learning atmosphere brings great challenges and pressure to adolescents, and this pressure weakens their sense of psychological need fulfillment, increases maladaptive cognition towards the Internet, and leads to a tendency to overuse the Internet.

2.3. Micro Factors

2.3.1. Personality Traits

Individuals with different personality traits can have different effects on the use of the Internet. According to Chen Shao-Hua et al. (2005), extroverted individuals usually need to maintain their level of alertness by interacting with the external environment or socializing with friends. The Internet as a communication tool fulfills this need of extroverted individuals, which in turn increases their risk of developing Internet addiction [17]. Narcissistic personality traits significantly predicted PIU. the desire of such individuals to self-present on social platforms, to seek praise from others to fulfill their needs, and the fear of missing out on information led to their unconscious and frequent use of the Internet [18].

2.3.2. Self-control

Research has found an association between self-control and PIU. Individuals who lack self-control usually show a variety of non-adaptive behaviors, such as not being able to meditate while writing homework and starting to play games without writing for a while. These individuals with low self-control usually unconsciously use the Internet as a means of escaping from the stress of reality and easily fall into addiction [19].

2.3.3. Emotional Distress

Emotional distress covers many aspects such as anxiety, depression, anger, loneliness, frustration, fear, and other different emotional disorders or distress. To combat emotional distress, individuals in a depressed state may tend to seek entertainment online [20]. Jeong et al. (2020) found a positive correlation between emotional disorders (e.g., depression and anxiety) and excessive Internet use [21]. In addition, it was found that the more isolated adolescents are, the more severe their PIU is, and that being isolated in real life, they desire a sense of belonging from the virtual world [22].

3. Consequences of Problematic Internet Use among Adolescents

Reading previous literature on PIU in adolescents, this study reviews the effects of PIU on adolescents in several

physiological, psychological, and behavioral aspects.

3.1. Physiological Aspects

Due to prolonged use of the internet, several health problems may arise such as headaches and disturbed sleep patterns. In this process users often sit or lie down, lack of exercise, unhealthy and irregular diet, no sense of time, which can easily lead to obesity, vision loss, musculoskeletal disorders, and so on. The sleep patterns of internet addicts are interrupted by late night internet access, leading to excessive fatigue and a compromised immune system, making internet addicts susceptible to disease [23]. In addition some studies have proved that there is a link between PIU and attitude towards life. People with high PIU are more accepting of death, and such individuals experience a great sense of loss when they leave the online world and return to real life, manifesting as emptiness, agitation, and despondency [24].

3.2. Psychological Aspects

Adolescent PIU is strongly associated with mental health problems, social anxiety and loneliness. Studies have shown that PIU is positively associated with depression, and prolonged addiction to the Internet leads to real-life insecurity and self-doubt, which can lead to depression [25], as well as a decrease in real-life communication and interaction with others, which in the long run leads to a decrease in the individual's socialization skills and an increase in anxiety levels [26]. Other studies have found a significant relationship between PIU and loneliness [27], negative self-esteem [28], and shyness [29].

3.3. Behavioral Aspects

Adolescent PIU negatively affects their behavior and social adjustment, and excessive online entertainment can neglect learning, socializing and other daily activities. Mixed messages on the Internet can easily expose adolescents to negative content. Studies have shown that adolescents with high levels of PIU are more likely to develop undesirable peer interaction behaviors [30]. Many undesirable web information may expose adolescents to undesirable inducements, such as school bullying and other phenomena. Adolescents' prolonged addiction to the Internet world may hinder the development of their social skills, leading to a decline in their social competence and triggering problems in interpersonal interactions.

4. Coping Strategies for Adolescents' Problematic Internet Use

With the popularization of the Internet, PIU among adolescents has become a concern that may affect brain development and mental health, socialization, and academics. Therefore, during this critical period of development, it is of utmost importance to take preventive and intervention measures to help adolescents form healthy Internet habits. This paper provides a comprehensive review of the influencing factors and consequences, and proposes systematic strategies to address this challenge.

4.1. Early Prevention Aspects

Early prevention of youth PIU requires multi-party cooperation, emphasizing education and nurturing. Families are the key. Parents need to improve their Internet literacy, participate in their children's Internet life and set up rules to

limit unreasonable use. Schools should strengthen education on Internet literacy, integrating Internet safety, information recognition and time management into the curriculum to cultivate students' self-control. Communities and governments should also provide resources to ensure a safe online environment and enact legislation to protect young people.

4.2. Timely Intervention Aspects

Timely intervention strategies focus on identification, assessment and treatment. Schools and families should pay close attention to adolescents' Internet behaviors and promptly identify potential signs of risk, such as excessive use, addiction to online games or social media. As soon as problematic Internet use behaviors are identified, immediate action should be taken. The following summarizes some of the currently effective intervention methods for the PIU population.

4.2.1. Cognitive-behavioral Therapy (CBT)

CBT has been widely used to treat problematic Internet use. The treatment is based on the cognitive-behavioral model, which posits that thoughts determine feelings and that changing a person's thoughts can help them change their behavior. Previous therapists have generally divided CBT into three phases: behavior modification sets goals to improve use behaviors; cognitive reframing helps to identify and challenge negative thinking; and behavioral substitution encourages the search for other activities to reduce Internet dependence.

4.2.2. Home Remedies

PIU in adolescents is often associated with the family environment. Family therapy can intervene in adolescent PIU by strengthening support systems within the family, improving family functioning and intimacy, and providing communication and education among family members. Importantly, family therapy is individualized and needs to be tailored to the family's specific situation and needs. The first step is to understand family functioning and interaction patterns and to identify family dynamics and environmental factors that may contribute to adolescent PIU. By assessing family functioning, areas that need to be changed or enhanced can be identified and intervention plans can be developed accordingly.

4.2.3. Exercise Interventions

Physical activity has a positive effect on intervening in adolescent PIU, including improving psychology, regulating behavior, and improving brain structure and hormone secretion. Long-term exercise increases willpower and self-control and reduces the risk of PIU. Physical activity provides opportunities for socialization, helps build healthy relationships, and reduces feelings of isolation and dependence.

5. Conclusion

The community needs to work together to sustain attention to implement adolescent PIU coping strategies to reduce problematic use and promote healthy adolescent development through prevention and intervention. Future research should explore more effective methods to provide guidance for policy development. As technology develops and behavioral patterns change, coping strategies need to be flexible and adaptable, and continuously monitored and updated to ensure long-term effectiveness. The goal is to create a safe and supportive online environment to ensure the healthy physical

and mental development of adolescents.

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