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A Review on Research Efforts on Internet Addiction

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Abstract: The fast development and expansion of the Internet has brought many conveniences to life and research, but has also brought multiple severe issues. For example, Internet addiction has come along as a problem of growing importance. Although many studies have proved the association between Internet overuse and many mental health problems such as depression and insomnia, there is a huge gap in the relating experimental studies, probably as correlated experiment brings serious ethical responsibilities. This paper will take a look at the current efforts done on the formation of Internet addiction and its correlations with common mental diseases through an inclusive review. The paper also offers some hypotheses and insight on Internet addiction to do with the latest Artificial Intelligence. After reviewing the mechanism, the criteria, and looking back at some correlational studies on the association between Internet addiction and psychological illnesses, some implications and potential improvements will be provided for conducting further experimental research in the future.

Keywords: internet addiction, mechanism, current research, AI, experimental studies

1. Introduction

Developing and expanding with astonishing speed, the Internet has growing more and more familiar to the world in recent years. As it plays a significant role in many fields such as communication and trade, its user number has skyrocketed. According to Internet World Stats, in March 2000, there were 304 million Internet users worldwide, taking up only 5% of the world population. Just after 22 years, in December 2022, the number of Internet users all over the world reached 5544 million, taking up about 69% of the world population [1]. However, many concerns are also raised regarding the overuse of the Internet, especially among adolescents and young adults. In the United States, researchers found that about 62% of teens use electronic devices for more than 4 hours a day, and approximately 29% use screens for more than 8 hours a day [2]. There has been much discussion on these shocking statistics under the name of “Internet Addiction”.

In the past couple of decades, many correlational researches have been done studying the potential harms of Internet addiction, especially mental health issues such as depression anxiety, and insomnia. For example, in 2018, researchers Manish Kumar and Anwesha Mondal studied Internet addiction and its correlation with psychopathology and self-esteem among 200 college students in Kolkata, India, by psychologically assessing them through different tests [3]. “Internet Addiction and Related Psychological Factors Among Children and Adolescents in China During the Coronavirus Disease 2019 (COVID-19) Epidemic” took a similar approach to different samples in China during the

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COVID-19 epidemic [4]. Almost all of these studies proved a great association between Internet addiction and many common mental disorders. These efforts hold great significance, as the results shed light on this association between the two matters, and preventing Internet addiction has become an important topic in the past decade especially. However, although many just assume that Internet addiction causes serious health issues such as depression and anxiety, the causality has not yet been proved and the biological relation between those matters is poorly investigated since virtually no experimental research has been done on the topic of Internet addiction. Hence, this paper aims to take a close look at some related research studying the process and mechanism of the development of Internet addiction along with its correlation to mental health issues, then discuss some theoretically possible improvements and designs for further experimental studies regarding this topic. Artificial Intelligence is also an important topic to discuss as the latest progress of it has brought similar problems as Internet addiction.

2. Mechanism and Criteria

In 2008, Martha Shaw and Donald Black stated in their article: “Internet addiction is characterized by excessive or poorly controlled preoccupations, urges or behaviors regarding computer use and Internet access that lead to impairment or distress [5].” This pointed out three major features of Internet addiction: It is an overuse, it is difficult to stop, and that it leads to harmful results. These features highly correspond to the process of being addicted.

2.1. Process and Mechanism

The two types of addiction, behavior (or process) and substance addiction, are similar except for the object of addiction [6]. behavior addiction shares a similar process with substance addiction, which includes a cycle made up of three stages: binge/intoxication, withdrawal/negative affect, and preoccupation/anticipation [7]. Firstly in the process, the binge/intoxication stage, where the subject is doing or using the object, euphoria and striking pleasure are experienced. In this specific case of Internet addiction, the subject feels extreme pleasure when he or she is online doing certain activities. Following is the withdrawal/negative effect, where the subject feels great discomfort and displeasure, and may become depressed, easily irritated, or agitated when they are offline, especially when being forced offline. Finally, the subjects become very obsessed and excited with their next chance to be online in the preoccupation/anticipation stage. Depending on the severity of addiction and overuse, this cycle may take place many times in one day. In fact, this addiction process is a result of hormone changes in the brain and B. F. Skinner’s Operant Conditioning Theory.

In the human brain, an area called the reward system has evolved as a way to reinforce behavior and habits by boosting dopamine levels in the reward pathways, which makes the individual feel pleasure and satisfaction. An addiction develops when the brain starts to change. Addictive substances and behavior cause dopamine to flood reward pathways in a relatively great quantity. As repetition of the behavior takes place, the brain adapts and becomes less sensitive to dopamine, leading to the necessity of more and more of the behavior to feel significant pleasure and satisfaction [8].

Operant conditioning also plays a crucial role. In the Internet addiction process, the great level of pleasure during the binge/intoxication stage acts as a positive reinforcement, letting the brain associate satisfaction with Internet usage, leading to more Internet usage. The large amount of discomfort experienced acts as a negative punishment, which results in the cease in withdrawal.

To note, Internet addiction can also change the structure of the brain. Specifically, the gray and white matter in areas of the prefrontal sections is related to tasks such as remembering details and planning [9]. In addition, a theoretical model and review in neuroscience published in 2014 suggests that Internet addiction reduces an individual’s prefrontal control processes, which, in turn, may be

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associated with loss of control over Internet usage [10]. This is in fact, an endless vicious cycle that continuously increases the severity of addiction.

2.2. Signs and Criteria

In the process of developing Internet addiction, many symptoms and signs occur. These signs have a significant association with the definition and the brain mechanism. Out of the common symptoms, five criteria have been identified. These include particular behaviors such as "unsuccessful attempts to cut down or stop using the Internet", and increasing time spent on the Internet to gain pleasure and satisfaction [11]. This greatly corresponds to the process briefly explained formerly, as operant conditioning causes the cease in withdrawal, and higher dopamine levels are required for pleasure as the brain grows less sensitive to it.

In addition, some physical symptoms come along as well. However, these symptoms are often associated with the long time spent in front of a screen and the lack of exercise rather than the direct association with human brain science. The symptoms include back strain, change in sleep pattern, and eye issues [11].

3. Current Research Efforts

3.1. Assessment of Kolkata College Students

This study was done by researchers Manish Kumar and Anwesha Mondal in 2018 with the aim of studying Internet usage patterns along with its association to self-esteem and psychopathology among young adults in an Indian setting. The researchers enrolled a total of 200 students from five different students in Kolkata, India, and then identified and excluded the students who had a history of psychopathology or substance abuse using a self-made sociodemographic data sheet. The mean age was 21.86 with a standard deviation of 2.82. After that, the subjects were assessed and interpreted through three different tests: Internet Addiction Scale, Symptom Checklist-90-Revised, and Rosenberg Self-Esteem Scale. A great difference between severe users of the Internet (39.5%) and the moderate users (31.5%) is presented in scores, where a statistically significant relation was shown between Internet overuse and psychiatric dimensions such as depression, anxiety, and obsessive-compulsive symptoms. Interestingly enough, no significant difference is show in self-esteem. This is contrary to some existing studies [12]. However, one possible explanation is that the online community may have built up the self-esteem of the severe users in this specific case. This fact demonstrates that the first study lacks conclusiveness as it is only done within 5 colleges of one city.

3.2. Assessment of Random Internet Users

Two years later, a group of researchers carried out a similar study. 954 subjects who were Internet users in the past six months have been enrolled rather than college students. However, the research was still mainly on young adults, as the mean age of the subjects was 23.81 with a standard deviation of 3.72. Out of the 954 subjects, 60.59% were male, and 39.41% were female. The methodology is virtually the same, which is assessing the subjects through three tests: Internet Addiction Test, Patient Health Questionnaire (considered a reliable tool for diagnosing depression), and Insomnia Severity Index. Judging from the results provided in the article, Internet overuse and addiction possess a significant correlation to insomnia and depression. From the specific statistical analysis of the subject's sociodemographic features in the article, parameters such as graduation level, smoking and alcohol are also found to be of great association with Internet addiction.

To note, the researchers noticed a difference between genders, where there are more male over-users and addicts than females, confirming similar observations in the past. The researchers believe

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this is a result of more liberty offered to males in society, as they may acquire more screen time and develop into addicts [13].

4. Hypotheses and Insight on AI and the Future

In the recent few months, there has been a lot of heated discussion about the "Artificial Intelligence", or AI, that many companies have released. These AI can respond to input a user types into the program. People have been using them for writing essays, and killing time, and many have grown an obsession with AI such as ChatGPT.

In fact, AI systems work by running large amounts of data through particular algorithms in order to learn from the patterns and features of the input information [14]. AI systems like ChatGPT work simpler. Similar to a search engine, they search for and combine information relating to the input data, then output the information in a manner similar to a human's.

With this information online, the author believes that the current new AI obsession is virtually the same as general Internet addiction, as the only difference is the deliverance of the information. Therefore, it may share the causes, the brain mechanisms and the potential risks. However, due to this human-like manner of output, AI obsession should be easier to develop than Internet addiction, as tone and deliverance can be easily associated with a close relationship among human beings.

Theoretically, AI systems in the future will be much like human being, as it can learn new behavior and patterns quickly. When that technology is achieved, AI obsession may be more similar to a human relationship rather than Internet addiction.

5. Implications and Discussion

5.1. Correlational Studies

There is a large number of correlational studies about the relation and association between Internet addiction and multiple particular behaviors and disorders, such as smoking, depression, anxiety, and insomnia. Although the cause and effect chain between the two matters is poorly investigated, Internet addiction can be made use of as a signal, since the occurrence of it may related to the potential occurrence of physical and mental health issues. For example, if a person is found to have an uncontrollable urge to play online video games, he or she may have some mental health issues such as low self-esteem and isolation, since he or she may have started to play games in the first place to find places to fit in due to low self-esteem, and a feeling of isolation may come along as the person spend a lot alone on video games.

In specific applications, schools should have a simple and basic questionnaire handed out to the students every few months. After finding some possible signs of Internet addiction, a more advanced test could be taken to spot some potential mental illnesses. This can help prevent and eliminate some of the risks of Internet addiction and mental health issues.

5.2. Experimental Studies

Currently, there is an enormous gap in the experimental studies of Internet addiction. This is because many ethical problems and responsibilities are involved. For example, if one researcher is going to do an experimental study on the negative effects of Internet addiction, the subject could potentially become depressed and have low self-esteem, and that could have serious permanent damage to an individual's social interactions and relations.

However, these ethical problems may find a balance when neither Internet addiction nor mental illnesses develop enough to cause permanent harm to an individual in an experimental study. For example, in depression, many areas of the brain structurally alter [15]. If similar alternations have

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been observed in the early stages of forming addiction, to a certain extent, Internet addiction and overuse may cause depression. The validity of this theory is still to be tested and argued. Perhaps more precise research devices in the future can help verify the potential mental illnesses in an early stage.

In addition, these potential experimental studies in the future could include the differences between males and females, which could be of great assistance in the study of male and female mindsets. As more and more voices seek gender equality, these findings could help find out and apply the advantages of each gender to social career design.

6. Conclusion

This paper took a close look at the correlational studies which proved a significant association with Internet addiction and many mental health issues, and has given some insight on future research regarding this topic. The two studies reviewed had a similar methodology, in which a large amount of subjects were selected and then assessed through different scaled tests. The first study was less conclusive as it was done in only five colleges in one city. It showed no great correlation between Internet usage and self-esteem, which contradicted the results of some other research.

In the topic of Internet addiction, although many correlational studies have been done, there is a big gap in experimental studies, and the specific cause-and-effect chain between Internet addiction and mental health issues is poorly investigated. Improvements and implications have been proposed in this paper from the two aspects of correlational studies and experimental studies.

From much effort put into correlational studies on this topic, a significant association between Internet addiction and mental illnesses has been proved. Therefore, Internet addiction and overuse could be used as a signal that may indicate some potential mental health issues. With this specifically applied to schools, the rate of mental illnesses can be decreased.

As ethical problems exist, there are virtually no experimental studies on the effects of Internet addiction. Using delicate devices to observe the early structural changes of the brain may eliminate those ethical problems and responsibilities. However, the validity of this method is still to be discussed, as early structural changes in the brain during experimental research may not indicate anything in particular.

References

[1] *Internet world stats. (2019). Internet World Stats - Usage and Population Statistics. Internetworldstats.com. https://www.internetworldstats.com/*

[2] *Rogers, K. (2019). New guidelines on screen time for young children. CNN. https://www.cnn.com/2019/10/29/health/common-sense-kids-media-use-report-wellness/i ndex.html*

[3] *Mondal, A., & Kumar, M. (2018). A study on Internet addiction and its relation to psychopathology and self-esteem among college students. Industrial Psychiatry Journal, 27(1), 61. https://doi.org/10.4103/ipj.ipj_61_17*

[4] *Dong, H., Yang, F., Lu, X., & Hao, W. (2020). Internet Addiction and Related Psychological Factors Among Children and Adolescents in China During the Coronavirus Disease 2019 (COVID-19) Epidemic. Frontiers in Psychiatry, 11. https://doi.org/10.3389/fpsyt.2020.00751*

[5] *Shaw, M., & Black, D. W. (2008). Internet addiction. CNS Drugs, 22(5), 353–365. https://doi.org/10.2165/00023210-200822050-00001*

[6] *Alavi, S. S., Ferdosi, M., Jannatifard, F., Eslami, M., Alaghemandan, H., & Setare, M. (2012). Behavioral Addiction versus Substance Addiction: Correspondence of Psychiatric and Psychological Views. International Journal of Preventive Medicine, 3(4), 290–294. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3354400/*

[7] *US Department of Health and Human Services. (2016, November). THE NEUROBIOLOGY OF SUBSTANCE USE, MISUSE, AND ADDICTION. Nih.gov; US Department of Health and Human Services. https://www.ncbi.nlm.nih.gov/books/NBK424849/*

DOI: 10.54254/2753-7048/23/20230470

[8] *Yale Medicine. (2022, May 25). How an Addicted Brain Works. Yale Medicine. https://www.yalemedicine.org/news/how-an-addicted-brain-works*

[9] *Brand, M., Young, K. S., & Laier, C. (2014). Prefrontal control and internet addiction: a theoretical model and review of neuropsychological and neuroimaging findings. Frontiers in Human Neuroscience, 8, 375. https://doi.org/10.3389/fnhum.2014.00375*

[10] *Van Rooij, A., & Prause, N. (2014). A critical review of "Internet addiction" criteria with suggestions for the future. Journal of Behavioral Addictions, 3(4), 203–213. https://doi.org/10.1556/jba.3.2014.4.1*

[11] *Symptoms of Internet Addiction. (n.d.). Priory Group. https://www.priorygroup.com/addiction-treatment/internet-addiction-treatment/symptoms-of-internet-addiction*

[12] *Bahrainian, S. A., Alizadeh, K. H., Raeisoon, M. R., Gorji, O. H., & Khazaee, A. (2014). Relationship of Internet addiction with self-esteem and depression in university students. Journal of Preventive Medicine and Hygiene, 55(3), 86–89. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4718307/*

[13] *Yadav, K., Jain, A., Sharma, R., Gaur, K., Yadav, N., Sharma, P., Sharma, N., Khan, N., Kumawat, P., Jain, G., Maanju, M., & Sinha, K. (2020). Study of internet addiction and its association with depression and insomnia in university students. Journal of Family Medicine and Primary Care, 9(3), 1700. https://doi.org/10.4103/jfmpc.jfmpc_1178_19*

[14] *CSU Global. (2021, August 9). How Does AI Actually Work? Colorado State University Global. https://csuglobal.edu/blog/how-does-ai-actually-work*

[15] *Zhang, F.-F., Peng, W., Sweeney, J. A., Jia, Z.-Y., & Gong, Q.-Y. (2018). Brain structure alterations in depression: Psychoradiological evidence. CNS Neuroscience & Therapeutics, 24(11), 994–1003. https://doi.org/10.1111/cns.12835.*