

Causes and consequences of technology addiction: A review of information systems and information technology studies

Osman Uslu¹

¹Afyon Kocatepe University, Faculty of Economics and Administrative Sciences, Department of Management Information Systems, Afyon-karahisar, Turkiye, e-mail: ousluu@aku.edu.tr; ORCID: <https://orcid.org/0000-0002-0571-6281>

Article Info

Abstract

Research Article

Received: 15 June 2022

Revised: 9 July 2022

Accepted: 29 July 2022

Keywords:

Addiction,
Technology addiction,
Information technology

The purpose of current study is to review the causes and consequences of technology addiction. With conceptual and descriptive intent, scope of technology addiction, its similarities and differences with other addictions, and causes and consequences of technology addiction have been examined. It has been determined that substance addictions differ from technology addiction due to their destructive consequences. Internet, game, smartphone, and social networking sites addictions are most prominent types of technology addiction. Personality, personality traits, psychological mood, and environmental factors are significant in terms of both causes and consequences of technology addiction. Mentioned factors have been examined in detail and interpreted from a holistic view. Study will be expected to contribute to technology addiction and management information systems literature from a broad and holistic perspective.

1. Introduction

Due to the many problems they cause, addictions are one of the most frequently discussed issues in the literature. Addiction is the inability to stop using a substance or behavior despite its psychological and physical harms (Luigies et al., 2019:9). Therefore, addicted people often use substances or engage in behaviors that persist and become compulsive, despite their harmful consequences (Lüscher et al., 2020:247). Described as chronic disorders (Dennis & Scott, 2007:49), addictions can seriously affect the course of daily life over time. Addictions can not only affect the addicted people itself but also harm their social environments. Anxiety, stress, depression, negative mental health, and permanent health complications are some of the prominent consequences (Akin & İskender, 2011:142). Neglecting social life and family, distancing from sociality, and inability to focus on the environment are among the social problems (Turel et al., 2011:90). There are many different types of addictions. They include the use of substances such as alcohol, drugs, cocaine, nicotine, and coffee (Kendler et al., 2007:1315) and behaviors such as gambling, sex and excessive use of technology (Amudhan et al., 2021:3). Technology addiction, which is the subject of the present study, in particular, is one of the prominent issues in the addiction literature with the spread use of technology.

Since the use of information and communication technologies facilitates many of our activities in social and daily life, it continues to be widely used and become an inseparable facet of our lives. Nowadays, technology is used in every environment and almost all activities are carried out employing technological tools. Listening to music, shopping, playing games, buying travel tickets, booking vacations, or transferring money are just some of them. There is no problem in performing basic activities, but technology addiction, which means excessive and inappropriate use of information and communication technologies (Amudhan et al., 2021:1), brings various individual and social problems. For instance, technology addiction results in loneliness, anxiety, depression, substance use, sleep problems, psychiatric problems, lack of social life, conflict, and academic deficiency (Kim et al., 2018:5; Young, 2004:405). In this sense technology addiction, like other addictions, is an important and critical issue that needs to be managed and examined. There are many studies in the literature based on the importance of the subject.

* All responsibility belongs to the researcher. All parties were involved in the research of his own free will.

To cite this article: Uslu, O. (2022). Causes and consequences of technology addiction: A review of information systems and information technology studies. *International Journal of Social Sciences and Education Research*, 8 (3), 299-306. DOI: <https://doi.org/10.24289/ijsser.1131136>

However, new studies are still needed to better understand technology addiction (Chou et al., 2005:382; D'Arcy et al., 2014:111). This situation has been the driving force in carrying out the current study. In this direction, it is aimed to examine the concept of technology addiction, detail its similarities and differences with other types of addictions, determine the scope of technology addiction, to reveal the causes and consequences of technology addiction. In line with the aim of the study, the studies accessed with the technology addiction and dependency keywords in the literature were examined and inferences were made at the general level. In this context, it is possible to say that the study has a conceptual and descriptive aspect. In this direction, general addictions, technology addiction, and the causes and consequences of technology addiction are presented respectively. This study seems important in three aspects. First it will help to better understand the technology addiction concept which misunderstood because of concepts such as problematic technology use or excessive technology use. Second, a general review of technology addiction studies will expand knowledge on the subject and contribute to the development of the relevant field. Finally, the study will reveal inputs that will guide future research. Thus, study is expected to contribute theoretically to future researchers studying technology addiction as well as it will provide practical clues to individuals struggling with technological addiction.

2. Method

As mentioned, with a conceptual and descriptive intent, a review of technology addiction studies was examined. Several reasons were effective on adopting the review method. First it allows to assess the current state of technology addiction field. It expands knowledge about related field and sheds light on future research. For this reason, previous studies examining technology addiction were examined. The scope of the study consists of article with "technology addiction" or "technology dependency" title. On the other hand, types of technology addiction such as games or the internet were not searched one by one due to huge literature. In the search of existing studies "Google Scholars" was preferred because it included all other databases. After search, approximately accessed 50 ones included in the study and they were examined in detail. Number of examined studies was considered sufficient due to the reason's findings began to resemble and general idea about technology addiction was already gathered.

3. Theoretical framework and literature review

3.1. Addictions and technology addiction

Addiction is defined by the APA (American Psychological Association) as a chronic disorder with biological, psychological, social, and environmental factors that affect its development and maintenance. Considering in more detail, it can be stated that addiction is a multifaceted situation arising from the combination of many elements. These elements include genetic, physiological, gender, psychological, trauma and abuse, family, peers, accessibility, and employment status (Belcher & Shinitzky, 1998:953; Cuomo et al., 2009; Parvizy et al., 2005). Almost all addictions affect the individual and the environment negatively. Social isolation, loneliness, depression, stress, anxiety, and conflict are just some of them. Addicted people can spend all their resources to seize the substance, especially in substance deprivation. The psychology of the addicts whose resources have expired deteriorates and there may be attempts to obtain the resources of their close circle by force. The most notable among addictions is substance abuse. Among these, there are those with severe consequences such as drugs, cocaine, and alcohol, as well as those with fewer problems with food and coffee (Kendler et al., 2007: 1315). Of course, addiction does not only consist of material elements (Chóliz et al., 2017:424). In addition to material factors, there are also behavioral addictions such as sex, gambling, gaming, and technology use which affect human life (Amudhan et al., 2021:3; Hall, 2011; Griffiths, 1995:14). In terms of consequences, although not as much as addictions caused by substance use, the harms of behavioral addictions are also critical. One of the types of addiction that has become widespread and continues to become widespread recently is technology addiction (Aagaard, 2021:559; Chen et al., 2021; Chóliz, et al., 2017:423).

Technology addiction has emerged as a result of increasing technology use and draws a similar appearance to other types of addictions. Therefore, in recent years, there has been a growing awareness that using technology every day is often impulsive and thoughtless and sometimes distracts attention from other activities (Aagaard, 2021:560). The concept of technology addiction is characterized by concepts such as preoccupation, mood change, and conflict. As in other types of addictions, individuals become more prone to technology addiction (Griffiths & Wood, 2000), due to reasons such as easy access, limited self-control, and increased peer pressure (Belcher & Shinitzky, 1998:953; Cuomo et al., 2009; Parvizy et al., 2005). In addition to these factors, exposure to technology can be considered another important antecedent. In terms of its consequences, technology addiction is similar to

the consequences of other types of addictions. These include sleep problems, psychiatric problems, loneliness, anxiety, stress, and depression (Jorgenson et al., 2016). In addition, neglecting social life and family can be considered among social problems. Dass et al. (2017) state that almost 80% of online gamers have lost at least one element of their lives such as sleep, work, education, or socializing with friends or family. At large, technology addiction negatively affects the health of individuals and consumes their resources. However, it is clear that technology addiction is not as painful and harsh as the consequences of substance abuse. At this point, technology addiction differs from substance addiction. Another issue that should be mentioned about the subject is the scope of technology addiction. There are various sub-dependencies described as technology addiction in the literature. Among these, game addiction, social media (social network) addiction, internet addiction, and mobile phone addiction are the ones that are emphasized most frequently (Amudhan et al., 2021:3; Chóliz et al., 2017:424). Each of these types is observed in all age groups. It can be argued that social media addiction is now effective not only in young people but also in older age groups. On the other hand, game and internet addictions are more common in younger individuals. It seems important to clarify which types of technology-related behaviors can be considered an addiction and which ones are out of this scope. Although the aforementioned issue is discussed in the literature, it is hard to give a clear answer since technology addiction has not a clear parameter. However, some researchers claim that technology addiction can be explained by other addiction criteria. Chóliz et al. (2012:290) argue the possibility to analyze technological addiction in terms of addiction criteria (DSM-IV-R). According to Chóliz et al. (2012:290), this will enable us to understand whether the abuse of the internet, mobile phones, or video games meets the mentioned criteria. The criteria proposed by Chóliz et al. (2012:290) for understanding technology addiction can be explained as follows.

- 1) Tolerance: The need for increased use of technology over time.
- 2) Withdrawal: Emotionally intense discomfort when an unusual amount of time passes or use is interrupted without using technology.
- 3) Use of more technology than intended.
- 4) Desire to stop using technology before doing so.
- 5) Spending too much time in activities related to technologies.
- 6) Stopping other activities to increase the use of the Internet, mobile phone, or video games.
- 7) Continuing to use the Internet, mobile phones, or video games despite being conscious of the harm caused.

A positive association can be expected between the amount of experience of the criteria mentioned above and the intensity of technology addiction. At this point, it may be possible to evaluate the technology addiction of some individuals as low and others as high. As technology addiction rises, social and individual problems will also increase. Because it is claimed that two-thirds of heavy technology addicts cannot eliminate their addictions (Kim et al., 2018). To better understand and explain technology addiction, it is useful to address its causes and consequences.

3.2. Causes of technology addiction

Since the scope of technology addiction is quite wide, factors causing technology addiction are also quite large. Especially the developments in information technologies are the most basic macro issue that causes the emergence of technology addictions (Chen et al., 2021:1). On the other hand, there are also very specific micro factors. Personality, mood, some negative habits, and environmental factors are some of them. For instance, in a study, self-control and the amount of time using media were found to be significantly related to internet addiction (Khang et al., 2013:2416). Similarly, sensation seeking, neuroticism, and dysfunctional impulsivity positively affect internet addiction (Kuem & Ray, 2021). Xu et al. (2012:331) in their research to identify the antecedents of game addiction, concluded that the need for mastering game mechanics and the need for relationships increase addiction. In another study, hedonic motivation, involvement, peer attachment, and trust were found to be causes of Facebook addiction (Nasr & Rached, 2021:9). Seo & Ray (2019:113) drew attention to focused immersion and concern for social acceptance as causes of addiction. One of the issues that can be associated with personality traits is emotional intelligence. According to a study, those who are emotionally intelligent are less technology addicted (Hamissi et al., 2013:310). On the other hand, dark personality traits seem to trigger addictions. For instance, highly narcissistic people tend to be more active on Facebook or other social networking sites (Buffardi & Campbell, 2008). Not only personality traits but also environmental factors have an impact on technology addiction. Positive correlations were found between perceived broken neighborhood relations and widespread phone use, and smartphone

addiction (Herrero et al., 2021:1108). In a study conducted on students, it was concluded that game addiction, neglecting daily chores, and bad relationships with professors were significantly associated with internet addiction (Baturay & Toker, 2019:2863). According to an interesting finding of a study, spending the weekend intensely increases social satisfaction and it triggers technology addiction (Li et al., 2017:613). As seen, the previous study points to many factors that cause technology addiction. These factors range from simple mood to personality traits, from neighborhood relationships to larger macro considerations. Of course, it is useful to address all the factors, but it seems difficult to fit each of them into a single study. The points mentioned above seem sufficient within the scope of this study and are current ones briefly summarized in Table 1.

Table 1. Some causes of technology addiction

Causes	Type of technology addiction	Reference
Advances in information technologies	General technology addiction	Chen et al. (2021)
Self-control The amount of time using media	Internet addiction	Khang et al. (2013)
Sensation seeking Neuroticism Dysfunctional impulsivity	Internet addiction	Kuem & Ray (2021)
Needs for mastering game mechanics Needs for relationship	Game addiction	Xu et al. (2012)
Hedonic motivation Involvement Peer attachment Trust	Facebook addiction (Social networking sites addiction)	Nasr & Rached (2021)
Focused immersion Concern for social acceptance	Social networking sites addiction	Seo & Ray (2019)
Low emotional intelligence	General technology addiction	Hamissi et al. (2013)
Narcissistic personality trait	Facebook addiction Other social networking sites addiction	Buffardi & Campbell (2008)
Poor neighborhood relations	Smartphone addiction	Herrero et al. (2021)
Game addiction Neglecting daily chores Poor relations with professors and friends	Internet addiction	Baturay & Toker (2019)
Heavy weekend	General technology addiction	Li et al. (2017)

Source: Compiled by the author.

3.3. Consequences of technology addiction

The types of technological addictions that arise due to the widespread use of information processing technologies often cause negative consequences. These emerging problems include psychological and health problems, negative mood problems, social and family problems, and work problems. It is emphasized that technology addiction creates mental health problems in modern societies (Chóliz et al., 2017:423; Brand et al., 2014). Oberts et al. (2017) specify internet addiction amongst adolescents has become a serious public health problem in some countries. In the emergence of such social problems, the possible effects of addictions on individuals' psychology could be the main reason. Because individuals with mental disorders affect the society they live in. Studies indicate that excessive internet use causes psychological problems (Barthakur & Sharma, 2012), and situations such as social phobia and hostile behaviors are caused by excessive internet use (Ko et al., 2009:937). According to Baturay & Toker (2019:2863), internet addiction decreases one's self-esteem, self-confidence, social self-efficacy, academic self-efficacy, and triggers loneliness. Other consequences of internet addiction include social anxiety (Wartberg et al., 2015), depression (Liang et al., 2016), attention deficit (Wang et al., 2017), poor academic performance (Kumar et al., 2018), and stress (Jun & Choi, 2015). Technology addiction is not limited to internet addiction. Addiction to social networking sites also has serious harmful consequences. For instance, social networking sites can negatively impact addicts' mental health (Bányai et al., 2017). According to Moqbel & Kock (2018:109), addiction to social networking sites reduces positive emotions which increase performance and improve health.

As a result, attention deficit increases, and performance decreases in individuals (Moqbel & Kock, 2018:109). The consequences of technology addiction are also related to social and business life. According to a study, excessive use of mobile social networking sites leads to three types of conflicts (tech-personal, tech-family, and tech-work) and increases perceived mobile technology stress (Zheng & Lee, 2016:71). Findings show that negative life experiences, poor health, and poor performance are linked to social network use (Fox & Moreland, 2015:173). Even at a micro level, the consequences of addiction are visible. For instance, even mobile e-mail addiction causes technology-family conflict, work overload, work-family conflict, and reduced organizational commitment (Turel et al., 2011). The consequences of technology addiction in the aforementioned studies are summarized in Table 2.

Table 2. Some consequences of technology addiction

Type of technology addiction	Consequences	Reference	
General technology addiction	Mental health problems	Chóliz et al. (2017) Brand et al. (2014)	
	Public health problems	Oberts et al. (2017)	
Internet addiction	Psychological problems	Barthakur & Sharma (2012)	
	Social phobia Hostile behaviors	Ko et al. (2009)	
	Low self-esteem Low self-confidence Low social self-efficacy Low academic self-efficacy High loneliness	Baturay & Toker (2019)	
	Social anxiety	Wartberg et al. (2015)	
	Depression	Liang et al. (2016)	
	Attention deficit	Wang et al. (2017)	
	Poor academic performance	Kumar et al. (2018)	
	Stress	Jun & Choi (2015)	
	Social networking sites addiction	Mental health problems	Bányai et al. (2017)
		Reduced positive emotions Decreased performance Increased attention deficit	Moqbel & Kock (2018)
Tech-personal conflict Tech-family conflict Tech-work conflict Increased tech-stress		Zheng & Lee (2016)	
Negative life experiences Poor health Poor performance		Fox & Moreland (2015)	
Mobile e-mail addiction	Technology-family conflict Work overload Work-family conflict Reduced organizational commitment	Turel et al. (2011)	

Source: Compiled by the author.

4. Discussion and conclusion

In this study, the scope, types, causes, and consequences of technology addiction were examined with a conceptual and descriptive intent. When general addiction and technology addiction are compared, similar causes and consequences are observed. However, at this point, it can be stated that the consequences of addictions created by alcohol and substance use are more destructive than technology addiction. This is the most important point where technology addiction differs from other addictions. Due to the integration of gambling and games with technology behavioral addictions such as gambling and gaming have also increased recently. Here, two types of addictive

behavior trigger each other. There are also efforts of researchers in the literature on what the concept is. Studies suggest that addiction criteria can be used to explain technology addiction (Chóliz et al., 2012:290). However, since technology addiction does not have a clear parameter, there is still a need for new studies on this subject. General factors that cause technology addiction are personality, personality traits, mood, and environmental factors. In addition to this, it is seen that neighborly relations and past activities (heavy weekends) also affect technology addiction. In this respect, it can be argued that technology addiction is affected by many factors, from macro to micro. Considering all factors, it is possible to say that personality traits and relations with the environment are among the main causes of technology addiction. Sensation seeking, neuroticism, dysfunctional impulsivity, poor relations with others, narcissistic personality traits, relationship needs, and emotional intelligence are the most frequently mentioned ones (Kuem & Ray, 2021; Baturay & Toker, 2019; Hamissi et al., 2013; Buffardi & Campbell, 2008). In terms of consequences, mental health, psychological states, conflict, and attention deficit are the most prominent ones (Moqbel & Kock, 2018; Oberts et al., 2017; Zheng & Lee, 2016; Brand et al., 2014). The scope of technology addiction is quite wide and includes various types of addiction-related to technology. These include internet addiction, social networking site addiction, mobile e-mail addiction, game addiction, and smartphone addiction (Herrero et al., 2021; Seo & Ray, 2019; Wartberg et al., 2015; Xu, Turel & Yuan, 2012; Turel et al., 2011). One of the striking details in the studies examined is that internet addiction and addiction to social networking sites, which are among the types of technology addiction, are intensely mentioned. Thus, it can be deduced that internet and social networking site addictions are more effective in terms of their consequences and therefore they are frequently discussed by researchers as a subject of in their studies. Present study has several implications for literature and practice. The findings of the study reveal that the causes of technology addiction are mostly based on psychological factors. This shows that it is important to question the psychological backgrounds of technology addicts in detail, as in other addictions. The factors affecting technology addiction are not only related to personality and psychological processes. In addition, environmental factors also seem to be important. Although studies on environmental factors are limited in the literature, it is obvious that the issue is quite significant. As internet-based transactions increase day by day, the use of technology also increases. This situation naturally causes an increase in technology addictions. In this context, more effort, information and therapy-like programs for addicts are needed more frequently in near future.

In literature, there are different types of technology addiction such as internet, mobile phone, or social media. In the present study, the studies accessed using the technology addiction keyword were examined from a broader perspective. This narrowing constitutes the limitation of the study. Another limitation is the general focus on only the causes and consequences of technology addiction. Focus studies on other types of technology addiction seem beneficial in future studies. For instance, studies examining social media addiction can be conducted. Such a study may be beneficial, especially in explaining the young generation and their behavioral tendencies who use social media more actively. In addition to the causes and consequences of technology addiction, it is possible to contribute to the development of the field by focusing on research on mediator and moderator variables. In this way, a different perspective will be reflected. The causes and consequences of technology addiction reveal the importance of personality, psychological mood, and environmental factors. At this point, it is difficult to change the personality, but if the emotional intelligence development of individuals can be achieved, addiction can be protected to some extent.

In addition to emotional intelligence development, several tips can be suggested to reduce technology addiction. Reducing the number of devices someone uses in their work or private life will be beneficial. Another way is controlling or limiting screen usage times per day or week via some programs such as Space (available in Android and IOS). This is also a feature possible on mobile phones and computers without the need for a program. One may also design their work or home environment to be away from technological devices. For instance, not go to bed or studying room with any technological devices or not keeping technological devices outside of only one room. Establishing real life connections is significant. It will enhance socialization with real people which helps to reduce technology addiction. The willingness of families to meet their children's psychological needs is also critical. It will be beneficial for them to guide their children, especially spending their spare time. Since it is very hard for the addicts to stay away from all games, gambling, and similar environments that are likely to cause addiction on the Internet, it will be beneficial for the policymakers to create preventive action plans such as closing harmful sites and software. For instance, access to addictive sites such as gambling or games is prohibited in some public institutions. Ensuring and disseminating this prohibition by law may be beneficial in reducing technology addiction. In the context of the current study, technology addiction was examined in general terms. So it has contributed to technology addiction from a broad perspective. But of course, more future studies about technology addiction are still needed.

Author contribution statements

The author contributed all to the research's design and implementation, the analysis of the results, and the writing of the manuscript.

Disclosure statement

The author reported no potential conflict of interest.

Ethics committee approval

All responsibility belongs to the researcher. All parties were involved in the research of his own free will.

References

- Akin, A., & İskender, M. (2011). Internet addiction and depression, anxiety and stress. *International online journal of educational sciences*, 3(1), 138-148.
- Amudhan, S., Prakasha, H., Mahapatra, P., Burma, A. D., Mishra, V., Sharma, M. K., & Rao, G. N. (2021). Technology addiction among school-going adolescents in India: epidemiological analysis from a cluster survey for strengthening adolescent health programs at district level. *Journal of public health (Oxford, England)*, fdaa257. Advance online publication. <https://doi.org/10.1093/pubmed/fdaa257>.
- Bányai, F., Zsila, Á., Király, O., Maraz, A., Elekes, Z., Griffiths, M. D., ... & Demetrovics, Z. (2017). Problematic social media use: Results from a large-scale nationally representative adolescent sample. *PLoS one*, 12(1), e0169839. <https://doi.org/10.1371/journal.pone.0169839>.
- Barthakur, M., & Sharma, M. K. (2012). Problematic internet use and mental health problems. *Asian Journal of Psychiatry*, 5(3), 279-280. <https://doi.org/10.1016/j.ajp.2012.01.010>.
- Belcher, H. M., & Shinitzky, H. E. (1998). Substance abuse in children: Prediction, protection, and prevention. *Archives of pediatrics & adolescent medicine*, 152(10), 952-960. <https://doi.org/10.1001/archpedi.152.10.952>.
- Brand, M., Laier, C., & Young, K. S. (2014). Internet addiction: coping styles, expectancies, and treatment implications. *Frontiers in Psychology*, 5, 1256. <https://doi.org/10.3389/fpsyg.2014.01256>.
- Chóliz, M., Echeburúa, E., & Ferre, F. (2017). Screening tools for technological addictions: A Proposal for the strategy of mental health. *International Journal of Mental Health and Addiction*, 15(2), 423-433.
- Chóliz, M., Echeburúa, E., & J Labrador, F. (2012). Editorial (Hot Topic: Technological Addictions: Are These the New Addictions?). *Current psychiatry reviews*, 8(4), 290-291. <https://doi.org/10.2174/157340012803520540>.
- Chou, C., Condrón, L., & Belland, J. C. (2005). A review of the research on Internet addiction. *Educational psychology review*, 17(4), 363-388. <https://doi.org/10.1007/s10648-005-8138-1>.
- Cuomo, C., Sarchiapone, M., Di Giannantonio, M., Mancini, M., & Roy, A. (2008). Aggression, impulsivity, personality traits, and childhood trauma of prisoners with substance abuse and addiction. *The American journal of drug and alcohol abuse*, 34(3), 339-345. <https://doi.org/10.1080/00952990802010884>.
- D'Arcy, J., Gupta, A., Tarafdar, M., & Turel, O. (2014). Reflecting on the "dark side" of information technology use. *Communications of the Association for Information Systems*, 35(1), 5. <https://doi.org/10.17705/1CAIS.03505>.
- Dennis, M., & Scott, C. K. (2007). Managing addiction as a chronic condition. *Addiction Science & Clinical Practice*, 4(1), 45-55. <https://doi.org/10.1151/ascp074145>.
- Fox, J., & Moreland, J. J. (2015). The dark side of social networking sites: An exploration of the relational and psychological stressors associated with Facebook use and affordances. *Computers in Human Behavior*, 45, 168-176. <https://doi.org/10.1016/j.chb.2014.11.083>.
- Griffiths, M. (1995, February). Technological addictions. In *Clinical psychology forum* (pp. 14-14). Division of Clinical Psychology of the British Psychol Soc.
- Griffiths, M., & Wood, R. (2000). Risk factors in adolescence: The case of gambling, videogame playing, and the internet. *Journal of Gambling Studies*, 16, 199-225. <https://doi.org/10.1023/A:1009433014881>.
- Hall, P. (2011). A biopsychosocial view of sex addiction. *Sexual and Relationship Therapy*, 26(3), 217-228. <https://doi.org/10.1080/14681994.2011.628310>.
- Jorgenson AG, Hsiao RC-J, Yen C-F. (2016). Internet addiction and other behavioral addictions. *Child Adolescent Psychiatric Clinics of North America*, 25(3), 509-520. <https://doi.org/10.1016/j.chc.2016.03.004>.
- Jun, S., & Choi, E. (2015). Academic stress and Internet addiction from general strain theory framework. *Computers in Human Behavior*, 49, 282-287. <https://doi.org/10.1016/j.chb.2015.03.001>.
- Kendler, K. S., Myers, J., & Prescott, C. A. (2007). Specificity of Genetic and Environmental Risk Factors for Symptoms of Cannabis, Cocaine, Alcohol, Caffeine, and Nicotine Dependence. *Arch Gen Psychiatry*, 64(11), 1313-1320. doi:10.1001/archpsyc.64.11.1313.

- Kim H-J, Min J-Y, Min K-B, Lee T-J, Yoo S (2018) Relationship among family environment, self-control, friendship quality, and adolescents' smartphone addiction in South Korea: Findings from nationwide data. *PLoS ONE* 13(2): e0190896. <https://doi.org/10.1371/journal.pone.0190896>.
- Kim, H. J., Min, J. Y., Min, K. B., Lee, T. J., & Yoo, S. (2018). Relationship among family environment, self-control, friendship quality, and adolescents' smartphone addiction in South Korea: Findings from nationwide data. *PloS one*, 13(2), e0190896. <https://doi.org/10.1371/journal.pone.0190896>.
- Ko, C. H., Yen, J. Y., Chen, C. S., Yeh, Y. C., & Yen, C. F. (2009). Predictive values of psychiatric symptoms for internet addiction in adolescents: a 2-year prospective study. *Archives of Pediatrics & Adolescent Medicine*, 163(10), 937-943. <https://doi.org/10.1001/archpediatrics.2009.159>.
- Kumar, S., Kumar, A., Badiyani, B., Singh, S. K., Gupta, A., & Ismail, M. B. (2018). Relationship of internet addiction with depression and academic performance in Indian dental students. *Clujul Medical (1957)*, 91(3), 300–306. <https://doi.org/10.15386/cjmed-796>.
- Lemmens, J. S., Valkenburg, P. M., & Peter, J. (2009). Development and validation of a game addiction scale for adolescents. *Media psychology*, 12(1), 77-95. <https://doi.org/10.1080/15213260802669458>.
- Li, Q., Guo, X., & Bai, X. (2017). Weekdays or weekends: Exploring the impacts of microblog posting patterns on gratification and addiction. *Information & Management*, 54(5), 613-624. <https://doi.org/10.1016/j.im.2016.12.004>.
- Liang, L., Zhou, D., Yuan, C., Shao, A., & Bian, Y. (2016). Gender differences in the relationship between internet addiction and depression: A cross-lagged study in Chinese adolescents. *Computers in Human Behavior*, 63, 463-470. <https://doi.org/10.1016/j.chb.2016.04.043>.
- Luigjes, J., Lorenzetti, V., de Haan, S., Youssef, G. J., Murawski, C., Sjoerds, Z., ... & Yücel, M. (2019). Defining compulsive behavior. *Neuropsychology Review*, 29(1), 4-13. <https://doi.org/10.1007/s11065-019-09404-9>.
- Lüscher, C., Robbins, T. W., & Everitt, B. J. (2020). The transition to compulsion in addiction. *Nature Reviews Neuroscience*, 21(5), 247-263. <https://doi.org/10.1038/s41583-020-0289-z>.
- Moqbel, M., & Kock, N. (2018). Unveiling the dark side of social networking sites: Personal and work-related consequences of social networking site addiction. *Information & Management*, 55(1), 109-119. <https://doi.org/10.1016/j.im.2017.05.001>.
- Oberst, U., Wegmann, E., Stodt, B., Brand, M., & Chamarro, A. (2017). Negative consequences from heavy social networking in adolescents: The mediating role of fear of missing out. *Journal of Adolescence*, 55, 51–60. <https://doi.org/10.1016/j.adolescence.2016.12.008>.
- Parvizy, S., Nikbahkt, A., Pournaghash Tehrani, S., & Shahrokhi, S. (2005). Adolescents' perspectives on addiction: qualitative study. *Nursing & health sciences*, 7(3), 192-198. <https://doi.org/10.1111/j.1442-2018.2005.00237.x>.
- Turel, O., Serenko, A., & Bontis, N. (2011). Family and work-related consequences of addiction to organizational pervasive technologies. *Information & Management*, 48(2-3), 88-95. <https://doi.org/10.1016/j.im.2011.01.004>.
- Turel, O., Serenko, A., & Bontis, N. (2011). Family and work-related consequences of addiction to organizational pervasive technologies. *Information & Management*, 48(2-3), 88-95. <https://doi.org/10.1016/j.im.2011.01.004>.
- Wang, B. Q., Yao, N. Q., Zhou, X., Liu, J., & Lv, Z. T. (2017). The association between attention deficit/hyperactivity disorder and internet addiction: a systematic review and meta-analysis. *BMC psychiatry*, 17(1), 1-12. <https://doi.org/10.1186/s12888-017-1408-x>.
- Wartberg, L., Kriston, L., Kammerl, R., Petersen, K. U., & Thomasius, R. (2015). Prevalence of pathological internet use in a representative German sample of adolescents: Results of a latent profile analysis. *Psychopathology*, 48(1), 25-30. <https://doi.org/10.1159/000365095>.
- Young, K. S. (2004). Internet addiction: A new clinical phenomenon and its consequences. *American behavioral scientist*, 48(4), 402-415. <https://doi.org/10.1177/0002764204270278>.
- Zheng, X., & Lee, M. K. (2016). Excessive use of mobile social networking sites: Negative consequences on individuals. *Computers in Human Behavior*, 65, 65-76. <https://doi.org/10.1016/j.chb.2016.08.011>.