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Modern information and communication technologies and the behavioral changes in adolescents with a psychiatric diagnosis

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Abstract | Background: For the current generation of teenagers, computers, smartphones and social networks are seen as a completely natural part of their lives. However, the overuse of social networks has been associated with a number of risks such as the possible development of addiction, procrastination and the negative effects on the psychological, physical and social aspects of health. Objectives: The aim of the research was to analyze the overuse of modern communication technologies on the behavior of adolescents with a psychiatric diagnosis. The research questions related to the participants' approach to using the internet, the influence of online activities on their behavior, the causes of risky behavior in cyberspace and the factors enabling these risks to be mitigated. Methods: The study adopted a qualitative research design using professional documentation, interviews and observations. These were used to compile and analyze case studies of six participants with a psychiatric diagnosis who had been hospitalized in a medical facility. Results: In the monitored group, there were symptoms of overuse or addiction to the internet accompanied by an excessive preference for online activities, withdrawal symptoms and conflict behavior. All the participants lacked a harmonious family background. During their time in cyberspace, they shared experiences with peers, looked for role models, friends and advice and expected support, understanding, recognition and appreciation. High number of their online contacts contrasted strongly with their low activity in the real social world. They used the internet intensively to compensate for their unfulfilled emotional and sexual areas, needs in family and school life as well as sharing their worries, fears and psychological pain. Problem behavior in cyberspace often led to the occurrence or worsening of psychological problems. The support that teenagers found on the internet did not meet their expectations. Conclusions: The use of modern technologies for teenagers brings a certain satisfaction of needs, stress relief, entertainment and education. People with mental health problems can find temporary relief in the online world. although in the long run, this approach can be risky if a functional support is missing. Moreover, a good environment at school, reliable friends in the real world, varied and high-quality content of free time play a vital role in preventing the overuse of online activities or addiction to them. It is essential that the adolescent experiences success, reward and positive motivation to receive adequate feedback. Appropriate therapy and counseling services can help in cases where problems occur.

Keywords | adolescent, behavior, internet, communication, research, addiction, health

Background

This paper focuses on the overuse of modern information and communication technologies, especially the internet and social networks, and the possible influence on the behavior of adolescents where there has been a psychiatric diagnosis. According to the findings mentioned in theoretical insight and discussion, it is similar to that modern digital technology affects the behavior of children and youth with a diagnosed mental disorder and behavior of children without psychological problems.

We present a wider theoretical background of the monitored phenomena to mention the potential risks of modern digital technologies, preventive and therapeutic measures in the case of their problem use or dependence on them.

Modern means of communication are attractive for adolescents as technological toys with which they can experiment and develop their skills. However, modern means of communication are more often than not used for social contact or ventilating certain emotions in the online environment. Indeed, it is among adolescents where there is the greatest risk of addiction. Today's young people have grown up with the internet (Blinka, 2015) with excessive internet use being a natural part of their everyday life since childhood. They find the company they are looking for there as online communities tend to be open and welcoming to newcomers. The risk of non-acceptance can be minimized by changing one's virtual identity. This can either assist the development of identity or, on the contrary, suppress it (Gackenbach & Bown, 2017).

Modern information and communication technologies lead to and may result in superficiality in the processing of information: "in the past, the text used to be read, today the text is skimmed" (Spitzer, 2014, p. 66). In the past, people "dove" into the text content; nowadays people "surf" the net. Children and young people develop new habits that are exclusively associated with this environment – such as lying or cheating - which may then be transmitted into real life (Spitzer, 2014).

Internet and behavioral addiction

The internet enables adolescents to fulfill their needs as it is "always an accessible means of managing emotional hypersensitivity and liability" (Blinka, 2015, p. 94). Nevertheless, its excessive use is most often associated with watching potentially risky videos, frequent visits to chat rooms or social networks and playing online games. The reasons why adolescents develop an addiction to the internet may be related to the failure to accomplish one or more developmental tasks or needs in the areas of identity creation, socialization skills or sexuality (Blinka, 2015). Boys are more inclined to play computer games because of the greater need for respect, prestige and self-confidence and are thus at risk of addiction. This is also associated with a higher incidence of obesity, violence, procrastination, poor school performance, anxiety, social phobia, shyness, impulsivity and depression (Janošová, 2008; Kimáková & Bernadič, 2018; Zimbardo & Coulombe, 2017).

The term "internet addiction" has not yet been clearly defined or fully accepted. Although it occurs in reality, it is not considered an official diagnosis because its definition is problematic and requires more research, especially in the field of neurology and genetics (Montag & Reuter, 2015). Spending over one hour a day for adolescents and two hours a day for older adolescents is considered excessive usage of the internet. It is common that online activities prevail at the expense of more beneficial activities. Individuals who are often bored or have difficulty controlling their impulsiveness are prone to excessive use of the internet. The attractiveness of online activities is

enhanced by the diversity of what is available, the ability to change activity and the well-designed reward systems. The other type of potentially at-risk user is shy, less socially skilled, more introverted with low self-esteem or mental difficulties. For this type of individual, the internet is a place where they can escape from their problems and make friends much more easily than in real life (Blinka in Ševčíková et al., 2014).

Internet addiction is characterized by: (1) the exaggerated importance of the internet (i.e. it is at the centre of one's life – thoughts, experience and behavior); (2) mood swings (sedation or arousal, escaping from real world problems); (3) higher tolerance of online activity (increased time spent on online activities); (4) withdrawal symptoms (unpleasant symptoms, discomfort in limiting or terminating the activity); (5) conflict (internal – in the area of desires, values; and external – relationships, quarreling and resentment in the family); and (6) relapse (tendency to repeat inappropriate behavior despite the desire to stop) (de Abreu in Young & de Abreu, 2017).

Data on the prevalence of internet addiction in the population fluctuate considerably and can range from between 0.7% to 27.7%. The rate is about 2% amongst adults with adolescents reported to be higher, especially in the developed Asian countries (e.g., Japan, South Korea) (Poli, 2017). A substantial difference between substance dependence and internet dependence is the fact that it is almost impossible to fully exclude the internet and new media from life. These means of communication and information are also commonly used for work and educational purposes (Víchová & Koblovský, 2013). Dependence on modern means of communication is relatively severe and is associated with other mental (anxiety and depression) and physical (orthopedic problems, visual and eating disorders, obesity, neglect of hygiene and sleep) problems. While depressed and anxious people can search the internet for information on their issues, addiction to searching for information on anxiety and depression can also lead to guilt, fear, loneliness and procrastination (Gregory, 2022).

Social networks and the associated risks

Social networks and the internet are very important phenomena associated with young people. These networks have been described as "interconnected groups of people who maintain on-line communication using various tools and means" (Kopecký, 2013, p. 206). The most well-known are Facebook along with Instagram and Twitter, and the more business-like service LinkedIn. Nowadays these networks are being increasingly used for marketing in addition to private communication (Kopecký, 2013).

Social media is already a common part of our culture. For adolescents, it primarily serves as social interaction, engaging in online communities and finding their position in the world. It has transformed from associations of people sharing common interests into networks aimed at developing and shaping friendships. Social networks are also associated with the phenomenon of the so-called online public which is based on content sharing, virtual space and community`s ideas. It is about the meeting of young people in cyberspace where they can engage in social life, make themselves known and make themselves visible.

Unlike adults, adolescents do not see risks; they are much less skeptical in their attitudes towards social networks. They have learned to use them and make use of them for their needs (Boyd, 2017).

Social networks also influence the lifestyle of their users. These changes are most noticeable in people who have grown up using modern ways of communication (the so-called digital natives). They often live a so-called second life on social networks where they share their joys and worries, meet new people, publish personal information, meet new partners and are influenced by fashion

trends (often very dubious or risky ones). In using these networks, they strive for peer recognition and as a result try to create the most original and interesting profiles to achieve this. The discrepancy between the ideal presentation in the virtual world and one's reality can lead to very serious consequences such as depression, suicidal tendencies, dissatisfaction with one's body and hatred of others. Facebook and Twitter promote social interaction which can also include the risk of cyberbullying or manipulation of a child or adolescent by an adult (i.e. "grooming"). Another important phenomenon are the challenges associated with videos mainly posted on TikTok, less on YouTube. The essence of these is imitating the Youtuber's behavior which is often unethical (including the ridiculing of others) or very dangerous. There is not only the risk of injury but even death (e.g., resulting from dousing oneself with flammable liquid and igniting it, climbing high buildings, jumping into water from high rocks) (Filip, 2017).

Other dangers of social networks include the spreading of inappropriate bids involving violence, sex, racism, user manipulation (subliminal and conscious advertising, influencing public opinion), addictive behavior, and the glorification of inappropriate patterns leading to risky behavior (Szotkowski & Kopecký, 2018).

Suicidal behavior is also associated with the use of social networks at two levels in that they might increase the risk of suicide or act as a protective factor. Social networks are full of suicide guide books, chat rooms, and communities of individuals interested in this issue, including those considering suicide. On the other hand, social media can play an important role in prevention by dealing with suicidal tendencies with the view of averting suicide (Koutek & Kocourková, 2007; Walrave et al., 2016).

Self-harm is another issue often encountered in social networking environments. Self-harm is most common amongst young people aged 13–25 and three times more frequent in girls. The principle is based on the idea of distraction from unpleasant thoughts, feelings and states by causing oneself bodily harm (e.g. burning, cutting with a knife – most often cuts on the arms, painful scratching, striking the wall, swallowing inappropriate objects). It may also signify a desire to gain the attention of the social environment or to avoid an unpleasant situation. It is often present in behavior and mood disorders, as well as in disharmonic personality development. In adolescents, this behavior may be the result of bullying, loss of a loved one (partner, parent), a traumatic experience, unpleasant event or extreme stress (Kriegelová, 2008; Platznerová, 2009). Social networks are often a place that increases self-harm in adolescents and there are communities focused on this topic. The members are often from certain subcultures such as emo or goths (Černá & Šmahel, 2009; Smolík, 2010). In the case of self-harm, it is possible to detect it in many social networks (in reflection, discussion) and offer professional help (Beasley & Mitchel, 2015).

Preventive and therapeutic activities

There are a number of preventive activities related to communication technologies, including dependence on the internet and its services. These can be divided into two main groups: the first are programs aimed at providing knowledge and information while the second group are interactive prevention programs. Adolescents can learn about the negative impact of potentially risky behavior. Peer programs or approaches that aim to change attitudes and behaviors towards modern means of communication are effective. It is important to try to offer adolescents other more appropriate and healthier activities. Attempts by close persons (family members) to forbid the internet usually do not work and adolescents naturally resist them (Jedlička, 2015; Vondráčková, 2015).

It is necessary to introduce effective preventive measures in the family from childhood, for example not "placing" children in front of screens as a form of babysitting. A healthy lifestyle helps children to develop appropriate leisure activities. However, it is not possible to fully prevent adolescents from using the internet in their free time. This would increase the risk of failing to be accepted by their peers and thus becoming socially isolated. However, parents should be interested in what a child does in cyberspace, why the child is interested or engaged in certain activities and what they bring to him or her. It is essential to explain to children and adolescents the risks of modern communication and how to work with information as well as setting up time for computer games, chatting, etc. If the child uses the internet excessively, it is not good to tackle the problem alone and professional help should be sought (Jedlička, 2015; Machová & Kubátová, 2015; Šikl, 2022). Children should be encouraged to understand that face-to-face communication is always less threatening than communication on the internet. They should also be aware about not posting personal or family related information online. Children also need to be educated in media literacy and responsible media behaviour (Mertin & Krejčová, 2016; Vojtová, 2005).

The treatment of internet addiction uses similar principles to the treatment of substance dependence. This involves a combination of psychological and pharmacological interventions. The aim is to reduce the time spent by the individual on the internet as well as reducing levels of depression and anxiety. Motivational interviews, work with the family, cooperation with the school and appropriate leisure time, lifestyle change, recognition of triggers, improvement of adequate self-confidence and prevention of relapses are important in addressing the issue (Vojtová, 2005; Vondráčková, 2015).

Objectives

The aim of the research was to compile case studies of six adolescents who have been reported as having psychological problems, describe and analyze the possible effect of excessive use of modern information and communication technologies, especially the internet and social networks. Four research questions have been set:

(1) What is the approach of participants to using the internet and social networks?

(2) What changes in behavior are observed in the participants during their online activities?

(3) What factors are associated with the participants` risk behavior in an online environment?

(4) What factors should be emphasized in the participants when dealing with their risky behavior?

Methods

This was a qualitatively focused survey meaning that the results cannot be generalized to the whole population. The influence of the researcher on the results of such a study is quite significant and thus there are certain risks of distortion (Disman, 2011; Reichel, 2009). The validity was ensured by means of triangulation, i.e., a combination of different approaches to exploring a given phenomenon (Miovský, 2006). The data were analyzed using professional documentation (school, medical, psychological); various types of observation, semi-structured interviews and case studies. Anamnestic data were taken from the parents of the participants and were supplemented with available documentation (Dokoupilová, 2018).

The participants were observed during both the interviews and during their stay in the psychiatric ward. The observations were unstructured and open, and for the most part of the research, they were participative (Hendl, 2005; Dokoupilová, 2018). Semi-structured interviews were conducted with the participants focusing on their current state, family background, school benefits, school and

class relationships, leisure time, best friends and acquaintances, the internet and social networking behavior, possible attacks through social networks, health problems and their solutions, and meeting their needs. The questioning scheme was prepared in advance and followed during the interviews (Dokoupilová, 2018).

The collected data are presented in the form of six case studies, the purpose of which is to understand and interpret events related to the studied subjects (Sedláček, 2007). In the case studies, the following data were collected: personal history, family history, school history, previous mental health problems, current problems, a comprehensive psychiatric examination, diagnosis, prognosis, conclusion and recommendations (Dokoupilová, 2018).

The research ensemble was based on the occasional selection of participants. Their main psychiatric diagnosis and possibilities of cooperation were taken into account. A snowball sampling technique was used (Ferjenčík, 2000). The selection was based on several selection criteria with hospitalized participants at the children's and adolescent ward of the psychiatric clinic being approached. The aim was to get persons aged 13-18 with a psychiatric diagnosis who had a history of risky behavior related to the use of modern means of communication (e.g. excessive use of the internet, self-harm in connection with contact with people in the online community) (Dokoupilová, 2018).

Before starting the research, the organization of the study and data collection was discussed and approved by the Ethics Commission at the hospital. Since the participants had not yet reached the age of 18, it was necessary to obtain informed consent from their legal representatives before starting the research. The adolescents were acquainted with the course of the research and its conditions. They could end their participation at any time or at the beginning. The research took place between autumn 2017 and autumn 2018 (Dokoupilová, 2018). The collected data were first pseudonymized and stored on a secure certified storage with authenticated access. The coding table was stored separately from the other data and was only accessible to the author. At the end of the data collection, their anonymization was carried out and the coding table was irreversibly deleted. In order to protect the identity of the participants, their personal and confidential data and to prevent direct identification, no details of the medical facility are mentioned and the persons are further stated under the designation of Participant 1-6.

Results

In the case studies, passages that relate to the mental state and problems of the monitored persons are highlighted.

Case study 1

This is a 17-year-old boy whose parents divorced 13 years ago. He has been hospitalized for *evasive behavior and truancy* and has long shown signs of *social anxiety*. The boy is an only child who now lives with his mother and stepfather in a harmonious family. He meets his biological father as they get along well. There was no hereditary psychiatric illness found in the mother or her parents. In the father's parents, there is a history of alcoholism and kidney disease.

The participant was born from the mother's first pregnancy; the birth itself and later postpartum reactions were without problems. He was not breastfed. His psychomotor development and speech development corresponded to the norm. He had chickenpox, but was otherwise properly vaccinated. In 2007 he underwent an operation to remove his tonsils and in 2009 an operation on the foot tendons. In 2008 he was hospitalized with bilateral pneumonia. He has also had concussion but was not hospitalized. He has never been unconscious. He has been seeing a

psychologist since September 2018 and is under the care of a psychiatrist for *mood disorders*.

He started kindergarten at the age of 3. The separation from his mother was managed well although he had *difficulties adapting to the new environment*. After some time, he got used to kindergarten and later to elementary school (from 6 years of age) thanks to *psychological support without major problems*. In the last 2 years, *evasive behavior*, *communication disorders and social anxiety* (including, among other things, girls ridiculing him because of his acne) have escalated since the start of secondary school. The participant now goes to a state secondary school specialized in law and has relatively good marks. He enjoys history but is not good at mathematics or physics. A year ago, he went to a technical secondary school but was not interested and subsequently had poor attendance.

His interests include cycling, football and computers. By nature, he is rather quiet and introverted. He regularly meets with a group of pupils from his elementary school. According to his mother, he has not experimented with drugs.

The psychological examination revealed that the boy's *difficulties in adapting* to the first stage at elementary school were *caused by the attitude of his mother's boyfriend* who *verbally attacked him and mocked* him. When his mother later broke up with this man, things settled down. Psychological help was sought again during the second stage of elementary school due to some problematic relationships between the participant and his teachers. After starting secondary school, there was some cases of absenteeism and truancy. The participant suffered from *depression*, was disinterested and quiet. After school, he mainly played *computer games* at home and *communicated with his peers online*. He was too *afraid of being ridiculed and meeting strangers* (including the doctor, visitors and unknown relatives). During the transition from elementary to secondary school, there were *anxiety attacks accompanied by somatic symptoms* (tremors, diarrhea and nausea), culminating in unexcused missed lessons and truancy. After moving from original technical school to the new one, the situation initially calmed down but after a short time the anxiety attacks returned. Following this, he was hospitalized at the psychiatric ward.

From conversations with the boy, I understood that he enjoys school, but does not feel comfortable among many girls. Rather, he feels marginalized and outcast. Although he *started skipping school*, he kept doing his homework, *playing computer games with friends* and *communicating with them online*. Sometimes he got *drunk in the park* and *tried marijuana* which calmed him down. He does not know what he wants to do in the future. He generally gets along with his mother and her second husband unless he forgets to tidy up or do something. He *takes antidepressants* and feels somewhat better after taking them although he still has *problems speaking in public* (presentations, tests). He has never had suicidal thoughts and also denies feeling persecuted. Upon arriving at the ward, he was shy when being spoken to by a doctor, but he described his mood as good and spoke with other patients without problems.

After having his medication adjusted and psychotherapy implemented, the participant trained to go back to school to cope with his problems. After a week, he was given a longer weekend pass to go to school. After his release home, his condition normalized and he was able to talk to his classmates and be in a good mood. *Individual psychotherapy and continued outpatient psychiatric care have been recommended*. Prognostically, the boy's condition seems favourable in the case of mutual cooperation.

Case study 2

This is a 17-year-old boy who has been hospitalized with *impaired consciousness*, *severe psychomotor restlessness* and the *risk of developing malignant neuroleptic syndrome*. The main reason for being admitted *was attempted suicide by overdosing on medication and the intentional cutting of his forearm*. The boy grew up with only his mother and significantly older sisters who already have their own families. He gets along well with them. The boy's father, who died 10 years ago, was *addicted to alcohol*, treated for depression and did not take part in the upbringing of the boy at all. The father's parents are also dead; in their medical history, there is mention of *alcohol abuse* and a stroke.

The participant was born from the mother's third pregnancy. The postpartum adaptation proceeded normally, as did the psychomotor development. The boy was briefly breastfed. He did not suffer from any serious illnesses, injuries or hospitalization and was properly vaccinated. He was psychiatrically *monitored for depression* and started taking *prescribed medications*. He does not smoke but *tried ecstasy and marijuana* 2 years ago; he denies having used other drugs. However, he often purchases *powder caffeine* on the internet, of which *he takes 150 mg daily*; he also *takes medicines such as benzodiazepines*. He has no problems with eating, is somatically healthy and has no allergies.

The boy started kindergarten at the age of 3.5. He managed without any problems, and from the age of 6 went to elementary school with excellent results. After the transition to secondary school, he was not happy with the content of teaching, suffered from *states of depression* and subsequently changed school. After starting the second school, similar problems occurred again although it was all managed well thanks to interventions. Now he is happy in his second year and is achieving good results. During the summer he has summer jobs and makes some money. He lives with his mother in a rented apartment. He has not had a serious relationship with a girl yet. His main interests are computers and surfing the internet. He enjoys programming and IT and would like to study and make a living out of it.

About a year ago, his mother noticed her son was *depressed*. *He spent almost all his time in front of the computer, and practically stopped meeting his friends*. At elementary school, he *had been bullied* for having the "wrong" brands of clothing although after the school authorities and a psychologist intervened, the attacks stopped. Some suicidal behavior occurred at home in the evening. The boy *cut his wrists and overdosed on medication* while his mother was at home. He shouted out to her and she called the emergency services. She was devastated by her son's behavior.

The participant told me that he has been in a *depressed mood* since last year, *sleeps badly*, *avoids his classmates, is anxious and does not want to do anything*. There was a temporary improvement after psychiatric intervention and medication. The suicide attempt took place when *he learned that his classmate had posted intimate photos on a social network of their mutual female friend.* The boy reported this to the Czech police but was then accused by the female friend of ruining her life. She criticized him over the phone for his overly great concern and effort. *Anxiety at school and dissatisfaction with classmates' behavior* also contributed to the suicidal behavior. Now he is glad that the suicide attempt failed and does not remember it much. He recalls that in his childhood his *mother had to deal with a complicated family and economic situation* and did not have enough time for him. He *has tried tobacco and marijuana*, the last time being a year ago. He also *tried ecstasy* once at home and had the feeling of being energized after using it. He *gets drunk* about four times in six months; during the summer holidays there *was one week when he drank daily*, but

he stopped when he realized what he had been doing. *He likes to take medicines from the benzodiazepine group due to his sleeping problems, and then high doses of caffeine to wake up in the morning. He buys both of these over the internet*.

The boy is reasonably somatically mature, slightly tense; he has quite a sophisticated manner and is restrained. In performance tests, he tries to succeed as best as possible although there is some awkwardness in his verbal expression. He is prone to *depressive experience* although his intellectual capacity is above average. The boy is somewhat introverted and has an abundant inner life. In his emotional experience, there is a *lack of satisfaction* including a lack of appropriate support in real life. This may increase his tendency to use addictive substances. During hospitalization, the participant *repeatedly expressed denial with his suicide attempt* and regret that the incident had occurred. He was actively involved in group activities and was evaluated positively at school. *Total abstinence from addictive substances and reducing the time spent at the computer are recommended*. It is necessary to *continue in outpatient psychiatric care and counselling, to use the recommended medication. It is advisable to enter more chores and reward their fulfillment.* The prognosis seems satisfactory.

Case study 3

This is a 14-year-old girl transferred from a children's psychiatric clinic in Prague where she was admitted for a *suspected psychotic disorder*. She was brought by ambulance from the airport accompanied by her mother. On her summer holiday in Greece, she had a *psychological episode with suicidal tendencies*. At the beginning of the year, she *attempted suicide by using a cleaning agent*; she is in the care of a child psychiatrist and takes psychopharmaceuticals. The girl was born to a mother in a common law relationship. Both parents come from Ukraine. The mother has been living in the Czech Republic since 1999; the father returned to the Ukraine. He *overused alcohol and built up debts*. He is not in contact with his daughter and the family has no further information about him. The mother is healthy, finished secondary school and is able to take care of the family well. The mother's parents have both died; her father *drank too much alcohol and died of complications from it*. The girl has no siblings. The family has *no hereditary psychiatric illnesses*.

The girl was born of her mother's third pregnancy; the previous ones were terminated at the mother's request. While the birth was natural, the girl was weak and had to spend one day in an incubator. She had *serious neonatal jaundice*. She was breastfed for 2 years. Psychomotor development was in accordance with the norm, as was speech development; she attended speech therapy for a few months to correct the mispronunciation of certain sounds. She had chickenpox, otherwise she was properly vaccinated and there have been no surgeries or serious injuries. She was *hospitalized once in the pediatric ward after drinking up a small amount of cleaner in a suicidal attempt*; there were no internal burns although she has been monitored psychiatrically and psychologically. She has no allergies and has had her period since 12, but irregularly probably due to psychopharmaceuticals.

She started kindergarten at the age of 3.5 and enjoyed it. She started elementary school at the age of 6.5 and is now in ninth grade. In the second grade, her mother sought *counselling services* as her daughter had problems in understanding the curriculum. A year ago her *marks became dramatically worse*, and she sees herself as incapable. She enjoys chemistry, art and volleyball but has difficulty in mathematics and physics. She *behaves naively and suffers from low self-esteem*. However, she is sociable and has many friends. Her mother knows that she has *tried marijuana* with her friends; she has come home *drunk several* times and her mother also *found a pack of cigarettes* on her. While she has a best friend, she tends to *be in contact with the troublemakers* which her mother has forbidden. The girl is an only child. She gets along well with her mother and

they live in their own apartment where she has her own room and a pet.

Two years ago, the *girl got in with a group which drank alcohol, smoked tobacco and marijuana*. *Self-harm and the recording of injuries on their mobile phones was also popular*, followed by posting this on social networks in a virtual group. The participant did not get along with the gang and was physically attacked. This resulted in *sadness and mood swings, and she avoided people*. *She skipped school, ate irregularly and must also have been bullied*. She *sent intimate photos of herself to a male friend who resent the photos* and then used them to blackmail her. At home she *repeatedly stole small sums of money*, probably to buy cigarettes. According to the mother, her *daughter often lies* and without her mum's permission, she follows communication on social networks. *The girl ingested a cleaning agent in a suicidal attempt, was hospitalized and is in the care of a psychiatrist*. She is taking medication, and her condition stabilized.

On a summer holiday in Greece a year ago, the *girl's condition deteriorated again*. She *was restless and anxious and kept falling asleep after taking her medication*. The next *day the symptoms reappeared*. She wanted to leave the hotel which her mother did not allow. She felt *anxious in the confined hotel room and wanted to jump off the balcony; she was crying, screaming and defending herself*. She and her mum were *hospitalized for a short time at a psychiatric ward* in Greece. They were then flown to the Czech Republic. *Anxiety symptoms, mental and motor restlessness* occurred during the flight.

The participant was *disoriented* at the time of admission. She was only *able to answer very simple questions* and *lacked communication*. *Association gaps and paranoid thoughts* were present in her thinking. *Attention deficit disorder, passivity, and anxieties* were found. She did not engage in the activities on the ward. She was not aggressive, nor did she talk about suicide. The girl looks attractive and sporty. She described what bothered her on vacation and how she felt. She had the feeling that someone was laughing at her and that people in the surroundings were gossiping about her. She *often hears "voices"* although it is mostly some whispering or noise, rarely a clear language. After elementary school, she would like to go to a secondary school specialized in art. She is *afraid of strangers* who would perhaps not like her after getting to know her better. She is *angry at herself* that she is insincere and sometimes lies. She wants to be smarter and better in the eyes of her friends. She has already had a boyfriend but only on a platonic level. She *attempted suicide* as she thought she was alone in the world and that no one liked her. She *tried marijuana and ecstasy* a year ago. She *was in with a bad gang*, longing for acceptance, afraid she wouldn't fit in with her successful classmates. She would like to find her father to see if he is alive and how he is doing. *Psychotherapeutic sessions help her enormously* and she has no trouble confiding.

The participant adapted well to the ward regime, was cheerful, felt herself and fitted into the group. Suicidal thoughts no longer appeared. *She was recommended to avoid drugs, to continue antipsychotic medication and individual psychotherapy*. *Restricting social networking was also appropriate.*

A few days later however, *she had to be re-hospitalized* as she had *similar symptoms* to those in Greece, probably *after taking marijuana*. The participant was *silent, hearing "voices" again, fearful, anxious, confused and disoriented*. After a few days, thanks to *medication and psychotherapy*, she normalized and was then *transferred to a children's psychiatric hospital*.

Case study 4

The participant is a 15-year-old girl sent to hospital by her General Practitioner and child psychiatrist with a diagnosis of *anorexia nervosa* which has lasted at least six months. She spent *2 weeks in ICU* where she was released at her mum's request but against the advice of doctors. The

girl's mother is healthy and high school graduate. She claims disability allowance and takes care of her mother who has hypertension. The mother's father suffered from *Parkinson's disease* and died 11 years ago. The participant's own father died of *total body failure due to alcohol abuse* 7 years ago. He had completed secondary school education. His father *died of alcohol abuse* while his mother had a stroke. The girl has a healthy brother one year younger as well as two half-brothers from the father's side.

The girl was born from the mother's first physiological pregnancy which was a Caesarean section. The postpartum adaptation period proceeded without any problems. She did not have neonatal jaundice and was breastfed for 3 months. Both psychomotor development and speech development were in accordance with the norm. She had chickenpox and was vaccinated properly. As a child she underwent left ear surgery and in 2014 suffered concussion after an accident where she ran out in front of a car. Her interests include reading books, sports (biking, cross-country skiing and ball games), her mobile phone and social networking. According to her mother, she is *mentally unstable* and has *problems integrating into a team*. Her best friend is her cousin. The mother denies that her daughter has experimented with drugs and alcohol. She had her first period 2 years ago although her menstruation stopped due to her low body weight about 6 months ago.

She started kindergarten at the age of 3. At first it was difficult for her, but after a month she settled in. She started elementary school at the age of 6. Now she is in her first year of secondary nursing school and has excellent results. She enjoys all the subjects except for physics. Originally, she wanted to study at grammar school but was not accepted. Since then, there have been *problems with food intake*. The girl lives in a house with her mother. Her parents were not married. Their cohabitation lasted 10 years and there were frequent conflicts due to the *father's alcohol abuse*.

In childhood, the girl was examined for *concentration problems* although ADHD was not confirmed. A year ago, she *saw a psychologist* several times because of *eating disorders*. She was also at a *child psychiatrist* from where she was *immediately sent to hospital*. About two years ago, *she started to feel fat*; her classmates had told her to lose weight. After failing to get into the grammar school, she *began to lose weight intensively* and was also selected for a competition by a model agency. She would wear loose clothing. Though she had enough food, she had inhibitions about consuming it. Even after being *hospitalized in ICU*, the situation did not improve. The girl's behavior changed and she became *more apathetic* and started doing more sports. She did not talk to the girls in her class until the end of elementary school although she does fit in better at grammar school. *She stopped obsessing about food and weighing herself.* While she eats a whole portion of food in front of her mother, the next day she refuses to eat, weeps and feels guilty. Her mother did not notice her taking laxatives or vomiting, only the more frequent occurrence of constipation. *She eats little and occasionally spits out the food in the garbage. She spends a lot of time on social networks*. Her mum once found her taking pictures of food and uploading them to her profile.

The girl has a tall and athletic figure. Initially, she did not share much and was reserved. She kept bargaining about being allowed to have her treatment at home. At first, she only wanted a slight weight adjustment so she watched her quantity of sugar, portion size and did more sports. *The drastic weight loss occurred when she was not accepted to the grammar school and was selected for a modelling competition*. Later she was terrified of her great weight loss and tried to put the weight back on. She claims family relationships are good. The participant is *slightly tense*, *sad* and has quite *simple verbal expression*. She is constantly repeating her wish to leave the hospital. In the future, she would like to study humanities at university. During the day, she fasts at school; in the evening, she overeats. Her *eating is unbalanced*: she chooses food according to taste rather

than nutritional benefit.

In the psychiatric ward, the girl *adapted with difficulty* and was very negative about hospitalization. She was *tearful and indignant that her cell phone would be taken away*. There was a *dietary regime* , consultations with a nutritionist, individual, group and family *psychotherapy* and *ergo therapy* provided. The girl was prematurely handed into outpatient care after her mother signed the release from the hospital. A regular eating and drinking regime, weight control, infection prevention and reduction in physical activity are recommended. Given that the participant has *difficulty in adhering to the rules*, her *prognosis for the future seems problematic*.

Case study 5

The participant is a 13-year-old boy with a *perinatal problems* and *hereditary psychiatric illness*. He has been in foster care since the age of 3.5 and in psychiatric care since 2014 with a diagnosis of *attention deficit hyperactivity disorder* (ADHD). He was *hospitalized* at the children's psychiatric ward *for suicidal tendencies, affective raptures and verbal aggression* towards his foster parents and other *behavioral disorders*. Since 2008, the boy has been in foster care with relatives of his biological mother (i.e. her uncle and aunt) who have two adult sons of their own and are now retired. The foster-mother' sister (i.e. mother of the boy's mother, or his maternal grand-mother) died of cancer. The biological mother's father is a soldier. He is alive but rarely meets with his family. The boy's mother has basic education and has been in prison. During pregnancy, she *used methamphetamine intravenously* but has been abstinent for two years. She rarely contacts her son. The boy's biological father is healthy, graduated from apprentice school and has occasional jobs. He takes his son once a month for the weekend. The boy's paternal grandmother is alive and has a good relationship with the boy. She understands him the best. She was treated for anxiety problems in the past. The boy has an adult half- sister on his father's side but does not see her.

The participant lived with his mother up to the age of 3 and remembers *violent domestic arguments* . When he was about one years old, he fell off a changing table and suffered a gash to his head and concussion. He learned from his grandmother that his mother *would bring him to be babysat* in a state of filth, hunger and sometimes bruised. In 2008, he *was taken out of his mother's care*. She stopped seeing him and did not resume contact until 2015 when she started taking him home at the weekends. She was living with her boyfriend in a village but as their social situation was so bleak, he stopped visiting his mother after several visits. For two years, there was no contact with his mother. The boy used to have a good relationship with the foster-mother but it is getting worse as he is required to do certain chores which annoys him. The relationship with the husband has been tense due to discipline and obedience problems.

The participant was born from his mother's second pregnancy, preceded by one abortion. *The mother used intravenous methamphetamine during pregnancy*. The birth was physiologically normal and full term. The postpartum adaptation was good but the baby was not breastfed. The psychomotor development and speech development corresponded to the norm; the boy only briefly attended speech therapy (difficulty with the sound "Ř" sound, otherwise known as rotacismus bohemicus). He is left-handed and has had chickenpox; otherwise he has been properly vaccinated. He has undergone several minor surgical procedures of the oral cavity (tongue, teeth) under general anesthesia (he is very afraid of pain) and has twice had a fracture in his forearm repositioned. He does not suffer from allergies. His interests include playing the flute, reading, parkour, baseball, computers and social networking. He is a kind, helpful, observant, curious and clever boy with *occasional uncontrolled outbursts of fury and rage*. He is determined, aggressive and competitive but tries to play "fair". He would like to suppress his negative emotions but does not know how. He often talks with friends who he has met when doing sports. He does not take

drugs.

He started kindergarten at the age of 3.5 and quickly got used to it. He went to elementary school from the age of 6 with very good results. These started to deteriorate at the end of 2017. He was *reprimanded by the principal* for *photographing a classmate during a lesson using a mobile phone and posting the photos on a social network*. He is very fond of physical education but does not care for other subjects although he could be good at them. At school he has an individual educational plan and a personal assistant. The boy lives in an apartment with his foster parents and has his own room. The foster parents' marriage is harmonious and the family climate is good and non-conflicting.

Since 2014 he has been *diagnosed with ADHD and visits a child psychiatrist*. Since 2015 he has also been *under the care of a psychologist and a special education counsellor* (i.e. expert focused on behavior disorders). He has had two two-month stays at an *Educational Care Centre* (for often *being truant, refusing to participate in class, he felt like an outcast, marginalized*); he appreciates the helpful approach of the therapists. In 2016 he was neurologically examined for headaches, without any serious findings. He was brought to the crisis centre twice due to *"affective rupture" at home*; he had *threatened his foster parents with using violence*, *refused to take his prescribed drugs and threatened suicide (jumping from a high place, jumping in front of a car, overdosing on medication, and slashing the veins on his forearm). Due to the lack of interest from his mother, there are problems at school and pressure to perform duties at home.*

The participant has come to hospital with *serious disciplinary problems at school*, *repeated thoughts about suicide and fits of anger*. At a time when he does not have to do much (e.g. during the holidays), he feels good, is calm and balanced. *Fury arises at home or at school when he is required to do something* such as being disciplined and responsible or accomplishing a task. The boy looks neat; in future he would like to become a photographer or a hairdresser. He says that he is not popular with his classmates or teachers at school but that he is to blame for it as well as for the occasional disagreements with his foster parents at home. He would like to be "normal" and manage his behavior. *He feels that if he killed himself, everyone around him would be relieved. He thinks his life is useless and that he is a burden to others*. He has a good relationship with his assistant at school but worries that he will not be accepted to the secondary school of his choice due to his poor results. *He does not sleep well and has nightmares.* Both foster parents are very responsible, organized, and cooperative. The boy is slim, athletic and tall but does *not maintain eye contact for long*. During the examination he is *restless, shuffling in his seat and making gestures. He speaks quickly, without hesitation, impulsively, with occasional anger or sarcasm.* He downplays his suicidal thoughts. He tries to perform well but has no perseverance to fulfill tasks to the end. *His attention fluctuates and he is easily distracted*. *His personality appears deprived with narcissistic features. The boy's high aspirations are unrealistic* as he is *repeatedly exposed to failure in achieving his goals and experiences frequent frustration and dissatisfaction*. His *self-image is negative*; in his interpersonal relationships he is repeatedly confronted with the topic of rejection. *He tries to hold back his negative emotions but with a stronger impulse, his defensive mechanisms fail and he ventilates his emotions externally. This behavior appears defiant and negativistic and can also take the form of suicidal thoughts. He lacks positive feedback and motivation to correct his behavior.*

It is recommended to continue *psychotherapeutic treatment and follow-up in the care of a children's psychiatric clinic*. In the case of interest, long-term psychotherapeutic support is also being offered to the foster parents. The boy has participated in psychotherapeutic groups, ergo therapy, drama therapy and music therapy. His medication has been modified, but *education outside the family* (foster and biological family) *is more important*. *Cooperation with the*

Educational Care Centre seems to be optimal. The boy's *prognosis is uncertain* due to his hereditary psychiatric illness. However, he is able to lead a full life thanks to his high intellectual abilities and appropriate educational help.

Case study 6

A 16-year-old girl was admitted to the *children's psychiatric ward after a suicide attempt*. She *swallowed 12 paracetamol tablets, allegedly without the intention of killing herself*; *she just wanted to forget and not think about anything*. As a reason for this, she speaks about *unbalanced relationships*. For the last two years, she has been *under the care of a psychiatrist* who diagnosed her *with post-traumatic stress disorder with anxious depressive and somatoform features* (e.g. a *history of long-term school bullying, emotional deprivation in the family environment and incest stigma in the family*). *The girl comes from a socially disadvantaged environment*. Since the beginning of 2018, there have been symptoms of *anorexia nervosa, decreased self-esteem, repeated self-harm and depressed mood.*

The mother of the girl is healthy, graduated from secondary school and is currently on maternity leave. Her parents have already died; her mother died of breast cancer and her father of a heart attack. The girl's own father is well-educated. His mother died of breast cancer; his father is being treated for heart ailments and asthma. The girl has four siblings – a brother and a sister, a half-sister on her mother's side and a sister born from the father's incest with his daughter. *The brother was hospitalized at the psychiatry ward in his childhood because of his violence and now receives a disability allowance due to psychiatric problems*. *In the extended family, there have been repeated suicides (jumping in front of a train, hanging)*. *The daughter from the incest is undergoing care for ADHD and mild mental retardation.*

The participant comes from her mother's third pregnancy; the birth was physiological, full term and the postpartum adaptation was good. She had mild neonatal jaundice and was breastfed for 4 months. Psychomotor development progressed in accordance with the norm. The development of speech was delayed; for a year she attended speech therapy because of problems with some sounds. She had chickenpox and was vaccinated properly. She has not undergone any surgery but has had concussion. She was *hospitalized at a pediatrics ward because of digestive problems and recurrent pre-collapse conditions due to a restrictive diet*. According to her mother, she is hypersensitive and indecisive. She denies being abused. She has had her period since she was 14, occasionally irregularly. She is *registered at neurology due to headaches* and at the internal medicine ward due to chronic inflammation of the stomach.

The participant now lives in an apartment with her mother and sisters; her parents divorced in 2011 because of her father's incest and gambling. The mother found another boyfriend who the girl does not like. Her mother inherited the family house although they unfortunately had to move out and are now renting. The participant lived with her aunt (her father's sister) for several months before her mother suddenly took her to her place without giving any reason. The girl became closed into herself and communicates with her mother to a limited extent.

The girl started kindergarten at the age of 3 without difficulty. She started elementary school at 6 from which time *she experienced long-term unresolved bullying in connection with being overweight and having incest in her family*. *She was beaten and insulted and had her things destroyed. At secondary school, there was mainly psychological bullying with nobody standing up for her*. She felt ignored and undervalued. From the 7th grade, there were *neurotic somatic problems, morning anxiety and truancy from school*. A year ago, she started a secondary school specialized in natural science but did not manage the separation of staying at a boarding school

and *suffered from anxiety*. She transferred to a vocational school where she is doing very well. She enjoys computer science, scouting and Asian culture; she has a blog where she puts her sci-fi stories and is an active member of an internet group of people interested in Asia. She has a good friend with whom she writes online; in real life she rarely sees her but she has other friends in scouts. *She does not consider her childhood happy*.

Thanks to the crisis centre, she was hospitalized after her suicide attempt when she overdosed on paracetamol. Her intention was self-harm, not suicide. It was due to her *unbalanced family relationships and disagreements with a female friend*. During the examination, the girl cooperated minimally, was *negativistic* and responded briefly. *She mentioned having had* a *long-term bad mood, anxiety and self-harming behavior by cutting her left forearm with scissors. She wonders if her life has any sense at all. She is in contact with people online who are considering or have already attempted suicide which is where she found inspiration for her actions.* She describes her *ambivalence to life* and does not see a future. She does not know if it is good that she did not die; she is *not critical of her behavior*. *She sleeps badly, is haunted by nightmares, suffers from appetite loss and is losing weight. She is sad and cries about not having her mobile phone.* Without the phone she cannot contact her female friend and is afraid she may do something to herself; something she had done earlier when there was a gap in their communication.

According to the mother, the daughter has *difficulties coping with the father's incest*; she is *hypersensitive and neurotic*, especially under stress. She hates her mother's boyfriend. The daughter has a great sense of justice and would often run away from home to her aunt's place. During the school year, she stayed at boarding school although she had *difficulty attending school*, often skipping school because of stomach pain. *She spends a lot of time with her online friends and on social networks. She is involved in an online community of people who support her in harming herself, especially one female friend of hers*. For the last two years, she and her mother have been attending psychotherapy sessions.

The girl reported that she *has been feeling bad for several years; recently she has not been eating much as she does not feel hungry. She suffers from stomachaches and vomits, especially under stress. She does not like talking to strangers as she is afraid of them. She has no vision of her future* ; she does not want to grow up and take responsibility. She finished formal education, and will go to vocational school. Now she has a few close friends although a large number of them are online friends. In hindsight, she sees her suicide attempt as stupid and a self-failure.

The participant was then *re-hospitalized twice upon the recommendation of a child psychiatrist*. She has recently changed schools and stopped hurting herself. She experienced a crisis, felt fat and *drastically reduced her food intake*. *She drastically lost weight but feels overweight. She does sports intensely and secretly purges the food she consumes*. At school she used to be mocked for her figure. Because of her pre-collapse state, she was admitted to the pediatrics ward, then to the psychiatric ward where she wanted to be. *She sees herself as disgusting and useless. Her suicidal thoughts returned temporarily and she broke up with her boyfriend. Psychotherapeutic interviews have been helping her*. She expects her condition to improve and stop being anxious about food. During hospitalization, her *medication was adjusted, dietary measures were taken and she underwent intensive individual and group psychotherapy*, as well as ergo and drama therapy. The condition of the girl gradually improved so she was released and allowed to go home.

At the time of the *second re-hospitalization*, the girl did not go to school for 3 weeks; she was *very upset, had conflicts with her classmates, was sick and dizzy and vomited at night*. *She anxiously monitors her food intake, chooses food carefully, takes pictures of it and publishes it on a social network*. In her opinion, the nausea is attributed to stomach inflammation and the quarrels with

classmates are because of her greater study activity; she does not agree with the hospitalization. She has left the internet community and has practically *no interest in anything*. *She does not like herself or how she looks*. *In stressful situations, she repeatedly cuts herself on the legs, choosing those places where she can easily hide the cuts*. Her mother left her boyfriend, is upset and argues with her daughter. The girl does not want to lose weight anymore but to eat healthily; she compares herself with her classmates. The medication remained unchanged but regular *intensive individual and group psychotherapy* was prescribed. It is *recommended that she* have *a regular, varied and balanced diet and appropriate drinking regime*. The condition of the girl is good at the time of release; she is calm and without suicidal thoughts.

Evaluation of the research questions

Table 1 provides the meaning of the symbols used in the tables summarizing the evaluation of the research questions.

Table 1 *The caption for the symbols used in the tables*

Symbol	Meaning
P1 – P6	designation of individual participants
-	the characteristic is not expressed
- / +	the characteristic is on the border
+	the characteristic is expressed weakly
++	the characteristic is expressed with medium strength
+++	the characteristic is expressed strongly

The first research question mapped the participants' access to the internet and social networks (Table 2). The participants used the internet most often to communicate with peers and for various activities on social networks such as engaging in interest groups, publishing your personal profile, sharing photos and videos and chatting. Their behavior was compulsive in some cases; they spent a lot of time online and used modern technologies too much, occasionally showing signs of dependence on those technologies (e.g., increasing online time, procrastination, bad moods when abstaining, escaping into cyberspace, unwillingness to solve everyday problems, unsuccessful efforts to control oneself).

Table 2 *Participants' access to the internet and social network use*

Online activity	P 1	P 2	P 3	P 4	P 5	P 6
Gaming	+	-/+	-	-	++	-
Communication	++	+++	+++	+++	++	+++
Social networking	++	++	+++	+++	+++	+++
Risk of dependence	-/+	+	+	++	-	+

The second research question looked at what behavioral changes occur in the adolescents, monitored in their online activities (Table 3). In most cases, there was a strong connection with the occurrence of suicidal thoughts and in half the cases, attempted suicides. While none of the participants felt shy communicating in cyberspace, most of them had serious communication problems in the real world such as distrust in confiding and unwillingness to reveal their views. Almost all the participants had a large number of friends in various social networks with whom they shared very sensitive information (e.g., texts, photos, videos). They all had some real friends but to a lesser extent than those in the virtual world; they were usually peers or best friends. Half of the respondents reported using alcohol and tobacco as well as experimenting with illegal drugs (especially cannabis and ecstasy) about which they had gained information from online communication.

Table 3 *On-line activities of the adolescent participants and observed changes in behavior*

Participant behaviour	P 1	P 2	P 3	P 4	P 5	P 6
Suicidal thoughts	-	++	+++	-	+++	+++
Suicide attempt	-	+++	+++	-	-	+++
Shyness in online communication	-	-	-	-	-	-
Shyness in communication in real life	+++	+++	++	-/+	-	++
Existence of virtual friends	++	++	+++	+++	++	+++
Existence of real friends	+	+	+++	+	++	+
Alcohol and tobacco use	+	+	++	-	-	-
Use of illegal drugs	+	++	+	-	-	-

The third research question was focused on factors that are related to the risk behavior of participants in the online environment (Table 4). In the case of all participants, there was a very strong role played by the family environment as well as the school and class environment. More than half the adolescents did not really enjoy the school they had chosen. The current health problems of the sample and the hereditary mental illness should be considered as very strong negative factors. Adaptation disorders and difficulties in face-to-face communication, and in some cases even a peer group with dangerous instructional actions, also played a strong negative role. None of the participants suffered from boredom.

Table 4 *Possible factors that are related to the risk behavior of adolescent participants in the online environment*

Possible factors associated with risky behavior	P 1	P 2	P 3	P 4	P 5	P 6
Family environment	+	+	-/+	+	++	+++
School and class environment	+++	+++	+++	++	+++	+++
Attractiveness of the school	+++	-	-	+++	+	+
Peer group with negative impact	-	-	+++	-	-	+++
Present health problems	++	+++	++	+++	+++	+++
Hereditary mental illness	-/+	+++	+	++	+++	+++
Adaptive disorders	++	-/+	-	-/+	+	+++
Problems with real communication	++	++	-/+	-/+	-	++
Boredom	-	-	-	-	-	-

The fourth research question examined what factors leading to adjusting participants` risky behavior in cyberspace should be reinforced (Table 5). In some cases, harmonization in the family environment helps (if possible), and interventions in the classroom and school (positive motivation, appreciation, daytime regime, lifestyle, and support for adaptation, addressing bullying and reducing potentially addictive behaviour) certainly help. Appropriate emotional relationships are also important positive aspects. Medication, changes of medication (if necessary) and appropriate forms of individual and group psychotherapy significantly contribute to adjusting the state of the participants.

Table 5 *Characteristics possible to adjust in the psychotherapeutic treatment of adolescent participants in relation to their risky online behaviour*

Possible characteristic to be adjusted	P 1	P 2	P 3	P 4	P 5	P 6
Family environment	-/+	++	+	++	+	+++
School and class environment	+	++	+++	+	+++	+++
Intimate relationships of the participant	+++	+	+	+	+	++
Adjustment of medication/mode	+	+	+++	+++	+++	+
Individual psychotherapy	++	+++	+++	+++	+++	+++
Group psychotherapy	+++	+	+	+++	+++	+++

Discussion, research limits and educational recommendations

Compulsive behavior in the case of online addiction is similar to that of addiction to drugs and substances. In the brain of those affected, there are neural connections being created that are resistant to extinction and thus result in potentially risky behavior. Social networks as well as other online activities are attractive to users because they bring challenges, fun, surprise and, above all, the satisfaction of needs. Activities leading towards the use of modern means of communication are rewarded and consequently the need to regain this pleasant feeling increases. Risky behaviour diminishes as long as adolescents can trust other people and establish safe relationships in the real world rather than just the virtual one (de Abreu, 2017; Kimáková, 2018a; Kimáková, 2018b).

The findings correspond to the results of a study by Ko et al. (2014) who explored the association between depression, hostility, social anxiety and internet addiction in a research sample of nearly 2,300 Thai adolescents (average age 12–13 years). Based on a scale designed to measure internet addiction, the respondents were divided into two groups: those addicted to the internet and those who were not. In both groups, the study was repeated one year apart. In the internet addicts, increased levels of depression and hostility were observed while there was no increase in the observed traits in the individuals without this addiction. Internet addiction leads to procrastination, truancy, social withdrawal from the real world and limiting encounters with parents, reflected in increasing depression and hostility. A vicious circle emerges which once again is increased by the inclination towards the internet and addiction to online environments. Protective factors, especially social support and suitable ways of spending leisure time are reduced or eliminated. Adolescents seek support, closeness and understanding in social networking environments; they want to experience success and increase their self-esteem in online environments and social networks even though this fails. Online activities do not help to kick-start the recovery process that the user expects. Girls are exposed to greater risk and it has also been shown that reducing excessive internet use leads to reduced depression and behavioral change. Respondents are more inclined to family, peers, and teachers as long as they receive greater appreciation and acceptance from

them. When reducing the time spent online in the sample, the level of hostility also dropped. This is related to lower exposure to violence while browsing the web or gaming. The level of social anxiety worsened in the online environment.

Ko et al. (2008) also explored the relationship between internet addiction and problematic use of alcohol in adolescents. The study looked at 2114 secondary school pupils (1204 male and 910 female) and found that internet addiction is associated with problematic use of alcohol. Internet addiction falls into the area of problematic behavior and its prevention and solutions can be easier to identify if it is associated with other types of problematic behavior.

Normand et al. (2022) conducted a meta-analysis of 10 studies that dealt with the prevalence of problem use of the internet in individuals with autism spectrum disorders. Eight studies showed that individuals with autism spectrum disorder showed more symptoms of problematic internet use. In particular, the length of time spent on-line, the age of first connecting, the occurrence of depression, inattention, hyperactivity, impulsivity, opposition behavior and escape.

Sugaya et al. (2019) carried out an overview of studies looking at internet use among children and adolescents. It has been confirmed that adolescents are susceptible to problematic use of online activities due to the insufficient development of cognitive control related to age. It was found that problem use of the internet had a negative impact on sleep and schoolwork. Family relationships were also found to be important factors. If there is abnormal brain function in children, studies using brain scanning show that regular playing online games from an early age can worsen the disorder. Therefore, preventive care and timely intervention are increasingly important.

In another study, Jang et al. (2008) focused on identifying factors associated with internet addiction and psychological symptoms in Korean adolescents. They obtained data from 851 pupils at 4 secondary schools. Symptoms of short-term internet addiction have been reported in a third of the sample, almost 5% then suffered from long-term internet addiction. The risk factors of addiction were male sex, chatting and longer time spent on-line daily. Symptoms of obsessive-compulsive disorders and depression were associated with transient addictions.

Sahu et al. (2019) have pointed out that most research has been focused on internet addiction while dependence on mobile phones in children and adolescents has been paid less attention. The authors attempted a comprehensive view of nomophobia by carrying out a meta-analysis of 12 published researches. While the prevalence of problematic use of mobile phones in the general population is 6.3%, it can reach up to 16% among adolescents. Excessive use of mobile phones has been associated with a sense of insecurity, lack of sleep, disturbed family relationships and impaired school results. There are also a number of psychological problems such as addictive behavior, compulsive shopping, pathological gambling, depressive states, feelings of tension and anxiety. Adolescents who were often bored in their free time had problems in behavior and emotions, and very often hyperactivity. Although the use of mobile phones helps to maintain social relationships, dependence on mobile phones among children and adolescents requires urgent attention. Intervention studies are required to solve these emerging issues.

Winds et al. (2022) examined with problem use of the internet among adolescent psychiatric patients. In the monitored sample of 104 adolescents (35 boys, 69 girls), 62% showed a milder and 34% stronger problem use of the internet. The boys were intensively devoted to online games while the girls spent their time communicating on social networks. In girls with a strong form of problem use of the internet there were more behavior problems, lower perseverance, self-confidence and cooperativeness than in girls with a milder form. In boys with a strong form of problem use of the internet, a higher score in internalization of problems and lower perception of

risk than in boys with a milder form was found. Thus, there are gender specific differences in problem use of the internet as well as in the field of symptoms, temperament and character traits. As such, a gender-specific approach is needed in the prevention and treatment of this phenomenon.

Şalvarli and Griffiths (2022) performed a meta-analysis focused on problem behavior such as the internet and internet gambling. They evaluated 33 empirical studies which included a total of 18128 participants. The results showed that 32 found a positive link between impulsiveness, a change in brain neurobiology and problem behavior of internet gambling.

Kuss and Griffiths (2012) analyzed 30 studies focused on youth in which some adolescents occur on online gaming. Excessive online gaming can lead to symptoms commonly found in substance addiction. As games are particularly attractive to children and adolescents, these groups may be more at risk than other population groups for developing an addiction to gaming. The risk of dependence is related to the amount of time adolescents dedicated to the preparation, organization and own game play. Problem online gaming can be conceptualized as a dependence on behavior rather than as an impulse control disorder.

Bickham (2021) has summarized the results of a prevalence study concerning internet addiction in adolescents. Higher levels of impulsiveness, aggressiveness and neuroticism potentially predetermine adolescents to being addicted to the internet. Cognitive behavioral therapy and medication commonly used to treat mental disorders, including depression and ADHD, are significant to deal with internet addiction. The conceptualization of this disorder is being discussed, including a wider range of media use behavior outside online gaming. Further research should focus on the clinical effectiveness of therapeutic methods and a longitudinal study of the etiology of the disorder.

The limits of the research are primarily the small sample of participants and its narrow selection. Furthermore, there is a blurred definition of problem use of the internet, social media, mobile phones and dependence on these technologies. Although there is a certain link between changes in behavior in patients with psychological problems who used modern digital technology, it is not straightforward when talking about the causes and consequences. In order to identify these relationships further, a study is needed to be carried out on a larger sample, set up regression models and explore them.

It is necessary to take care in interpreting the results and generalizing as this was a small set of intentionally selected participants. A deeper understanding of the issue would require a larger study which may be based on the research presented here.

It was not always easy to make contact with the participants and talk about their problems; it was necessary to have plenty of time and a feeling of mutual confidence. There is also no clear cause of the relationship between the psychiatric symptoms of the participants and their activity in cyberspace although the risks to which adolescents with psychiatric diagnoses are exposed online can be understood better. In addition to the therapist’s work, it is necessary to emphasize the role of the counselling system and school counselling centers in providing appropriate types of interventions and re-socialization.

The virtual world is far less limited compared to reality with one able to be almost anyone in it and do almost anything that can be imagined. Although there is an age limit for "inappropriate" content (violence, eroticism), there are still many places with controversial stimuli (e.g. various risky or dangerous challenges) commonly and easily followed by adolescents in cyberspace. They are illusions that the presented virtual world is real. Social networks can be useful in the finding and

sharing of study materials, instructions for solving various professional issues or everyday problems. On the other hand, it is also a potentially risky environment so access to it should be regulated in some way. The content of the internet as a planetary information highway information consists of its users, which is its strength, vulnerability and opportunity.

It is desirable to plan preventive action in such a way that it increases its frequency during the school year and is appropriately integrated into the educational system. A higher proportion of interactive elements are welcome, as well as a lower proportion of monologue, so that students have space to ask questions, have discussions, are more involved in programs and are able to express their own opinions. Lectures should be given on current topics, presented by a professional in the field or teacher, who is close to the topic and is well-informed about it.

Motivation for a healthy lifestyle should come not only from school, but also from the family members and peers. Pleasant experiences can be obtained in other ways than through activities in cyberspace. It is impossible to completely abstract from the usage of modern digital technologies; it would not be realistic or expedient. Children come across them at home, during education and free time, then later as adults at work. It is more effective to know the advantages and disadvantages of these means of communication, to set clear boundaries for their use, to know their possible risks and methods of protection. Modern means of information and communication should serve as support, but they should always be under the control of the user, not the other way around.

It is necessary to cultivate in a child media literacy and an effective and critical approach to information from an early age. The digital world has become a great attraction, the boundaries between it and reality gradually blurring. Quickly found answers to those questions reflect the current fast pace times of current information postmodern society; however, easy and short-sighted solutions to problems may not be the best. Uncritical trust in everything that is published online and the sharing of a significant part of one's life can lead reckless, uneducated and mentally unstable users into a trap. A solid family background, trust, time reserved for children, communication with them, advice and help, the art of creating and maintaining quality interpersonal relationships, effectively solving conflict situations and working with information appropriately are the basic prerequisites for ensuring that the new electronic media do not become the unruly master, but rather remain a helpful and loyal servant.

Conclusions

These results show that the participants being online might be very risky for their behavior. Indeed, there are already signs of internet dependence (e.g., excessive preference of online activities, withdrawal symptoms, conflicting behavior) in some of them.

It is apparent from the presented case reports on the participants that there are a number of serious incidents including incest. All the adolescents come from incomplete families, have witnessed domestic violence, quarrels, breakups and the changing of their parent’s partners. They lacked support, positive motivation, trust, warmth and enough time from their loved ones, as well as the opportunity to experience success and be rewarded for it. As a result, they were all emotionally deprived in some way. The reason for the frequent escape into cyberspace and their inability to return from it is not only the need for social contact and communication with peers in adolescence, but also the additional search for certainty and support that the participants lacked during childhood.

The pleasant feelings experienced by the adolescents in the virtual world were not only associated with specific online activities, but also with the possibility of experiencing closeness with others

(albeit remotely) and sharing their experiences, thoughts and opinions with them. The overuse of the internet and relationships established within it can negatively affect the mental health of the participants and worsen the already present symptoms of mental illness.

The presented study has showed the occurrence or worsening of the mental difficulties in participants who often moved in cyberspace. The degree of mutual connection and the relationship of these phenomena will require more detailed examination and further studies. The support that adolescents found in the internet environment did not meet the requirements of a stable and trusted person. Along with the absence of solid and safe social ties in the real environment, this probably played a role in their risky behavior and subsequent hospitalization.

The use of modern information and communication technologies is inherently connected with today's advanced society. Adolescents perceive them as part of their daily lives and are able to orientate themselves well in cyberspace. The new means of communication bring them a certain saturation of their needs, stress relief, entertainment and education. Those with a psychiatric diagnosis can resort to them as a temporary relief from their difficulties. In the long run however, this is a risk because they lack good foundations, relationships and support in the real world. One possible solution is psychotherapeutic and counselling work that deals with their internet use, family, school and personality issues.

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Because of the sensitive nature of the data collected for this study, requests to access the source data from qualified researchers trained in human subject may be sent to the author.

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