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**Digital Hoarding, Problematic Internet Use and Their
Links with Hoarding and Obsessive-Compulsive Disorder:
An Analysis of Recent Literature**

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Section 1

1.1 Definition of digital hoarding and its difference with hoarding

Since the start of the internet age, storage of data has been an important factor for online users. Nowadays, free online storage spaces like Dropbox or Google Drive are becoming more and more frequently used. Some may have a form of subscription if people need more than a certain amount of storage space, but the cost is often still low and if someone did not want to pay, they could still create another account and store their data there.

One issue which may not appear immediately as people subscribe to these online storage spaces is the environmental impact data servers have. Just one data server is able to consume an amount of energy which is equal to 25,000 households and their costs to receive energy double every five years (Dayarathna, 2016). Considering this information, we can realize how it would be important to better consider this phenomenon and make people more responsible about how they store their online possessions.

In the last eight years, i.e., since the first paper was published on the topic (van Bennekom et al, 2015), what seems to be a subtype of hoarding disorder which focuses on digital items rather than physical ones has been found in some individuals and has promoted growing interest among researchers. Considering the environmental impact data servers have, it is evident how hoarding of digital information has an adverse impact not only on individuals suffering from it, but also society in general.

According to the American Psychiatric Association (2013): “People with hoarding disorder have persistent difficulty getting rid of or parting with possessions due to a perceived need to save the items. Attempts to part with possessions create considerable distress and lead to decisions to save them. The resulting clutter disrupts the ability to use living spaces”. The estimates prevalence of hoarding disorder is about 2.6%, and similar among men and women.

In the last edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013), hoarding disorder has been considered as a separate disorder from obsessive-compulsive disorder, with its own diagnostic criteria (see Figure 1.1).

Figure 1.1 Diagnostic criteria for Hoarding disorder in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013)

Criterion	Content
A	Persistent difficulty discarding or parting with personal possessions, regardless of their actual value
B	The difficulty is due to strong urges to save items and/or distress associated with discarding
C	The symptoms result in the accumulation of a large number of possessions, which fill up and clutter active living areas of the home or workplace to the extent that the intended use of those areas is no longer possible. If all living space is uncluttered, it is only because of the interventions of third parties (eg, family members, cleaners, authorities)
D	The symptoms cause clinically significant distress or impairment in social, occupational or other important areas of functioning (including maintaining a safe environment for oneself and others)
E	The hoarding symptoms are not due to a general medical condition (eg, brain injury, cerebral vascular disease)
F	The hoarding symptoms are not restricted to the symptoms of another mental disorder (eg, hoarding due to obsessions in obsessive-compulsive disorder; cognitive deficits in dementia, restricted interests in autism spectrum disorder; food storing in Prader-Willi syndrome)

Van Bennekom et al. (2015) defined digital hoarding as: “the accumulation of digital files to the point of loss of perspective, which eventually results in stress and disorganization. Although digital hoarding does not interfere with cluttering of living spaces, it has an immense impact on daily life functioning”. If we compare this definition with the diagnostic criteria of the DSM-5 we can see one of the main differences between the two types of hoarding, which is the space occupied. According to van Bennekom et al. (2015), digital hoarding may be a new subtype of its physical counterpart. In their paper the author suggested that digital hoarding may be comparable to physical hoarding as it also involves the overaccumulation of items that leads to increased clutter and disorganization; difficulties in discarding because of the intense emotional attachment people suffering from this disorder feel; distress and difficulties in everyday functioning, like the case she presented in which the patient said that his hoarding activity made him have sleeping difficulties and he did not have the time to clean or go outside the house

Sedera et al. (2022) observed how people suffering from physical hoarding and digital hoarding share three main aspects: the individual who hoards, the objects/content stored and the space. However, the two hoarding types differ because of their nature. *Space awareness* is different, because while in physical hoarding it is easier to see when a living area is cluttered, on digital spaces it is less clear when it happens. Digital hoarding also has a *space expandability*,

i.e., there are no clear “walls” for digital hoarders to stop and new storage spaces can always be added. Moreover, *acquiring content* requires a lower amount of effort to be acquired by digital hoarders since it is usually free, or self-created. The *creation rate* of content is also higher in digital hoarding because content can be easily duplicated and it can be shared faster thanks to the advent of social media or file sharing technologies or new cloud spaces Likes and comments in social media can also add an extra emotional value to the contents hoarders put online. Lastly, Sedera et al. (2022) suggest how digital hoarders seem to have more difficulties in distinguishing themselves from people who do not present the disorder since the content they accumulate is not as tangible as when someone hoards physical objects.

Since the topic is fairly new, Sedera et al. (2022) notice how creating an a-priori model for digital hoarding would be helpful for the scientific discussion of the topic. They define it as a multidimensional construct consisting of three sub-constructs. The first sub-construct is *constant acquisition* - content is indeed coming in our devices (laptops, cell phones, smart watches) constantly, for instance via messaging apps or social media. The second is *discarding difficulty*, which is shown in digital hoarders in the same ways as physical hoarders. Indeed, they highlight how people with digital hoarding tend to place a higher value on their content than people who do not present this type of disorder and this may be the cause of why they present difficulties in deleting items. Other factors they list that may contribute to the obstacle of deleting items are the fact that hoarders may not be able to disengage from their content and may not be able to think about deleting stuff openly leading to an exaggerated emotional response and the use of the content as a form of emotional support; moreover they suggest how people who hoard digitally may present an higher-than-usual level of emotional attachment with their content. The last sub-construct is *clutter propensity*, people that hoard digital items seem to group different types of unrelated contents together generating clutter in their devices like digital cameras, smartphones, or computers.

1.2 problems related to hoarding of digital data.

The practical consequences of hoarding data are easily understandable. According to Vitale et al. (2018), the participants with hoarding characteristics they investigated presented problems in: “1) keeping up with their data because of how much they had, 2) knowing what exactly they had, and 3) knowing where they had stored it”.

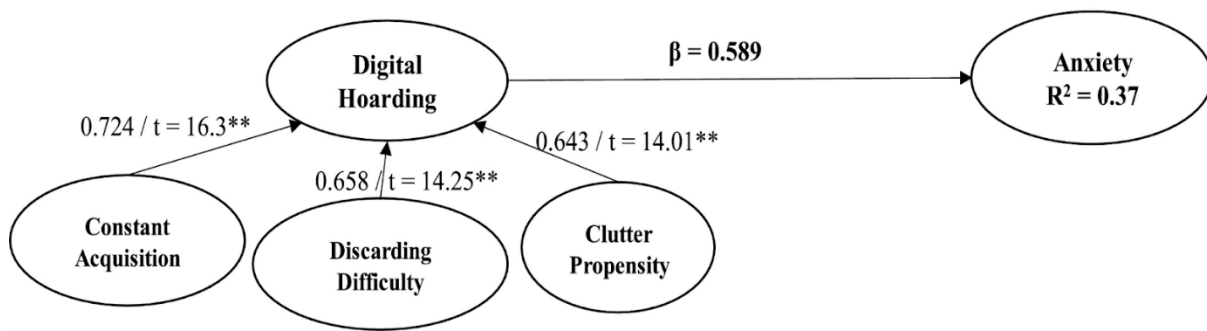
One aspect which affects the individual well-being and the consequent choices made around their organization of data is the emotional attachment they feel about their digital

possessions. Both Watkins and Molesworth (2012) and Nagy and Koles (2014) have discussed the emotional meaning of digital objects in online gaming. In particular, Nagy and Koles (2014) focused on how people develop an attachment to their online avatar, a fictional representation of the person which is increasingly becoming popular thanks not only to online games but also messaging apps (e.g., WhatsApp) which let people create their avatar to use as a sticker to respond to messages.

Vitale et al. (2018) interviewed participants about their digital data, and they suggest that digital hoarding has an emotional component as well. Participant P15 of the above-mentioned research, indeed, said: “I’m sentimental. As a mom, both my children, 15 and 18, they encapsulate memories. And sometimes it feels I have to hold on to those because that’s all I got left in some sense. Sometimes it feels like that. So the pictures represent something that’s important to me, that’s precious. The experiences with my children. [. . .] There’s maybe this impression that things that are digitalized are somehow permanent and maybe it’s an attempt to try and hold onto things, in spite of the passing of time”. The participant felt like the over 20,000 pictures they had on their laptop were a form of emotional support, a way of remembering their emotional past, with a focus on their children growing. Other participants reported they accumulated digital objects because of the fear of forgetting what happened in the past.

It is also important to notice that digital hoarding may be linked to anxiety. Sedera et al. (2022) focus their study on anxiety generated by digital hoarding. They distributed a survey with 9 items to measure anxiety and found a positive and significant relationship between digital hoarding and anxiety, in the sense that the bigger the impact of digital hoarding on the individual, the higher the level of anxiety was measured. (see Figure 1.2).

Figure 1.2 Graphical representation of the constructs on which the study of Sedera et al. (2022) focused on. The relationship between digital hoarding and anxiety is made evident graphically and it is possible to see how the latter presents an R^2 (coefficient of determination) of 0.37, that means that digital hoarding is responsible for the 37% of the dispersion of anxiety, but the other 63% should be attributed to other variables not considered in the study or errors.



Signs of digital hoarding are often observed in the workplace and can compromise workers performance. Sweeten et al. (2018) suggest that there are four main problems related to the hoarding of digital data in the workplace. First, it impairs productivity of workers, especially when they need to look for data since it is more difficult to find the precise information they need. Participants suggested how they have difficulties navigating their laptop space when working because of the number of tabs open or just because the amount of data affected their concentration. Second, having a cluttered digital space impacts the psychological well-being of people, they especially report stress and anxiety due to the amount of data they have. The third problem is the cybersecurity threat which is directed towards not only the individual, but also the company because both personal and work data could be acquired by hackers. Lastly, some people, even if they were not provided with a definition of digital hoarding, defined themselves as hoarders. This point showed how not only they had a problematic and hazardous behaviour in the workplace, but also how they were able to recognize it.

Gormley and Gormley (2012) hypothesized six areas in which hoarding of data generates problems for individuals and organizations. Firstly, one aspect to consider is the cost, both in the sense that having bigger data servers is more expensive since more energy is used, but also the cost of the time of the workers which may waste even hours looking at unnecessary information. Moreover, the cost aspect may appear when there is loss of relevant information due to the clutter. The second impacting factor is that data's lifespan is progressively reducing, therefore hoarders accumulate information which has a declining value. Another component proposed is the impact on effectiveness of workers. The hoarder co-worker indeed may not communicate and share information with the co-workers, leading to a slowing of the working process and hoarders could also impact the organization itself by making it more difficult to declutter data when needed. Building from these issues, they highlight the issue of sharing data in the workplace. Employees may not share information, they may avoid making decisions, and

they may hoard in fear of not receiving information back. The fifth element was also considered by Sweeten et al. (2018), and it is the one of productivity. However, Gormley and Gormley (2012) suggest something slightly different. They indeed say that the impact of hoarders in the workplace is that they reduce the simplicity of the system, limiting the process of ideas generation. Lastly, they propose what may contribute to the amount of hoarder employees in an organization may be a workplace culture characterized by a highly competitive environment, the insecurities of the employees, low cooperation between co-workers.

1.3 psychological barriers to the deletion of data.

Even though someone who does not present the characteristics of hoarding disorder may think that deleting irrelevant information from our phones or computers is effortless, there are several barriers which prevent digital hoarders from deleting data.

Sweeten et al. (2018) interviewed 46 participants to highlight the variables involved in the difficulties discarding digital objects, and they identified five barriers. The first barrier is the fact that hoarders feel that they need to keep the data in case it would be useful in the future (as also described by van Bennekom et al., 2018). One interesting thing about this aspect is that participants, when they were asked to hypothesize a situation in which the files would have been useful, they did not know how to answer. Participant 45 said: “My main concern would be that I may need the email in the future, although I really know I won’t need ones from shops advertising items from 3 years ago”.

The second barrier highlighted by Sweeten et al. (2018) is keeping data to use as evidence. This condition differs from the one before it is more calculated and specific, to the point that patients knew types of situations in which the data could be used as “evidence” Participant 26 said: “I like to have a full breakdown of email conversation that can be referred to at a later time. So even someone replying with a “thanks” may come in handy later, if someone was to say an email wasn’t read or received”.

The third barrier that is mentioned in the paper of Sweeten et al. (2018) is laziness or time constraint, i.e., feeling bored at the thought of deleting data, or not having enough time to assess the task. Some people also talked about the fact that they had so many data to the point that they felt overwhelmed at the idea of starting to delete files.

The fourth barrier mentioned by Sweeten et al. (2018) is emotional attachment. Interviewees expressed the sentimental importance their data (especially photos, music files

and even emails) had for them and the thought of deleting these data was stressful for those interviewed. Participant 4 said: “It would be really hard for me to delete any documents, music or photographs. Particularly photos, I love my pictures, they are one of the devices I use to pick myself up is to look over past photographs whilst listening to music. To delete any of the above would be really unnerving for me because there is a feeling of the data being lost forever”.

Lastly, another barrier which prevented people from deleting data was when they did not perceive their clutter as a problem since the server space was not theirs. This barrier was evident only in the workplace.

Whilst Sweeten et al. work (2018) is focused on the barriers that prevent deletion, a paper by Luxon et al. (2019) focused on the emotions people feel when thinking about discarding some of their digital possessions. Luxon et al. (2019) selected participants that were users of Pinterest. In the first phase of the study, they were required to fill in the Discrete Emotions Questionnaire (Harmon-Jones 2016) after reviewing their Pinterest boards and then, in the second phase, they were led to believe that either one pin or one board would be deleted from their account. They had then to fill the same questionnaire again to report on the emotions they felt when thinking about deletion, and the Object Attachment Questionnaire (Grisham et al, 2009) in order to rate the attachment they felt to the files in their account.

After the second completion of the questionnaire, changes were observed in self-reported Anger and Anxiety, Fear, Relaxation and Happiness. As what regards changes in anger and anxiety the researchers highlighted how the more people used Pinterest and the more importance they put on Pinterest, the more changes in Anger and Anxiety were present during the study, while the more time since the last saved pin, the less changes Anger and Anxiety were present. The more frequency of use of Pinterest and its importance for the participants, the more changes in Fear were noticed and the more time since the last saved pin the less changes in Fear were noticed. When considering the last item, changes in Relaxation and Happiness, the more Pinterest was used and the more importance had for participants, the less changes in Relaxation and Happiness were seen and the more time since the last pin saved, the more changes in relaxation and happiness were seen.

Lastly, a positive correlation was found in the paper by Luxon et al. (2019) between Object attachment, and enjoyment, importance and time spent on the app, that means that Object attachment scores were higher when there was more enjoyment of Pinterest, more importance put on the application and more use. Moreover, a negative correlation was found

with the moment in which the last pin was saved and Object Attachment (the more time since the last pin saved, the lower the Object attachment score was).

Luxon et al. (2019) highlight how the more time participant spent on Pinterest, the more enjoyment they felt when using the app and the more importance they put on the app, the more participant had difficulty discarding the items.

The estimated prevalence for hoarding disorder in the world population is 2.6%. In the sample of Pinterest users of the paper by Luxon et al. (2019) the prevalence of participants who scored in the significant range for hoarding disorder was 8%. This datum may be considered for future research in order to investigate if Pinterest has specific characteristics that makes more people who score in the significant range for hoarding disorder use it.

1.4 description of a clinical case.

Unfortunately, there are not many descriptions of clinical cases in literature to have a better understanding of the psychological characteristics of people suffering from digital hoarding. The most cited, however, is the study by van Bennekom et al. (2015). They described a 47-year-old male patient, diagnosed with autism spectrum disorder, traits of attention deficit disorder and recurrent depressive episodes. The patient presented since when he was at university the physical form of hoarding. His house was cluttered with several objects usually with no economic value and he felt like they could have been useful to him in the future. He also presented digital hoarding. Indeed, he spent most of his day taking pictures of landscapes (up to 1000 per day) and trying to organize them in eight hard drives (4 for the originals and 4 for back up). Just the activity of organizing the pictures took him three-to-five hours a day, and it disrupted his activities like sleeping, taking care of the house or going outside. He was feeling stressed because of his hoarding of digital pictures. The patient felt like the pictures could be useful to him in the future and he thought in the future he will be able to merge them thanks to a yet uninvented technology and that the pictures could then be published. Therefore, he had several copies of every picture, but he never looked back at them. The research team highlighted that there were similarities between the hoarding criteria of the DSM-5 (American Psychiatric Association, 2013) and digital hoarding. They considered that the patient had two previously diagnosed disorders (autism spectrum disorder and attention deficit disorder) to which his digital hoarding could partially be attributed, but since the digital hoarding he presented was fulfilling the criteria for hoarding disorder the researchers suggested that this could justify also a diagnosis of hoarding disorder. In order to help the patient with their digital hoarding first the

authors suggested to use motivational interviewing to encourage him to take actions regarding his disorder and then a form of cognitive-behavioural therapy that is usually used for traditional hoarding, but modified for the digital type of the disorder, was used. The focus was on making the patient reduce the amount of pictures they took, on setting a maximum number of pictures they could take of a landscape and, at the end, on challenging the thoughts about the possible future use of the pictures.

Section 2

2.1 Definition of problematic internet use

As internet usage becomes more common, disorders related to its problematic use are becoming more common. Problematic internet use (also known as internet addiction) was first described by Young in 1996, and subsequently by Greenfield in 1999 (Maurer, 2017). Since 1996 the phenomenon has been investigated by much research, but it has not been added to the diagnostic and statistical manual of mental disorders (American Psychiatric Association, 2013) yet.

Shaw and Black (2012) define problematic internet use as: “characterized by excessive or poorly controlled preoccupations, urges or behaviours regarding computer use and internet access that lead to impairment or distress”.

Moretta et al (2022) define problematic internet use as all the internet related behaviours that can lead to an addiction, in the sense that control over the use of internet diminishes and the person affected continues to use it even if there are negative consequences or impairment in important domains of a person’s life. They also highlight that the behaviours of people who present problematic internet use may be: online gaming, gambling, shopping, pornography viewing, email checking, instant messaging and social media use.

Young (1996) proposed a set of diagnostic criteria for problematic internet use, based on pathological gambling (see Figure 2.1.)

Figure 2.1 eight criteria for problematic internet use diagnosis (Young, 1996).

1. Do you feel preoccupied with the Internet (think about previous online activity or anticipate next online session)?
2. Do you feel the need to use the Internet with increasing amounts of time to achieve satisfaction?
3. Have you repeatedly made unsuccessful efforts to control, cut back, or stop Internet use?
4. Do you feel restless, moody, depressed, or irritable when attempting to cut down or stop Internet use?
5. Do you stay online longer than originally intended?
6. Have you jeopardized or risked the loss of a significant relationship, job, educational or career opportunity because of the Internet?
7. Have you lied to family members, therapists, or others to conceal the extent of involvement with the Internet?
8. Do you use the Internet as a way of escaping from problems or of relieving a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression)?

Young (1998) suggested that 58% of students that had poor academic results suffered from excessive internet use. The book edited by Maurer (2017) highlighted the different prevalences that have been estimated across different parts of the world. The middle east showed a prevalence of 10.9%. Taiwan was the country with the highest prevalence (17.9%) The area that seems to have the lowest prevalence of internet use disorder, 1.2% of the population, is Europe. From these data it may be possible to suggest that the phenomenon can be partly related to culture even though it must be considered that other variables could have played a role in the differences in the prevalences across different countries like the use of different tests to look for internet use disorder.

2.2 problematic internet use and its relationship with obsessive-compulsive and hoarding disorder

Problematic internet use can co-occur with other psychological disorders. Kuss et al. (2014) summarize the different comorbidities that have been reported in the relevant literature, e.g. substance and alcohol use disorder, depression, ADHD and obsessive compulsive disorder. In this chapter the focus will be on the comorbidity between problematic internet use and obsessive-compulsive disorder/hoarding disorder.

One issue which may arise in diagnosing problematic internet use is the fact that there are many questionnaires used to assess it. Indeed, Kuss (2014) highlights that: “no gold standard of Internet addiction assessment has emerged”.

With regards to the relationship between obsessive-compulsive disorder and problematic internet use, different questionnaires are used to assess each disorder.

Concerning the investigation for problematic internet use, the most used questionnaire is the Internet Addiction Test (Young, 1998). It is a questionnaire on which participants rate on a five-point Likert scale how much the internet affects their daily life, sleep, productivity, social life, and feelings. The higher people score on the scale, the more problems related to internet use they have.

In order to explore the presence of obsessive-compulsive symptoms, the questionnaire which is mostly widely used in the literature on which this thesis focused on is the Symptom Checklist 90 (Derogatis et al, 1999) in particular the obsessive-compulsive subscale. It is a self-report questionnaire with 90 items, which are categorized in 9 symptom dimensions: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism. Those who need to complete the questionnaire need to report the intensity of their symptoms in a 5-point Likert scale (from 0 to 4).

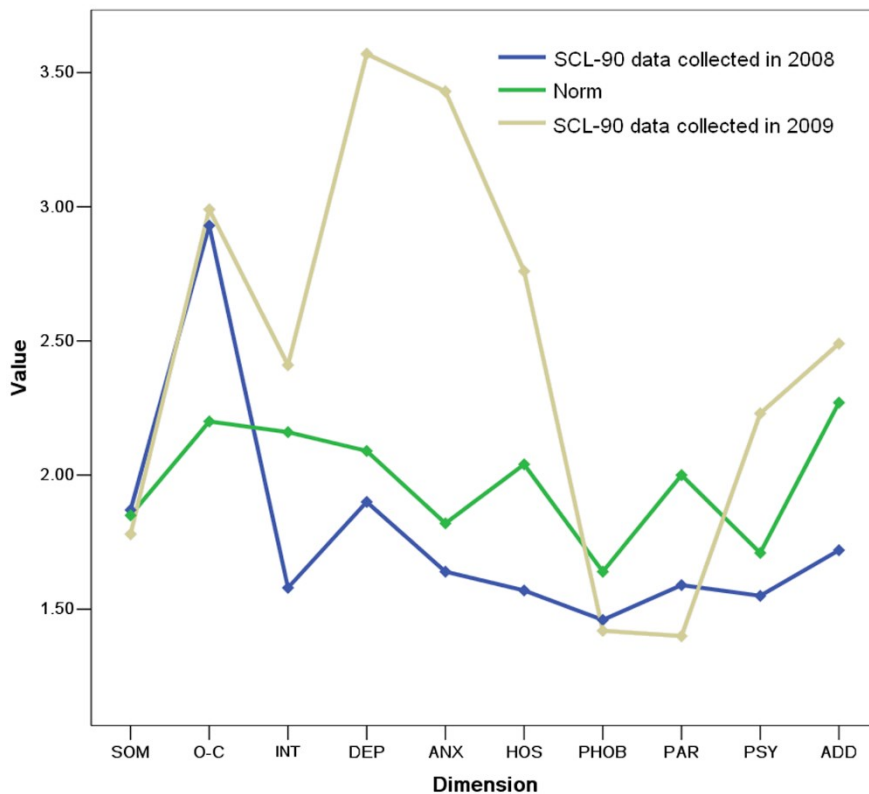
Most research on the relationship between problematic internet use and obsessive-compulsive disorder has been conducted in Asian countries like China and South Korea. Moreover, much investigation has considered high school students. Jang et al. (2008) highlighted how adolescents are immature both physically and mentally and they are more at risk of the negative effects of internet use than other age groups. However, it is important to notice how most studies focused on younger people than older people, therefore the relationship between obsessive-compulsive symptoms and internet use disorder should be investigated more also in older individuals.

Jang et al. (2008) in their paper assessed participants with the Symptom Checklist-90-Revision (Derogatis et al., 1999) to look for psychiatric symptoms that are associated with problematic internet use in a group of Korean students. They highlighted how the obsessive-compulsive dimension of the test had the highest average score and suggest that students with obsessive-compulsive symptoms should be screened and advised by school nurses to try and prevent problematic internet use.

Dong et al. (2011) focused as well on a sample of students which is about 2000 people. The obsessive-compulsive scores were the only ones on which it was possible to see a much higher value than the norm both before (in 2008) and after (in 2009) the development of problematic internet use (see Figure 2.2). This value shows the possible relationship between

the two disorders. Since participants were tested two times, one before and one after developing the disorder, they suggested that a causative relationship can be found.

figure 2.2 Mean scores of Symptom Checklist—90-revision dimensions in different groups. (Dong, 2011)



Something which may emerge as a problem when trying to identify how problematic internet use and obsessive-compulsive disorder relate to each other is highlighted by Zamboni et al. (2020), i.e., the symptoms of addictions and the ones of obsessive-compulsive disorder are similar to each other. But there are some differences that is possible to notice like the fact that that, while in obsessive-compulsive disorder the symptoms, obsessions and compulsion, take place in order to relieve the stress, in addictions (like internet use disorder can be) the symptoms sometimes take place because there are positive thoughts about the object of addiction, which lead to the use in order to have gratification.

In the last release of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013), hoarding disorder has been separated from obsessive-compulsive disorder and according to some research hoarding disorder seems to have a relationship with problematic internet use too. Moretta and Buodo (2021) found using

multiple regression analysis that hoarding symptoms were predictors of problematic internet use severity. They also suggest that it would be relevant to investigate if hoarding disorder and its digital subtype are either elements characterizing problematic internet use or a consequence of altered mechanisms that also determine it because of their potential relevance to diagnose problematic internet use.

2.3 the cause/effect relationship between problematic internet use and obsessive-compulsive disorder

Research has also focused on understanding which between problematic internet use and obsessive-compulsive disorder precedes the other.

Stavropoulos et al. (2015) compared the scores of three questionnaires, and they administered them twice to the participants with a two-year gap, first when participants were 16 years old and then when they were 18 years old. The questionnaires used were: the internet addiction test (Young, 1998), the symptom check list 90 revised (Derogatis and Savitz, 1999) and the five factor questionnaire for children (Asendorpf and van Aken, 2003). By doing so they explored how obsessive-compulsive symptoms relate to problematic internet use in the two years. They suggested that obsessive-compulsive symptoms were a risk factor for problematic internet use when the adolescents were 16 years old, and they highlighted how the problematic internet use behaviours may appear to relieve the tension caused by the pre-existing obsessive-compulsive traits. However, they noticed how, after the second test which was done when the participants were 18 years old, the relationship between the two became insignificant and they suggested that it may be because the relationship is influenced by age between 16 and 18 years old.

Bernal-Ruiz et al. (2017) highlighted how the obsessive-compulsive symptoms might predict cognitive preoccupations, compulsive internet use and problematic internet use. In addition to the observations of Stavropoulos et al. (2015), they suggested that the participants with obsessive-compulsive symptoms even though they perceive the negative consequences of their exaggerated use of the internet become compulsive users and this led the researchers to suggest that it might be that participants use excessively the internet as a way of relieving anxiety and not as an enjoyable activity.

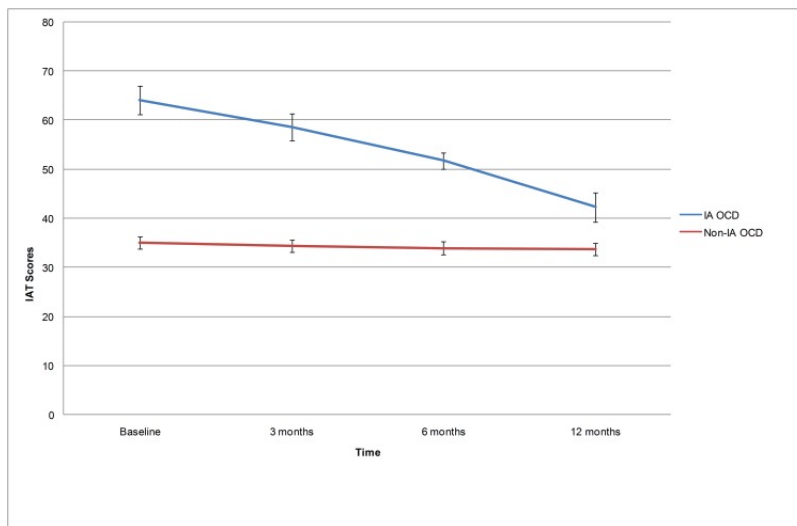
Other studies, although reporting a relationship between problematic internet use and obsessive-compulsive disorder consider it is difficult to imply a cause/effect relationship

because of the research design. This is the case of Dong et al. (2011), who indeed found that before the emergence of problematic internet use the scores of obsessive-compulsive symptoms were higher than the norm, but since the scores did not change significantly in the second measurement, after the development of the addiction, it cannot be defined for sure that obsessive-compulsive symptoms predict problematic internet use.

2.4 possible pharmacological and psychological treatments for problematic internet use and obsessive-compulsive disorder

Problematic internet use as any other disorder impairs life activities and causes stress in the person suffering from it. Therefore, an effective treatment needs to be developed. Bipeta et al. (2015) in their paper suggest treating the underlying comorbid disorder in order to relieve the symptoms of problematic internet use. In the paper the sample is constituted by patients already diagnosed with obsessive-compulsive disorder that either present problematic internet use or not, that were treated with drugs for obsessive-compulsive disorder for one year. Both groups evidenced a reduction in the obsessive-compulsive symptoms and, as it is possible to see from figure 2.4, the scores in the Internet Addiction Test, for those participants who presented the disorder, were lower after one year of treatment. Out of the 11 participants who presented both problematic internet use and obsessive-compulsive disorder, only two still met the criteria of obsessive-compulsive disorder after being treated. This, according to Bipeta et al. (2015) might just be an indicator for the need to treat them for more time than one year. More research, and with a bigger sample size, is needed in order to affirm that treating obsessive-compulsive disorder with drugs helps reduce the symptoms of problematic internet use.

Figure 2.4 Change in Internet Addiction Test (IAT) scores with obsessive-compulsive disorder (OCD) treatment in participants with problematic internet use and participants without (Bipeta, 2015)



At the moment no psychological way of treating both problematic internet use and obsessive-compulsive disorder together has been developed. As what regards obsessive-compulsive disorder, exposure and response prevention is the most used form of psychotherapy. As the paper by Hezel and Simpson (2019) shows, this type of treatment is based on the theory that Mowrer developed in 1939. The idea at its basis is the fact that people with obsessive-compulsive disorder have obsessions which lead to anxiety and they try to reduce it with compulsions or avoidance. By doing so, the behaviour is reinforced through operant conditioning. Hazel and Simpson (2019) highlight how exposure response prevention first objective is to provide an assessment plan, treatment plan and provide information regarding the disorder to the patient. The patient and the clinician should work together in this phase and identify what is that leads the patient to the obsessions and compulsions, and it is important to understand the content of obsessions and compulsions, their relationship and what people expect to happen if they do not carry out their rituals. Moreover, ranking of how much distress different situations provide to the patient should be developed. Hezel and Simpson (2019) highlight how after this assessment, the treatment session should focus on making the patient slowly face the feared situations (also via imagination), but without engaging in their rituals.

As evidenced by Kuss (2016), the psychological treatment that is used in most cases of problematic internet use is cognitive behavioural therapy with different topics used across research like: control issues, principles of healthy interpersonal communication, internet awareness, cessation techniques of the behaviour, understanding other factors contributing to the internet abuse.

Considering the comorbidity that has been found between obsessive compulsive disorder and problematic internet use, the question of future research could be to find participants which

present both disorders and to explore whether psychological treatment of either of the two leads to a reduction in the symptoms of the other.

Conclusions

In this thesis, it has been evidenced how many aspects of digital hoarding and of the relationship between problematic internet use and obsessive-compulsive disorder could be further investigated by research. Since the use of internet is growing constantly, especially in younger generations, the knowledge of pathological aspects of its use seems to have a core importance for further ways of treating or to develop prevention programmes.

As what regards digital hoarding, its peculiarities have not been much the focus of literature yet. Since it has been defined as a subtype of hoarding (van Bennekom, 2015) it may be that by increasing the knowledge on the topic, more knowledge also on hoarding could be developed. For example, the space that digital hoarders can occupy is virtually infinite, but the material space of a physical hoarder is usually limited, and it would be difficult to increase their space that much. Could the behaviour of a digital hoarder with that amount of space tell us something more about hoarding?

Even the possible comorbid disorders of digital hoarding have not been the focus of research yet, but they could help to understand better how the disorder develops, how much it affects people who develop it and to further define digital hoarding as a subtype of hoarding.

In one of the studies that were described in this bibliographical thesis (Moretta and Buodo, 2021) a relationship between problematic internet use and hoarding disorder was found. Not much literature has focused on this relationship, but it seems like it could be relevant for a better understanding of both disorders, especially for digital hoarding since it is a fairly new topic in literature.

Moreover, as of right now, obsessive-compulsive disorder is mostly treated with exposure response prevention, while problematic internet use is treated mostly with cognitive behavioural therapy. As mentioned in section 2, pharmacological treatment of obsessive-compulsive disorder has led to a reduction also in the symptoms of problematic internet use, but no research has yet been published on whether problematic internet use symptoms can be reduced using exposure response prevention for the comorbid obsessive-compulsive disorder.

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