PHD THESIS:

The Relationship between Self-Representation on Social Media and Affective or Anxiety Disorders in the Perspective of the COVID-19 Pandemic

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DOKTORI ÉRTEKEZÉS:

A közösségi médiabeli önreprezentáció és az affektív, illetve szorongásos zavarok összefüggései a Covid19-világjárvány perspektívájából

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1. Introduction

Over the past 15 years, social media has become an integral part of our daily lives, influencing our informal interactions, professional discourses, and their structure. Its numerous definitions are well known – within the discipline of communication and across related disciplines such as public relations and information science – though they may essentially be summarized as follows: "social media employ mobile and web-based technologies to create highly interactive platforms via which individuals and communities share, co-create, discuss, and modify user-generated content" (Kietzmann et al., 2011, p. 241). Howard and Parks offered a complex definition of social media as consisting of three parts: (a) the information infrastructure and tools used to produce and distribute content; (b) the content that takes the digital form of personal messages, news, ideas, and cultural products; and (c) the people, organizations, and industries that produce and consume digital content (Howard & Parks, 2012, p. 362). According to a newer definition from Carr and Hayes, social media is "internet-based, disentrained, and persistent channels of masspersonal communication facilitating perceptions of interactions among users, deriving value primarily from user-generated content" (Carr & Hayes, 2015, p. 49). From this, one can conclude that social media has its own logic, which includes special norms, strategies, and mechanisms (van Dijck & Poell, 2013).

The social media usage penetration is so vast that the most prominent platform, Facebook, had 2.93 billion active monthly users as of the first quarter of 2022 (Statista, 2022a), while Instagram had almost 1 billion active monthly users in the same period (Statista, 2022b). The number of social media users are constantly increasing, so the research on social-psychological trends related to social media is probably more relevant than ever. One of the most complex issues in social psychology is the examination of self-representation: how we present ourselves, and when and where we do that. On social media platforms, users publish virtual self-representations, which may be related to "real-life" events and changes (Hogan & Quan-Haase, 2010). Initially (at the beginning of the doctoral training), only "Face and body representation in social media" was marked as the topic of this dissertation. However, during the four years of the program, a "real life" event occurred, which it is no exaggeration to say brought sweeping changes worldwide, including at the level of society as a whole. The COVID-19 pandemic and the restrictive measures aimed at preventing the spread of the virus (lockdowns, curfews, mandatory wearing of protective masks), as well as the consequences of infection or the fear of infection, have resulted in unprecedented situations, bringing fundamental changes to the lives

of hundreds of millions of people. It should not be forgotten that certain social groups can be particularly receptive to social media use and regular self-representation there, and some groups react particularly sensitively to changes such as those caused by the pandemic. People who suffer from some form of anxiety or affective disorder, such as those with some form of depression or panic disorder, are located in this cross-section.

The purpose of the current dissertation is to shed light on the relationship between self-representation and affective or anxiety disorders from the perspective of the COVID-19 pandemic by presenting the author's research results after a thorough literature review. After this short introduction – which includes the justification of the choice of topic, its social relevance, the methodology of the research, and the personal motivation of the author – an extensive literature review (Chapter 2) will discuss the relationship between social media, mental health, and the COVID-19 pandemic. Since so far, very few research results have been published that examined this triple connection, the sources available on the double connections will be discussed as well: first, on the connection between social media and mental health (Chapter 2.1), then on the connection between mental health and the COVID-19 pandemic (Chapter 2.2), and finally on the about social media and the pandemic (Chapter 2.3), before turning to examine the results of the triple connection so far (Chapter 2.4). The literature review is followed by the author's research results (Chapter 3) in three separate yet connected parts, which can be interpreted separately but give a more comprehensive picture together.

The first research is about the possible psychosocial impact of modifying face and body photographs in social media (Chapter 3.1); this mixed-method pilot study helps explore the correlations of self-representation with questionnaire data collection and interviews with experts and users. This part reveals what motivational factors may exist between self-representation on social media and the digital modification of face and body images published there and how this is related to the risk of depression based on the Beck Depression Inventory (BDI). The second research is a real-time cross-sectional analysis of self-representation on social media and depression risk during lockdowns and restrictions of the first five COVID-19 pandemic waves (Chapter 3.2). The unique feature is that the data was not collected retrospectively but took place at the peaks of the waves of the pandemic. Participants answered how often and in what form they represented themselves on social media. They also completed a widely used pre-diagnostic depression test, Patient Health Questionnaire-2 (PHQ-2), at four data points: during the first, second, third, and the merging fourth and fifth pandemic waves.

This analysis uniquely sheds light on changes in self-representation during the pandemic and its correlations with depression risk. The third research, which took place in parallel with the second, is a longitudinal analysis that focuses on the self-representation of users diagnosed with an affective disorder or anxiety disorder (Chapter 3.3). Here, self-representative photos and videos were analyzed on Facebook or Instagram over three years, from the pre-pandemic period to the post-peak period of the fourth and fifth waves. The analysis covers three groups: the members of the first had an official diagnosis of one of the specified common anxiety or affective disorders; the members of the second group did not have such a diagnosis, but based on their symptoms, they suspected that they might have such mental illnesses; and the members of the third group had neither an official nor a self-suspected diagnosis. In addition to the content analysis, questionnaire data were collected twice, during which all participants filled out the Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI). In this way, not only the changes in the patterns of self-representation during the pandemic were highlighted, but also the correlations with existing or suspected anxiety or affective disorders – and the presence of anxiety or depression symptoms independent of diagnosis. The longitudinal research discussed in Chapter 3.3 also covers the proportion of modified self-representative contents in the three examined groups, the significance of which is explained in Chapter 3.1.

Although social media use and the pandemic can be related to many mental health problems, the mental disorders discussed (with a focus on depression and anxiety) were chosen because practical measuring instruments were available for them; narcissistic or borderline personality disorder, which is also related to the use of social media, is so multidimensional that it would not have been possible to examine it only within the framework of online questionnaire-based research, which was the only possible method of data collection in the early stages of the pandemic.

The author of this dissertation would like to contribute to the scientific knowledge of the COVID pandemic's short- and long-term socio-psychological effects. In addition, she wants to answer how self-representation in social media has changed during the pandemic and how this may be related to the most common anxiety and affective disorders. The author's primary motivation for preparing this dissertation and conducting research was to encourage the conscious use of social media, in addition to general education about common anxiety and affective disorders, their symptoms and their impact on everyday life.

2. Literature Review

2.1. The Relationship between Social Media and Mental Health

Humans are social creatures. Human well-being depends on social interaction. Numerous studies have shown that people flourish when they have significant positive relationships with others. Strong social ties have many proven benefits, including lower risks of mental illnesses, a higher likelihood of positive health behaviours, a lower likeliness of harmful health behaviour patterns, such as alcohol abuse, and lower morbidity and mortality rates (Kawachi, 2001; Uchino, 2006). The primary function of social media (the definition of which was explained in Chapter 1) is usually to maintain existing "offline" connections through online communication rather than communicating with strangers, but of course, the latter is also possible (Kuss & Griffiths, 2011). It is excellent for maintaining contact with the extended social network, especially with those with whom it would not otherwise be possible (Boyd & Ellison, 2007). Notably, social media platforms allow users to see what activities their peers or other contacts are engaged in (Eysenbach, 2008).

On social media platforms, users publish virtual self-representations influenced by "real-life" individual and societal changes (Hogan & Quan-Haase, 2010). Meanwhile, simultaneously learning significant amounts of information about what is happening in "real life" from the posts of others through social media. There are serious concerns about the impact of social media on mental health – both in the scientific literature and the public discourse. The American Association of Suicidology stated in a press release: "...we do know that social media – in all forms – can have a significant impact on mental health, especially for young people" (American Association for Suicidology, 2018).

The term "Facebook Depression" was used by the American Academy of Pediatrics (AAP) for the first time. They warned that this mental health problem could develop in young people with frequent social media usage. AAP defined the phenomenon as "depression that develops when preteens and teens spend a great deal of time on social media sites, such as Facebook, and then begin to exhibit classic symptoms of depression" (American Academy of Pediatrics, 2011, p. 802). Although this drew attention to the tendency, subsequent publications later claimed that erroneous information was the basis for the statement rather than confirmed scientific findings (Magid, 2011; Jelenchick et al., 2013). Meanwhile, it has been established that users' mental

states can be detected by traces left behind on Facebook (Csepeli & Nagyfi, 2014). Exemplifying the contradictions in the literature, a study found an association between Instagram use and stable mental well-being but revealed that there is also a phenomenon of so-called "Instagram anxiety", which in turn – along with social comparison, a concept to be discussed later in this subchapter – is associated with poorer mental health (Mackson et al., 2019).

There is debate over whether social media use worsens or improves conditions like depression and anxiety – research results and arguments will be discussed in detail later in this dissertation. Social media platforms, such as Facebook, Instagram, Twitter, LinkedIn or Snapchat, may help maintain contact with family, friends, colleagues, and others. These social interactions might add to the users' social capital, but their use also carries new risks that have arisen with the global spread of social media. Social media's far-reaching impact requires an interdisciplinary approach (Kende et al., 2015). However, based on the current literature review, the tools and frameworks of sociology and social psychology used in the present thesis have proven suitable.

Regarding these disputes in the literature, it is clear that certain actors' – such as advocacy groups' – overestimation of study findings in the media has clouded the picture. While much of the public narrative on the impact of social media use assumes that simple exposure is linked to mental health problems, the most reliable results show that the quality of use, rather than its quantity, is more important (Davila et al., 2012). The concept of problematic social media use is also known in the literature, with several definitions, but the common denominator of the definitions is that there is a strong emphasis on the addictive pattern (Bányai et al., 2017; Kircaburun et al., 2018). Singh et al. (2020) use the term "social media disorder" and relate it to mental health and even general health (Singh et al., 2020). The scientific basis for this is that excessive social media use has already been established to affect the health of the cardiovascular system, metabolism, and sleep rhythm, in addition to affecting self-esteem and well-being (Turel et al., 2016; Cheng & Li, 2014).

At the end of the last decade, problematic social media use has been included in the biopsychosocial model as a non-substance-related compulsive behaviour with possible negative consequences (Kircaburun et al., 2018). Compulsive behaviour, in this case, means the appearance of the usual addictive symptoms such as withdrawal (Bányai et al., 2017). There are even specific scales for measuring social media addiction. One of the best-known is the

Bergen Social Media Addiction Scale (BMAS). In this, respondents have to determine on a scale of one to five to what extent they consider a particular symptom of addiction characteristic of themselves (for example, that they have tried to spend less time on social media but failed) (Andreassen et al., 2017). Some studies have previously found an association between time spent using social media, frequency of use, and depression (Yoon et al., 2019). Based on the correlations, it can be hypothesized that problematic social media use may be more closely related to depression than "normal" social media use. Addictive behaviour arouses guilt and shame and increases feelings of loneliness (Bilevicius et al., 2018), where loneliness refers to the uncomfortable absence of meaningful social relationships (Hawkley & Cacioppo, 2010).

Based on the definition and criteria above, it is not surprising that not only the duration and quality of social media use but also its timing matters concerning mental health: nighttime social media use is more closely associated with depression than daytime use (Woods & Scott, 2016). However, an exciting interaction between social media and mental health is indicated by the fact that depressed individuals are more likely to engage in problematic social media use (Edgerton et al., 2018), supporting the relevance of the present dissertation. Previous research also shows that those who suffer from loneliness are more prone to problematic internet and social media use (Caplan, 2006; Savci & Aysan, 2016). Social media provides a suitable medium for social interaction (Morahan-Martin & Schumacher, 2000), but its maladaptive or excessive use can be a problem (Boursier et al., 2020). The results show a negative interrelation, or reciprocal relationship, between loneliness and excessive social media use (Nowland et al., 2018). The reason is that those who feel more lonely use the internet more intensively for social connection (Sum et al., 2008), while communication via the internet can even make users confront their loneliness (Janta et al., 2014). Apart from loneliness, however, many other concepts and emotional states can be associated with the problematic use of social media.

An abundant source of literature explains the excessive engagement of social media use with the concept of **loss of control**. This sense of loss of control, which might occur due to burdensome experiences, harms mental health (Skaff, 2007). A low sense of control is also associated with more severe anxiety symptoms (Keeton et al., 2008), while anxiety symptoms are associated with addictive social media use (Atroszko et al., 2018). According to various research results, those who feel they have lost control over some area of their lives are more inclined to use social media excessively (Apaolaza et al., 2019; Primack et al., 2017; Ryan et al., 2014). The connection can be attributed to the fact that in social media, users can decide

how they (re)present themselves and with whom they communicate (Boyd & Ellison, 2007). This temporarily allows them to escape negative feelings (Marino et al., 2018), thus creating the illusion of regaining control over their own lives (Ryan et al., 2014). Individuals can develop a **strong emotional bond** with social media, leading to a desire for a continuous online presence (Brailovskaia & Margraf, 2020a).

At this point, mentioning the general concept of addiction is inevitable. Although many definitions are known, according to the systematic review of Sussman and Sussman (2011), the concept of addiction consists of the following elements, so the existence of these means the criteria of addiction: (a) engagement in the behaviour to achieve appetitive effects, (b) preoccupation with the behaviour, (c) temporary satiation, (d) loss of control, and (e) suffering negative consequences (Sussman & Sussman, 2011). Unfortunately, the distinction between normality and psychopathology has been the subject of debate for a long time, which does not make it any easier to define addiction or even problematic Internet use (Stein et al., 2010).

According to Andreassen et al. (2017), addictive social media use has six characteristics: salience (the fact that the person constantly thinks about social media), tolerance (the need to spend more and more time on social media to induce positive feelings), mood modification (mood change due to social media use, typically improvement), relapse (unsuccessful attempt to "quit", i.e. reduce the time spent on social media), withdrawal symptoms (lack of social media causes discomfort and tension), and conflicts (human relationship problems due to social media use) (Andreassen et al., 2017). Although social media addiction is currently not an officially recognized psychiatric diagnosis (Brailovskaia & Margraf, 2021), we still need to pay attention to its possible negative consequences due to its spread (Marino et al., 2018). Research exploring the topic of "internet addiction" has also shown that this often means increased use of social media or gaming activities.

Interestingly, while "internet gaming disorder" is listed as a provisional disorder in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), social media disorder is not, even though experts advocate it (Ryan et al., 2014). However, COVID-related social media addiction was impossible to match the usual diagnostic criteria during the first pandemic waves since it would require the fulfilment of at least five of the nine of the following during twelve months: preoccupation, tolerance, withdrawal, persistence, escape, problems, deception, displacement, and conflict – which is roughly consistent with the criteria mentioned

above (Singh et al., 2020; Andreassen et al., 2017). Another reason experts referred to COVID-related social media addiction as officially undiagnosable is that the DSM-5 criteria require symptoms to persist for at least 12 months. New pandemic waves were not expected at first, which often affected the research methodology carried out during the first wave. The circumstances support the necessity for repeated cross-sectional and longitudinal studies on the long-term effects of the pandemic, such as the two that form part of the present dissertation (Subchapters 3.2 and 3.3).

The scientific results suggest that addictive social media use is closely related to mental health problems. For example, stress symptoms in university students (Apaolaza et al., 2019) or depression and insomnia up to six weeks later, mostly among diagnosed patients with affective disorders (Brailovskaia et al., 2019). Suicide ideation up to one year later was also observable in university students, specifically during COVID-19 (Brailovskaia & Margraf, 2020b). In light of all this, the conclusion was reached that those who want to compensate for losing control in real life with social media perceive an even more significant loss of control, which can adversely affect their well-being (Brailovskaia & Margraf, 2021).

According to research, one of the keys to the relationship between social media and mental health is using social media for **negative comparison** with other users, which, combined with rumination, might lead to depression later (Feinstein et al., 2013). However, to avoid being one-sided, it must be mentioned that social media use might positively affect mental health through authentic self-presentation, which can be associated with positive well-being (Reinecke & Trepte, 2014). As for an essential aspect of the relationship between the content of social media posts and mental health, Berryman et al. pointed out that in social media posts, rumination often reflects psychopathology (Berryman et al., 2017). They also suggest that researchers should take a phenomenon called "vaguebooking" into consideration. The term refers to social media messages that contain no real and explicit information but are worded to attract viewers and make them concerned, just like "a cry for help" (Berryman et al., 2017).

According to **sociometer theory**, self-esteem is proportional to one's perceived relational value; positive feedback means acceptance by others, thus increasing self-confidence (Leary & Beaumeister, 2000). The positive feedback that can be given quickly and efficiently is paramount in the algorithm of today's social media platforms. On the one hand, this is one of the keys to the user experience, and on the other hand, it also determines the speed at which

posts spread. The simple "liking" method on Facebook leads to billions of likes being generated daily (Smith, 2020). Receiving positive feedback on posted content correlates positively with self-esteem and subjective well-being and negatively with loneliness, as several studies have shown (Burke et al., 2010; Oh et al., 2014; Valkenburg et al., 2006). However, the confirmation thus obtained comes at a price. Dependence on others' affirmation to feel good about oneself may indicate conditional self-worth, jeopardising well-being (Kernis et al., 2000). It is critical to distinguish between these possibilities because trying to seek attention and recognition from others is reported to be the primary driver of social media use (Sung et al., 2016). Multiple experiments and research results have confirmed that it increases self-confidence if one feels accepted, included and popular (Leary et al., 1995; Reitz et al., 2016). However, as individual value systems can vary widely, it is not surprising that in the case of stronger individual goals and motivations, **social inclusion** is a far less powerful factor in self-esteem (Guay et al., 2008).

Nevertheless, it can be stated independently of individual factors that social media feedback – the mechanism of giving and receiving "likes" – has common features with **monetary and social rewards** (Sherman et al., 2018). The abundance of knowledge about the effects of these likes on the human brain well exemplifies the interdisciplinary nature of the study of social media. Researchers studied neural responses to viewing or receiving likes and discovered that these one-click positive feedbacks influence neural responses to online information (Sherman et al., 2018). Receiving likes has been shown to stimulate the brain's reward system and affect attention focus (Gunther Moor et al., 2010; Sherman et al., 2016). The neural and behavioural responses elicited by "likes" include the fact that the appearance of images with more likes activates the brain regions associated with reward and visual attention, and a higher number of likes increases the likelihood of clicking on the "like" button (Sherman et al., 2016). Whereas "likes" are frequently used to indicate social support, affiliation, or acknowledgement of a shared experience, they are also commonly used to demonstrate approval or enjoyment (Hayes et al., 2016). According to Sherman et al., who performed fMRI-based (functional magnetic resonance imaging) experiments on the subject, "likes" can stimulate reward-activated brain regions because social media users look at images that are pleasing to them (Sherman et al., 2018).

The images visible on social media – and the reactions to them – provoke such an instinctual response from us. It is undeniable that self-representation has a visual aspect on social media: we are talking about an online space where we are not present with our 3-dimensional self but

with the help of photographs or videos. As Jurgenson wrote, "We cannot understand photography or social media without stepping back and looking at the deeper impulse fuels both: the desire for life in its documented form" (Jurgenson, 2020, p. 2). The underlying motivations for online photo sharing are of both social and technological nature. Researchers point out that online communication has taken a visual turn in the past decade, especially with the extensive use of digital cameras and smartphones that allow immediate and high-quality visual documentation of any event or everyday life moment. A study from 2008 emphasizes that 85% of digital camera owners find it necessary to share photos, and 55% feel guilty if they neglect to do accordingly (cited by Oeldorf-Hirsch & Sundar, 2016). The need to share one's experiences and memories has always motivated the act of personal photo sharing, and the development of technology has made it more available than ever. According to investigations, people may recognize unique reasons for posting images, such as the need to bring others up to date with their children's activities (Van House et al., 2005). However, research shows that those who post images online may be unaware of the underlying needs that these practices address, such as identity formation and self-expression (Van House, 2007).

When discussing online self-representation, we cannot avoid clarifying the meaning and significance of "selfies". In 2013, "selfie" was named the word of the year by the Oxford English Dictionary (BBC, 2013), implying a self-portrait photograph taken by oneself using a digital camera or a smartphone, mainly to post on social media. In the past decade, selfies have become a new medium for self-expression and self-representation (Qiu et al., 2015). Moreover, the phenomenon can also be considered a cultural artefact and social practice (Senft & Baym, 2015). The selfie concept exists at the intersection of multiple assemblages (DeLanda, 2006; Deleuze & Guattari, 1987; Wise, 2005) since it displays the corporeal self (primarily the face from a special angle) and the surroundings, conveyed by the inventions of modern technology. As pointed out in the literature, selfies exist in a unique moment in human technological history, one that invites consideration of the multiple worlds that individuals inhabit (Hjorth & Pink, 2014).

Social media has now become part of the world we live in irrevocably. Therefore, research examining social media usage's various patterns, reasons, and effects is ubiquitous. Certain things are now universally recognized. Facebook use impacts life satisfaction and subjective well-being (Ellison et al., 2007). Because it provides a platform for social support, Facebook can potentially boost adolescent life satisfaction (Kim & Lee, 2011). People utilize social

networking sites to meet various social requirements, such as self-expression and self-presentation (Back et al., 2010). Social networking site activities can boost users' self-esteem and improve their overall well-being (Gonzales & Hancock, 2011). Social support on social media invokes positive emotions and, as a result, greater life satisfaction (Lee et al., 2013).

Another exciting aspect of the relationship between selfies and mental health is that, according to Ging and Garvey (2017), women with eating disorders who share selfies on social media contribute to faster recovery (Ging & Garvey, 2017). However, it has also been proven that the time spent using social media and sharing self-representative images is related to eating disorders (Padín et al., 2021). Face and body representation on social media, including selfies, has drastically changed the public health scenario of how people present themselves and their behaviour (Levin-Zamir, 2020). Showing various health-related behaviours on social media platforms has also become commonplace, including eating habits and exercise or smoking and alcohol consumption (Ging & Garvey, 2017). Users' habits can therefore be monitored through shared content, enabling more targeted health awareness campaigns than ever before. Based on all of this significant scientific evidence, social media support and build social interactions. Enhanced social media usage can contribute favourably to happiness and fulfilment in life.

Nevertheless, the positive effects are overshadowed by the negative ones, which we also have to reckon with, including decreased life satisfaction – which contradicts the previously mentioned results – and jealousy (Lin & Utz, 2015). In addition to the already mentioned research, several sources confirmed that people who use social media more often are more likely to suffer psychological distress, such as anxiety and depression symptoms (Royal Society of Public Health and Youth Health Movement, 2017). The link between social media and anxiety has also been studied. Daily social media use was linked to more dispositional anxiety symptoms and a higher risk of a likely anxiety disorder in young adults (Vanucci et al., 2017), with lower self-esteem and an increased feeling of loneliness (Saiphoo et al., 2020). This association might be causal (Twenge et al., 2017). Spending more than 2 hours a day on social media sites has also been linked to increased psychological distress, such as anxiety and depression (Dobrean & Pasarelu, 2016). Frequent social comparison is one of the most significant risk factors that link social media use to anxiety and depression (Seabrook et al., 2016). In support of the interrelationship mentioned earlier, it is worth mentioning that symptoms of depression were found to be significantly related to the amount of time spent on social media and the intensity with which it was used (Cunningham et al., 2021). Increased use

of social media has already been shown to predict an increased risk of developing depression (Vernon et al., 2016). In addition, it has been observed that the adverse effects of social media use are more pronounced in depressed people (Vernon et al., 2016).

Of course, depression is not the only **affective disorder** that has been shown to have interesting connections with social media so far: Budenz et al., for example, after analyzing more than 1,2 million tweets (posts on Twitter), found that **bipolar disorder**-related entries carried more stigma and less support than general tweets about mental health, which means that this platform is not necessarily ideal for people with bipolar disorder to gain social support (Budenz et al., 2019). Furthermore, it has also been revealed that risk-taking behaviour associated with bipolar disorder and subsequent remorse extends to social media use and online dating among patients (Rydahl et al., 2021). However, the use of social media can also help in diagnosis, as the prodromal phase of bipolar disorder can also be recognized based on patterns of social media use, making deterioration predictable in some cases (Huang et al., 2017). The relationship between anxiety disorder and social media has already been discussed among the mental health problems discussed in this dissertation. However, it is essential to note that social media is also specifically associated with one specific type of **anxiety disorder**, **social anxiety**. Social media offers an excellent opportunity for social interactions for people with social anxiety since, according to the **social compensation hypothesis**, people use social media to compensate for their lack of social skills, which is more conspicuous in face-to-face communication (Dobrean & Pasarelu, 2016).

In contrast, the **social enhancement hypothesis** states that social media offers new opportunities to interact with others, which can increase social anxiety (Dobrean & Pasarelu, 2016). Concerning the relationship between anxiety disorders and social media, it can be concluded that the relationship between **panic disorder** and social media is not well-studied in the literature. One of the few pieces of research covered designing and analysing a social media corpus related to panic disorder for diagnostic purposes (Lee et al., 2021). As for the relationship between agoraphobia and social media use, the number of available resources is so small that it has not been possible to find one that specifically addresses this using the search term "social media agoraphobia" in Google Scholar. However, studying the relationship between social media and mental health is complex because the diversity of results found in the literature is also due to methodological factors (Baker & Algorta, 2016).

First, it is crucial to recognize that the relationship between social media and mental health is multidimensional so that it can be examined from several perspectives. Closely related to the topic of this dissertation – and extremely important from a sociological point of view – is the **mapping of the factors** that may influence the correlation based on the literature sources known so far. Certain **demographic traits** are associated with identifiable patterns of (possibly problematic) social media use and/or increased susceptibility to mental health problems. The first such demographic parameter is **age**. Adolescents, for example, are more prone to use social media, so the negative side of social media use is more common among them, too, including negative social comparison, **cyber-bullying**, and **FOMO** ("fear of missing out") (Kircaburun et al., 2018).

Social comparison will be explained in more detail in this subchapter of the dissertation. The definition of cyberbullying is multifaceted. Most formulations include that bullying is an intentional and repetitive harmful behaviour where the victim finds it difficult to defend themselves (Olweus in Smith [Ed], 1999). It is based on an imbalance of power and is considered a systematic abuse of power (Smith & Sharp, 2006); all in the online space. Strom and Strom point out in their assessment of cyber-bullying: cyber stalking, cyber intimidation, and cyber mistreatment are legal issues, too, since many adolescents go online after returning home from school (Roberts & Foher, 2004) and become a target of various forms of cyberbullying, including threats and rumours (Strom & Strom, 2006). To better understand FOMO, according to Przybylski et al., it has two main components: one is the concern that someone is missing out on positive experiences that others are going through. The other is the constant urge to stay connected to their social network (Przybylski et al., 2013). Aware of all this, it is hardly surprising that the rising rate of depression and suicide among adolescents since 2010, according to Twenge et al., is directly attributable to the increasing use of social media in this age group (Twenge et al., 2017).

Another demographic trait that may influence the relationship between social media and mental health is **gender**. Depression affects at least twice as many women as men, and this difference is even more prominent in adolescence (Salk et al., 2007). In addition, young women spend more time using social media for relational purposes than men, who prefer social media for general information-seeking (Brooks & Longstreet, 2015; Krasnova et al., 2017). Accordingly, the association between social media use and the incidence of depressive symptoms was also stronger in women than men (Brooks & Longstreet, 2015). The effect of gender as an

influencing factor is somewhat overshadowed by the fact that a significant proportion of research did not make it clear whether respondents were asked about their biological sex or gender or whether they had the opportunity to not only identify themselves as women or men (Cunningham et al., 2021). The year of publication may also influence the revealed links between social media use and mental health in a given study (Cunningham et al., 2021). In just eight years, between March 2012 and March 2020, the number of active Facebook users has grown from 901 million to 2.6 billion (Clement, 2020). Social media has become part of the daily routine of more individuals, partly due to the widespread use of smartphones and other portable devices such as tablets.

Obviously, Facebook is not the only social media platform studied so far for its links to mental health. The number of strangers followed on Instagram has also been associated with stronger social comparison and more depressive symptoms (Lup et al., 2015). To understand what might be behind these facts – and the importance of face and body representation on social media as a research topic –it is good to know that friends' pictures on social media have the most significant impact on women's body image (Hogue & Mills, 2019). However, photos of strangers also impact neural and behavioural reactions (Sherman et al., 2016). Facebook usage was also associated with body image concerns in young women (Fardouly & Vartanian, 2015), especially with the high exposure to modified face and body photographs in social media (Sándor, 2020b). However, ethical questions about photo modification in the media arose long before social media became part of everyday life (Wheeler & Gleason, 2010).

But where does this quest to look different or "perfect" come from? One of the explanations cited in the related literature is Festinger's social comparison theory from 1954, which states that people have an inherent desire to assess their personal views and abilities reliably and compare themselves to others when unbiased evaluations are unavailable (Festinger, 1954). According to this theory, the need to evaluate our abilities and opinions is an inherent part of human nature. This is the reason for the desire to compare ourselves to others: to get to know our capacities and limitations (Festinger, 1954). Although, the outcome and consequence of this social comparison depend to a large extent on whether we perceive our selected fellow human beings as "better" or "worse" than ourselves. If we believe that the other person is better than us in something, we may experience it as a threat to us and to the image we have created or intend to create of ourselves. According to Festinger, the phenomenon is called upward or negative social comparison, common in Western culture, where being above average through

constant self-improvement became desirable (Festinger, 1954). Upward or negative social comparison is associated with negative effects and poorer psychological well-being (such as depressive symptoms) (Lockwood & Kunda, 1997; Salovey & Rodin, 1984). Downward or positive social comparison – where we are "better" than others – may decrease anxiety (Steers et al., 2014).

According to Vogel et al. (2014), the increasing use of online interaction has made social media one of the main arenas of social comparison, where textual and pictorial information published by users serves as a basis for constant upward and downward comparison (Vogel et al., 2014). For example, positive messages and joyful images seen on Facebook can give users the impression that they are less happy than others and therefore feel more unfair about life (Chou & Edge, 2012). On social media platforms, depending on the persons or other entities being followed, both types of comparison are possible in a very short time. We can compare our own external and internal qualities with an unprecedented amount of people. This is why the question arises: if the comparison result is variable (sometimes we feel "better" than others and other times "worse"), what will be the bottom line? Bäzner et al. (2016) give a possible answer to this, which shows that those prone to upward social comparison are less likely to observe the positive effects of comparison (Bäzner et al., 2016).

The author of the present thesis believes that the above contradictory research findings may not diminish each other's raison d'être but rather complement each other and point to the often-forgotten fact that we are discussing social *media*. Media is the plural of the medium, an agent for sending and receiving messages in terms of communication, so it is inherently neutral in itself. However, the messages published, the reception they receive, and the impact they seek and achieve are rarely neutral. The author often uses the analogy that social media is like a sword that can accolade others but can even be used as a dangerous weapon against them. It all depends on the conscious and unconscious intent of the users and the conscious nature of their content consumption.

2.2. The Relationship between Mental Health and the COVID-19 Pandemic

In December 2019, news hit the global presses that a novel form of coronavirus had appeared in Wuhan, the most populous city in Central China. It was easy to predict that the high population density in Wuhan would be conducive to transmitting the pathogen via droplet infection. It first spread throughout the rest of Asia, then landed on the shores of other continents, affecting more than a hundred countries in just a few weeks (Remuzzi & Remuzzi, 2020). In January 2020, the World Health Organization (WHO) declared the epidemic a global public health emergency.

Epidemics and pandemics have always been part of the history of humankind. Considering only the past century, there were severe outbreaks such as Spanish flu (1918-1920), Asiatic flu (1956-1957), Severe acute respiratory syndrome (SARS, 2002-2003), "Swine" flu (2009), and Ebola (2013-2014) (Talevi et al., 2020). It is known in the literature that epidemics and pandemics can have a negative impact on mental health and cause problems such as stress, fear, frustration, anger, boredom, loneliness, anxiety or depression (Taylor, 2020). The multifactorial nature of the situation is exemplified by the fact that in addition to the fear of the disease and the socio-psychological effects of possible restrictive measures and the potential future consequences (e.g. for example, the collapse of the healthcare system or the economy, unemployment) (Paredes et al., 2021), there is now a so-called "headline stress disorder", which is a consequence of the abundant and incessant news about the epidemics and is also likely to affect mental health adversely. It can exacerbate psychosomatic symptoms such as heart palpitation or insomnia (Dong & Zheng, 2020).

During a previous coronavirus epidemic (SARS), the detrimental consequences of quarantine were demonstrated, including anxiety, tension, fear, sadness, guilt, and anger (Reynolds et al., 2007). In addition, surveys examining the long-term consequences of SARS found that three years after the outbreak, addiction symptoms were more common among quarantined healthcare workers (Wu et al., 2008). During the H1N1 epidemic a few years later, in addition to stress and depression, death anxiety could also be detected in the general population (Elizarrarás-Rivas, 2010). In addition, it has been found that those with a neurotic or somatoform disease had a significantly higher proportion of those more concerned about swine flu (Page et al., 2011). MERS, widespread in the Middle East, has been reported to correlate with anxiety and anger in quarantine patients with a history of mental illness (Jeong et al.,

2016). Furthermore, many of those hospitalized with MERS in severe conditions developed psychiatric symptoms (Kim et al., 2018). The Ebola outbreaks have been associated with similar mental health complaints, such as insomnia due to anxiety, anger, and fear (Desclaux, 2017), not to mention the psychological effects of infection, such as post-traumatic stress, depression and anxiety (Lötsch, 2017).

However, COVID-19 has emerged in a new, globalized world. This has facilitated its spread in several ways, such as the generalization of international traffic – and its relationship to mental health has been influenced by the widespread use of social media in recent years: the number of active users has multiplied worldwide. The novel coronavirus is extremely contagious, spreads quickly, and is especially dangerous for those with weakened immune systems. According to the Centers for Disease Control and Prevention of the United States of America, "COVID-19 is thought to spread mainly through close contact from person to person, including between people who are physically near each other (within about 6 feet)" (CDC, 2020). Experts are constantly monitoring new cases, testing those who have come into contact with those who have contracted the disease. Curfew restrictions, lockdowns, quarantine, and physical distancing have been proposed and implemented in many regions of the world (Sanche et al., 2020). For the first time in Europe, strict restrictions were imposed in Lombardy on March 82020. It happened due to a sharp increase in morbidity in Italy and an almost exponential increase in the number of cases since February 21, with 9 to 11% of these cases needing intensive care (Remuzzi & Remuzzi, 2020).

Because the online space of social media allows for an immediate response to societal change, in China, for example, the number of Internet searches and social media entries for a new coronavirus epidemic peaked 10–14 days earlier than the epidemic itself in terms of the number of new diseases (Li et al., 2020a). (The distinction between the terms "epidemic" and "pandemic" is intentional here, as the epidemic was only later declared as a pandemic by the WHO.) The two fundamental characteristics of social media are that they cross geographical and cultural boundaries and that, in contrast to the traditional mass communication model, the message recipients also play a sending role when they share posts. Thus, we can also talk about "infodemic", as the dynamics of the spread of pandemic information can be quantified on social media platforms (Cinelli et al., 2020), which can lead to information overload and anxiety among users (Hyvärinen & Vos, 2016).

The term "infodemic" refers to the viral spread of overwhelming information. In the first months, up to April 30, 2020, more than 8,000 publications appeared on PubMed about "COVID-19," which increased to 14,479 by May 19 (PubMed, 2020). According to the TalkWalkerTM (New York City, NY, USA) social media analysis interface, COVID-19 was mentioned a total of 40.2 million times in social media in just six days (May 12-18, 2020) (TalkWalker, 2020). In addition, according to data from the analytics company Sprinklr, almost 20 million people mentioned coronavirus-related terms on social media in the first months of the epidemic, so according to Molla (2020), "coronavirus took over social media" (Molla, 2020). From the data above, we can see that this was an exceptional stream of information to date, meaning that pandemic-related information was also spreading epidemically (Zarocostas, 2020), which was overwhelming both in scientific and average user circles.

As Gottlieb and Dyer (2020) put it, "as the sheer volume of social media information rises, the signal-to-noise ratio lowers, and it can become difficult to identify factual and pertinent information". They also suggested improving social media's role during COVID-19 and other emergencies. In addition to checking the authenticity of resources, they suggested that a system should be set up to monitor each social media resource with the involvement of a third party to filter out incorrect information (Gottlieb & Dyer, 2020). The experts warned of the risk of the outbreak of a "digital epidemic" (Chiolero, 2020), which can primarily be prevented by limiting media use and awareness of media consumption (American Psychological Association, 2020). Monitoring the use of social media during an epidemic is particularly important, as it can shed light on problematic, maladaptive behaviour patterns (Boursier et al., 2020). The need for social relationships caused by forced isolation can trigger symptoms similar to addiction (Kardefelt-Winther, 2014). According to Kardefelt-Winther (2014), based on the compensation model of problematic internet use, internet use due to negative changes in real life can lead to either positive or negative results, i.e. to the intensification of either positive or negative feelings (Kardefelt-Winther, 2014). In order to gain a deeper understanding of the complex relationship between social media use and the pandemic, it is worthwhile to map the possible motivations behind the use of the internet and social media.

The volume of information consumed and shared about COVID-19 on social media aligns with the long-known theory that individuals always seek to reduce uncertainty. The **uncertainty reduction theory** was formulated for interpersonal communication by Berger and Calabrese (Berger & Calabrese, 1975), referring to unpredictable situations beyond understanding bounds

(Baxter & Montgomery, 1996). The author of the present thesis believes that the COVID-19 infodemic can be related to two axioms of the uncertainty reduction theory (URT). Axiom 3 of the URT states that intense uncertainty leads to information seeking, while Axiom 1, increased communication, is related to reduced uncertainty (Berger & Calabrese, 1975; Kramer, 1999). However, along with the URT, its critique also played a crucial role during the pandemic: it has previously been shown, for example, that unexpected information can even increase uncertainty rather than reduce it (Planalp & Honeycutt, 1985).

In addition, individuals' tolerance for uncertainty can vary widely: some are more tolerant of uncertainty, and others are less tolerant (Kellerman & Reynolds, 1990). Kramer stated that "individuals may also create certainty with minimal information seeking and without overt communication", and one of the best-known strategies for dealing with uncertainty is stereotyping (Kramer, 1999). Although stereotyping can have a stigmatizing effect (Heilman et al., 1992), it helps to increase the sense of certainty. It is practical in the case of limited time, skill, or energy for information seeking. It was also a destabilizing circumstance in the COVID era that, in many respects, unexpected and unprecedented situations arose, with solutions developed in real-time. This, of course, was accompanied by continuous changes in expert opinions and preventive measures, while maintaining coherence is also an essential motive in communication (O'Keefe & Shepherd, 1987) in addition to uncertainty reduction.

Similarly, the **attribution theory** of Fiske and Taylor (Fiske & Taylor, 1991) suggests that specific causal attributions can be made to reduce uncertainty based on a person's trait(s) or situation. This concept is already made much more evident by an example from the author of this dissertation: attributing exclusive responsibility for an outbreak to another person or group can significantly reduce one's insecurity, as the sanctioning of the person or group responsible seems to eliminate the trigger, so apparently, there is no need to fear another pandemic. On the other hand, accepting that the outbreak resulted from much more complex processes, which we have only partially known to this date, continues to perpetuate uncertainty, so the science-based view offers a less satisfactory explanation for reducing uncertainty. The effort to reduce uncertainty and the attribution process is the basis for spreading various conspiracy theories. Among the most common non-science-based theories about the origin of COVID-19 is, for example, that the government of the U.S.A. had created the novel coronavirus, and it was intended to be a Chinese biological weapon (Jamieson & Albarracin, 2020). Alternatively, Bill

Gates brought it upon us because he has a financial interest in vaccination programs (Georgiou et al., 2020); or 5G is related to the transmission of the virus (Ahmed et al., 2020).

These theories became so popular that social media users encountered them worldwide. As Chen K. et al. pointed out after analyzing conspiracy narratives and user engagement on the leading Chinese social network, Weibo, "conspiracies and responsibility attribution evolved with Sino-US conflicts, underscore pandemic as a catalyzer for geopolitical conflicts, nationalism, and misinformation" (Chen K. et al., 2020, p. 5). In addition to these equally important aspects, there is at least one relevant aspect of conspiracy theories in social media that seek to explain the background to COVID-19, which was rapidly spreading: belief in COVID-19 conspiracy theories is associated with mental health. According to Chen X. et al., distress disorder and anxiety disorder were more common among those who thought the virus had been intentionally developed in a laboratory than those unsure of its origin; therefore, such beliefs can predict distress and anxiety (Chen X. et al., 2020). It also shows that the explanations devised to reduce uncertainty do not, in fact, consistently achieve their purpose, so the COVID-era has been highly burdened with factors detrimental to mental health. Several online questionnaire surveys have shown a decline in the general population's mental health (Talevi et al., 2020; Hossain et al., 2020).

As for those with a history of psychiatric issues, more than 60% reported that they perceived their mental health condition to worsen during the pandemic (Talevi et al., 2020; Czeisler et al., 2021; Quittkat et al., 2020). In addition, one-fifth of those who had not previously been diagnosed with any mental disorder achieved such a score on validated self-reported psychometric questionnaires during the pandemic that the possibility of having some mental disorder has emerged (Perna et al., 2021). All of this leads to the assumption that stress factors related to COVID-19 can aggravate existing mental illnesses and worsen the condition of individuals who were previously below the diagnostic threshold and can even lead to newly diagnosed mental problems in those for whom the possibility of this did not arise until the pandemic (Caldirola et al., 2021). On the other hand, among those who self-reported a previously diagnosed psychiatric disorder, 7-17% perceived an improvement in their condition during the pandemic, from which we can again only infer the multi-level and varied effects of the pandemic (Caldirola et al., 2021).

Undoubtedly, the COVID-19 pandemic and infodemic have raised entirely new societal questions about the lives of individuals. What happens when our home suddenly becomes the living space where all our interactions occur? What happens if our living room replaces our office or school, and discussions are transferred to some online platform? In other words: what happens when community members can communicate with each other primarily online? These questions can be answered from the perspectives of many disciplines, so it is advisable to choose a multidisciplinary approach that considers all layers of change at different levels (Sándor, 2020a). However, social psychology alone can provide an interpretive framework to shed light on the social implications of the COVID-19 pandemic. Human nature – and the mind – loves permanence. Somewhere deep down, it is true even for those who are truly adventurous, as they too have "sure, fixed points" in their lives that they expect to be permanent, and the loss of those would sensitively affect them. Change can be difficult because it often requires us to evolve: it may simply "not allow" us to continue our daily routine, our usual things, and our well-established patterns. Therefore, change management is one of the most important topics in social psychology (Marris, 2014), which has significance in management theory and everyday life. Moreover, the changes caused by the pandemic led to a crisis in several aspects (e.g. economically and in personal life), so crisis and post-crisis management became necessary from a mental health point of view (Fiorillo & Gorwood, 2020).

Change equals challenge, which is equally valid for everyone — but there are considerable differences in response to it. Uncertainties about the future, fears of infection, resource shortages, public health measures that limit personal freedom in unprecedented ways, material losses, and contradictory messages in the media are all emotional burdens associated with the COVID-19 pandemic (Pfefferbaum & North, 2020). According to the WHO, the proposed measures, including self-isolation and quarantine, had an impact on people's everyday activities, routines, homes and lives, potentially increasing loneliness, anxiety, depression, insomnia, alcohol and drug abuse, and self-harm or suicidal behaviour (WHO, 2020). Although social isolation does not necessarily coincide with loneliness – after all, someone with few human connections is not necessarily lonely, and a person can be lonely even with many human connections – a correlation can be observed between them (van Baarsen et al., 2001).

Loneliness creates a feeling of failure in the social sphere of life, so it can significantly damage mental health (Zammuner, 2008), thus increasing the risk of anxiety and chronic stress (MacHugh & Lawlor, 2013) and unhealthy behaviour (Segrin & Passalacqua, 2010). It is a

recognized fact in the literature that social isolation and loneliness are related to anxiety in both the younger and older age groups and decrease the feeling of happiness and life satisfaction (Salimi, 2011). In addition, this can make individuals more prone to coping mechanisms such as searching for new social relationships (Russell et al., 1984), for which social media provides an excellent platform. It is essential to distinguish between voluntary and forced isolation, as coping strategies for the loneliness experienced in the latter are still controversial (Mucci et al., 2020). Social media can help increase social capital (Boursier et al., 2020). The isolation required in connection with the restrictive measures during COVID-19 could have been terrifying for many. So experts have drawn attention from the very beginning to the importance of nurturing human relationships online and to the fact that social media can help maintain a sense of belonging despite the required physical distance (Banerjee & Rai, 2020; Courtet et al., 2020). The American Psychological Association (APA) explicitly recommends using social media platforms to get information and reduce stress (American Psychological Association 2020). On the other hand, those who overuse media – including social media – and are excessively informed about the pandemic and its consequences are at risk of deteriorating mental health (Holmes et al., 2020).

Showing the severity of the impact of the pandemic on mental health, based on an Indian Psychiatric Society survey, there was a 20% overall increase in mental illnesses in India after the coronavirus outbreak (Loiwal, 2020). In parallel with the WHO warning, it is clear from the literature that mental health experts believed that the pandemic would impact the well-being of the global population. They predicted a rise in the prevalence of depression, suicide, and self-harm, in addition to other symptoms reported globally due to COVID-19 (Li et al., 2020a; Yao et al., 2020). They suggested early on the likelihood of neurotic disorders like generalized anxiety disorder or obsessive-compulsive disorder (OCD) developing in large populations due to new preventive measures (such as continuous hand washing and mandatory physical separation). Aside from mood-related and emotional overreactions, psychological manifestations included panic, fear, avoidance and fear of socialising, fear of death (thanatophobia), fear of being isolated, stigmatisation, fear of lacking essential items, food, and so on; individuals started hoarding necessary items in many countries due to anxiety, resulting in a shortage of goods (Kumar, 2020).

In mental health scholarship, the term "coronavirus anxiety" was established in the early stages of the pandemic (Lee et al., 2020a) to describe not only the fear of becoming ill but also

responses to the difficulties surrounding changing life circumstances. This coronavirus-related anxiety took varying degrees in individuals: the severity could even be functionally impairing. Participants who were functionally impaired by their anxiety and fear of the coronavirus showed increased hopelessness, suicidal thoughts, spiritual crisis, and alcohol or drug problem than those who were anxious but not impaired by the fear of disease in a study of 775 adults in the United States (Lee et al., 2020b). Medical experts and mental health professionals should understand the stressors of those suffering from this condition (Asmundson & Taylor, 2020) since many people perceive clinically relevant fear and anxiety during an infectious disease outbreak (Taylor, 2020). Patients with severe dysfunctional coronavirus anxiety experience various psychological issues, and coronavirus infection is a crucial risk factor for this psychopathology (Lee et al., 2020b).

The pandemic has also made the situation and health care of those who already had mental illness before the outbreak more difficult. Yao et al., for example, expressed their "concerns with regards to the effect of the epidemic on people with mental health disorders" (Yao et al., 2020). They pointed out that "when epidemics arise, people with mental health disorders are generally more susceptible to infections for several reasons" (Yao et al., 2020). Among these reasons was that infections, such as pneumonia, can be exacerbated by mental health issues (Seminog & Goldacre, 2012). Furthermore, a cluster of COVID-19 cases among psychiatric hospital inpatients shortly after the outbreak raised questions about the role of mental disorders in coronavirus transmission (China Newsweek, 2020). Possible causes include a disturbed mental state that limits adherence to preventative measures and risk awareness, the closed nature of psychiatric wards and the discriminatory treatment of psychiatric patients in health care, preventing them from receiving adequate care promptly (Yao et al., 2020). Besides this, COVID-19 comorbidities with mental health disorders make treatment more difficult and plausibly less effective (Sartorius, 2018). COVID-19 can cause a stronger emotional response in people with mental illness, leading to relapse or worsening symptoms associated with their current diagnosis. The pandemic strains the healthcare system, and these patients are unlikely to receive the care they need (Yao et al., 2020).

This global phenomenon – the increased burden on the health care system – also impacted Hungary. György Szekeres, president of the Hungarian Psychiatric Association (MPT), said that the coronavirus epidemic had further worsened the already deficient psychiatric care in Hungary (Kalapos, 2022). He emphasized that psychiatric care requires outpatient care, so

primary care levels must exist across the country. Since the closure of the National Institute of Psychiatry and Neurology in Budapest in 2007, psychiatric inpatient care has been available only in hospital wards with a smaller number of beds. There has been a decline in the need for hospital care for psychiatric patients in recent decades (Kalapos, 2022). The president added that certain illnesses require hospital care at a given stage. However, some affective or anxiety disorders that affect large numbers of people, such as the recent rise in mood disorders caused by the pandemic, might not require inpatient care but outpatient care (Kalapos, 2022). At the same time, psychiatry is very understaffed in Hungary, and since the mid-2000s, it can be considered an official shortage profession. The novel coronavirus has exacerbated the problem, Szekeres pointed out (Kalapos, 2022).

From the beginning of the pandemic, a recommendation could be found in the literature for mental health workers to monitor the condition of patients and those considered at risk remotely (online or via telephone) to reduce the number of infections (Venkatesh & Edirappuli, 2020). In addition, experts stressed the need for the population, decision-makers and health professionals to work together to promote a healthy lifestyle with virtual social interactions during the social distancing and a possible quarantine (Venkatesh & Edirappuli, 2020). The only problem is that even if the technical possibilities are given, not all mental health issues can be treated equally without a personal presence (Feijt et al., 2020). At the same time, professionals have reported that they are confident in the effectiveness of online treatment and benefit from reduced travel time and flexibility; instead, they were concerned about the technological, organizational, and logistical background (Feijt et al., 2020).

The impact of the pandemic on mental health is also a relevant research topic because it is a long-standing condition in both the lives of individuals and health care. As the research related to the present dissertation was conducted in Hungary and in Hungarian language, it is essential to emphasize that Hungary detected its first COVID-19 case on March 4, 2020, with the first COVID-19-related death in the country occurring within 11 days. In reaction to this initial pandemic wave, the Hungarian government declared an epidemiological emergency on March 11, 2020. The lockdown began on March 28 and was supposed to last two weeks, but the administration extended it on April 9 and then progressively until May 4. Closed in this first wave were borders, educational institutions, recreational facilities, restaurants, cafés, bars, clubs, and some private industry service providers, among many others. Meetings, events, and non-emergency visits to health and social care institutions were consequently prohibited.

People had to wear masks publicly in enclosed spaces, e.g. on public transport and in stores. There were few limitations beyond the face mask requirement in Hungary during that summer. However, autumn brought the pandemic's second spike in infections, and the government again announced an epidemiological emergency on November 4, 2020, imposing a curfew the next day. Everyone in the country was forced to stay indoors from 8 p.m. to 5 a.m., and those in cities of more than 10,000 inhabitants had to wear masks in all public spaces, indoors or outdoors. A third COVID-19 wave followed the second as the Alpha variant hit Hungary in mid-February 2021, leading to the limitations remaining in force for a more extended period than those in the first wave. As more than half of the country's population had been vaccinated by then, the government gradually eased restrictions, including lifting the curfew and requirement to wear masks in public spaces by the end of May 2021 (Sándor, 2022). People saw themselves forced to mask up in enclosed spaces again and temporarily switch to taking their university courses online with the arrival of the Delta variant, and hence the fourth wave of the pandemic, that autumn. By the end of 2021, another COVID-19 variant, Omicron, merged the fourth and fifth waves, with Hungary's declared epidemiological emergency extended until June 1, 2022.

During the period(s) mentioned above, significant adjustments to the operations of the institutions that govern our daily lives (e.g., schools and workplaces) were being made daily, and most social interactions quickly became digital. The COVID-19 pandemic has altered the nature of human social interactions considerably – not only because, in many cases, online communication has replaced personal interaction but also because covering a significant part of the face has become mandatory for personal contact (Calbi et al., 2021). There is ample scientific evidence about the critical role of facial parts in recognizing another person's emotional state (Calvo & Nummenmaa, 2008; Nusseck et al., 2008). Studies of traditional Muslim women's wear have shown that if only the upper half of the face is visible, negative feelings are more perceptible than positive ones – partly because of a lack of a visible smile (Fischer et al., 2011). Wearing sanitary masks is more likely to cause negative feelings in men than in women (Caparo & Barcelo, 2020), which may affect the willingness to wear masks and the proportion of masked self-representation in social media. Several studies have been conducted during the COVID-19 pandemic that has examined the negative social effects of mask-wearing (Carbon, 2020; Freud et al., 2020). It turned out that wearing a mask makes it difficult to recognize and identify the emotions of others but symbolizes physical distance. The interpersonal space known in proxemics increased during the pandemic, which is also

interesting from a socio-psychological point of view because the greater distance is typical after certain traumatic events, such as in abused children or adults with post-traumatic stress disorder (Vranic, 2003; Bogović et al., 2016). Not to mention that wearing a mask is also a symbol of the fear of the disease, which is detrimental to social interactions, as one who is afraid has a lower capacity for empathy for one's fellow human beings (Bavel et al., 2020). On the other hand, the same study has shown that the sanitary mask can even be an expression of cooperation, shared values, and the fight against the pandemic under the guise of a kind of shared destiny (Bavel et al., 2020), so here too we can talk about a multidimensional psychosocial effect.

It has already been discussed in the current literature review that the COVID-19 pandemic itself may have led to the worsening of depressive symptoms, loss of self-confidence, alienation and helplessness, and anxiety and post-traumatic stress, even years later (Brooks et al., 2020). This negative effect may be even more pronounced in people with bipolar disorder, partly because both public and private healthcare settings have changed, and disruption to the treatment process has increased patient stress levels (Stefana et al., 2020). Moreover, mental health care in Hungary was suspended during the most stringent restrictive measures. The total capacity of the care system had to be mobilized to control the epidemic, and private healthcare providers had to be temporarily shut down to stop the spread of the infection.

The condition of people with bipolar disorder may not only have worsened mentally during the pandemic, as all specialist care operated with a paused or reduced capacity for the reasons mentioned. Obesity, coronary heart disease, diabetes, and COPD (chronic obstructive pulmonary disease) are prevalent in people with bipolar disorder, which may also be associated with more frequent smoking and substance use (De Hert et al., 2011). This is a problem regarding their care; these factors increase the risk of a more severe form of acute respiratory syndrome if they become infected with the novel coronavirus (Stefana et al., 2020). Experts have also noted that medication for bipolar disorder may interfere with the medication recommended at certain stages of the pandemic and may even lead to worsening bipolar symptoms. Side effects of chloroquine or hydroxychloroquine – considered anti-malarial agents and have therefore been studied in several aspects – given to relieve the symptoms of COVID may include mood disorders, psychosis, or even suicidal ideation (Nevin & Croft, 2016). Home visits with social distancing have been suggested to continue therapy in bipolar patients and others with mental health issues (Garriga et al., 2020). Recommendations included online drug

prescriptions with home delivery, online or telephone therapy, and online mindfulness tools and applications (Hidalgo-Mazzei et al., 2020).

As far as **panic disorder** is concerned, the term **"COVID-19 Pandemic-Induced Panic Disorder"** is also known in the literature: a case study has also been published in which the patient and their family had no history of psychiatric illness, substance use, hospitalization, or chronic illness, such as diabetes or high blood pressure (Bhatia et al., 2021). Panic disorder is also known as "the most physical of mental disorders" as its symptoms may even be debilitating, from gasping for breath to chest pain or discomfort to fear of dying. However, the signs of a panic attack show similarities to symptoms of COVID-19, which makes the relationship between the two diseases very complex. Due to their irregular breathing patterns and the fear of suffocation (which can be a severe problem when wearing a sanitary mask), patients with panic disorder are hypersensitive to the possible COVID symptoms that might result from a panic attack rather than an infection. In case of infection, their panic disorder should be taken into account during treatment, as they may perceive even more intense respiratory symptoms regardless of the severity of their COVID (Perna & Caldirola, 2021).

Moreover, it is harder for them to tolerate bodily sensations and changes (Hoehn-Saric, 2004). Another important link between panic disorder and COVID-19 is that medications taken against the former (mainly clomipramine and paroxetine) have a beneficial effect on breathing issues. It is not advisable to stop taking them suddenly, as this may worsen a possible respiratory problem (Caldirola & Perna, 2019; Oleynick, 2020). Thus, according to professional recommendations, patients with panic disorder experience stronger anxiety about COVID-related symptoms, so it is advisable to offer them mental healthcare in case of infection (Perna & Caldirola, 2021). It is another matter due to the anomalies mentioned above in some countries' healthcare systems; this was impossible or difficult to do in many places, for example, in Hungary.

Of the anxiety disorders discussed in this dissertation, the literature often mentions panic disorder and **agoraphobia** in the same studies – as they often occur together – which can also be observed in connection with the pandemic. Among panic disorder patients with agoraphobia, it was typical that the restrictive measures initially led to an improvement in their condition. Keeping their distance and staying at home had previously been an effective avoidance strategy in everyday life, and during the pandemic, this avoidance behaviour became normalized or even

desirable (Caldirola et al., 2021). For patients with agoraphobia, the request to stay at home could be a direct relief, which is why it was possible to measure an improvement in the condition of 6-22% of them on a self-reported basis during the first lockdown (Quittkat et al., 2020). However, this temporary relief may have resulted in a setback in the therapeutic process. After the more powerful avoidance strategy took effect, the later relaxation of the restrictive measures, the patients had to face the real-life situations that they had already fought for before: their fears that had been extinguished earlier could come to the fore (Goode & Maren, 2014). In addition, the situation was made worse by the fact that forced avoidance and prolonged distress prevailed simultaneously (Perna & Caldirola, 2018).

The relationship between **social anxiety** and the pandemic is also worth mentioning among anxiety disorders. Within the already detailed effects of social distancing and isolation on mental health, the correlation that school closures have contributed significantly to the spread of social anxiety among children and adolescents deserves special attention (Loades et al., 2020). The dual nature of the effects of the pandemic has been emphasized again by the fact that there were students in whom this type of anxiety was reduced due to school closures, as being in school was one of the main stressors for them. However, they were primarily social phobics (Loades et al., 2020). As Zheng et al. pointed out, COVID-19 had a so-called buffering effect on social anxiety in the pandemic-affected areas where psychological distance was mediating (Zheng et al., 2020). All this was explained in the theoretical framework of the Stimulus-Organism-Response (SOR) model, the essence of which is that environmental factors may be able to determine individual responses through an organismic variable: the severity of the pandemic, the number of new cases and restrictive measures were the stimuli, the psychological distance was the organismic variable, and anxiety was the individual reaction (Zheng et al., 2020).

In a nutshell, this means that the more we are affected by the rising number of cases and the restrictive measures, the more likely we are to experience anxiety about the pandemic. A great example of the concept of psychological distance – and a good illustration of the difference from a physical distance – is that more medical students at the same university were affected by anxiety than non-medical students during the previously mentioned SARS epidemic (Wong et al., 2007). Psychological distance, however, is strongly correlated with physical distance, as research showed that students at another university, 20 km away from the hospital, reported much less anxiety (Zheng et al., 2020). A high level of social anxiety can harm social stability

since the social psychological literature states that emotion is the number one trigger of human behaviour (Baumeister et al., 2007). Emergency stress can trigger irrational behaviour, leading to a secondary disaster (Zheng et al., 2020). Tsao et al. (2021) drew attention to the fact that the mental health-related aspects of the pandemic require further investigation since the population's mental health is deteriorating based on the current results (Tsao et al., 2021). It was also a warning sign that the number of deaths due to overdose increased significantly (Schmunk, 2020).

From the above, it can be seen how complex the relationship between COVID-19 and the changes it has caused is with mental health. Due to its unique technological features, social media has been used widely to navigate these changes.

2.3. The Relationship between Social Media and the COVID-19 Pandemic

It is indisputable that during the COVID-19 pandemic lockdowns, the role of social media increased in the lives of both individuals and society. The internet connection has become the "umbilical cord" through which we can stay informed of developments and keep in touch with the outside world, including family members, friends, fellow students or colleagues, and everyone who does not live in the same household.

The importance of social media during an epidemic has already been recognized once before. During the SARS (severe acute respiratory syndrome) crisis, a former coronavirus epidemic that emerged in 2002 and subsided in 2003, social media served as a key means of informing the public and mobilizing public health measures. Furthermore, through spatial and temporal analysis of social media discourses, we can now obtain a comprehensive picture of the epidemiological situation and even generate a real-time map of the spread of the diseases (Yang et al., 2013).

According to the meta-analysis of Tsao et al. (2021), in the case of COVID-19, there was no real-time pandemic monitoring based on social media data, which is probably due to the faster spread and increase in the number of cases than in previous epidemics (Tsao et al., 2021). Nonetheless, the COVID-19 pandemic exemplifies the strong influence of this novel information technology environment. The spread of information can significantly impact people's behaviour and the effectiveness of governmental prevention strategies (Cinelli et al., 2020). In this regard, models for predicting future virus spread are beginning to account for the population's behavioural response to public health interventions and the communication patterns underlying content consumption (Kim et al., 2019; Shaman et al., 2013).

Naturally, in a public health emergency caused by the COVID-19 pandemic, the proportion of health information on social media has increased. Doctors, other health professionals, and policymakers have taken the opportunity to provide information to the public quickly and efficiently. However, one of the main shortcomings of social media stems precisely from its most significant advantage: published information can also be spread "virally" through redistribution, all without going through professional scrutiny. The merit of social media (as a tool) is thus indispensable in disseminating credible health information, but it is also one of the main distribution bases of misinformation. Users on the internet tend to acquire information

that supports their worldviews (Bessi et al., 2015), dismiss contradictory information (Zollo et al., 2017), and "form polarized groups around shared narratives" (Cinelli et al., 2020; Del Vicario et al., 2016). This kind of polarization and the concomitant distortion of interpretation is not at all conducive to the objective reception and evaluation of content, thus facilitating the spread of misinformation (Wardle & Derakhshan, 2017). It has been shown that fake news and inaccurate information can spread faster than fact-based information on social media (Vosoughi et al., 2018). Ruths (2019) argues that "fake news" is an inappropriate name in the first place, as the meaning of the term is influenced by the fact that the views of the adversary or the other parties are often stigmatized this way in political debates (Ruths, 2019). The situation may be different for scientific or health-related topics.

However, a discrepancy can be observed between the literature supported by scientific findings and the knowledge fed by conspiracy theories or hate speech (Velásquez et al., 2020). As Velásquez et al. (2020) pointed out, "hate multiverse spreads malicious COVID-19 content" (Velásquez et al., 2020, p. 1), while Ferrara (2020) drew attention to the role of robot-generated content in the spread of fake news and conspiracy theories (Ferrara, 2020). Based on the data from Pew Research Center (2020), more than half of social media users came across information about the pandemic – even during the initial period – which they judged to be entirely fictional (Jurkowitz & Mitchell, 2020). On YouTube, the second most popular social media platform after Facebook at the time, more than a quarter of the most viewed videos related to the pandemic contained misleading information, with more than 62 million views (Li et al., 2020b). Based on a case study – where a man died from taking chloroquine used for cleaning aquariums as an anti-COVID medicine in the United States – researchers have warned that misleading health information spread on social media can pose a real, even deadly, risk (Waldrop et al., 2020).

All of these factors play an essential role in disseminating information in social media posts. Therefore, it can be stated that there is a risk of widespread misinterpreted or scientifically unfounded – possibly outright misleading – information, which could even encourage inconsistent or inappropriate behaviour. Emotional impact evoked by a piece of given information plays a crucial role in the willingness to share (Stieglitz & Dang-Xuan, 2013). Users should also examine social media posts that represent a strong emotional impulse from a rational perspective. In order to check the authenticity, it is essential, among other things, to identify the source of information beyond any doubt, to identify possible conflicts of interest,

and to map out the data that support the information, which is also authentic. In the case of medical and health content, it is all the more clear that mere goodwill (the "I share it because it seems [to be] useful" attitude) is not enough. More attention is needed to full awareness of the responsibility for sharing (Venegas-Vera et al., 2020). This can be achieved by educating users, which social media platforms have started – partly due to the pandemic. As for expert content, according to the renowned medical journal The Lancet, "verified information is the most effective prevention against the disease of panic and misinformation" (The Lancet, 2020).

Considering the above, it is important to mention that the characteristics of social media also have a positive side, both for the average users and for doctors or other health professionals. Social media represents a new space for collaboration, providing an opportunity for resilient communication (Almansoori & Habtoor, 2018). Since the rapid spread of COVID-19 did not make it possible to fight against the pandemic in the usual way in scientific circles (i.e. with randomized trials and best practices supported by data collected over many years), scientists and health professionals had to find another way for information exchange (Kearsley & Duffy, 2020). The need for rapid information exchange was enhanced because the information and recommendations changed quickly. By the time some results went through the usual editing and publication process for professional journals, they were retracted despite meeting all form and content requirements (e.g. Mehra et al., 2020).

Fortunately, social media has facilitated the spread of the latest findings and recommendations. One of the consequences is that many doctors and health experts have already begun to prefer social media as an authentic source of information over professional journals. This trend was already visible before the pandemic (Kearsley & MacNamara, 2019) when Twitter was considered the most popular social media platform in academic circles (Collins et al., 2016). Social media enables quick communication of recent results and provides an opportunity for interaction, in addition to the fact that some of its platforms can also serve as a venue for webinars or video conferences. The significant shortening of the publication time, which could previously be measured in months or even years, led to the fact that health professionals could already check the validity of the published results in real-time (Gottlieb & Dyer, 2020). Several studies emphasize the role of Twitter in the dissemination of health-related information. Even in the case of scientific texts, as the authors claim that the publication of papers or articles on Twitter promotes professional discussion and the secondary peer review process after publication (Collins et al., 2016; Gross, 2016), this may result in an increase in the number of

citations or even the retraction of the given article. However, there is no authentic tradition of using Twitter in Hungary, and online marketing experts recommend it primarily to those whose target group are foreigners (Mózes & Szoboszlai, 2019). Social media has become an important arena for the previously mentioned crisis management during COVID-19. It helped to draw more attention to preventive measures (social distancing, hand washing) and the way to recognize symptoms, which could contribute to responsible decision-making (when to consult a doctor, when to go into quarantine, when to administer vaccinations) (Depoux et al., 2020).

The dual nature of social media – which has been emphasized several times so far in this dissertation – was discussed by Venegas-Vera et al. (2020) as well, who directly state in their study that social media is both "our ally" and "our enemy" at the same time. The more effective professional discourse and the faster information delivery to the population naturally make social media our ally, but the already mentioned "infodemic" makes it our enemy (Venegas-Vera et al., 2020).

One of the main problems is that popular content on social media gets better reach and more reactions, which does not correlate with truth and credibility. This does not necessarily lead to the spread of best practices – this phenomenon, where popularity determines the value of information according to algorithms, is also known as the effect of the "Kardashian Index" (Hall, 2014). The Kardashian Index (K-index), proposed by Hall (2014, p. 1), is "a measure of discrepancy between a scientist's social media profile and publication record based on the direct comparison of numbers of citations and Twitter followers". It was named after a well-known celebrity, Kim Kardashian, who is one of the often-mentioned examples of the concept of "famous for being famous" (Hall, 2014). In his paper, Hall (2014) draws attention to the fact that the daily life of a celebrity, whose fame mostly comes from a leaked adult film, is viral content in the age of social media. Meanwhile, many scientists and professionals are not recognized even after numerous relevant publications (Hall, 2014). The creator of the K-index suggested that all researchers should display it on their social media profiles. If it is higher than 5, it indicates that the person is very active on social media but has few relevant publications, which reduces their credibility (Hall, 2014). Another exciting aspect of the relationship between social media and COVID-19 is that, according to fact-checkers, celebrities are a major source of misinformation (Bruno Kessler Foundation, 2020).

However, regarding the amount of information, social media has enabled the spread of educational content during the COVID-19 pandemic faster than ever before. Chan et al. (2020), for example, published an infographic on airway management – ensuring airway patency in anaesthesia and intensive care, which is particularly important among covid patients – on Twitter and WeChat (Chan et al., 2020) that was translated into more than ten languages within a few days. The distribution allowed for the infographic to be tailored to the specifics of each clinical setting (González-Padilla & Tortolero-Blanco, 2020).

It became clear long before the pandemic that social media platforms can also help spread scientific results as studies and conclusions reach more people, increasing downloads and citations (Allen et al., 2013). However, during the pandemic, the internet and social media also became one of the main synergies of scientific collaboration: it maintained real-time discourse among researchers even under the most stringent restrictive measures. Besides these, social media is also suitable for disseminating information on preventive measures, which health organizations and decision-makers have used. An interesting correlation was found when Basch et al. (2020) examined the 100 most watched videos on YouTube with the word "coronavirus" in their titles: these videos reached more than 165 million views at the start of the epidemic on 5 March 2020 – 85% of which were published in news channels – and it turned out that half of these videos did not mention preventive measures, less than half brought up the most common symptoms; meanwhile, almost 90% of them discussed deaths, anxiety and quarantine (Basch et al., 2020).

Cuello-Garcia et al. (2020) collected what guidelines could be used to disseminate health information as efficiently and safely as possible (Cuello-Garcia et al., 2020). They believe scientists should use social media to share knowledge with their peers and the wider public. Especially since social media can increase visibility and citations (Luc et al., 2021), discourse with non-experts can help identify and refute misinformation. Fact-checking is also an essential task for experts in social media, which can be realized with the help of information crowdsourcing (Pennycook & Rand, 2019). In addition, Cuello-Garcia et al. (2020) call on scientists to appear in the traditional media and to spread facts and accurate data whenever possible since the information will "eventually trickle down to social media users" (Cuello-Garcia et al., 2020, p. 199).

Unsurprisingly, many of the changes affecting society today have been instigated by increasing social media usage. As mentioned previously, two fundamental features of social media are its ability to transcend geographical and cultural boundaries and the recipients' role when posts are shared, as opposed to traditional models of mass communication. Consequently, these features have led to the rise of the previously mentioned "infodemic", a term that describes the excessive spread of information and can be used specifically to refer to the dissemination of information about the COVID-19 pandemic on social media platforms (Cinelli et al., 2020). The phenomenon of "infoxication" is also known, which means an overwhelming amount of accurate or false information (Cuello-Garcia et al., 2020).

The dire consequences of social media usage during the COVID-19 pandemic are highlighted in the documented case of an Indian man who committed suicide on 12 February 2020. Although his doctor diagnosed him with a different viral infection, the man mistakenly identified his symptoms as indicators of COVID-19. He began obsessively watching videos on social media platforms in which Chinese people who contracted COVID-19 collapsed in public places and were hospitalized against their will (Goyal et al., 2020). While this case may seem like an extreme example, it is undoubtedly thought-provoking regarding how much users are influenced by the information they find on social media. Researchers observed drastic increases in depression, anxiety, and comorbidities among heavy social media users during the COVID-19 pandemic (Gao et al., 2020).

Social media platforms responded quickly to the threat posed by disinformation and sought to modify their algorithm accordingly, which sorts entries for each user according to certain principles. (These principles and the algorithms' details are not public for market reasons, as their disclosure would affect the chances of making a profit.) The algorithm changes may have influenced the spread of self-representational photographs and videos and the number of reactions given and received. However, these modifications were all the more necessary as it has been shown – based on Facebook, which is currently the world's largest social media platform – that the geographical spread of COVID-19 is related to the online network of users (Kuchler et al., 2020). As early as January 2020, Facebook and Instagram have provided a prominent opportunity for educational content from the WHO, the CDC (Centers for Disease Control and Prevention), and local health authorities in each country. The official information resource alert window always appeared when someone clicked on content related to the pandemic on these social media platforms.

In addition, the worldwide COVID-19 Information Center, which provided real-time, authentic information, was launched on Facebook and Instagram in mid-March and received a permanent button at the top of the news feed. According to official reports, by March 25, 2020, more than a billion people had been directed to authentic sources of information (Clegg, 2020). At the same time, restrictions on the dissemination of information that contravenes official recommendations began. This meant the removal and sanctioning of the posts concerned. Facebook has started using artificial intelligence and more effective algorithms to check content marked as false or problematic in some way (Sumbaly et al., 2020). WhatsApp launched the WHO Health Alert service, which included a daily report on COVID-19 statistics, prevention advice and expert answers to frequently asked questions. Viber also launched the WHO Coronavirus Info community, providing real-time updates with the latest news, statistics, prevention suggestions, mask usage information, and questions and answers. Meanwhile, it must be taken into account that although fact-checkers can filter a large amount of information quickly, they cannot pay attention to all the information that emerges. They may be biased regarding the selection of sources (Brennen et al., 2020). Artificial intelligence would also raise questions and involve other kinds of error possibilities. However, in non-public message exchanges between two or more users, the platform operator cannot filter the information because restricting private communication (and possibly online self-representation) would raise serious ethical and legal issues.

This situation – a stake in the credibility of information published in connection with the pandemic – has often encouraged health leaders and decision-makers to communicate even with the broader public through social media. Physicians or healthcare influencers have emerged who have reported on their experience at the front line in the fight against the epidemic, gaining many non-expert followers. Another interesting connection between COVID-19 and social media is that physicians and health experts have also conducted professional debates within social media ranks that have previously remained in expert circles (Gottlieb & Dyer, 2020). One consequence is that perhaps health discourse has become more open than ever, allowing for a wide-ranging exchange of views. One of the dangers of open discourse may be that professional information can be accessed by people who, as laymen, are not necessarily able to interpret it correctly and share it with others in their own (mis)interpretation. Another consequence is that conflicting expert information has emerged about the prevention and treatment options for COVID-19, which may have contributed to the uncertainty affecting the

entire society despite the abundance of information. From the above, it seems that social media is both an alleviator and an increaser of uncertainty, which makes its examination even more exciting and relevant.

The literature also mentions the possible role of social media influencers in the pandemic. Based on the definition by Freberg et al. (2011), influencers are "third-party endorsers who shape an audience's attitudes through blogs, tweets, and the use of other social media channels" (Freberg et al., 2011, p. 90). Since they can have thousands (or even millions) of followers, they are a point of reference for many to form opinions. Mangan & Flaherty (2021) examined the phenomenon that influencers who often share posts about their travels sometimes travelled abroad even during the pandemic restrictions so that they would not have to interrupt their sharing activities on social media. They concluded that "social media influencer tourism should be recognized as a novel entity in travel medicine, in order to protect this vulnerable group of travellers from harm to themselves and their hosts, and to harness their potential as communicators of public health messages" (Mangan & Flaherty, 2021, p. 1).

COVID-19 has broadened the concept of being an influencer, as health experts who were previously mostly followed by professionals have become widely known opinion leaders on social media. Markovitz et al. (2022), for example, attaches great importance to the "vaccine selfies" shared by healthcare workers on social media, which may have played a key role in increasing the willingness of the population to take the vaccine. Their study reveals that almost half of the surveyed healthcare workers posted about their initial vaccination to raise awareness about its benefits and encourage their friends and followers to get vaccinated (Markovitz et al., 2022). They may have felt the need for this because anti-vaccination opinions appeared on many social media platforms during the pandemic, which reduced the willingness to accept the vaccine and promoted vaccine hesitancy (Wilson & Wiysonge, 2020). This is of great importance because previous research confirms that patients often consider healthcare professionals to be the primary source of information when making decisions about vaccination (Hadjipanayis, 2020).

The relevance of the use of social media by healthcare professionals and the general population has also been emphasized by the connection that such expert posts can help counter negative messages about vaccination (Puri et al., 2020). Some experts have even suggested placing photo booths at the entrances of hospitals and vaccination centres that encourage people to take

"vaccine selfies" and ask for this kind of self-representation at medical conferences as well (Markovitz et al., 2022). In addition to this, the researchers also warned that social media, despite its significant influence, cannot be the only arena for disseminating health information, as those who do not use social media must also be reached (Markovitz et al., 2022).

Vaccine selfies spread like wildfire on the internet – or, to use a more apt term, they "went viral" – at the beginning of the COVID-19 vaccine rollout. Of course, not only among healthcare professionals: many users uploaded a photo of themselves before, during or after the vaccination, often with a text message on the importance of vaccination. Social media specifically promoted the spread of this form of self-representation: on Facebook, for example, users can set different frames for their profile picture (this frame can be purely aesthetic, but it can also be used to express a stance in favour of a noble cause), and soon the first frames with the message "I am vaccinated" appeared, even with the type of vaccine in question, or the number of so-called "boosters", which means repeated vaccinations received at recommended intervals. According to Levin-Zamir (2020), the goal was to make being vaccinated against COVID-19 a "new and optimistic norm" for everyone, using the "bandwagon effect" as a motivation (Levin-Zamir, 2020).

However, the motivational structure of posting covid selfies is multifactorial: users could let their social circle know that they had been vaccinated, encouraging them to organize gatherings again, but they could also contribute to convincing vaccination sceptics and share their personal experiences with vaccination (Levin-Zamir, 2020). However, this new trend of self-representation on social media has raised several serious questions: among others, how ethical and appropriate it is to show the act of administering the vaccine by exposing the affected body surface, whether it is permissible to spend time taking selfies in hospitals and vaccination centres, how safe it is to publish the certificate of vaccination with personal data on it, and whether all this does not cause resentment among those who, for some reason, do not have access to vaccination yet or do not have access at all (Levin-Zamir, 2020). Nevertheless, despite the disadvantages, the advantages triumphed, and the "covid selfies" published by tens of thousands of users (health professionals, lay people, influencers) became sociocultural mementoes of the era.

The social effects of disease-related face and body representation are supported, for example, by Nyhan et al. (2014)'s previous research, who found that people viewing pictures of children

with measles tend to associate the symptoms of the disease with perceived or real harmful effects of vaccinations (Nyhan et al., 2014). However, since "vaccine selfies" are typically photographs with a positive meaning, they can create a positive association. COVID-19 vaccine selfies can boost vaccine adoption amongst social media users; with its supporters and critics, the COVID-19 vaccination selfie could favourably change public perception of vaccines by emphasizing health, happiness, and positivity (Ittefaq et al., 2021). Ittefaq et al. (2021) even mapped out in their research what strategies are most effective for taking and publishing such photographs and then concluded that vaccine selfies posted on social media are a viable and effective tool for persuading those against vaccination.

The presence and self-representation in social media changed in several aspects during the pandemic: it was already mentioned in this dissertation that the problematic, addictive use of social media might be an attempt to regain control lost in real life (Ryan et al., 2014; Atroszko et al., 2018); moreover, COVID-19 worldwide has resulted in a situation where millions of people have lost a sense of control in their daily lives amid rapidly changing circumstances due to restrictive measures.

However, it has been suggested that the **increased use of social media during COVID-19** may not be addictive behaviour but rather "just a phase", a **coping mechanism** (Singh et al., 2020). According to a survey of Hammerkopf Consumer Survey, total social media use was, on average, 150 minutes per day, which increased to 280 minutes during the initial period of the first lockdown, and three-quarters of those surveyed spent more time on Facebook, Twitter and WhatsApp (Business Today, 2020). Singh et al. (2020) argue that "when 'social distancing' has become a norm, over-engagement in social media has become a 'psychological necessity'" to maintain human interactions, and healthcare professionals presented themselves as influencers during the time of the crisis (Singh et al., 2020, p. 1). Their theory that increased social media use is a coping mechanism may have been temporary for some, so the phenomenon must be treated accordingly. Nevertheless, it is essential to emphasize that during the pandemic, the connection between mental health status and the time spent using social media became more prominent: in the location of the first COVID-19 outbreak, in Wuhan, for example, it was possible to establish a high risk of combined depression and anxiety in 82% of those reporting frequent social media use (Gao et al., 2020).

2.4. Results on the Tripartite Relationship

Compared to the bilateral relationships discussed in the subchapters (from Chapter 2.1 to 2.3), little research has been done on the tripartite connection between COVID, mental health and social media use. This is probably due to the complexity of the topic and the relatively short time since the pandemic outbreak. However, briefly mentioning some of the most relevant available studies and conclusions is important.

For example, mental health problems were found to be more common among those who used social media more actively during the COVID outbreak; moreover, this study was based on a study conducted in Wuhan, the site of the pandemic outbreak, where anxiety was measured by the Chinese version of generalized anxiety disorder scale (GAD-7), and depression was measured by the WHO-Five Well-Being Index (WHO-5) (Gao et al., 2020). The starting point of another research was that "During the COVID-19 pandemic, both social media use and rates of anxiety and depression among college students have increased significantly", and concluded with the result that "The COVID-19 pandemic acts as a moderator by strengthening the relationship between social media use and mental health" (Haddad et al., 2021). The complexity of the triple connection is shown by the fact that, according to a third study, social media were both attributed a role in mitigating the mental health consequences of the pandemic, while at the same time, newsfeeds related to the coronavirus increased the risk of mental health problems (Abbas et al., 2021).

There was a longitudinal study that suggested that the use of social media may have been a coping mechanism during the pandemic, but since social media can amplify negative feelings in the long term, this could have significant public health consequences (Valdez et al. 2020). A systematic review that examined 30 studies on the link between mental health and digital media use in adolescents during the pandemic concluded that "higher levels of digital media addiction were reported" during COVID and that these users "are particularly at risk of experiencing mental health problems due to the augmented exposure to screen time and social media during the pandemic; on the other hand, however, "one-to-one communication, mutual online friendship, and positive and funny online experiences mitigated feelings of loneliness and stress" (Marciano et al., 2022).

It can also be found in the literature that the risk of depression and secondary trauma in the Wuhan population can be detected by examining the use of social media; all this with the conclusion that "as the virus struck, social media usage was rewarding to Wuhan people who gained informational, emotional, and peer support from the health information shared on social media", but "an excessive use of social media, led to mental health issues", thus "taking a social media break may promote well-being during the pandemic" (Zhong et al., 2021).

As for cause-and-effect relationships, according to another research, it was also revealed that "social media use did not cause mental health issues, but it mediated the levels of traumatic emotions among nonpatients" during the pandemic, but the level of these traumatic emotions significantly influenced by geographical location and lockdown conditions (Zhong et al., 2020).

The relevance of the scientific work discussed in this subchapter is indisputable; however, it is essential to highlight that the uniqueness of this dissertation is the focus on self-representation on social media; in the above pieces of research, the authors did not specifically examine self-representation, but rather the frequency or pandemic-specific aspects of social media activity. Thus, the results discussed below (in Chapter 3) are expected to contribute somewhat to understanding the mental health consequences of the pandemic and self-representation in social media.

3. Research

3.1. The Possible Psychosocial Impact of Modifying Face and Body Photographs in Social Media

One of the unique features of this dissertation is that it was written in a historically exceptional period. Therefore, the first experimental study examined the relationship between self-representation on social media and mental health (the initial topic at the start of the doctoral program) and could not yet cover the pandemic period indicated in the title since the COVID outbreak occurred 2-3 months later. Thus, the research discussed in this subchapter examines the connections between social media use, online self-representation, and mental health. According to the initial hypotheses based on the Literature Review (Chapter 2), (1a) the interviewed social media users are exposed to visibly digitally modified or manipulated face and body photographs through their connections; and those who report seeing altered images of others (1b) will tend to modify images of themselves on social media, and (1c) more symptoms suggestive of depression can be observed in them based on a widely used, validated measuring instrument. Moreover, in addition to the literature, (1d) it is such a relevant and multifaceted social-psychological phenomenon based on the results that it deserves further investigation.

3.1.1. Methods

Assessing the psychosocial impact of modifying face and body photographs in social media is a rather complex task which can only be examined using a mixed method. Individual social media usage patterns, exposure and attitude to modified pictures, and the possible habit of modifying their pictures were assessed with a classic qualitative method: structured one-on-one interviews during in-person meetings with ten Hungarian social media users with various demographic traits, e.g. gender, age, or education. During the interviews, which took place at Eötvös Loránd University, Faculty of Social Sciences, the participants were presented with eight pairs of "before-and-after modification" photographs with four pairs of faces plus four pairs of face and body images. They subsequently completed the Beck Depression Inventory (BDI), a 21-question multiple-choice self-report inventory, one of the most widely used psychometric tests to detect overall mental health status and the severity of a possible depression. Participants were selected by applying to a call published on social media. Besides

the fully structured interviews with social media users, half-structured interviews were also recorded with four Hungarian experts: Dr György Csepeli, social psychologist, professor emeritus of Eötvös Loránd University, Faculty of Social Sciences; Orsolya Pócsi, clinical psychologist, lecturer of the University of Miskolc, Faculty of Arts; Dr Gergely Pataki, chief plastic surgeon, Premium Plastic Surgery, Budapest; and Miklós Bemer, professional photographer of model agencies and licensed beauty pageants. The experts also declared themselves as test subjects specifically within the framework of this research; this is how they made subject-specific comments on behalf of their profession. Each interview was individually recorded between November 17 and December 9, 2019, shortly before the outbreak of the COVID-19 pandemic (Sándor, 2020b).

3.1.2. Results and Discussion

The interviewed sample of the ten social media users consisted of four men and six women with an average age of 41 years and a median age of 36.5 years. The youngest participant was 15 years old, while the oldest was 70. Regarding their level of education, 40% had a university (MA/MSc) degree, 30% had a college (BA/BSc) degree, 20% completed secondary school, and the youngest participant still attended secondary school. According to the BDI, 30% probably had mild depression or were in a mildly depressive state during the data collection and had 10–18 points. In comparison, 70% could be classified as depression-free or minimally depressive with less than 10 points based on their answers. The average Beck score was 5.7 points, and the median score was 4. All participants used social media: 100% consumed images on Facebook, 80% on Instagram, 30% on LinkedIn, 20% on Pinterest, and 10% on Snapchat. The least active user spent "3 minutes a year" browsing social media, while the most active was "online in every waking minute", which meant 16 hours per day. The average daily time on social media was 172 minutes, with a median of 69 minutes.

All participants encountered face and body photographs that they considered "modified". (The author defined modification as "retouching, editing, using filters or any kind of digital altering mechanism".) On social media, 80% saw such images on Facebook, 70% on Instagram, 20% on LinkedIn, and 10% on Pinterest and Snapchat. Half of the interviewed users saw modified face and body photographs "multiple times a day", 30% "once a day", 10% "multiple times a week", and 10% "only a few times". Nine of the ten social media users encountered modified face and body photographs of their acquaintances – the only one who did not, spent just "3

minutes a year" on social media. During the in-person interviews, 70% of the users admitted that they took the opportunity to modify photographs of their faces and bodies. It happened "multiple times a week" to 10%, "few times a month" to 10%, "few times a year" to 30%, and "few times at all" to 20%. Most of them published the modified photo on social media: 40% on Facebook, 30% on Instagram, 10% on LinkedIn, and 10% on Snapchat. To the question, "Did you manage to achieve the desired goal by posting a modified image of you?" all answered "yes". The average Beck score of the image modifiers was 7.14, while the non-modifiers' was 2.33. The 30% of the interviewees who probably had mild depression or were in a mildly depressive state during data collection based on their Beck scores were all image modifiers exposed to modified pictures.

What motivates people to modify photographs of their faces and bodies?

"Different cultures have different ritual reasons for changing their bodies. Modern body modification is related to strengthening a person's market value and increasing their marketability. Everyone wants to be attractive and enhance their appeal. Image modification is a cheap and immediately available alternative to plastic surgery. The basic idea is that you like yourself better if others like you: an interesting fusion of narcissism (to please yourself) and making yourself attractive to others (to please them). Life has become a desperate race against time that destroys the face and the body. Technologies to enhance this marketability must be available until we find the genetic antidote to ageing. This is the consequence of externally directed consumer capitalism," explained social psychologist Dr Csepeli in the interview.

"She is a product", said one of the social media users seeing the same portrait of a well-known American celebrity before-and-after modification. "She's a slave of this image. Ageism is strong; you can't get old. It's all about looks. If you don't meet the standards, you're not good enough. You'll be worthless. She can't be like an average person. They are selling this illusion". "I'd definitely not buy her album if she put the before photo on the cover", admitted another interviewee. "The left one could be next door Mary, and the right one is Beyoncé", as the third participant grasped the result of the modification.

"You must follow the trend to be competitive or be left out completely. People are searching for values everywhere, assuming things that are not true", warns clinical psychologist Pócsi.

She recalled that humans are lied to as many as 200 times a day in general, according to the 1977 book of social psychologist Jerald Jellison of the University of Southern California. "In smaller or bigger things, the photographic world also lies. You can't believe what you see. How can you orientate yourself under these circumstances? There is great uncertainty; the reference point is unstable", summarized Pócsi. "Sometimes I wonder why people modify a certain part of their face or body that they do. What is the goal? I do not know", shared one of the social media users. "Why on earth would you make a plus-size model look skinnier? The whole point of being plus-size is not to be skinny, isn't it?" asked the same interviewee seeing a retouched photo of a plus-size model next to the original one. "Everyone has a built-in sense of beauty, with the golden ratio and everything, something about the proportions we find beautiful. Here they tried to approach it. If we are already showing something to the world, devoting efforts to it, it should be perfect because more people will buy the newspaper or the advertised product. It's a general phenomenon, aiming for more profit", pointed out one of our participants.

"People compare themselves to the ideal images created by advertising professionals who identified those perfect images that seem most attractive to a particular group that they can sell a product with, stated plastic surgeon Dr Pataki. Hair, skin colour, eye colour, eyebrow shape, smile, fullness. Everything counts. Unblemished skin and facial symmetry are a must in these pictures we are surrounded with. There is no time to think about whether you identify with them; it works as an elementary reflex. In a tenth of a second, you are trying to resemble. You want to be young and perfect. You want to gain a selective advantage, an evolutionary instinct like when peacocks trick their potential mate with their pen-feathers," added Dr Pataki.

"Everyone has their unique face, and what they want to show is a little different for everyone. You feel the need to improve your image for the outside world to be accepted or to prevail. This is semi-legitimate, as we can see countless times that those are favoured who do it for some interest", described a social media user during the interview. "This is like a typical before-after commercial," said another while looking at a young woman's original and modified portraits. "The first is completely spontaneous; the second is completely artificial. The first is more human; the second is more like a robot", illustrated another social media user.

"Human face is the play of lights and shadows, and people are susceptible to the harmony of this game. You find it beautiful if the contours follow a line, are continuous and have a nice

curve", clarified Dr Pataki. "Modifying the lights is the first step of retouching a photo", stated professional photographer Miklós Bemer. "Digital image modification is like adding half a dimension to a two-dimensional picture to make it more three-dimension like, more alive. I manipulate things to show the best side of the person being photographed. I make irrelevant defects disappear. I only modify irrelevant things when looking at a person, starting from the most obvious defects to the smaller ones: I don't add, and I don't take away anything essential", explained Bemer.

Whether the widening availability of digital image modifying tools and applications makes any difference, the photographer said, "Unfortunately, not only professional and reasonable points of view exist. We see distorted, unrealistic images in social media. Those who don't understand this can lose themselves quickly. This unrealistic distortion destroys the image of oneself by drawing attention to their supposed defects and intensifying the desire to look like the person they idealise". Among the interviewed social media users, one person said, "Yes, I publish modified pictures of myself to Facebook where the lights are adjusted, my face and hair are made perfect, and my skin unblemished". Others modified the "lights", "colours", "background", and "disturbing details", e.g. blemishes, darkness, distortions, on photographs of their faces and bodies. One of them said, "I correct my body shape". The most frequent tools were Instagram filters (among all Instagram users), but they also mentioned FaceApp and Photoshop. During each user interview, there was a unanimous understanding that the modification below "is OK" because "removing blemishes is acceptable". However, two women participants noted, "I hope that he didn't upload the modified picture to a dating site" because it might result in "disappointment".

"Modifying your face and body photographs is sheer self-deception", Dr Csepeli believes. The social psychologist adds, "People are very self-deceived, tend to look at themselves in an idealised way and accept the idealised image as their real image. Retouching is the anteroom of cosmetic interventions. Everyone likes to look better, more beautiful, and more perfect. In social media, immediate feedback is appealing". Plastic surgeon Dr Pataki talked about the same phenomenon: "Patients who brought the image of others to show the result they wanted had to be rejected by international plastic surgery standards. Today, however, professional guidelines have changed. Every third patient between 18 and 30 comes with images seen on the Internet: most are from Facebook or Instagram, which depict people in a distorted, anatomically impossible way". One of the interviewees noted that "my Facebook connections try to resemble

the manipulated pictures seen in social media and newspapers on their published photos". Another participant said their social media connections tend to modify "mainly the structure of their face, but there are also some who do not look exactly like their picture: sometimes I do not even know who is in the picture because she is a bit more corpulent in real life".

Clinical psychologist Pócsi warns, "Social media doesn't work as a real mirror; it's not about real images, not about real connections. High-school-age children are at a higher risk because they are susceptible to the world of modified images. Even my child of this age asks me not to post anything without editing it!"

3.1.3. Conclusion

The initial hypotheses may have been confirmed among the people studied: (1a) the interviewed social media users are exposed to modified or manipulated face and body photographs through their connections. Those who report seeing modified images of others (1b) will tend to alter their pictures on social media, and (1c) more symptoms suggestive of depression can be observed based on a widely used, validated measuring instrument. Moreover, (1d) based on the results, presumably, it is such a relevant and multifaceted social-psychological phenomenon that it deserves further investigation.

Notwithstanding the small sample size in this pilot study, the results speak to the long-running debate about the psychosocial impact of modifying face and body photographs in social media. The results produced from the mixed-method analysis support the hypothesis that social media users are exposed to altered or manipulated face and body photographs through their connections, and they might also tend to modify their pictures. The findings suggest that modifying face and body photographs will likely persist in social media since the demand originates partly in human nature and consumer society. Based on the Beck scores of the participants, there might be a relation between the inclination to modify pictures of self and mental health. Without a concerted effort to recognize the broad and long-term consequences of such image modifications, this phenomenon might also contribute to the spreading of mental and physical health issues. Hopefully, these findings demonstrate the need to extend research examining the psychosocial impact of modifying face and body photographs in social media (Sándor, 2020b).

3.2. Cross-Sectional Analysis of Self-Representation on Social Media and Depression Risk During the Lockdowns and Restrictions of the First Five COVID-19 Pandemic Waves

"Desperate times call for desperate measures." This idea is attributed initially to Hippocrates, who wrote, "For extreme diseases, extreme methods of cure, as to restriction, are most suitable" in his famous work Aphorisms (Hippocrates, n.d.). However, a similar quote from Erasmus is also known from his book Adagia: *"Malo nodo, malus quærendus cuneus."* (Erasmus, 1520). The phrase has been used as a proverb for centuries, meaning that unconventional solutions may prove to be the best under special circumstances.

As mentioned in this dissertation, Hungary discovered its first COVID-19 case on March 4, 2020, with its first COVID-19-related fatality happening 11 days later. In response to the pandemic's initial wave, the Hungarian government declared an epidemiological emergency on March 11, 2020. The lockdown began on March 28 and was meant to last two weeks, but it was extended by the government on April 9 and then gradually until May 4. The flux of the pandemic then did not allow for a long sampling process, as the timing, duration, and severity of subsequent waves seemed entirely unpredictable. When the first weeks of the lockdown started to show changes in the use of social media, the rapidly changing scenario required the fastest and most effective suitable method, so that data collection could take place even in the presence of strong external influences. Since everyone hoped that the one-off lockdown was an unrepeatably extraordinary period, the author of this dissertation could then rely on the most readily available sample to get a real-time picture of self-representation on social media and depression risk. This hope could also be instilled by the official communication, which suggested that we should endure the lockdown period only once, and it could end any day, only for life to return to normal.

The evaluation of the results was published as a pilot study, considering the characteristics and limitations of convenience samples. This dissertation also relies on the results of longitudinal research based on conventional, diagnosis-based sampling (see Chapter 3.3: "Longitudinal Analysis of Self-Representation of Users Diagnosed with Affective Disorder and/or Anxiety Disorder").

The current subchapter ("Cross-Sectional Analysis of Self-Representation on Social Media and Depression Risk During Lockdowns and Restrictions of the First Five COVID-19 Pandemic Waves") sought to validate the following multipart hypothesis: (2a) time spent on social media and (2b) willingness to share self-representative content increased during at least the first three COVID-19 waves among the participants and were associated with (2c) a growing risk of depressive disorder among users and (2d) an even higher risk among the most active sharers (according to the embedded PHQ-2 questionnaire). The hypothesis was formulated based on the revealed and possible connections discussed in the Literature Review (Chapter 2).

3.2.1. Methods

An online questionnaire represented the most efficient way to collect data from social media users amid the methodological challenges the social sciences faced during COVID-19 and lockdowns. The limitations arising from the situation (shortage of time, impossibility of a personal meeting) did not allow for other types of data collection. This anonymous survey – created in Google Sheets – contained the same 20 questions in Hungarian, with a few modifications in their phrasing to match the different periods at hand during the subsequent pandemic waves. The author shared this questionnaire via Facebook and Instagram during each pandemic wave in Hungary to gain insight into the changes in self-representation on social media and test her hypothesised connection to users' deteriorating mental health. Each time, the questionnaires were spread exclusively through so-called organic reach, i.e. along the basic operating characteristics of the platforms' algorithms, and not as paid advertising.

The questionnaire was designed to record participants' basic demographic traits (gender, age, type of settlement, education level), their social media use patterns (used platforms, types of shared content, frequency of sharing), and current mental health state via the Patient Health Questionnaire-2 (PHQ-2).

Regarding the validated method chosen to assess mental health status, it is essential to note that brief self-report questionnaires have been used for depression screening in primary care for decades (U.S. Preventive Services Task Force, 2002). The PHQ questionnaire exists in shorter and longer question forms (consisting of 2 or 9 questions). However, the length of the entire questionnaire used for this research did not allow the incorporation of the more extended version due to methodological reasons: taking into account the other questions, the excessively

high number of questions could have significantly reduced the willingness to answer, and thus the number of participants. The most significant advantage of PHQ questionnaires is that they are suitable for detecting changes in the condition of individuals even with a small number of questions (Löwe et al., 2004a). Although the different questionnaires used to screen for depression are generally comparable (Mulrow, 1995; Williams et al., 1999), according to several literature references, Patient Health Questionnaires stand out among the questionnaires used to screen for depression: for example, Löwe et al. concluded that "the PHQ-2 appears promising as a brief multipurpose measure for detecting depression, grading its severity, and monitoring outcomes over time" (Löwe et al., 2015, p. 163). As a decisive argument, it was also proven that diagnostic algorithms based on the PHQ provide a realistic estimate of the rate of occurrence of depressive disorders (Rief et al., 2004).

Although at first glance, it may seem questionable that only two items on depressed mood and loss of interest are needed to screen for depression, it still has significant empirical support since the Primary Care Evaluation of Mental Disorders (PRIME-MD) has previously provided evidence (Whooley et al., 1997). Later, clinicians also confirmed this with the oral presentation of the same questions (Arroll, 2003). PRIME-MD, however, was not found to be ideal for grading depression severity or analyzing depression change over time due to its binary (yes/no) response style. Fortunately, the newer PHQ-2's four-point scale answers eliminate this methodological problem. Impressively, based on the calculations of Löve et al. (2004a), the PHQ-2's overall diagnostic accuracy was 0.90 for major depressive disorder and 0.89 for any depressive disorder, as evaluated by the AUC (area under the receiver operating characteristic curve). This is comparable to the results of the significantly longer Hospital Anxiety and Depression Scale (HADS, 0.89 and 0.86, respectively) and the World Health Organization Five-Item Well-Being Index (WBI-5, 0.91 and 0.88, respectively), indicating that the PHQ-2, HADS, and WBI-5 have comparable overall diagnostic accuracies (Löwe et al., 2004a). Although the diagnostic accuracy of the PHQ-9 slightly exceeds that of the PHQ-2 in the case of major depression (AUC = 0.95 vs 0.90), it shows almost the same effectiveness for any depressive disorder (AUC = 0.90 vs 0.89); and there is no relevant difference between them in terms of sensitivity to change (Löwe et al., 2004a; Löwe et al., 2004b).

In all likelihood, the Hungarian language of the research conducted for this dissertation could not have significantly affected the reliability of the PHQ-2, given that, for example, the American and German PHQ-validation studies showed similar results in terms of construct

validity, internal consistency, sensitivity to change, and proposed cut-off scores (Löwe et al., 2004b).

The PHQ-2 questionnaire, as its name suggests, consists of two questions (the first two questions of PHQ-9, the full version of PHQ). It is aimed at how often, in the last two weeks, the person completing it felt "little interest or pleasure in doing things" or was "feeling down, depressed, or hopeless". The answer options are: "not at all", "several days", "more than half the days", and "nearly every day". Since "not at all" is worth 0 points, "several days" is worth 1 point, "more than half the days" is worth 2 points, and "nearly every day" is worth 3 points, the number of points that can be obtained is a minimum of 0 and a maximum of 6. Those who score at least 3 points are at risk of depressive disorder, and further tests are recommended. The PHQ questionnaire, therefore, does not diagnose in itself. It can be one of the first tools for practitioners on the way to a diagnosis and is suitable for detecting a state at risk of depression. It is suitable for identifying patients who may require additional examination, counselling, or treatment; the PHQ-2 could be used effectively in research to determine depression status and severity at baseline and follow-up (Löwe et al., 2005).

The PHQ-2's compactness makes it more feasible to combine it with additional validated screening items for medical problems and mental disorders other than depression and makes it very convenient to insert it into any questionnaire – precisely as in the case of the cross-sectional research described in this dissertation. (The existence of a diagnosis formulated by a healthcare expert was crucial for the longitudinal research that is also part of this dissertation, where this official diagnosis or its absence will form the basis for inclusion in the sample; the two pieces of research are meant to complement each other.)

Returning to the description of the questionnaire for this research, in addition to the questions mentioned so far, two open-ended questions were also included in the online survey used for this repeated cross-sectional study. This allowed users to share their thoughts on their own and their peers' social media use and self-representation amid the first five COVID-19 waves. "How do you think your social media use has changed due to the entire pandemic and the current wave? What kind of pictures and videos do you post about yourself, and how much time do you spend on them?" and "How do you think others' social media use has changed due to the entire pandemic and the current wave? What kind of pictures and videos do they post about themselves, and how much time do they spend on them?" These questions, and the possibility

of freely formulating the answers, ensured that the respondents could shed light on deeper connections, adapting to the methodological challenges posed by geographical and time constraints during the pandemic waves. The situation due to the pandemic and the protection measures that until then have unprecedentedly limited personal freedom made it impossible to conduct interviews or arrange focus groups when defining the methodological framework of this research (in the period marked by the strictest prohibitions of the first wave): social distancing, calls to avoid face-to-face meetings and to stay at home, the closure of institutions and restaurants prevented interviews from being conducted in the usual way, and the culture of online interviewing became habitual only later, raising highly debated concerns ever since (for example, whether the researcher can get different answers online than in person and what factors can influence this difference, how much it influences or distorts the results).

After it was determined that the online questionnaire was the only way to conduct this research within the deadline, data for the first wave was collected from 170 survey respondents during the first strict lockdown, between April 22 and May 11, 2020, via answers related to their social media use before and during the pandemic (Sándor, 2020c). The endpoint of the lockdown was uncertain, but the restrictions could be lifted or eased any day, which would have possibly changed the conditions affecting the use of social media; therefore, the situation required a constant state of readiness to finish the data collection.

In the autumn of 2020, during the second round of data collection (between November 20 and December 2, 2020), the samples were made comparable by adjusting the second to match the first. This happened in the wake of the realization that there will be at least two pandemic waves, but two samples of convenience cannot have the same composition due to their nature. The second version of the survey covered the second-wave lockdown and the "lockdown-free" period between Hungary's first two COVID-19 waves. The author of this dissertation selected 100 sets of answers from 119 participants in the second sample to match it to the first regarding gender and age, with less than a 0.5% difference. In both the selected samples, 79% of the respondents were women and 21% men, among which 2% were aged 13–19, 34% were aged 20–29, 31% were aged 30–39, 16% were aged 40–49, 13% were aged 50–59, and 4% were aged 60–69 (Sándor, 2021). The third survey round, corresponding to the third wave, began on March 13 and ended on April 4, 2021, and included 157 respondents and 135 sets of answers chosen in proportion to the gender and age statistics of the two preceding samples. The final data collection round pertained to the combined fourth and fifth COVID-19 waves. A total of

202 social media users filled out the survey between January 7 and 20, 2022, from which 130 sets of answers were selected to match the previous three samples.

3.2.2. Results and Discussion

The answers to the first social-media-use question ("which social media platforms do you use?") revealed that the most popular platforms among the respondents were Facebook and Messenger. Respectively in each of the four samples, 100%, 97%, 100%, and 98% had used Facebook, and 100%, 96%, 100%, and 98% had used Messenger [Figure 1]. The most used social media platforms also included, in order of popularity, YouTube (76%, 85%, 81%, 83%), Instagram (59%, 55%, 64%, 45%), Viber (53%, 52%, 47%, 38%), Pinterest (28%, 18%, 38%, 35%), WhatsApp (28%, 20%, 19%, 18%), LinkedIn (19%, 15%, 18%, 18%), Snapchat (6%, 7%, 12%, 6%) and Twitter (8%, 6%, 9%, 6%). These numbers were approximately in line with world trends. However, lagging 1-2 years behind them. TikTok, which has been extremely popular since then, only became widely known and used in Hungary after finalizing the questions and answer options of the first data collection. The other difference compared to international trends is the absence of Chinese WeChat, which has hundreds of millions of users due to the population there but is hardly used in Hungary (Revive Digital, 2021).

*Figure 1: Social media platforms used by participants*
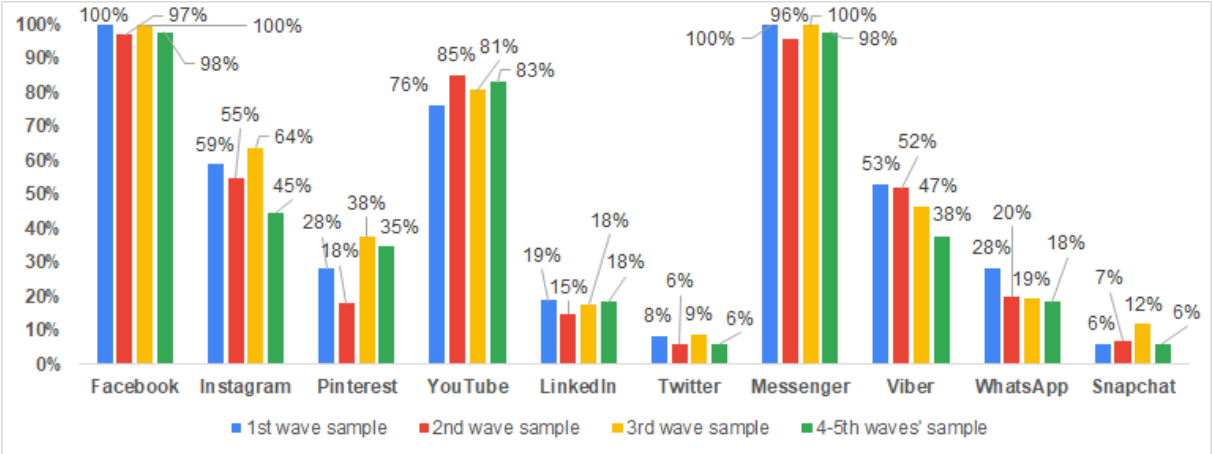
Source: the author

The responses to the next question ("how has your total time spent using social media changed?"), pointed to the first COVID-19 wave as the most momentous: 54% of participants reported they spent more time on social media during the first-wave lockdown in the spring of

2020 than they did pre-pandemic (19% claimed "increased significantly", while 35% answered "increased to some degree"). The second wave brought an increase in social media use compared to the first wave to 35% of the respondents (with a "significant" increase in 12% and an increase "to some degree" in 23%). Intriguingly, the social media activity between the first two pandemic waves was similar to that of the second pandemic wave, according to the participants' self-report.

One possible explanation for this is that the socio-psychological consequences of the first wave extended beyond the wave itself, so the respondents' perceived social media use level did not fall back to the pre-epidemic period during the break between the two waves. (It could also be observed in the later waves that there was a more significant difference compared to the pre-pandemic period than the previous wave. This also supports the former assumption, as mentioned in the literature: people gradually get used to extraordinary situations.) By the third wave, 55% of the participants said they had come to spend more time on social media than before the COVID-19 outbreak (as a "significant" increase was reported by 26% and an increase "to some degree" by 29%), indicating a significant cumulative effect from the first three waves. However, that rate went down to 48% during the final round of responses (with a "significant" increase in 15% and an increase "to some degree" in 33%), in January 2022, indicating that the perceived cumulative effect may have faded during the merging fourth and fifth waves [Figure 2].

Figure 2: Overall perception of one's own time spent on social media
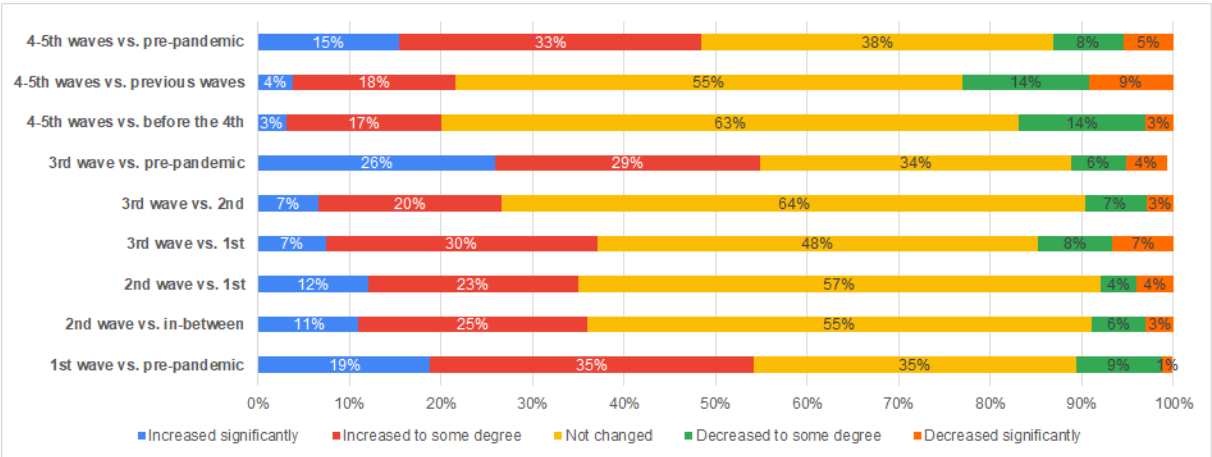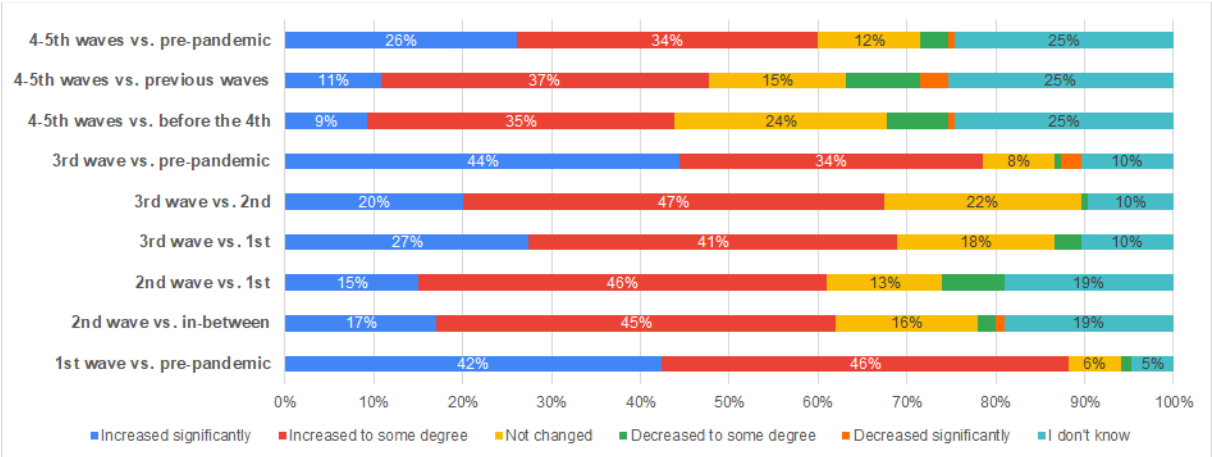

Source: the author

Interestingly, the survey results show a significant discrepancy between respondents' impressions of changes to their social media use and that of others. To a similar extent, in the first, second, and third waves, they noted more significant changes in others' social media usage patterns (in both time and frequency) than in their own. During the first COVID-19 pandemic wave in Hungary, 42% of participants said that others' social media use 'increased significantly', and 46% said it 'increased to some degree' [Figure 3]. This means that a total of 88%(!) of the participants perceived an increasing trend in the social media use of others during the first wave compared to the pre-epidemic period. The increase during the second pandemic wave turned out to be smaller but also relevant: 17% of the respondents believed that others' social media use "increased significantly" compared to the period between the first two pandemic waves, and 45% said that it "increased to some degree". Similar results were obtained when comparing the second and first epidemic waves: 15% of participants said that others' use of social media "increased significantly", and 46% said it "increased to some degree".

Even though the second and third waves were merging (but to a smaller extent than the fourth and the fifth), two-thirds of respondents (67%) saw an increase in others' social media usage times from one to another (with a "significant" increase in 20% and an increase "to some degree" in 47%). During the third wave of the pandemic, 68% perceived an increase in the use of social media by others compared to the first wave. This is a similar ratio when comparing the third and second pandemic waves, with the essential difference that compared to the first wave, 27% perceived a "significant" increase, while compared to the second, only 20%. Compared to the pre-pandemic period, the second largest increase was seen in the data collection of the third wave: 44% believed that the use of social media by others had "increased significantly", and 34% said that it had "increased to some degree". This total rate of 78% may be lower than the 88% measured during the first wave. It might be due to adaptation to change (also mentioned in the literature).

During the fourth and fifth waves, 48% noticed that others spent more time on social media compared to the previous waves (according to 11%, there was a "significant" increase, while 37% perceived an increase "to some degree"). 60% reported the same compared to the pre-pandemic period (26% believed "significantly", and 34% "to some degree"). However, it is essential to note that after the third wave, a more extended period passed until the arrival of the fourth and fifth waves, which overlapped. The fourth wave's peak occurred more than a year and a half after the start of the pandemic in Hungary (which happened in March 2020). There

are probably two main reasons (or a combination of them) behind this trend: on the one hand, in the more extended period, a significant adaptation to the socio-psychological effects of the pandemic may have taken place, and on the other hand, with the spread of vaccination and the gradual weakening of the virus variants (with the easing of symptoms and the decrease in the number of deaths), the restrictive measures also became more and more mild, so the data recordings that coincided with the restrictions took place in a less "extraordinary" period compared to the previous ones.

Figure 3: Overall perception of time others spent on social media

Source: the author

Participants were asked to answer the following open-ended question: "How do you think others' social media use has changed due to the entire pandemic and the current fourth and fifth wave? What kind of pictures and videos do they post about themselves, and how much time do they spend on them?" One of the participants wrote during the last data collection: "I spend more time on it, even 5–6 hours a day. I also share more content, preferring to share [content] about me on Instagram or Snapchat, and other people's content on Facebook." Another respondent pointed out that "due to contact restrictions, contact with family and friends could only be limited to social media." Reasons for increased social media use may be not only personal but also professional, as a third user emphasized that "before the pandemic, I didn't use any social media other than YouTube at all. I was forced to FB [Facebook] as a teacher, but I only use it for work."

Some participants made social-level conclusions. "Due to the pandemic, society is spending even more time on the internet and social media sites than before". "I think people spend much

time doing this and increasingly post more information and pictures about themselves, their [health] condition, and their concerns". "People are much more active because this [social media] may connect them to the outside world. I think they rather upload pictures of what they do at home". However, pandemic-related changes in social media use may fade over time, as indicated by another respondent, in sync with the literature: "during the current [fifth] wave, I'm already posting less and reading less about the pandemic." Engagingly, someone suggested that trauma response may be a reason for sharing content more often during the pandemic, writing that "my acquaintances share more pictures and posts, especially those who have already gone through the [COVID-19] disease or lost a loved one." The quoted responses may help explain the numbers in Figure 3.

Survey participants saw the most notable increase in responses (likes, other one-button reactions, comments) to the self-representative photos and videos they shared on social media during the second COVID-19 wave compared to the first [Figure 4]. At that time, 62% felt other users reacted more to their posts (17% reported a "significant" increase in the reactions received, while 45% perceived an increase "to some degree"). To support the theories about the gradual weakening of specific socio-psychological effects of the pandemic, the spike in reactions perceived compared to pre-pandemic times gradually decreased over time. The slightest perceived increase could be measured during the fourth and fifth waves compared to the previous waves, when 13% of participants reported an increase in the number of reactions to self-representative content on social media (1% described a "significant" increase and 12% told of an increase "to some degree").

One of the explanations for the increase in the number of reactions detected during the second wave may be that several of the respondents at that time mentioned the so-called "#throwback" photos to the open questions about changes in social media use. Such self-representative photographs "throw us back in time", so they were taken in the past (weeks, months, or even years before). During the second wave that began in the fall of 2020, the pictures taken during the lockdown-free summer between the first two waves could have been #throwback photos in the same way as the snapshots of the first wave or the pre-pandemic period. These could all create nostalgic feelings amid repeated restrictive measures.

As Tatar et al. pointed out, the impact of the restrictive measures "has led people to past experiences and memories, and many people have used nostalgia as a crucial resource for

alleviating the negative impact of the outbreak", which evoked emotions such as regret, hope, pride, freedom, joy, peace, excitement, yearning, gratitude, sadness, and happiness (Tatar et al., 2022, p. 13).

*Figure 4: Overall perception of amount of reaction received*
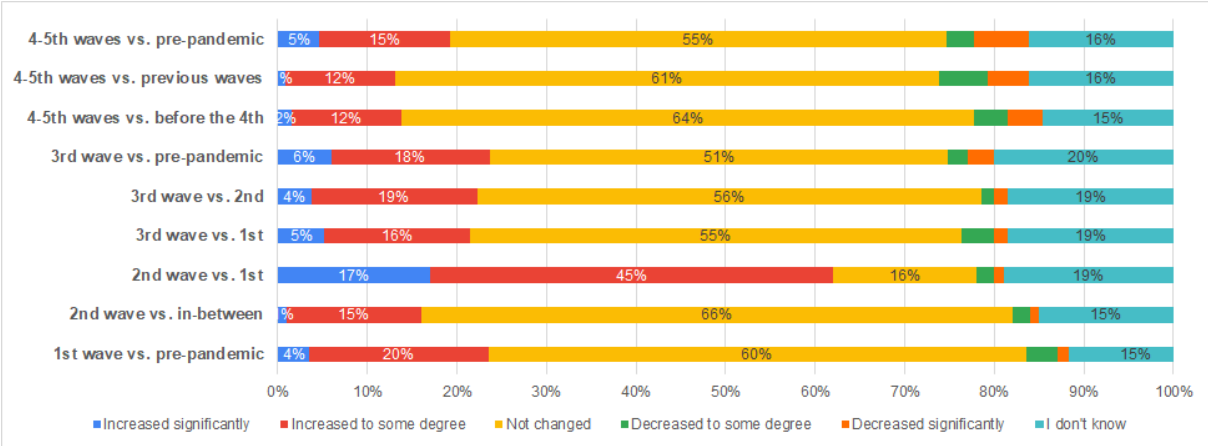
Source: the author

Concerning one's responses to other users' posts (likes, other one-button reactions, comments), the most significant change vis-à-vis pre-pandemic times was observed during the first and third COVID-19 waves [Figure 5], when 40% and 36%, respectively, thought they had come to react more on social media. During the first wave, 6% perceived their reactions to other people's content "increased significantly" compared to the period before the pandemic. In contrast, during the third wave, 12%, and the proportion of those who, according to their admission, were more generous "to some degree" with reactions, accounted for 34% and 24%.

Conversely, the period of the merging fourth and fifth waves saw a more modest 17% increase vis-à-vis the months between the third and fourth waves. This may also support the assumption that specific psychosocial effects of the pandemic were more substantial over the first waves and then lost some of their momenta – in this case, in terms of social media activity. This may also be the explanation for the fact that during the fourth and fifth waves, the respondents reported the most significant drop in the number of given reactions: at that time, the proportion of those who, according to their admission, reacted less often to other people's content on social media was 16% (compared to both the previous waves and the period between the third and fourth waves).

Figure 5: Overall perception of amount of reaction given
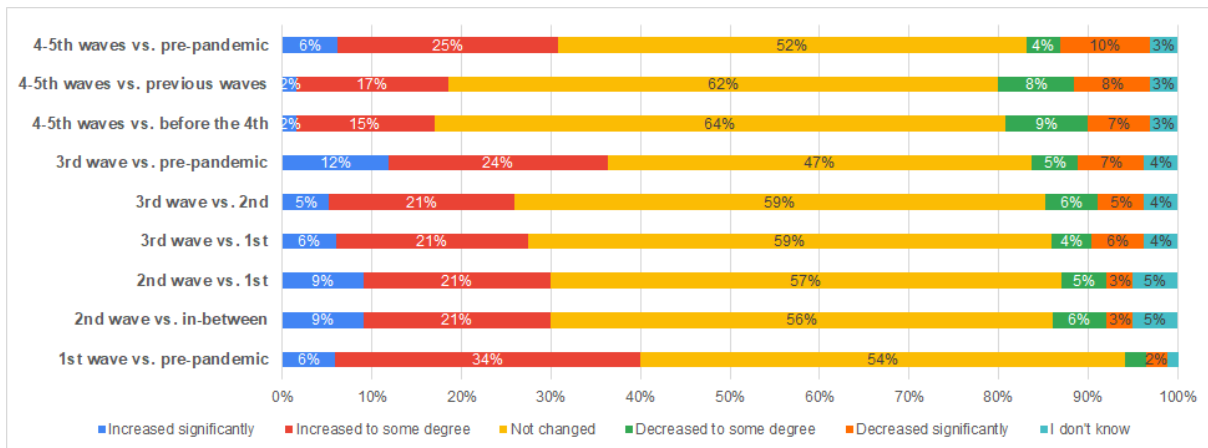
Source: the author

According to data from matrix questions (multiple-choice grids with time intervals in their columns and social media platforms in their rows), the time respondents spent on social media increased dramatically during the COVID-19 pandemic. Participants answered these matrix questions twice in the first two survey rounds: the first time to record their platform-specific perceived social media usage prior to and during the first lockdown and the second time to evaluate it prior to and during the second lockdown. Likewise, the third-wave data collection assisted in quantifying users' perceived social media use during the third lockdown. The fourth assessed it for the merging fourth and fifth waves. The data refer to self-reported time estimation, although the respondents were encouraged to report social media usage based on the accurate application-specific screen time data on their phones (all smartphones have this built-in feature).

The most remarkable changes in time spent on social media were observed among the respondents in the case of Facebook. The most common answer (21%) was "more than 2 hours" among the periods serving as answer options ("less than 10 minutes", "10-29 minutes", "30-44 minutes", "45-59 minutes", "60-89 minutes", "90-120 minutes", "more than 2 hours") [Figure 6]. The rate of participants who used Facebook for such extended periods daily fell to about half (11%) between the first two lockdowns, only to rise again during the subsequent wave to 18%, then fall slightly to 15%. The corresponding rate in the fourth and fifth waves (12%) was closer to the in-between period of the first two waves (11%). However, more users reported "90–120 mins" of use during the fourth data collection round (8%) than in the first in-between period (5%).

The proportion of those who spent at least one hour a day on Facebook increased to 40% during the first wave compared to 30% before the pandemic, only to drop to 29% between the first two waves and then increase to 35% during the second wave and to 40% under the third wave. During the merging fourth and fifth waves, however, a downward trend of 31% could be observed again. The research data shows a trend change on several occasions during the merging fourth and fifth waves, probably due to the already mentioned connection that people might "get used to" an extraordinary situation over time, so its socio-psychological effects also weaken.

*Figure 6: Time spent daily on Facebook (before, during, and between pandemic waves)*
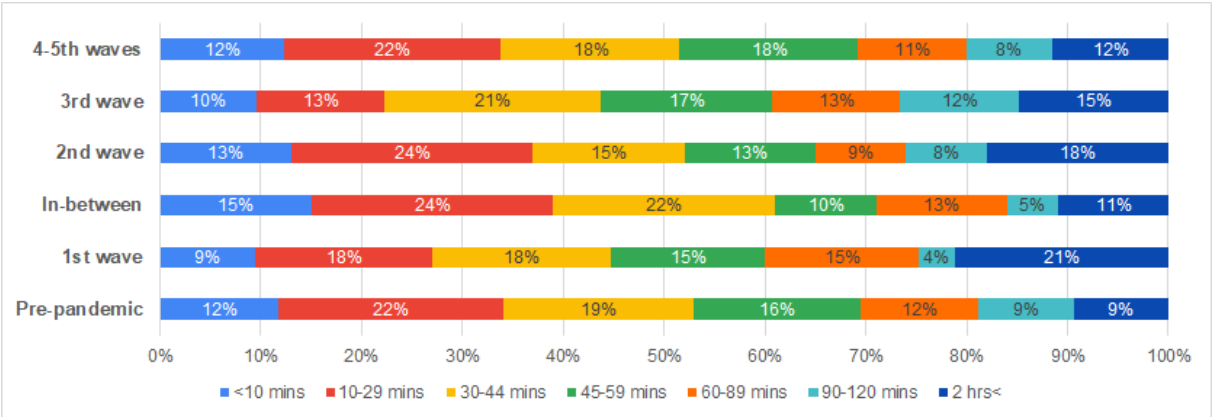
Source: the author

Messenger was the most popular social messaging platform among the respondents, and its use also increased prominently. Vis-à-vis the pre-pandemic era, the proportion of the least-assiduous users (less than 10 minutes per day) decreased from 21% to 7% by the third wave (with 13% during the first wave and 21% to the second) but bounced back up to 24% during the combined fourth and fifth waves.

Meanwhile, extended Messenger use (more than two hours per day) was the most frequent during the second wave (13%) and least frequent during the fourth and fifth waves (5%). Interestingly, this ratio is even smaller than that of the pre-pandemic-related data (8%), which also might be explained by the supposedly evanescent psychosocial effects of the pandemic. However, for methodological reasons, the convenience sample limits the scope of conclusions drawn from the data.

Figure 7: Time spent daily on Messenger (before, during, and between pandemic waves)
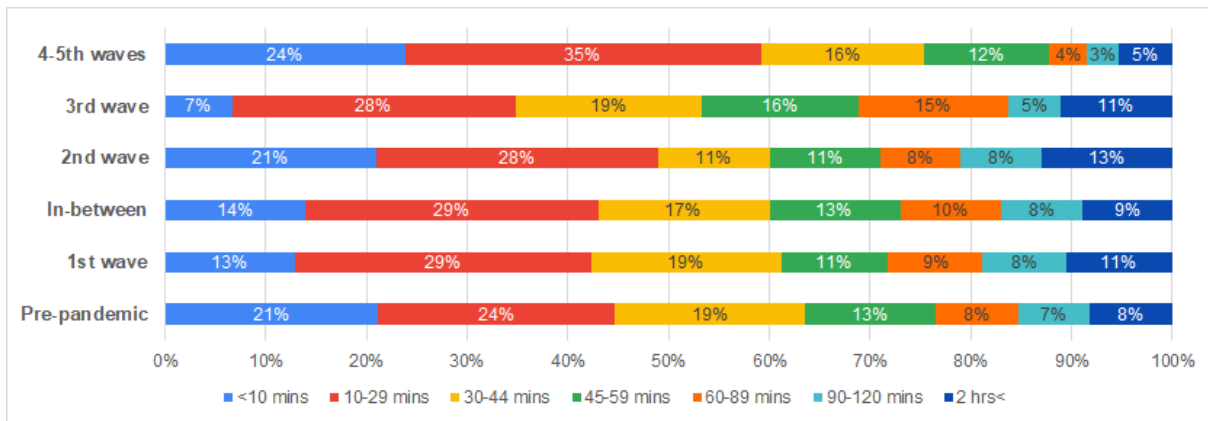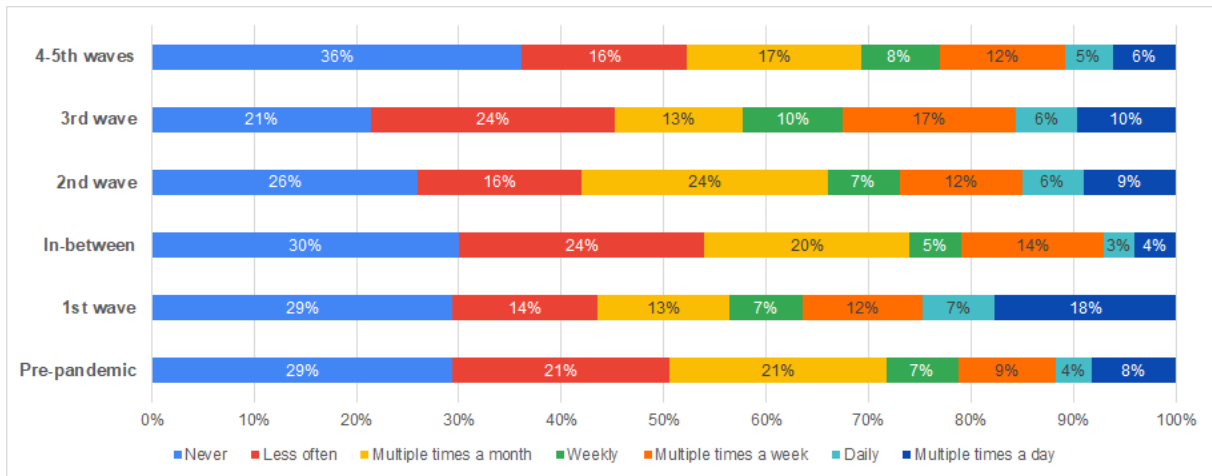

Source: the author

Participants also reported how frequently they shared photos or videos of themselves alone or with others (including their pets) on social media before, between, and during the COVID-19 waves in Hungary. According to the data collected, changes in this behaviour were more noticeable on social messaging platforms (Messenger, Viber, WhatsApp, and Snapchat) than on social networking sites (Facebook, Instagram, LinkedIn, Twitter, Pinterest, and YouTube).

Changes were most apparent on Messenger, where 18% of participants reportedly shared personal photos or videos "multiple times a day" during the first COVID-19 wave, at more than double the pre-pandemic rate of 8% [Figure 8]. Between the first two waves, the proportion of the most assiduous sharers dropped to 4%, only to climb back up to 9% during the second lockdown and 10% during the third. It then dropped to 6% during the fourth and fifth waves, less than the pre-pandemic rate.

The proportion of those who sent or shared personal photos or videos daily on Messenger increased from 12% pre-pandemic to 25% during the first lockdown. Between the first two lockdowns, it decreased to 7%, then more than doubled to 15% in the second lockdown, reaching 16% in the third and dropping to 11% in the fourth and fifth waves. Non-sharers had increased to 36% by the fourth and fifth waves, the highest proportion recorded, meaning that the respondents' willingness to share was the lowest among the pandemic waves. This is in line with the decrease in the intensity of social media use already observed in the answers to the previous questions during the fourth and fifth waves.

Figure 8: Frequency of self-representative photo or video posts on Messenger (before, during, and between pandemic waves)
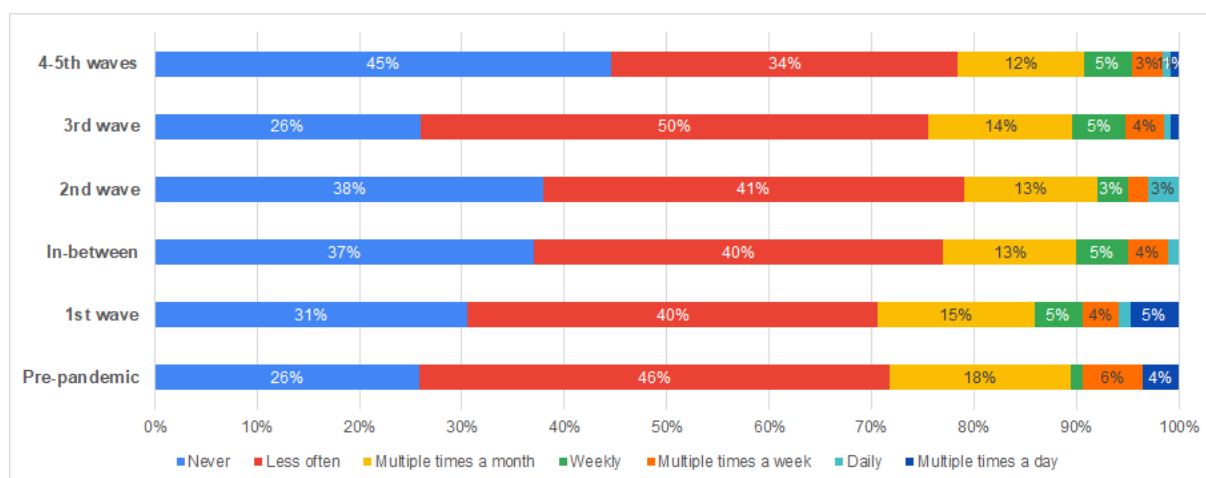

Source: the author

Despite being the world's most popular social network, Facebook appeared to lose self-representational value among users as the pandemic progressed (Wright & Bullock, 2021). During Hungary's first COVID-19 wave, the rate of users who shared at least one personal photo or video per day on the platform went up from 4% to 6%. It then fell to 1% between the first two waves, increased to 3% during the second wave, and dropped to 2% during the third wave, staying there during the fourth and fifth waves [Figure 9].

The proportion of non-sharers climbed to 45% by the end of the data collection on Facebook, representing the weakest level of desire to share amid the pandemic, as was the case on Messenger [Figure 8].

The proportion of non-sharers has almost doubled by the last data collection compared to the pre-pandemic period (in less than two years), which suggests that, for some reason, the participants felt less motivated to share self-representative content on Facebook. In the case of Messenger, the trend was not that spectacular. Possible explanations include the general decline in the popularity of Facebook (with the simultaneous rise in popularity of other social media platforms). The function change of Facebook from self-representation to information acquisition; the decline of this kind of social-psychological impact of the pandemic after a peak; or their mutually reinforcing combination.

Figure 9: Frequency of self-representative photo or video posts on Facebook (before, during, and between pandemic waves)

Source: the author

In response to the corresponding open-ended question about the changes in their self-representation on social media during the pandemic, a participant explained that "as we gained more 'practice' in confinement, the time we spent there [on social media], the desire and need to share and read, decreased." However, self-representation could also remain as a rite, even with fewer such shares: "I post a maximum of one picture per month, but I try to edit it as nicely as possible, spending an average of 1.5 hours per picture. These pictures are mostly selfies; unfortunately, I cannot share travel photos." To another survey participant, social media functioned more as a communication channel than a self-representative one: "I communicate more on social media than I did before the pandemic. I don't post more pictures of myself, rather less, because I rarely go to a place that's worth it."

This means that social media is not premised upon self-representative content for everyone while becoming central for social interaction during the pandemic. "I'm spending much more time on social media [during the pandemic], but I don't share pictures or videos of myself," said one of the participants in support of this. They declared that they spend "approximately 4 hours a day" browsing social media and sharing other types of content. Rarely going out the traditional way may mean going out more frequently "online", as someone else pointed out that "a fundamental change during the pandemic is that with people we met with before frequently, e.g. with former colleagues, we now have a beer online instead of a pub every month. In the summer, we met in person outdoors, before [during the third wave] and after [during the fourth wave] on Messenger."

Asked about the type of self-representative photos and videos they posted, a considerably higher rate of participants indicated posting in this way during the third lockdown and fourth and fifth waves than during the first two waves. They reported having posted "selfies" more than any other type of self-representative content (from the options "selfie", "portrait, "with others", "at work", "at home", "sexy", "exercising", and "trip") during the first lockdown. This was valid for all social media platforms mentioned in this study (Facebook, Instagram, Pinterest, YouTube, LinkedIn, Twitter, Messenger, Viber, WhatsApp, and Snapchat). Despite what one may think, the predominance of selfies on Facebook decreased during the second lockdown (during the first lockdown, 20% of the respondents reported sharing these, then 11%), going up to 18% during the third wave and down to 14% during the fourth and fifth waves [Figure 10]. By the second wave, selfies had been overtaken by the previous runner-up, images and videos shot "with others", whose popularity climbed from 19% to 28% by the second lockdown and experienced a similar up-and-down pattern, going from 20% to 22% during the last two data collection periods.

Travel photos and videos became the single most popular self-representative post type by the third wave (21% of respondents indicated that they shared this kind of content), a trend strengthened during the fourth and fifth waves (26%). However, selfies and portraits together composed the most popular self-representative posts during each wave. (The distinction between selfies and portraits is that in selfies, the photographer is the subject of the image, but in portraits, the photographer and subject are usually separate.)

It is worth noting that the preventive restrictions were lighter between the first two waves and during Hungary's third, fourth, and fifth waves. Thus, one probable reason for this trend of taking photos or videos on a trip or while spending time with people otherwise was the less strict set of limitations enabling individuals to connect, attend numerous public or private events, and enjoy a summer or winter vacation. Nostalgia for the times before the lockdowns may also have played a role in sharing earlier travel and gathering photos and videos published during the strict restrictive measures of the first and second waves (including curfews), which refers to the already mentioned #throwback concept. Obviously, a single photo or video may fall under more than one category (for example, a "workout selfie").
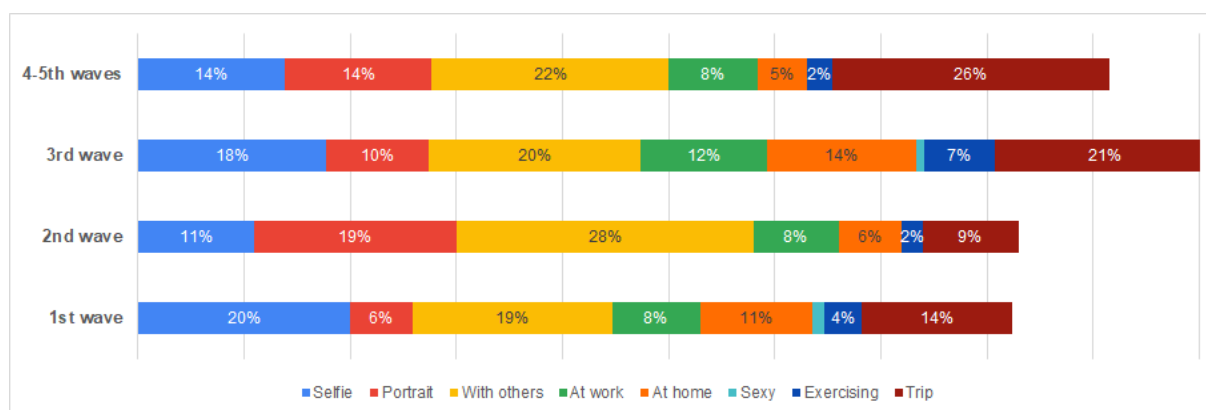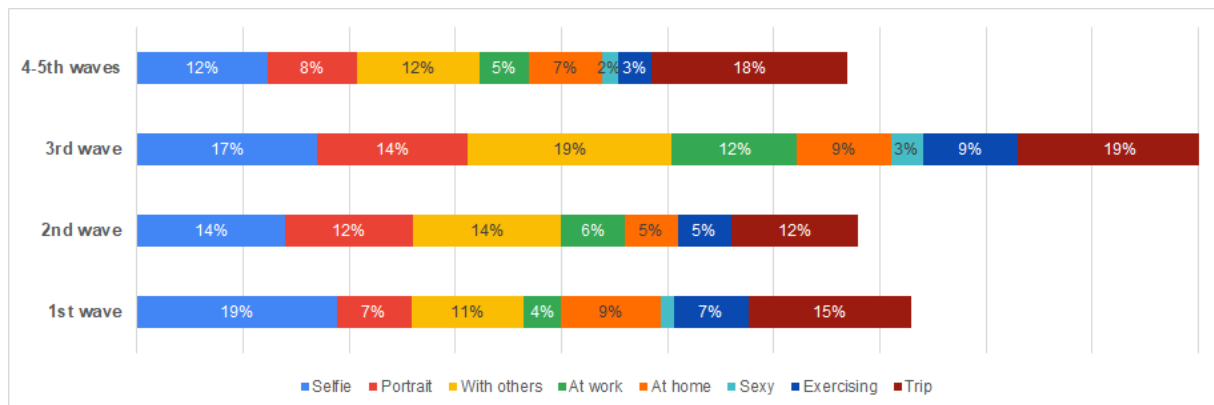
Source: the author

Instagram, another popular social network, has shown a similar trend, with selfies and portraits together composing the most frequent self-representative post types, and photos and videos taken during travel and/or spending time with others surpassing selfies' popularity over time [Figure 11]. The differences between Facebook and Instagram can be explained in several ways. One of the possible reasons is that Instagram is a visual platform where pictures and videos are clearly in the foreground, and the text description that can be attached to them is not featured at all. It is unnecessary to read it to press the "like" button or comment on the content. Thus, it is conceivable that users chose another platform to publish content that required a more detailed explanation or background explanation.

 The age composition of Instagram and Facebook users also differs, which may also justify the discrepancy: even though a decade ago, joining Facebook used to be the digital imprint of coming of age (Robards, 2012), the range of Facebook users is showing an "ageing" tendency now, while the younger generation migrates to other platforms (Auxier & Anderson, 2021). However, since 65% of the participants of all the samples used for this research are between 20 and 39 years old, and only 2% fall into the category of 13-19-year-olds, it is not necessary to discuss the social media preference of teenagers here. At the same time, professional articles discussing why millennials are increasingly moving away from Facebook (e.g. Williams, 2018) can provide a relevant interpretive framework for the results measured on different platforms regarding self-representation.

*Figure 11: Types of self-related photos or videos shared on Instagram during COVID-19 pandemic waves*

Source: the author

The essential difference between social messaging and social networking is that the former offers a more private way to exchange content (with only one user or a small group with selected members), implying that the user-generated content there is often not intended to be shared publicly. However, examining this within such a framework is difficult because users are not necessarily aware of the difference between social messaging platforms and social networking sites. (Fortunately, it was still possible to formulate platform-specific conclusions, as seen in this subsection's continuation.)

Hence, it is not surprising that the respondents reportedly tended to share more explicit photos and videos of themselves on Messenger (with 4%, 2%, 7%, and 3%), which is among the world's most popular social messaging platforms. (The use of Messenger requires an active Facebook user account, but it is also available with a separate application in addition to the standard web interface.) Apart from this, posting trends were similar between social messaging and social networking. However, photos and videos taken "at home" had greater importance in the former (with 14%, 23%, 27%, and 20%, respectively, during the data collection periods), just like photos and videos taken 'at work' (with 8%, 10%, 20%, and 12%). "I think they [others] must be browsing and posting more overall. Many people from my environment have started a new hobby, a job, posting pictures at home", explained one of the participants, answering the open-ended question about the perceived changes in others' social media use patterns.

Figure 12: Types of self-related photos or videos shared on Messenger during COVID-19 pandemic waves
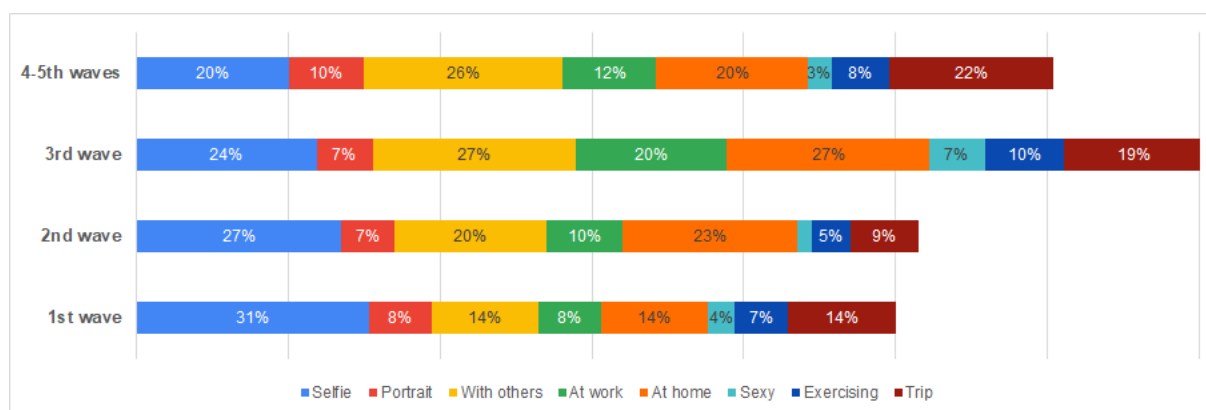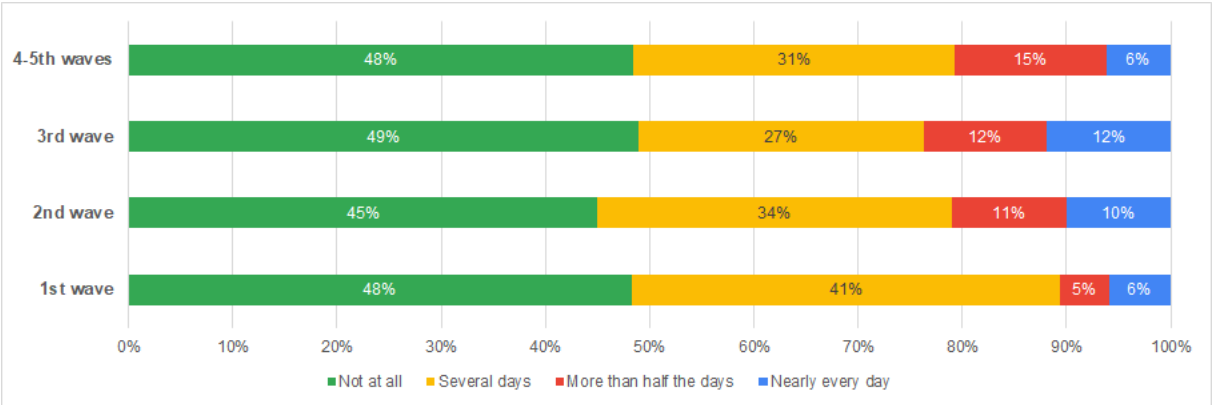
Source: the author

As explained in the methodological subsection, the online survey incorporated the Patient Health Questionnaire-2 (PHQ-2) to gauge respondents' mental health. The two PHQ-2 items were included under the same question (precisely as in the original PHQ-2 questionnaire): "Over the last two weeks, how often have you been bothered by the following problems?" The first item was "little interest or pleasure in doing things", and the second was "feeling down, depressed, or hopeless", with the possible answers being "not at all" (0 points), "several days" (1 point), "more than half the days" (2 points), or "nearly every day" (3 points). Accordingly, PHQ-2 scores range from 0 to 6. Scoring a three or higher would suggest a depressive disorder and a need for additional evaluation. Based on the PHQ-2 data, a rising proportion of respondents had symptoms of depressive disorder during the pandemic waves [Figures 13–15].

During the first wave, 6% of the respondents experienced "nearly every day" that they had "little interest or pleasure in doing things". In contrast, 10% of the participants gave such an answer during the second wave, and during the third wave, 6% of them [Figure 13]. This single answer (regardless of the answer to the other question) means 3 points in itself, which raises the possibility of depressive disorder. The upward trend stopped during the merging fourth and fifth waves, and 6% of the participants stated that they had "little interest or pleasure in doing things" almost every day in the last two weeks, just like during the first wave. However, this does not indicate that there were much more favourable answers to this question. The answer option "more than half the days" was chosen by 5% of the respondents during the first wave, 11% during the second wave, 12% during the third wave, and 15% during the fourth and fifth waves,

so the frequency of this 2-point increased continuously, showing a constant deterioration of mental health as the pandemic progressed.

Taking all of this into account, it can be seen that the total proportion of the two response options indicating a more serious condition ("more than half the days" and "nearly every day") was 11% during the first wave, 21% during the second wave, 24% during the third wave, then the trend, which had been continuously increasing until then, turned into a slight decrease during the fourth and fifth waves, again with a result of 21%. This could also be the result of the gradual adaptation to the emergency and the milder restrictive measures, as was already mentioned in the analysis of other data showing similar trends.

Figure 13: PHQ-2 answers on "little interest or pleasure in doing things" during COVID-19 pandemic waves

Source: the author

The proportion of those who were "feeling down, depressed, or hopeless" in the two weeks prior to the data collections also shows a similarly increasing trend during the first three waves [Figure 14]. However, the decrease is less evident during the fourth and fifth waves than in the previous question [Figure 13]. During the first wave, 8% of respondents reported that "nearly every day" was "feeling down, depressed, or hopeless". Although during the second wave, 9% and during the third wave, 11% said so. However, in the previous case, the proportion of answers worth 3 points (that is, indicating the danger of depressive disorder) by the merging fourth and fifth waves was subsequently reduced by half; here, it remained unchanged at 11%. At the same time, the proportion of those who answered "more than half the days" also shows a constantly increasing and then slightly stagnating trend with rates of 7%, 10%, 13% and then 12% per pandemic wave.

Figure 14: PHQ-2 answers on "feeling down, depressed, or hopeless" during COVID-19 pandemic waves
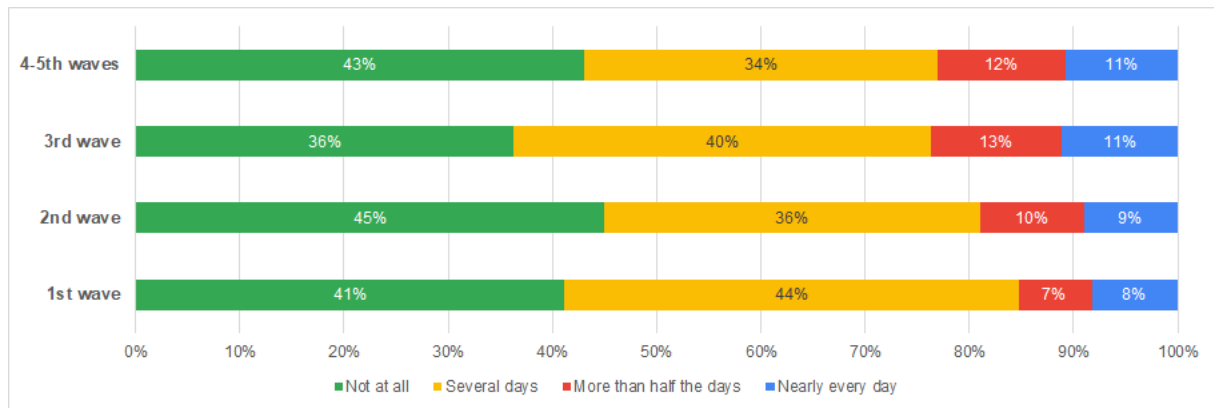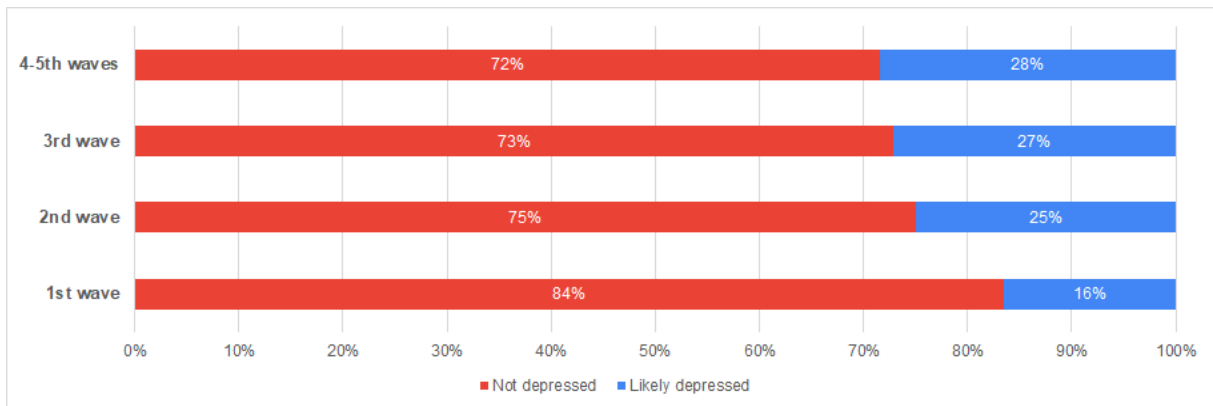

Source: the author

In summary, it can be concluded that from the evaluation of the PHQ-2 questionnaire (that is, from the total score given for the above two questions), the proportion of those at risk of depression increased continuously as the pandemic progressed in each sample. During the first wave, 16% of those completing the questionnaire achieved at least 3 points, so further examination was justified due to the risk of depressive disorder. Meanwhile, during the second wave, the same was true for 25%, during the third wave for 27%, and during the fourth and fifth waves for 28%. Accordingly, 84% of the sample during the first wave, 75% during the second wave, 73% during the third wave, and 72% during the fourth and fifth waves were unlikely to be depressed.

Of course, the conclusions of the sample of conveniences can only be applied to the samples themselves. However, at the same time, it is a fact that the observed trend coincides with the correlations between COVID and the risk of depression discussed in the literature. It is well-documented that epidemics and pandemics can significantly influence mental health, resulting in symptoms such as stress, fear, frustration, anger, boredom, loneliness, anxiety, or depression (Taylor, 2020). Although the research discussed in this subchapter does not address this (but the longitudinal research part of the current dissertation will), it may be one of the possible explanations for the trend that those with a self-reported history of psychiatric disorders are, unfortunately, more susceptible. More than 60% declared that their mental health worsened throughout the pandemic, as highlighted by various authors (Talevi et al., 2020; Czeisler et al., 2021; Quittkat et al., 2020).

Figure 15: Proportion of those likely to experience depressive disorder during COVID-19 pandemic waves
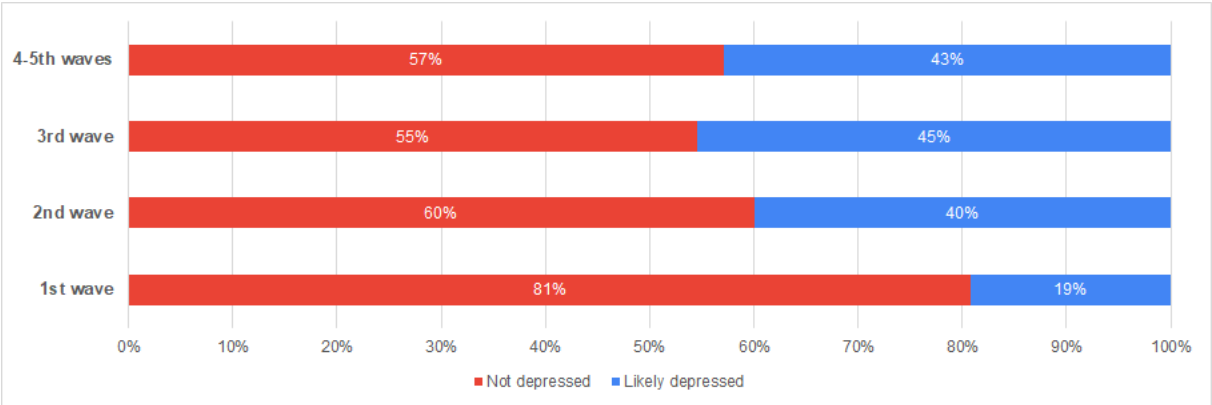

Source: the author

Given the pilot nature of this research, it would not be methodologically appropriate to conclude different demographic groups. However, even without this kind of generalization, an exciting tendency could be observed among the sampled participants, particularly regarding the correlation between mental health and self-representative social media use. Symptoms of depression were most frequent (and the likelihood of having depression the highest, with 19% during the first pandemic wave, 40% during the second, 45% during the third, and 43% during the fourth and fifth) among those who shared photos or videos of themselves alone or with others on Messenger at least once a day [Figure 16].

Looking for an explanation of the above phenomenon, it is important to note that in the case of other social media platforms, the deviation compared to the results of the entire sample was not so significant. Since Messenger (Facebook's instant messaging service that can be used as a separate application) is designed for interpersonal contact and messages can be shared with a specific person or a closed group with multiple members, users might be motivated to use it by different factors than in the case of social networking sites. Mass "liking" and commenting on self-representative images and videos by several users are not as typical for social messaging services as it is for social media (except for larger groups, although their platform is not primarily Messenger, but rather WhatsApp, the use of which is significantly lower in the sample and among Hungarian users than that of Messenger). So instead of Festinger's social comparison theory (Festinger, 1954), usage is presumably stimulated by the need for contact with others and affiliation. Based on previous research results, heavy instant messaging

platform users are motivated by affection and sociability, while lighter use is motivated by the need for entertainment and being fashionable (Chung & Nam, 2007).

Sending self-representative photos or videos daily is, of course, considered heavy use, coupled with a high need for self-representation. It is already known from the literature that attempts to gain attention and recognition from others are said to be one of the key motivators for using social media (Sung et al., 2016). According to multiple research, receiving positive feedback on posted content correlates favourably with self-esteem and subjective well-being and negatively with loneliness (Burke et al., 2010; Oh et al., 2014; Valkenburg et al., 2006). Nonetheless, this reinforcement comes at a cost because relying on others' approval to feel positive about oneself may suggest conditional self-worth, which might endanger well-being (Kernis et al., 2000), thereby raising the possibility of an interesting interrelation between social media use and mental health.

Figure 16: Proportion of those likely to have depressive disorder among respondents who shared photos or videos of themselves alone or with others on Messenger daily during COVID-19 pandemic waves

Source: the author

Although the results cannot be generalized based on convenience samples, nor can a cause-and-effect relationship be assumed, considering the references mentioned in the literature review, it is still important to talk about this kind of interrelationship between mental health state and social media use. To support this, it is worth mentioning the previous research results again, in which more than two hours of social media use each day has been related to higher psychological distress, such as anxiety and depression (Dobrean & Pasarelu, 2016). One of the most remarkable risk factors linking social media use to anxiety and depression is frequent

social comparison (Seabrook et al., 2016). Depression symptoms were found to be significantly related to the social media usage time and intensity (Cunningham et al., 2021), and increased use of social media has already been shown to predict an increased risk of developing depression (Vernon et al., 2016). Furthermore, it has been discovered that the negative consequences of social media use are more prominent in depressed individuals (Vernon et al., 2016). Whilst the results presented in this chapter of the dissertation are consistent with the cited literature sources, a significant difference is that the author of this dissertation specifically examined the relationship between self-representation in social media and mental health in real-time in a historically unique and unrepeatable period.

3.2.3. Conclusion

All four parts of the hypothesis were confirmed by the results of the four-step data collection during the first, second, third, and combined fourth and fifth COVID-19 waves in Hungary: among the participants, (2a) time spent on social media and (2b) willingness to share self-representative content increased during the pandemic waves up until the fourth wave, and these changes were associated with (2c) a growing risk of subjects' developing depressive disorder during the first five waves and (2d) an even higher risk among the most active sharers, based on the embedded PHQ-2 questionnaire.

The fact that more than a quarter of the total sample and more than two-fifths of the most active self-representative content sharers qualified for further examination due to the probability of having depressive disorder raises serious public health concerns. It highlights the need for broader screenings, either among the general population or social media users, possibly considering particularly vulnerable groups, such as heavy social media users or even those who share self-representative images or videos with attention-grabbing frequency.

Despite the obvious and already mentioned limitations of samples of convenience, the most outstanding value of this research is that at the time of writing this dissertation (one year after the merging fourth and fifth waves), the author could not find any other study that would have examined the changes in self-representation in social media during the COVID pandemic waves in real-time. Exceptionally valuable retrospective research has been carried out and is still ongoing by other authors.

The above results can be integrated into the context of scientific works discussing the connections between mental health and social media use, as well as online self-representation, and fit into research discussing the socio-psychological effects of the COVID pandemic. In conclusion, this real-time cross-sectional study highlights that mental health and conscientious social media usage should be prioritised in addressing the social-psychological consequences of pandemic-related lockdowns and other restrictive measures. (The results were published shortly after each pandemic wave.) The multidimensional societal impact of the COVID crisis and social media use is worthy of further examination.

3.3. Longitudinal Analysis of Self-Representation of Users Diagnosed with Affective Disorder and/or Anxiety Disorder on Social Media

Complementing the research discussed in the previous subchapter (3.2. Cross-Sectional Analysis of Self-Representation on Social Media and Depression Risk During the Lockdowns and Restrictions of the First Five COVID-19 Pandemic Waves), this work is not based on convenience samples but a diagnosis-based group classification with the recruitment of voluntary participants. Considering the correlations revealed in the literature so far, as well as the research of the author of this dissertation, it became justified to examine the correlations of social media use, self-representation and mental state of people suffering from the most common affective and/or anxiety disorders; and to compare them with those who do not have such a diagnosis or do not experience symptoms indicating such mental health problems – of course, all of this is still in a special, unique and unrepeatable period caused by the COVID pandemic.

The novelty of this research lies in the fact that at the time of writing this dissertation (one year after the merging fourth and fifth wave of the pandemic), the only available studies have been published that examine the existence of depressive and/or anxiety symptoms in connection with the use of social media in particular groups, occasionally monitoring the activity of some users before and during the pandemic. Muzi et al., for example, linked problematic social media use with other health-damaging behaviours among adolescents (Muzi et al., 2021). Hou et al. investigated gender differences in depression and anxiety among social media users during the COVID-19 outbreak in China (Hou et al., 2020), Riehm et al. published a study on the relationship between mental distress and social media exposure among U.S. adults (Riehm et al., 2020). These excellent scholarly works (along with similar ones) fill a gap and help us understand the mental health implications of COVID and social media use. Meanwhile, they did not address the social media usage or online self-representation patterns in patients with existing affective or anxiety disorder diagnoses, only examining the presence or absence of symptoms of these mental health problems. This can be mentioned as a deficiency despite the sometimes large samples.

The aim of the research described in this subchapter of the dissertation is, therefore, to compare the face and body representation patterns on social media of those diagnosed with affective and/or anxiety disorder(s) a) with those who have symptoms suggestive of such mental health

problem(s) according to their admission but do not have a diagnosis and b) with those who do have neither such symptoms nor diagnosis. Initially, this longitudinal study was only aimed at comparing people with and without a diagnosis. Nevertheless, the cross-sectional research discussed in the previous section highlighted the possibility that due to the rapid increase in the proportion of those experiencing depressive symptoms, and the repeated interruption of healthcare services due to the pandemic, it did not seem sure that everyone had reached a specialist. Considering this, there is a risk that there were many people during the study period whose symptoms could be diagnosed with depression or another affective/anxiety disorder. However, they did not consult a specialist for official diagnosis and treatment. The classification of undiagnosed but symptomatic participants into a separate group was justified. For this reason, a third group was also needed, enabling comparison with the other two.

The hypotheses of this research were developed as follows: (3a) BDI and BAI scores and (3b) self-representative content sharing were both showing different patterns in all three groups (Group A: diagnosed with affective disorder and/or anxiety disorder; Group B: not diagnosed with neither affective nor anxiety disorder but having such symptoms; Group C: without either such diagnosis or symptoms), with (3c) less large-scale changes in Group C. Namely, the (3d) willingness to share self-representative content greatly increased during the first wave of the pandemic, then started to decrease in accordance with the effects of the pandemic easing over time – in all three groups; and (3e) visible image modification (filters, editing) on self-representative photos and videos were more frequent in Group A and B, (3f) associated with higher Beck Depression Inventory (BDI) / Beck Anxiety Inventory (BAI) scores in these groups.

3.3.1. Methods

The research discussed in this subchapter is based on mixed methodology. The recruitment period took place from September 19 to November 14, 2021. Volunteers were exposed to the call posted on Facebook and Instagram, which, in addition to the so-called organic reach (non-paid, therefore non-advertisement-based access method for users along the social media algorithm), was also posted in thematic groups. These were the author's own "Selfie 4 Science" group (created for research purposes), as well as groups related to the topic of this dissertation, which are about different affective and anxiety disorders (depression, anxiety, panic disorder) or mental health in general. A total of 149 respondents applied for this first research call.

Applicants provided their e-mail address, birth year, gender, type of settlement where they live, and their highest completed education. Besides these, they stated how often they share posts on Facebook and Instagram (several times a day, several times a day, several times a week, weekly, a few times a month, less often, or never). In addition, they answered the question whether a specialist had diagnosed them with any of the following: a) depression (e.g. major depression, seasonal depression, postpartum depression); b) bipolar disorder (manic depression); c) panic disorder (panic syndrome); d) generalized anxiety disorder; e) agoraphobia; f) social phobia; g) mixed anxiety and depressive disorder; h) obsessive-compulsive disorder (OCD); i) other mood disorder and/or neurotic, stress-related and somatoform disorder. The answer options included j) "I think I have this kind of problem, but I don't have any diagnosis" and k) "I don't have any problem of this kind, and I don't have a diagnosis either."

At this point, a four- or five-digit number identifier was assigned to each participant in the database. The identification numbers were non-consecutive numbers due to possible problems arising from this. All the questionnaires of this research were prepared in Google Sheets and were technically anonymous (that is, no personal data was stored unless a question was directed explicitly to that). Identification numbers could be assigned to individual questionnaires using the "pre-filled" option, so everyone received a personalized questionnaire URL each time, which led to their questionnaire. From then on, the ID was contained in a pre-recorded answer to the first question of each questionnaire, so the respondents had to give answers starting from the second question. The sending of personalized URLs could be solved with the help of Microsoft Power Automate (Microsoft Flow), which, by connecting the data stored in Microsoft Excel and the mail-sending processes of Microsoft Outlook, made it possible not to have to send them individually.

The participants provided the link to their Facebook and Instagram profiles on the questionnaire sent out during the first data collection after the application (from January 23 to 29, 2022). The respondents agreed to the analysis of the images and videos on their social media profiles for research purposes. If they had non-public profiles and/or content, they were marked as a friend on Facebook and/or followed on Instagram for access. One hundred twenty-four of the previous applicants gave access to their content published on Facebook or Instagram (out of 149, with a dropout rate of 20.2%).

In the second data collection questionnaire (also called "Mental health questionnaire 1" in this research, available between February 26 and March 14, 2022), the participants stated again whether a specialist had diagnosed them with one of the health problems listed on the application questionnaire and listed again under the question (depression [e.g. major depression, seasonal depression, postpartum depression]; bipolar disorder [manic depression]; panic disorder [panic syndrome]; generalized anxiety disorder; agoraphobia; social phobia; mixed anxiety and depressive disorder; obsessive-compulsive disorder [OCD]; other mood disorder and/or neurotic, stress-related and somatoform disorder). Three types of answers could be given to this question: 1. Yes (if at least one of the above was diagnosed); 2. "I think I have this kind of problem, but I don't have any diagnosis"; and 3. "I don't have any problem of this kind, and I don't have a diagnosis either". Here, the questionnaire could jump to 3 different sections (Section A, B, C) with a logical branching according to the answer.

If someone answered yes to the existence of a diagnosis, they could describe the diagnosis in the following question in Section A (it was optional). However, then they had to select one or more of the previously listed diagnoses from the list. After that, they were asked about the year in which they were first diagnosed with the given mental health problem and then answered with yes or no whether they had been newly diagnosed since the start of the COVID pandemic (March 2020). Finally, they indicated whether they are currently undergoing any treatment: a) "I am not undergoing any treatment"; b) "Yes, I go to therapy, but I don't take medicine"; c) "Yes, I take medicine, but I don't go to therapy"; d) "Yes, I also go to therapy and take medicine." Medication takers were asked to provide the name of the product they were taking, but it was not mandatory.

Those who answered "I think I have this kind of problem, but I don't have any diagnosis" to the question about the existence of a diagnosis at the beginning of the questionnaire were free to describe their undiagnosed problem in Section B (it was optional). However, they had to select one or more of the previously listed diagnoses from the list, the existence of which they assumed for themselves. (Later, this type of self-diagnosis was not considered equal to a diagnosis made by an expert would have been.) After that, they were free to describe their symptoms, the year they appeared, and whether they had any new symptoms since the start of the COVID-19 pandemic (March 2020), and if so, what they were.

In the case of the answer "I don't have any problem of this kind, and I don't have a diagnosis either" to the first question (which was, technically, the second question because the first pre-filled answer contained the personal ID), the questionnaire immediately jumped to the BDI for measuring depressive symptoms, which was BAI followed (Section C). Those who completed Section A and Section B (because they reported such problems and/or diagnoses) also arrived at Section C, so everyone completed the BDI and BAI.

The final grouping was based on the second data collection questionnaire ("Mental health questionnaire 1", available between February 26 and March 14, 2022). Although the research application form also included a question about existing diagnosis(es) and complaints, since it could be filled out 3-6 months earlier (between September 19 and November 14, 2021), the answer to this may have changed since then. It was more practical to use the most recent data for grouping. A total of 112 respondents completed this, representing a dropout rate of 24.8% compared to those who applied for the first research call and 9.7% compared to those who provided access to their social media profiles.

Those who reported here that they had at least one of the following mental illnesses diagnosed by a specialist (depression [e.g. major depression, seasonal depression, postpartum depression]; bipolar disorder [manic depression]; panic disorder [panic syndrome]; generalized anxiety disorder; agoraphobia; social phobia; mixed anxiety and depressive disorder; obsessive-compulsive disorder [OCD]; other mood disorder and/or neurotic, stress-related and somatoform disorder), were included in Group A (n=33).

In the case of the answer, "I think I have this kind of problem, but I don't have any diagnosis", participants were placed in Group B, whose members did not have a diagnosis made by a specialist but believed that they had at least one of the listed mental health problems (n=37).

Finally, those who chose the answer option "I don't have any problem of this kind, and I don't have a diagnosis either" formed Group C, the members of which have neither a confirmed diagnosis nor a diagnosis assumed by themselves regarding the listed affective or anxiety disorders (n=42).

Table 1: Requirements for classifying research participants into groups

Group	Entry requirement
Group A	Self-reported existence of a diagnosis made by a specialist of at least one of the listed affective or anxiety disorders
Group B	Self-presumed existence of at least one of the listed affective or anxiety disorders, in the absence of a specific diagnosis
Group C	None of the listed affective or anxiety disorders are present, nor are they suspected by the participant

Since this research also monitors mental health in addition to self-representation patterns in social media, it was justified to send the questionnaire to the participants three-quarters of a year later, after the depression and anxiety symptoms (based on the BDI and BAI) recorded during the merging fourth and fifth waves. The online questionnaire of the repeated data collection between December 1 and 17, 2022 ("Mental health questionnaire 2") contained the same questions as Mental health questionnaire 1 (available between February 26 and March 14, 2022), with a slight difference that the participants answered the question at the beginning of whether they had been newly diagnosed by a specialist with one of the listed affective or anxiety disorders since the previous data collection (with a special note that earlier diagnosis was not relevant here), or whether they developed a problem of this kind since then, which had not been present before. However, they did not have any related diagnosis.

The BDI and BAI seemed to be the most appropriate choice for all three groups because they are among the most commonly used questionnaires for screening depression and anxiety worldwide.

Since its creation in 1961, the BDI has been used in thousands of empirical studies with samples of psychiatric and non-psychiatric patients (Richter et al., 1998). The Beck Depression Inventory (BDI) was revised in 1996 (BDI-II) to meet DSM-IV depression criteria; the BDI-II distinguished well between different levels of depression and was responsive to changes (Kühner et al., 2007). The 21-item BDI-II questionnaire was used for the research that is the subject of the present subchapter of this dissertation (containing statements on sadness, pessimism, past failure, loss of pleasure, guilt, punishment feelings, self-dislike, self-

criticalness, suicidal thoughts or wishes, crying, agitation, loss of interest, indecisiveness, worthlessness, loss of energy, changes in sleeping pattern, irritability, changes in appetite, concentration difficulty, tiredness or fatigue, and loss of interest in sex). However, there is also a shortened version with nine items. Each item has four statements worth 0-3 points based on the presence and severity of the given symptom. (There is also a version where the items related to sleep patterns and appetite have seven answer options as two exceptions.) The evaluation of the result is "minimal depression" up to 13 points, "mild depression" between 14 and 19 points, "moderate depression" from 20 to 28 points, and "severe depression" from 26 points.

Several studies have previously supported the BDI-II two-factor framework for measuring cognitive-affective and somatic depression symptoms. Furthermore, the internal consistency of the BDI-II was satisfactorily high (alpha>or=0.84, according to (Kühner et al., 2007), and its concurrent validity was confirmed by positive correlations with self-report assessments of depression and anxiety (Storch et al., 2004). These findings back up preceding studies that demonstrate the validity and reliability of the BDI-II. However, its limitations must be mentioned as well: the fundamental disadvantage of the BDI-II, as with other self-administered inventories, is that the score can be effortlessly overstated, downplayed, or even manipulated by respondents, but since these types of questionnaires are professionally generally accepted, official screening tools and form the basis of high-quality research, this should be considered acceptable. Mainly because the advantages of BDI-II can be summarised as follows: concise and user-friendly, broad content coverage of depressive symptoms, good reliability across languages, positive correlation with other psychological tests and health outcomes, allows easy symptom screening and reassessment, flexible application in different settings (Wang & Gorenstein, 2021).

In the literature, there are several references to the fact that different scales measuring anxiety (e.g. the State-Trait Anxiety Inventory, STAI) are correlated or simply indistinguishable from depression-measuring instruments (Dahlquist et al., 1996; Dobson, 1985). The BAI aimed to create an anxiety scale less contaminated by depressive elements, taking into account both cognitive and somatic symptoms (Beck et al., 1988; Enns et al., 1998).

The BAI is methodologically similar to the BDI, only used to measure anxiety symptoms. As its creator pointed out, The Anxiety Checklist, the Physician's Desk Reference Checklist, and the Situational Anxiety Checklist were used to create an initial item pool of 86 items. Several

analyses reduced the item pool; the final scale consists of 21 items, each describing a common anxiety symptom (Beck et al., 1988). On a 4-point scale, the respondent is asked to rate how much each symptom has troubled them in the previous week. The text evaluation of the result is "minimal" for a total score between 0 and 7, "mild" between 8 and 15 points, "moderate" from 16 to 25 points, and "severe" from 26 to 63 points. The BAI demonstrated strong internal consistency (alpha =.92) and test-retest reliability (r(81) =.75) over one week; it distinguished between anxious and non-anxious diagnostic groupings (panic disorder, generalized anxiety disorder, major depression, dysthymic disorder, etc.) (Beck et al., 1988).

The online questionnaires of the two data collections between February 26 and March 14 and December 1 and 17, 2022, sent out with a unique URL to each respondent, included both the BDI and the BAI one after the other. These questionnaires were therefore concluded with the BAI. In this way, during the longitudinal research, on two occasions (both during the merging fourth and fifth waves of the pandemic and three-quarters of a year later), a picture became obtainable of the participants' mental health symptoms indicative of affective and/or anxiety disorders, measured with official and globally accepted screening tools.

Table 2: The number of participants in the research

Applied for the research call	Given social media access	Group	Completed Mental health questionnaire 1	Completed Mental health questionnaire 2
149	124	A	33	29
		B	37	31
		C	42	34
		Σ	112	94

During the longitudinal study, in addition to the questionnaire data collection, the social media activity of the participants was also analysed by examining the number, temporal distribution and type (selfie, portrait, with others, at work, at home, sexy, exercising, trip) of photos and videos considered self-representative ("photos or videos of themselves alone or with others, including their pets") according to the definition of the cross-sectional research discussed in the previous subchapter. In addition, it was also recorded how many pictures or videos of each participant showed visible traces of digital modification (editing, retouching).

The detection of digital modification is a major issue in the methodology of today's related research since, simultaneously with technological development, more and more modification options have become readily available for social media users. For example, the so-called filters built into smartphones, tablets, and built-in options in social media applications or any specialised software. With applications developed to modify face and body photographs, for example, in addition to sharpness, contrast, brightness and saturation, various details can also be adjusted so that the skin, face shape, and body shape of the depicted person look flawless. One of the most effective ways of digital modification for photographs is to examine the so-called EXIF data (metadata), which contains attributes of the file that may indicate the fact of the modification (for example, the name of the software from which the file was saved). However, social media platforms usually do not provide access to the original image files uploaded by users (Facebook and Instagram observed in this research do not), only the compressed and converted content stored on their servers is available. Thus, there was nothing left but the subjective classification of the research participants' self-representative content according to the suspicion of modification based on visible clues, such as the sight of unnatural colours, shapes, outlines or other visual features.

The present longitudinal research analysed the Facebook and Instagram activity of the participants partly in real-time and partly retrospectively, from January 1, 2020, to December 31, 2022, i.e. for three years, starting from the period before the pandemic, through five pandemic waves, to three-quarters of a year after the peak of merging fourth and fifth waves. The beginning and end of the pandemic waves were determined based on the data on the official COVID information website operated by the Hungarian government (Palkó, 2022): the content published from the beginning of data collection to the outbreak of the pandemic (between January 1 and March 3, 2020) was labelled "pre-pandemic", while photos and videos shared between March 4 and June 20, 2020, was classified for the first wave of the pandemic, when the dominance of the original (Wuhan) virus was detected with a 14% mortality rate. Self-representative content between June 21, 2020, and January 26, 2021, belonged to the second wave caused by the original virus strain but with a 3.2% mortality rate. This was followed by the third pandemic wave between January 27 and July 7, 2021, with the Alpha (British) variant and 4% mortality. The fourth pandemic wave swept through Hungary between July 8 and December 30, 2021, with the Delta (Indian) variant and a 2% mortality rate, during which the fifth wave with the Omicron (South African) variant and 1.1% mortality rate also began, so the

fourth and fifth waves were placed under the same category, which lasted until the end of the data collection period, December 31, 2022.

The data were stored anonymously, based on the IDs of the participants, without storing the contents themselves. Personal data storage would have raised serious data protection issues, and there was concern that it would have significantly reduced the willingness to participate voluntarily.

3.3.2. Results and Discussion

A total of 112 people completed the Mental health questionnaire 1, which measured diagnoses and symptoms (and included BDI and BAI), between February 26 and March 14, 2022, during the merging fourth and fifth waves of the COVID pandemic. Thirty-three of them had a diagnosis of anxiety or affective disorder; they became Group A. Thirty-seven respondents reported symptoms, but in the absence of a diagnosis, they became Group B. Finally, 42 participants indicated at the beginning of the questionnaire that they had neither such a diagnosis nor symptoms, to make them Group C.

In **Group A** (participants with a diagnosis, n=33), the proportion of mental health problems was as follows (one participant could, of course, have more than one): depression (e.g. major depression, seasonal depression, postpartum depression): 60.61% (n=20); bipolar disorder (manic depression); c) panic disorder (panic syndrome): 24.24% (n=8); panic disorder (panic syndrome): 27.27% (n=9); generalized anxiety disorder: 15.15% (n=5); agoraphobia: 18.18% (n=6); social phobia: 9.09% (n=3); mixed anxiety and depressive disorder: 9.09% (n=3); obsessive-compulsive disorder (OCD): 12.12% (n=4); other mood disorder and/or neurotic, stress-related and somatoform disorder: 9.09% (n=3) [Figure 17].

When filling out the Mental health questionnaire 1, i.e. during the merging fourth and fifth waves, they stated that since the beginning of the COVID pandemic, i.e. since March 2020, 21.21% (n=7) of them had been diagnosed with a new diagnosis, while 78.79% (n=26) of them had been diagnosed with such a condition only earlier. They had at least one of the diagnoses for an average of 9.21 years (with a median of 6 years), with a minimum of less than a year (0) and a maximum of 28 years. Regarding treatment, 63.64% (n=21) attended therapy and took medication at the same time, 12.12% (n=4) attended therapy without taking medication, 9.09%

(n=3) took medication without therapy, and 15.15% (n=5) were not currently undergoing any treatment [Figure 18]. Those under medication took the following in alphabetical order, according to the Hungarian brand names: Anafranil 3% (n=1); Cipralex 6% (n=2); Citalopram 6% (n=2); Duciltia 3% (n=1); Elontril 3% (n=1); Floxet 6% (n=2); Fluoxetine-Zentiva 3% (n=1); Frontin 6% (n=2); Kventiax 6% (n=2); Lamolep 18% (n=6); Liticarb 3% (n=1); Olanzapine 6% (n=2); Rivotril 21% (n=7); Seropram 6% (n=2); Teperinep 12% (n=4); Xanax 12% (n=4). Group A had a mean BDI score of 31.42 (with a median of 34) and a mean BAI score of 33.94 (with a median of 38) during the fourth and fifth waves, indicating severe depression and severe anxiety. Regarding the evaluation of these screening questionnaires, 6.06% (n=2) of Group A members had "minimal depression", 3.03% (n=1) had "mild depression", 6.06% (n=2) had "moderate depression", and 84.85% (n=28) had "severe depression" based on the BDI. In comparison, anxiety symptoms based on BAI scores were "minimal" in 3.03% (n=1), "mild" in 9.09% (n=3), "moderate" in 15.15% (n=5), and "severe" in 72.73% (n=24) [Figure 19]. Therefore, although 84.84% (n=28) of the members of Group A were undergoing diagnosis-specific treatment, according to the BDI and BAI, they were in a mental health state showing severe depression and anxiety.

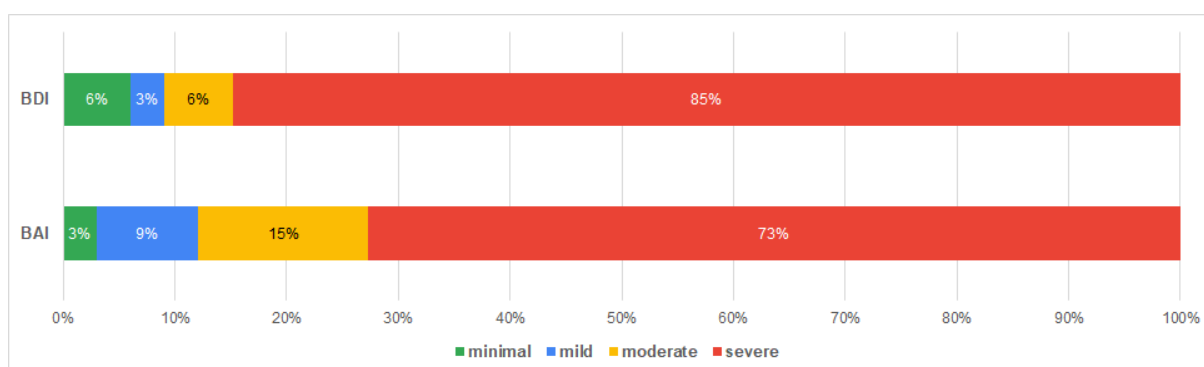*Figure 17: Affective and anxiety disorder diagnoses in Group A*
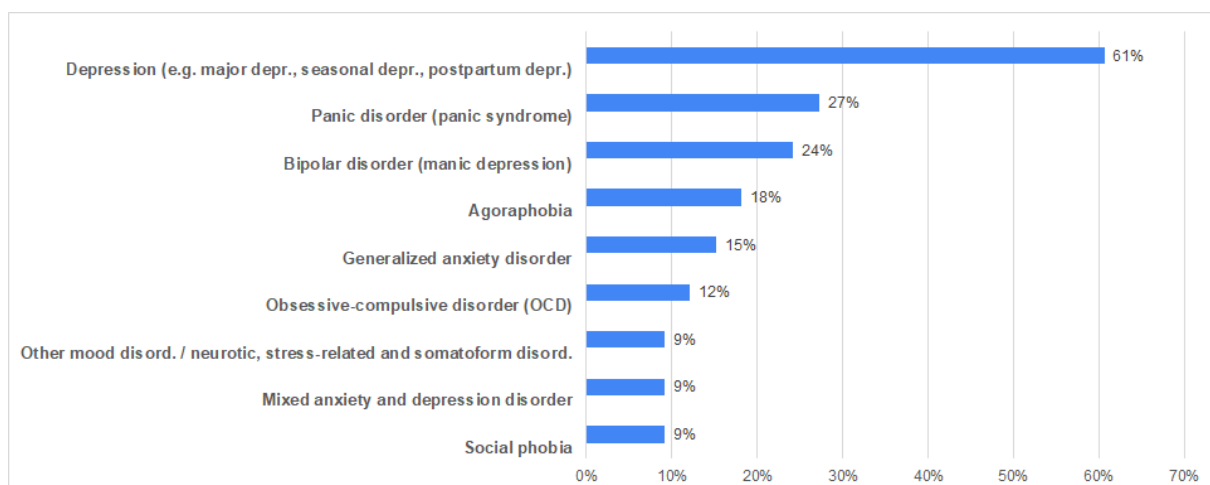
Source: the author

Figure 18: Current therapeutic statuses in Group A
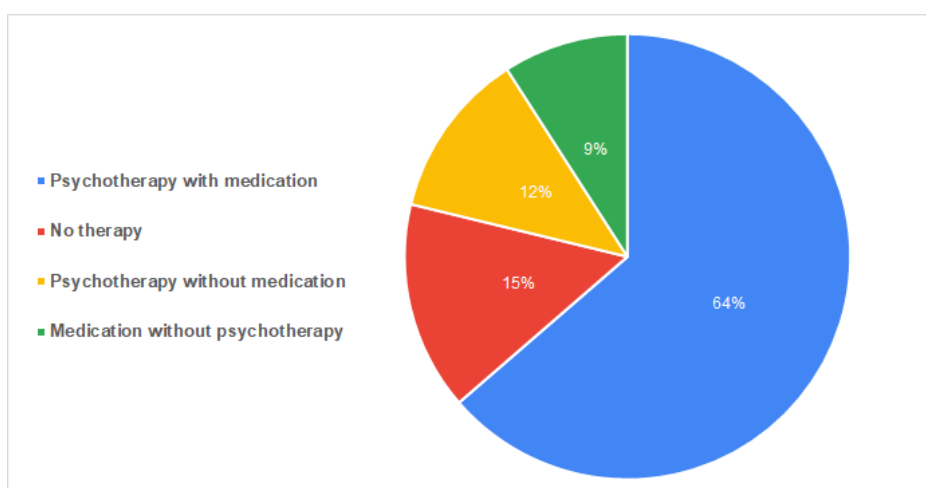
Source: the author

Figure 19: BDI and BAI results in Group A during the merging 4th and 5th pandemic waves

Figure 19: BDI and BAI results in Group A during the merging 4th and 5th pandemic waves
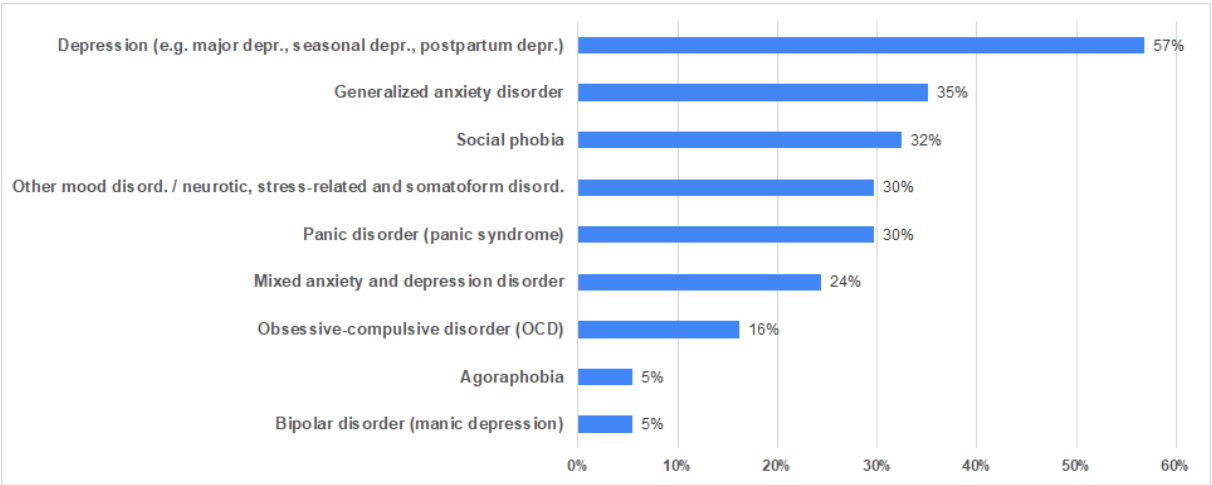

Source: the author

In **Group B** (participants without a diagnosis but struggling with mental health problems according to their admission, n=37), the proportion of self-presumed diagnoses was as follows (one respondent could suspect one or more): depression (e.g. major depression, seasonal depression, postpartum depression): 56.76% (n=21); bipolar disorder (manic depression); c) panic disorder (panic syndrome): 5.41% (n=2); panic disorder (panic syndrome): 29.73% (n=11); generalized anxiety disorder: 35.14% (n=13); agoraphobia: 5.41% (n=2); social phobia: 32.43% (n=12); mixed anxiety and depressive disorder: 24.32% (n=9); obsessive-compulsive disorder (OCD): 16.22% (n=6); other mood disorder and/or neurotic, stress-related and somatoform disorder: 29.73% (n=11) [Figure 20]. They suspected at least one of the diagnoses for an average of 7.6 years (with a median of 6 years), with a minimum of less than a year (0) and a maximum of 25 years. Three participants did not mark the beginning of complaints with a year but with a life event or in some other way (so they were not included in the average and

median calculation): "Since I got divorced and I have to pay for everything alone. Now, without child support", "I have always had them [the symptoms]", "Good question... I noticed [the symptoms] when I was a teenager."

The members of Group B described the experienced symptoms in their own words, with a variety corresponding to the nature of affective and anxiety disorders: they reported, among other things, constant worry, sleep disorders, loss of appetite, exhaustion, digestive complaints, nervousness, irritability, compulsive action, negative thoughts, panic attacks, tremors, depression, crying, rapid heartbeat and general anxiety. Group B had a mean BDI score of 26.14 (with a median of 20) and a mean BAI score of 27.1 (with a median of 26) during the fourth and fifth pandemic waves, indicating severe depression and severe anxiety, although with somewhat lower scores than Group A.

Regarding the evaluation of these screening questionnaires, 5.41% (n=2) of Group B members had "minimal depression", 8.11% (n=3) had "mild depression", 2.7% (n=1) had "moderate depression", and 83.78% (n=31) had "severe depression" based on the BDI;. In comparison, anxiety symptoms based on BAI scores were "minimal" in 5.41% (n=2), "mild" in 10.81% (n=4), "moderate" in 43.24% (n=16), and "severe" in 40.54% (n=15) [Figure 21]. Therefore, the vast majority of the members of Group B were in a mental state requiring further examinations and possibly therapy during the merging fourth and fifth pandemic waves.

Figure 20: Self-suspected affective and anxiety disorder diagnoses in Group B

Source: the author

Figure 21: BDI and BAI results in Group B during the merging 4th and 5th pandemic waves
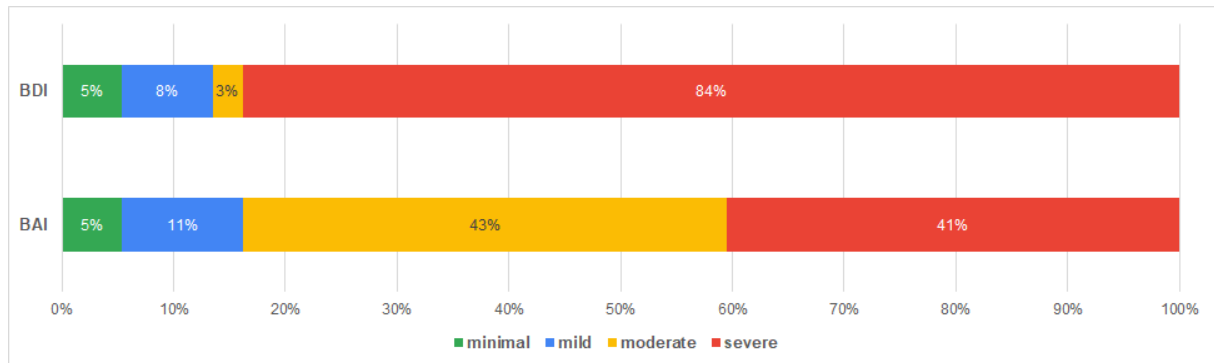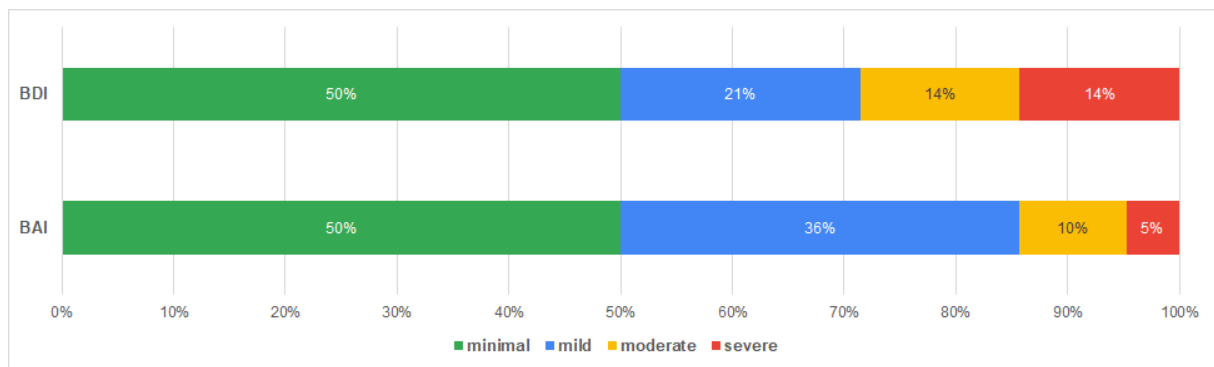

Source: the author

In **Group C** (participants with neither a diagnosis nor a self-reported suspicion of the mentioned affective and/or anxiety disorders, n=42), only the BDI and BAI results were recorded. Group B had a mean BDI score of 9.53 (with a median of 7.5) and a mean BAI score of 10.29 (with a median of 7.5) during the fourth and fifth pandemic waves, indicating mild depression and mild anxiety. In addition to the point limits described in the methodological section, it is also important to note that the BDI and BAI indicate minimal risk below 8 points.

According to the screening questionnaires, Group C members were also at risk of depression. Fifty per cent (n=21) of Group C members had "minimal depression", 21.43% (n=9) had "mild depression", 14.29% (n=6) had "moderate depression", and 14.29% (n=6) had "severe depression" based on the BDI. In contrast, anxiety symptoms based on BAI scores were "minimal" in 50% (n=21), "mild" in 35.71% (n=15), "moderate" in 9.52% (n=4), and "severe" in 4.76% (n=2). Consequently, in addition to the fact that the mean BDI and BAI scores of Group C were much better (lower) than those of Group A and Group B, it is important to note that half of Group C – who were undiagnosed and considered themselves free of affective and anxiety disorders – had mean scores that indicated depression or anxiety disorder, sometimes in a severe form.

Figure 22: BDI and BAI results in Group C during the merging 4th and 5th pandemic waves
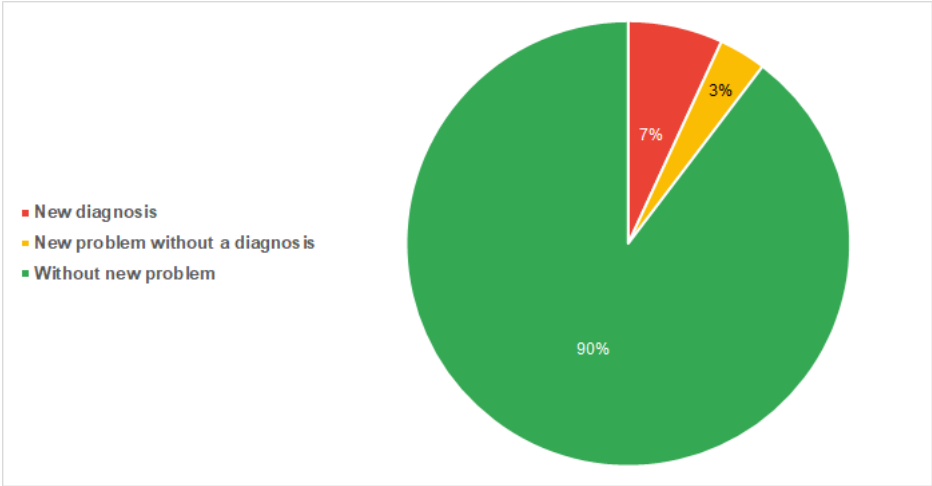

Source: the author

The above shows the mental health status of the sample groups during the merging fourth and fifth pandemic waves, based on the Mental health questionnaire 1. The Mental health questionnaire 2 was completed three-quarters of a year after the pandemic waves accompanied by restrictive measures (between December 1 and 17, 2022), with the same respondents in the sample. Ninety-four responses were received then, with dropout rates already described in the methodological subchapter. The members of all three groups answered whether they had been diagnosed with at least one of the discussed anxiety and/or affective disorders since the last data collection (if yes, which one and what kind of therapy they were receiving), or whether they had a self-suspected diagnosis based on their complaints (if yes, what their complaint), and filled out the BDI and BAI questionnaires again to assess their current mental state.

Twenty-nine people from Group A who already had a diagnosis completed the Mental health questionnaire 2 between December 1 and 17, 2022. 2 of them (6.9%) had a new diagnosis in addition to the existing one(s): one was diagnosed with social phobia, for which they were receiving medication (Frontin, Flector, Sirdalud), and the other had a newly developed diagnosis of a set of four, i.e. bipolar disorder, panic disorder, generalized anxiety disorder, and other mood disorder and/or neurotic, stress-related and somatoform disorder (taking Liticarb, Elontril, Floxet, Rivotril) [Figure 23].

According to their statements, both received only drug therapy, without psychotherapy. One participant reported self-suspected, undiagnosed depression with the justification of "constant bad mood, which I haven't had before". Group A had a mean BDI score of 19.52 (with a median of 19) and a mean BAI score of 23.55 (with a median of 24) during the period less affected by the pandemic – and not at all burdened by restrictive measures –, indicating "severe depression"

and "moderate" anxiety, with a significant change compared to the data recorded during the merging fourth and fifth waves, when the average BDI was 31.42 (with a median of 34). The average BAI was 33.94 (with a median of 38) in the same group. The convergence of the average and the median also shows fewer exceptionally high values in the period free of restrictive measures. Concerning the evaluation of these screening questionnaires, 13.79% (n=4) of Group A members had "minimal depression", 6.9% (n=2) had "mild depression", 20.69% (n=6) had "moderate depression", and 58.62% (n=17) had "severe depression" based on the BDI;. In comparison, anxiety symptoms based on BAI scores were "minimal" in 10.34% (n=3), "mild" in 13.79% (n=4), "moderate" in 31.03% (n=9), and "severe" in 44.83% (n=13) [Figure 24].

Figure 23: New official and self-suspected diagnoses in Group A

Source: the author

Figure 24: BDI and BAI results in Group A nine months later (in a restriction-free period)
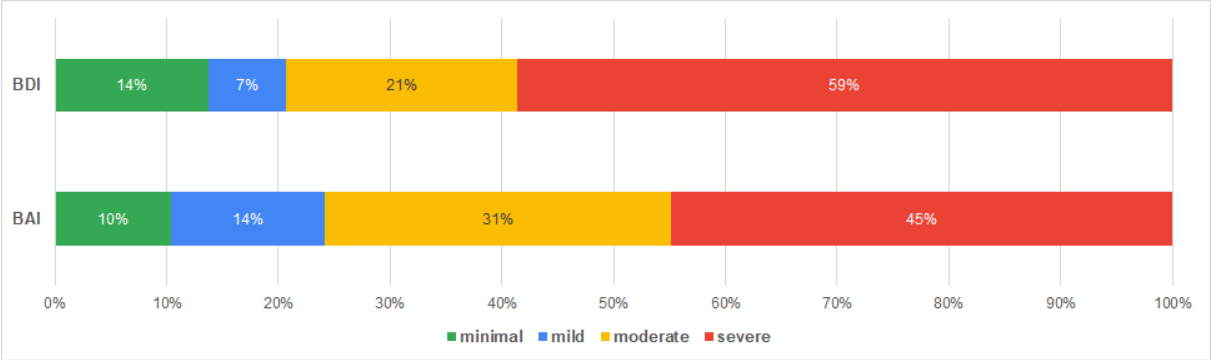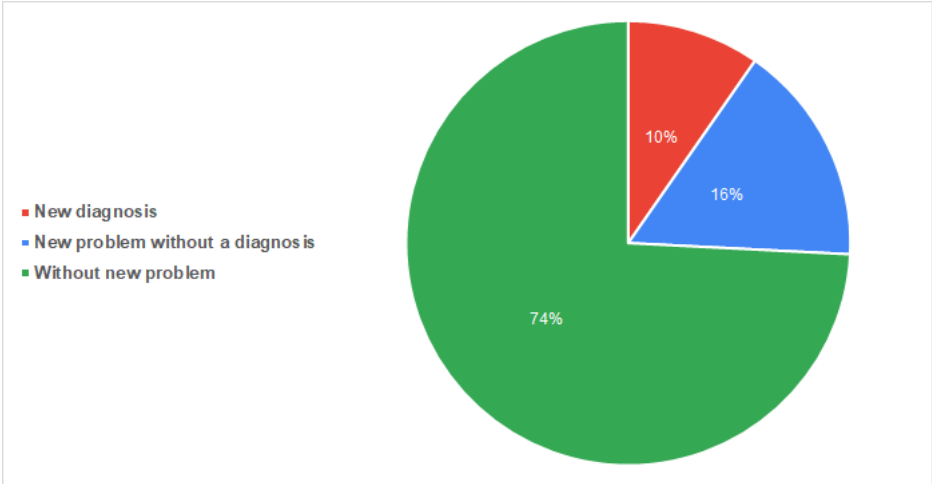

Source: the author

Thirty-one respondents from Group B filled out the Mental health questionnaire 2. The members of this group did not yet have a diagnosis of affective or anxiety disorder during the merging fourth and fifth pandemic waves; they only had self-suspected diagnoses based on their symptoms. However, nine months later, 3 (9.68%) of the group members already reported an official diagnosis [Figure 25]: one respondent was diagnosed with depression, the other with generalized anxiety disorder, and the third with a social phobia with mixed anxiety and depressive disorder; all of them received treatment, two went to psychotherapy without medication, and one with medication (Citalopram).

Five members (16.13%) of Group B indicated the emergence of new self-suspected diagnoses based on their novel symptoms since the previous data collection [Figure 25]: two (6.45%) assumed that they had developed depression; one (3.23%) thought that he developed depression, generalized anxiety and other mood disorder and/or neurotic, stress-related and somatoform disorder together; one reported suspected mixed anxiety and depressive disorder; while the fifth suspected a quadruple diagnosis with social phobia, mixed anxiety and depressive disorder, obsessive-compulsive disorder and other mood disorder and/or neurotic, stress-related and somatoform disorder. The symptoms that formed the basis of the newly suspected diagnoses in Group B were "anxiety, disappointment, postponing things for months, sometimes I can't stand being touched, OCD symptoms", "inherited depression, I cut people off very easily and the feeling of dark clouds above me", "fatigue, exhaustion, listlessness, binge eating/stress eating, reduced performance", "non-stop lethargy", and "There are days when I can't do anything, my life feels completely pointless and useless, I can't move or do anything, I could cry and panic that it will never go away."

The average BDI measured in Group B decreased to 17.29 (median 16), and the average BAI decreased to 18.23 (median 20), indicating "severe depression" and "moderate" anxiety. (However, as a reminder, it is worth reviving that the lower limit value for "severe depression" is 17 points, which shows a deviation from Group A despite the same text evaluation.) A significant decrease was also observed compared to the previous data collection, compared to the 26.14 BDI average and the 27.11 BAI average measured during the fourth and fifth waves (with a median of 20 and 26, respectively). In addition, the convergence of the mean and median also showed a decrease in the number and extent of outliers, just as in the case of Group A. About the evaluation of these screening questionnaires, 12.9% (n=4) of Group B members had "minimal depression", 22.58% (n=7) had "mild depression", 16.13% (n=5) had "moderate

depression", and 48.39% (n=15) had "severe depression" based on the BDI. In comparison, anxiety symptoms based on BAI scores were "minimal" in 9.68% (n=3), "mild" in 35.48% (n=11), "moderate" in 35.48% (n=11), and "severe" in 19.35% (n=6) [Figure 26].

Figure 25: New official and self-suspected diagnoses in Group B

Source: the author

Figure 26: BDI and BAI results in Group B nine months later (in a restriction-free period)
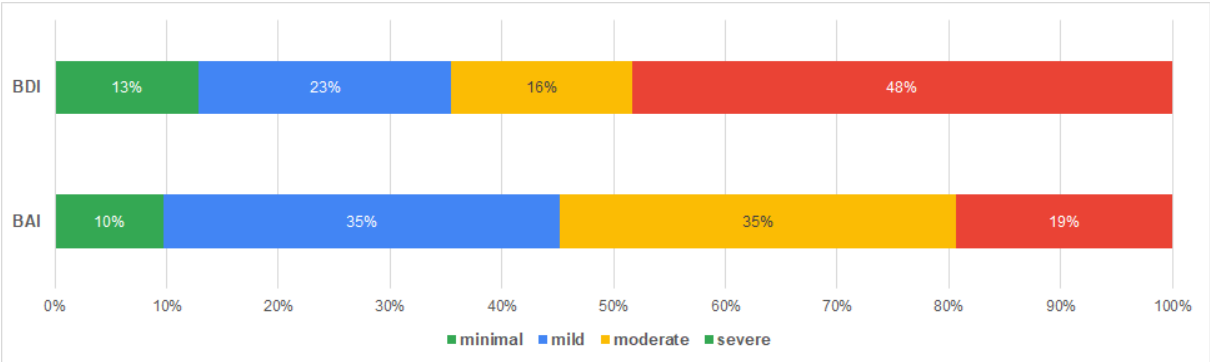
Source: the author

From Group C, whose members did not have an official or self-suspected diagnosis during the fourth and fifth epidemic waves, 34 members filled out the Mental health questionnaire 2. Two (5.88%) of them were diagnosed with an affective and/or anxiety disorder in the nine months since then: one (2.94%) with depression with medication and psychotherapy (Kventiax, Scippa), and the other (2.94%) with bipolar disorder with psychotherapy and no medication. Five (14.74%) reported a newly arisen self-suspected diagnosis: one (2.94%) of major depression and four (11.76%) of suspected multiple diagnoses. Two (5.88%) of the latter indicated the onset of depression and mixed anxiety and depressive disorder; the third

participant (2.94%) suspected the development of depression, bipolar disorder and social phobia; and the fourth (2.94%) reported the possible existence of generalized anxiety disorder and other mood disorder and/or neurotic, stress-related and somatoform disorder.

The symptoms that formed the basis of the self-suspected diagnoses were the following in Group C: "fear, anxiety, sadness, apathy", "anxiety, indifference to events previously experienced as joyful, fear of the future, extreme reaction to stressful situations, I am not balanced, I'm afraid of social situations", "my productive and energetic periods often alternate with more depressive periods (I'm in bed for days and can't bring myself to do anything...), panic attacks are more frequent", "digestion problems, sleep disorders, depression, hopelessness feeling", "a feeling of hopelessness, sadness, withdrawal from society". The mean BDI of Group C was 10.79 (with a median of 7.5).

The mean BAI was 10.62 (with a median of 6), which, unlike the other two groups, was similar during the non-restrictive period, such as during the merging fourth and fifth pandemic wave (average BDI 9.52, median 7.5; average BAI 10.29, median 7.5), even a slight increase was observed. Based on these average scores in Mental health questionnaire 2, "mild depression" and "mild" anxiety were characteristic of Group C. Fifty per cent (n=17) had "minimal depression", 14.71% (n=5) had "mild depression", 5.88% (n=2) had "moderate depression", and 29.41% (n=10) had "severe depression" based on the BDI;. In contrast, anxiety symptoms based on BAI scores were "minimal" in 55.88% (n=19), "mild" in 8.82% (n=3), "moderate" in 29.41% (n=10), and "severe" in 5.88% (n=2). From these data, it can be concluded that in Group C, the members of which had neither an official nor a self-suspected diagnosis during the merging fourth and fifth pandemic waves, the proportion of those with "severe depression" increased from 14.29% to 29.41% based on their BDI scores, showing the opposite trend as Group A and Group B.

Figure 27: New official and self-suspected diagnoses in Group C

Source: the author

Figure 28: BDI and BAI results in Group C nine months later (in a restriction-free period)
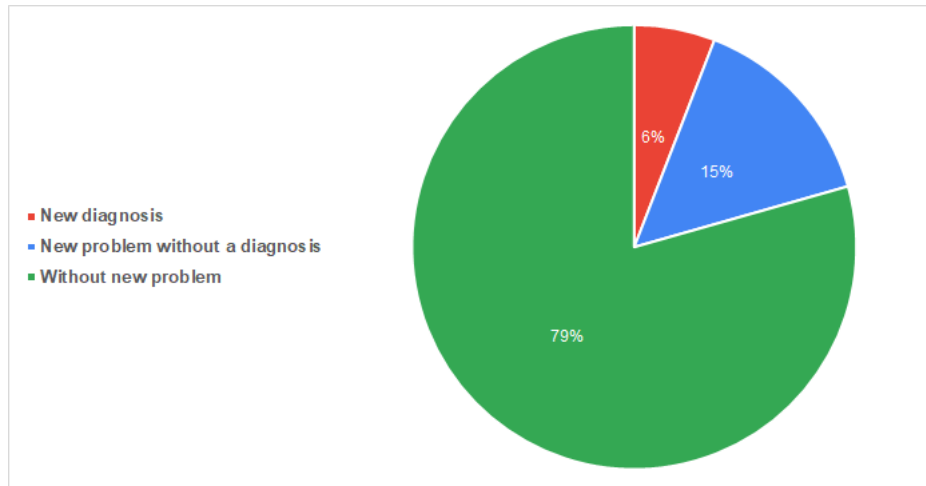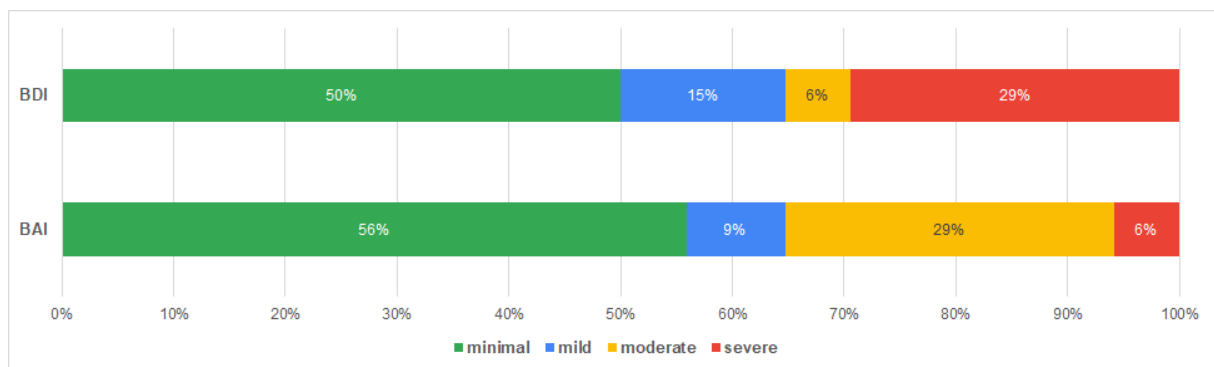

Source: the author

In addition to questionnaire data collection, a social media content analysis was also carried out based on the participants' Facebook and/or Instagram profiles. Self-representative photos and videos published between January 1, 2020, and December 31, 2022, were the subject of the three-year longitudinal study. For the sake of the comparability of the results and the consistency of this dissertation, the concept of self-representativeness and the categorization of the contents were the same as in the cross-sectional study discussed in the previous subchapter (3.2). As described in the "Methods" section of this subchapter, the beginning and end of the pandemic waves were determined on the basis of the data on the official COVID information website operated by the Hungarian government (Palkó, 2022): the content published from the beginning of data collection to the outbreak of the pandemic (between January 1 and March 3, 2020) was labelled "pre-pandemic", while photos and videos shared between March 4 and June 20, 2020, was classified for the first wave of the pandemic; self-representative content between

June 21, 2020, and January 26, 2021, belonged to the second wave; this was followed by the third pandemic wave between January 27 and July 7, 2021, with the Alpha (British) variant and 4% mortality; the fourth pandemic wave swept through Hungary between July 8 and December 30, 2021, during which the fifth wave also began, so the fourth and fifth waves were placed under the same category, and lasted until the end of the data collection period, December 31, 2022.

During the data collection period, the number of self-representative images and videos published during the above time intervals was recorded, as well as which of the following categories they belong to: selfie, portrait, with others, at work, at home, sexy, exercising, trip. (Since the author of this dissertation could not find research with a similar focus and methodology in the literature, the categories were defined based on the research discussed in Subchapter 3.2 and the topic of the examined content.) For a photo or video to belong to the selfie category, it had to be taken from a visibly particular angle. A portrait differs from this in that the creator of the picture or video is visibly (presumably) not the same as the person depicted. The "with others" category displayed others (people or pets) and the depicted person. The content classified as "at work" depicted the participants while working (at a workplace or other place, in such a way that the fact of working is revealed from the content or the metadata associated with it, e.g. image description or hashtag). The "at home" category represented pictures or videos taken at home (the fact of being at home was also revealed either from the picture or video or from the metadata associated with it). The "sexy" content included those with a distinctly erotic tone (for example, the person in question was seen in underwear and/or scantily clad and/or with a description containing an explicitly sexual appeal). The "exercising" pictures and videos showed working out or other sports activities. The contents of the "trip" category showed travelling or trips. Of course, a picture or video could be included in several categories, for example, travel pictures taken with others or those depicting work at home, which was one of the typical life situations of the pandemic.

The amount of self-representative photos and videos posted on social media differed between the three groups before and during the pandemic. However, with the emergence of COVID, these differences became even more apparent. During the entire study period, Group A members diagnosed with at least one of the most common affective and/or anxiety disorders posted the most pictures and videos of themselves. The pre-pandemic sub-period (which took two months) amounted to 71 such contents. It more than quadrupled to 304 during the first

wave (4 months), before falling to 287 during the second wave, 198 during the third wave, and finally increasing to 653 during the merging fourth and fifth waves, which was the longest (lasting one and a half years) [Figure 29].

Members of Group B, who did not have an official diagnosis but had symptoms and suspected self-diagnoses, posted 49 self-representative photos and videos on Facebook and/or Instagram in the pre-pandemic phase of the study period. This increased almost sixfold to 287 after the pandemic outbreak; the increase was more pronounced than in Group A. During the second pandemic wave, there was a more significant drop (21.3%) than that observed in Group A (5.6%) to 226. The decline during the third wave was similar in Groups A and B: while a 31% reduction could be measured in the former compared to the second wave, in the latter, it was 29.6%. However, during the fourth and fifth waves, which are the longest sub-period of the study period, a greater difference could be observed between the tendencies of Groups A and B: while the members of Group A posted more than three times as much (329%) self-representative content, this ratio was 340% in Group B.

The members of Group C uploaded a total of 63 photos and videos of themselves to Facebook or Instagram during the pre-pandemic period. This number increased almost fourfold (375%) to 236 during the first wave of the pandemic, before decreasing minimally to 229 (by 3%), then falling back to two-thirds, to 152, and finally increased almost three and a half times (340%), to 517 in the year and a half of the merging fourth and fifth waves. Therefore, Group C showed the smallest quantitative increase in self-representative content during the pandemic outbreak, while Group A presented the most significant increase.

Figure 29: Number of photos and videos of self before and during the pandemic per Group
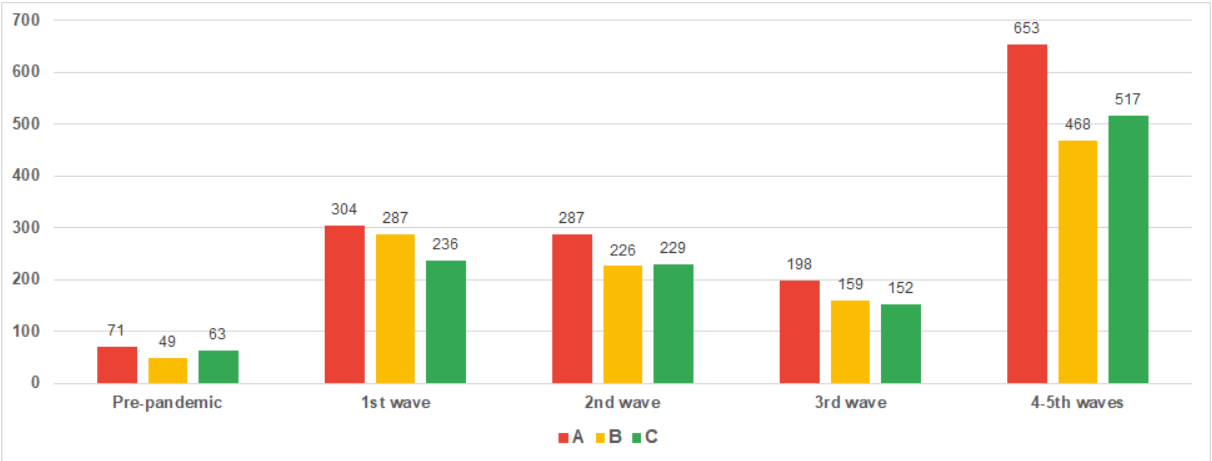
Since the duration of the subperiods was quite variable, it seemed appropriate to look at the amount of self-representative content on a monthly average (calculated for 30 days) [Figure 30]. The duration of each sub-period was as follows: pre-pandemic period - 63 days, first pandemic wave - 109 days, second wave - 220 days, third wave - 162 days, fourth and fifth wave - 542 days. According to this, the members of Group A published an average of 33.81 such contents per month in the pre-pandemic period, which increased by two and a half times (247%) to 83.67 during the first wave of the pandemic. Then they decreased to less than half, 39.14 during the second wave, declining another 6% to 36.67 during the third wave. The fourth and fifth waves showed another decrease, albeit a very small one, of 1.5%, to 36.14.

In the case of Group B, there were 23.33 self-representative posts per month in the pre-pandemic period, which more than tripled (339%) to 78.99 during the first wave. This increase was even more significant than in the case of Group A. Group B's monthly average fell to 30.82 in the second wave, which is 39% of the value of the first wave, so this decline was also more significant here than in Group A. The third wave showed little change, the monthly average decreased by barely one-twentieth to 29.44, and during the merging fourth and fifth waves, it fell to 88% of the previous one to 25.9. Thus, Group B mostly showed larger fluctuations than Group A, so it was more receptive to conditions indicating a change.

Group C posted an average of 30 self-representative content per month on Facebook and/or Instagram, which more than doubled (217%) to 64.95 during the first wave. This increase is significantly smaller than in Groups A and B. In the case of Group C, the total amount of content made public during the second wave decreased to 31.23 on average per month, i.e. less than half (48%). However, numerically this was the slightest change among the three groups in this sub-period compared to the previous one. During the third wave, Group C posted an average of 28.15 self-representative photos and videos per month, a 10% decrease. This was followed by a slight increase of 1.7% during the fourth and fifth waves to 28.62, uniquely among the three groups.

It should be noted, however, that while Group A, diagnosed with anxiety and/or affective disorder, and Group B, which included members who consider themselves to have anxiety or affective disorder based on self-diagnosis, there was a sustained increase in the amount of self-

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representative content. Their average monthly amount during the first period of the pandemic did not decrease to the pre-pandemic value during the five waves. On the other hand, in Group C, which was neither officially nor self-diagnosed, the average number of self-representative content published per month decreased below the pre-pandemic value during the third wave, to remain below it for the merging fourth and fifth waves even after a slight rise. Based on the data, although the pandemic outbreak brought about a significant change in the self-representation of the members of Group C in social media, this change did not last as long as in the case of Groups A and B.

Figure 30: Average monthly (30-day) number of photos and videos of self before and during the pandemic per Group
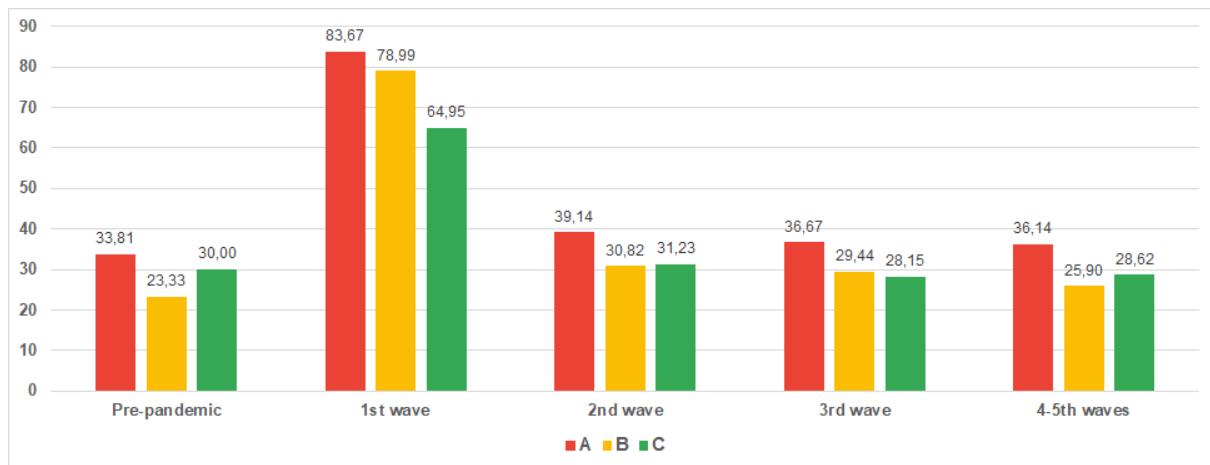
Source: the author

Examining the average number of self-representative content per person published by the members of each group on Facebook and/or Instagram, significant differences can be observed again between Groups A, B and C. These data are also important because the number of members of the groups is not equal, so they show the differences between them even more precisely. In the pre-pandemic phase of the study period, Group A members posted an average of 2.45 pictures or videos of themselves, which more than quadrupled (427%), increasing to 10.48 during the first wave, before marginally dropping to 9.9 (94%) during the second wave. During the third wave, the number of self-representative contents decreased to almost two-thirds, 6.83 (69%) in the group of people with anxiety and/or affective disorder diagnoses. Then it increased to 22.52 in the last 18 months, during the fourth and fifth a wave. The members of Group B, as was also seen from the previous data, produced a more considerable increase than this during the pandemic outbreak. The initial 1.58 self-representative content per capita

became 9.26 (568%) following a more than five-fold increase. This dropped to nearly four-fifths of 7.29 (79%) during the second wave before falling further to 5.13 (70%) during the third wave and then increased nearly three and a half times to 15.21 (340%) during the fourth and fifth waves, which constitute half of the entire study period.

Members of Group C posted an average of 1.85 pictures or videos of themselves on Facebook and/or Instagram in the pre-pandemic phase, which was a smaller increase compared to Groups A and B during the first wave. However, this more minor increase also represented an almost fourfold increase to 6.94 (375%). Then there was the smallest change of one and a half per cent measured for all groups to 6.74 during the second wave, which was followed by a significant decrease to 4.47 (64%) during the third wave, and then at least partly due to the length of the fourth and fifth waves, followed by an increase to 15.21. In this last sub-period, the average number of self-representative images and videos posted per person minimally exceeded that of Group B.

Figure 31: Average amount of photos and videos of self before and during the pandemic per person in each Group
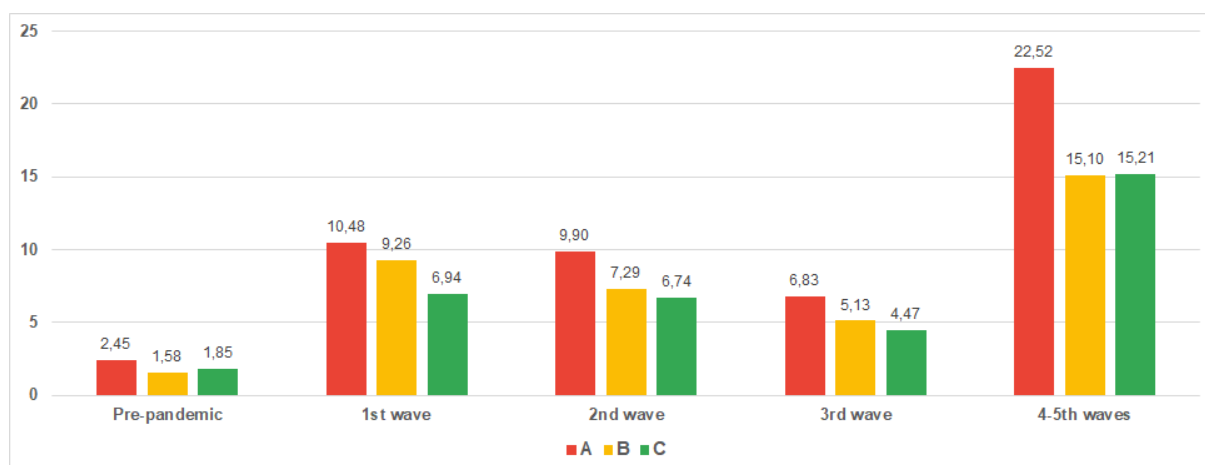
Source: the author

Regarding the self-representative images and videos published by the three groups during the study period, exciting conclusions could be drawn from their content and/or type. According to the previously defined types (selfie, portrait, with others, at work, at home, sexy, exercising, trip), there were differences in the amount of such content by group and sub-period. In the following, for the sake of easier comparability, these differences are presented both by group and by content type. For all three groups, selfies were the most popular in each sub-period [Figures 32-34].

For **Group A**, this meant an average of 1.9 for selfies in the pre-pandemic phase, followed by travel content with an average value of 1.0, and then content made in the company of others with 0.9 [Figure 32]. This was closely followed by portraits with 0.86, pictures and videos taken during work with 0.62, those in the "at home" category with 0.52, and then "exercise" pictures and videos with 0.41, and finally, the "sexy" ones with 0.31. During the first wave of the pandemic, the average number of selfies per person increased more than fourfold (403%) to 7.66%, which was now followed in popularity by "at home" content with an almost tenfold increase (4.93%, 948% – the largest ever increase measured within the entire sample), then portraits came next by 3.34 (also an almost four-fold increase, 388%) [Figure 33].

The popularity of excursion or travel content also almost tripled (to 2.96, 296%). This can be explained by the nostalgia for travelling that was severely limited at the time, with the already mentioned publication of previous content (the so-called #throwback photos and videos).

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During the first wave, the members of Group A published significantly more of the other categories on Facebook and Instagram as well: pictures and videos taken in the company of others fell down the popularity list, but there were still more than twice as many of them (1.86, 206%). The reason for the category's relegation to the background was probably the special isolation due to the pandemic. This was followed by "exercising" content, of which, after an almost threefold increase, Group A members posted an average of 1.14 per person, 278% of the amount before the pandemic. The number of erotic images and videos also increased by a remarkable amount: by almost five and a half times, or 1.07 (541%), thus overtaking contents depicting work, of which there were also more, after an increase of more than one and a half times, on average 1.03 (167%).

During the second wave, the average per capita of the still most popular selfies dropped to four-fifths, to 6.1 (80%), and "at home" content remained in second place, with a similar decrease (3.86, 78%). However, third place was taken over by travel-related images and videos, which even increased (3.38, 114%), so portraits fell to fourth place (2.76, 83%). The per capita average of content depicting others as well increased by more than a third (2.52, 135%), which – together with the popularity of travel pictures and videos – can probably be attributed to the freer summer period between the first two waves, allowing travel and social events. The per capita average of content depicting work more than doubled during the second wave (2.28, 221%), and images and videos showing sports or exercise significantly increased (2.07, 236%). However, erotic content fell to the last place, decreasing to three-fifths (0.66, 62%).

Although both the total number of published images and their average per capita decreased during the second wave [Figures 29-31], a quantitative increase could be observed in several categories. It can probably be explained by the fact that one content could be classified into several categories, that more selfies or portraits were published without context or could only be classified into one of the other categories.

During the third wave, the average amount of selfies per capita decreased minimally (6.0, 98%), but portraits came in second place (3.2, 116%), which is probably because, during the lighter restrictions between the peaks of the pandemic waves, there were more opportunities for others to take photos and videos of the participants. Trip or travel content (in contrast to the second wave) had overtaken those made at home in third place, although their average per capita has decreased (2.79, 82%). The fourth place went to photos and videos depicting other people (2.72,

108%), and the fifth place to the "at home" category, which almost halved in average per person (2.07, 54%). "At work" content (1.90, 83%), "exercising" photos and videos (1.52, 73%), and erotic content (0.55, 83%) were also less popular.

During the merging fourth and fifth waves, which lasted for a year and a half, selfies remained the most popular. However, the increase in the frequency of the individual content categories, which can also be seen in the graph, can be attributed to the length of the sub-period. However, their order can hardly be explained by the length of the period: the second place (as in the second wave) was once again taken by travel photos and videos, followed by portraits, then photos and videos depicting others. This was probably due to freer travel and leisure opportunities, fewer restrictive measures, and the possibility of social gatherings. On the popularity list, these were followed by content related to exercising, then content made while working or at home, and finally, erotic photos and videos in the last place. The third wave also brought the primacy of selfies (4.13, 79%) and portraits (2.61, 96%) for Group B. In third place was content made in the company of others (1.81, 88%), and in fourth place was travel content (1.45, 66%); these two were reversed for Group A. This was followed by pictures and videos at home (1.39, 60%), followed by those at work, which showed a significantly smaller decline (1.35, 95%). Exercise content was overall more unpopular with Group B than with Group A; for example, during the third wave, their average per person dropped to two-thirds (0.83, 67%). Erotic content was the rarest (0.32, 82%), as in all groups and sub-periods.

Figure 32: Average amount of photos and videos of self by type before and during the pandemic per person in Group A
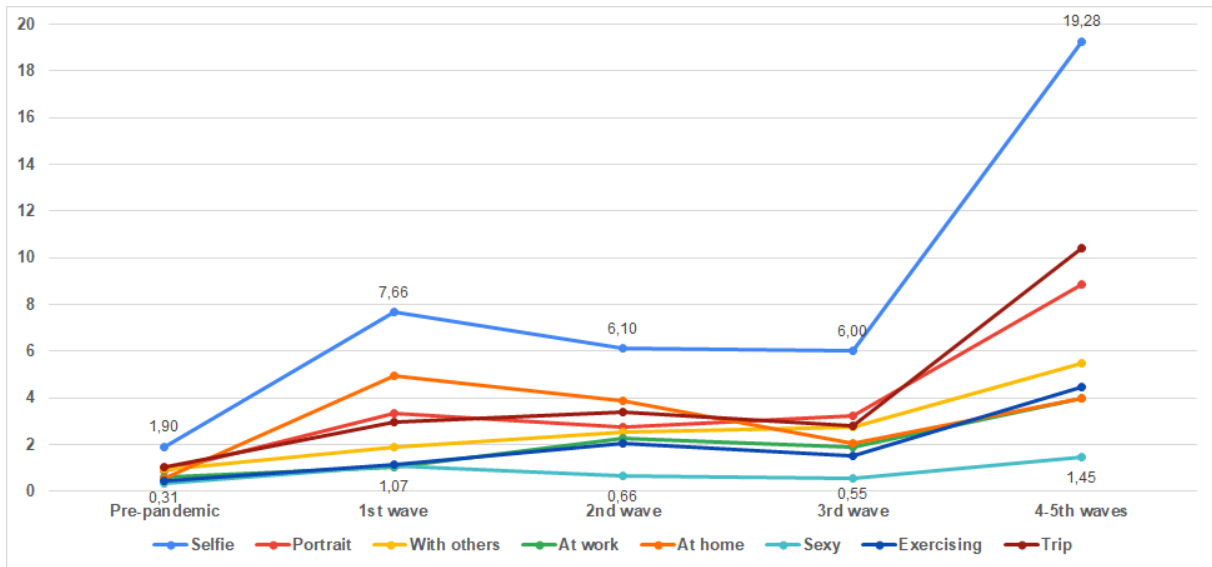
Source: the author

Figure 33: Changes in the average amount of photos and videos of self by type before and during the pandemic per person in Group A
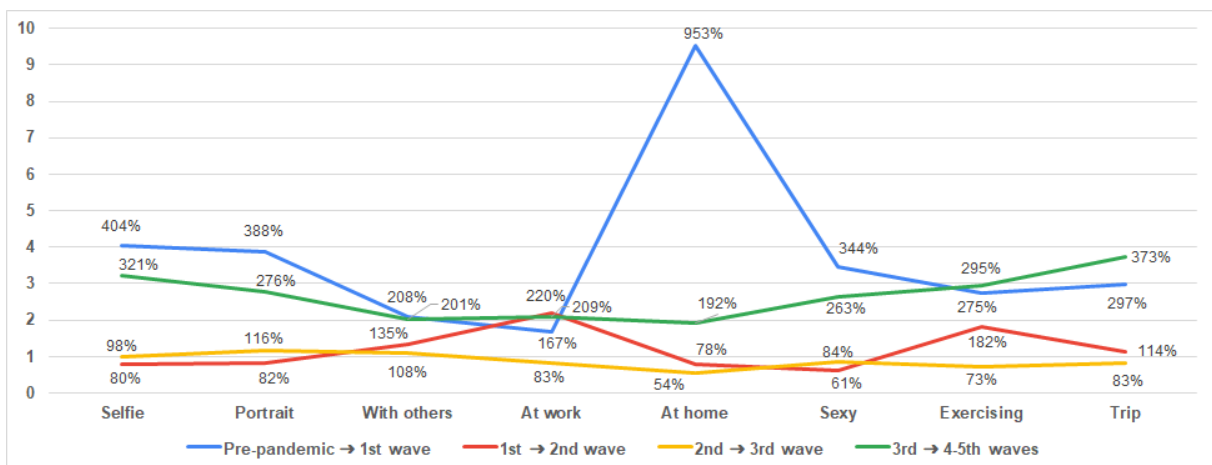
Source: the author

The average amount of self-representative content published by **Group B** per person per category can be seen in Figure 34, where the scale of the vertical axis is the same as that of Group A [Figure 32] for comparability. Selfies were the most popular among Group B members, too – who did not have an official diagnosis but considered themselves suffering from anxiety or affective disorders based on their symptoms – with an average of 1.16 per person during the pre-pandemic sub-period. Next came portraits with 0.84, photos and videos

taken in the company of others with 0.58, and those taken at home with 0.45. This was followed by travel content with 0.42, those depicting the work process with 0.29, exercise photos and videos with 0.26, and erotic self-representative content with 0.16. During the first pandemic wave, the average of selfies published on Facebook and/or Instagram increased by almost five and a half times (6.32, 545%) [Figure 34], which is a significantly higher increase than what could be observed in the case of Group A [Figure 32]. In the case of Group B, during the first wave, self-representative content made at home was the second most popular, with the second largest increase measured within the entire sample (3.87, 860%) [Figures 34-35]. The third most popular type of content at that time was portraits: the average per person increased by more than two and a half times (262%) to 3.16, while at the same time, photos and videos taken with others in fourth place showed an increase of more than three and a half times (2.1, 362%).

The members of Group B showed a greater willingness to publish exercise content (1.29, 516%) and work content (0.71, 241%) than Group A. The same was observed for erotic photos and videos, which showed a more than a threefold increase (0.52, 325%). During the second wave, the average number of selfies per person in Group B decreased to a similar extent as in Group A (5.23, 83%). However, portraits returned to second place (2.71, 86%), although they were in fourth place in Group A, because both the "at home" and "trip" categories overtook them in the same sub-period.

In Group B, on the other hand, home content dropped to third place (1.35, 60%), and travel content fell to fourth place (2.19, 120%) despite the increase in volume. The last three places were also occupied by self-representative photos and videos taken at work (1.35, 190%, this almost two-fold increase is probably also explained by the return to work between the peaks of the first two waves), exercise content (1, 26, 98%) and together with erotica (0.39, 75%). Interestingly, while the average exercise content per person increased in Group A, it decreased here in Group B. Selfies (11), and portraits (7.77) maintained their leading positions during the merging fourth and fifth waves. However, their average amount per person did not reach that of Group A. Group B members published significantly less travel content (4.23) in this one-and-a-half-year sub-period, so they ranked fourth behind the "with others" category (5.55). Next on the popularity list were home photos and videos (3.7), then work photos (2.7), and finally, exercising (2.48) and erotic content (0.35). Of these, only the per capita average of photographs and videos depicting others and those taken at home was similar to that of Group A.

Figure 34: Average amount of photos and videos of self by type before and during the pandemic per person in Group B

Figure 35: Changes in the average amount of photos and videos of self by type before and during the pandemic per person in Group B
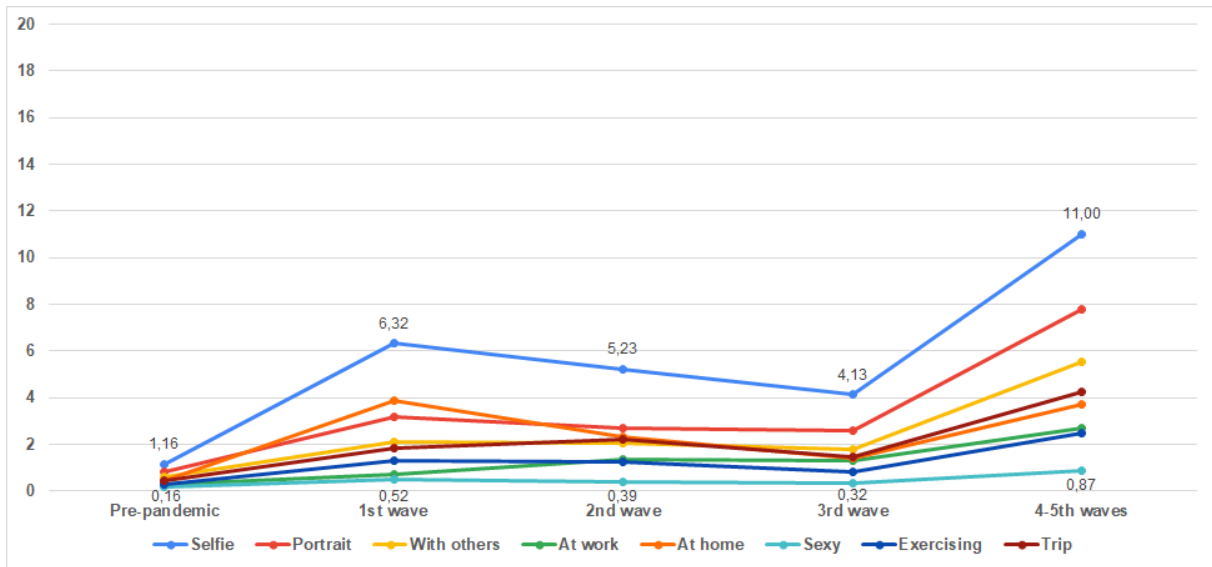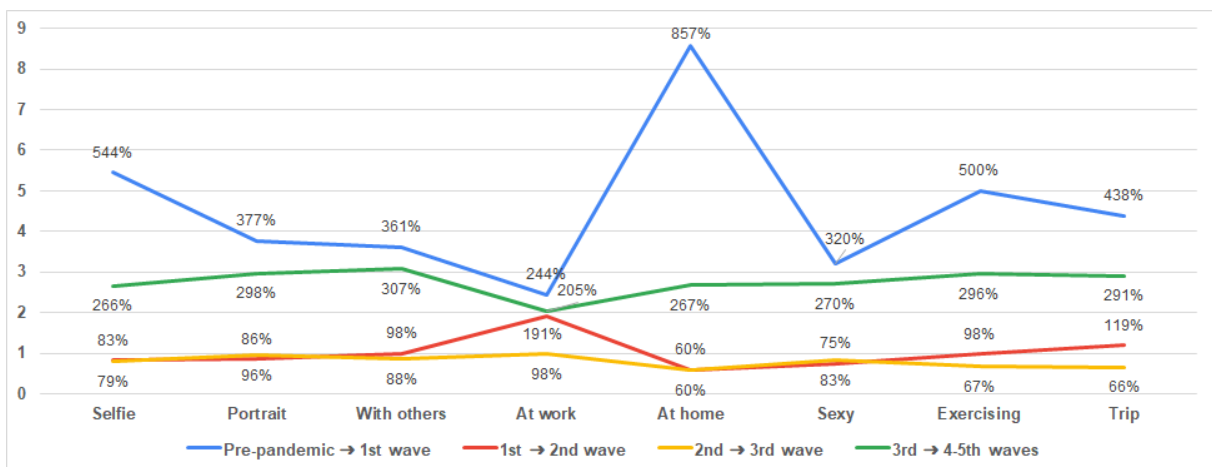
Members of **Group C**, who had neither an official diagnosis nor self-diagnosis based on their symptoms, shared fewer selfies (1.06), portraits (0.76), home photos or videos (0.41), and erotic photos or videos (0.38) on average per person during the pre-pandemic sub-period [Figure 36] than Groups A and B [Figures 32 and 34]. Members of Group C, who had neither an official diagnosis nor self-diagnosis based on symptoms, took fewer selfies (1.06), portraits (0.76), and

home content (0.41) on average per person during the pre-pandemic sub-period and posted an erotic picture or video (0.38) [Figure 36] than Groups A and B [Figures 32 and 34]. However, they posed more often with others (0.62), while working (0.53), and travelling (0.52) or exercising (0.38) [Figure 36] than members of Group B [Figure 34].

Therefore, among the three groups, Group B showed the least amount of social interaction and experience-making or health-preserving activities in the sub-period just before the pandemic. The per capita average of erotic content (0.12) in this and all other sub-periods was the lowest in Group C [Figure 36]. During the first wave, the average number of selfies per person increased three and a half times, which is an impressive increase but still the smallest of the three groups. In this sub-period, pictures and videos at home came in second place (2.88) for Group C, which, even with their more than seven-fold increase, showed the smallest increase among the three groups [Figure 37].

Portraits took third place with a three-fold increase (2.32, 305%), which, despite its relevance, was also the smallest increase of the three groups here. The fourth place belonged to photos and videos depicting others, too (1.82, 294%), followed by the "trip" category (2.89, 289%). The sixth place belonged to exercise content (1.35, 355%), the average per capita of which was the highest in Group C during the first wave; therefore, those without an affective or anxiety diagnosis or a self-diagnosis-based suspicion of it did publish the most content promoting exercise during the first wave.

The per capita average of self-representative content in the "at work" category increased minimally during the first wave (0.62, 117%). Although the per capita average of erotic content increased by more than two and a half times (0.32, 267%), it still lagged behind that of the other two groups.

During the second wave, Group C was the only one where the average number of selfies per person increased compared to the first wave (4.35, 116%). This was followed in popularity by pictures and videos taken at home (2.09, 73%) and travel content (1.79, 117%). The per capita average of travel content increased for all three groups in this period, which could be due to vacation and excursion opportunities between the first two pandemic waves. The per capita average of photos and videos taken with others also decreased (1.65, 90%), but content related to sports and exercise increased slightly (1.38, 102%). The "at work" category, next in the

ranking, became more popular on average per person (0.88, 142%), while erotic content fell to three-quarters (0.24, 75%).

During the third wave, as in all groups, the average number of selfies leading the list decreased here as well (3.2, 74%). Portraits also returned to second place (2.5, 185%). The fact that "with others" was in third place (1.47, 89%) may reflect the re-opening of opportunities for social pastimes. This was followed by travel content (1.38, 77%), also with a slight decline, then the "at home" category, which decreased by three-fifths (1.26, 60%), and the "at work" category, which increased by more than a third (1.21, 138%). Group C was the only one where the per capita average of the contents of the "at work" category increased from the second to the third wave. This probably leads to the conclusion that this group felt more motivated to show their working conditions but interpreting the "at home" data as well, not their work at home. The average per capita of photos and videos depicting sports or training also decreased (1.06, 77%), but that of erotic content remained completely unchanged (0.24), which is unique among the three groups.

During the one-and-a-half-year period of the fourth and fifth waves, selfies remained the most popular (10.62), together with portraits (6.2). In third place was content depicting others (7.65), followed by travel-related content (5.65). This trend so far is the same as that of Group B. However, Group C published fewer selfies and portraits per person but more "with others" and "trip" content than Group B. The same can be said for the fifth place also for exercise content (4), which, on the other hand, had the largest increase in their per capita ratio since the third wave (378%). The per capita average of "at home" (3.06) and "at work" (2.59) content was also lower than that of the other two groups in Group C, as was that of erotic content (0.62).

Figure 36: Average amount of photos and videos of self by type before and during the pandemic per person in Group C
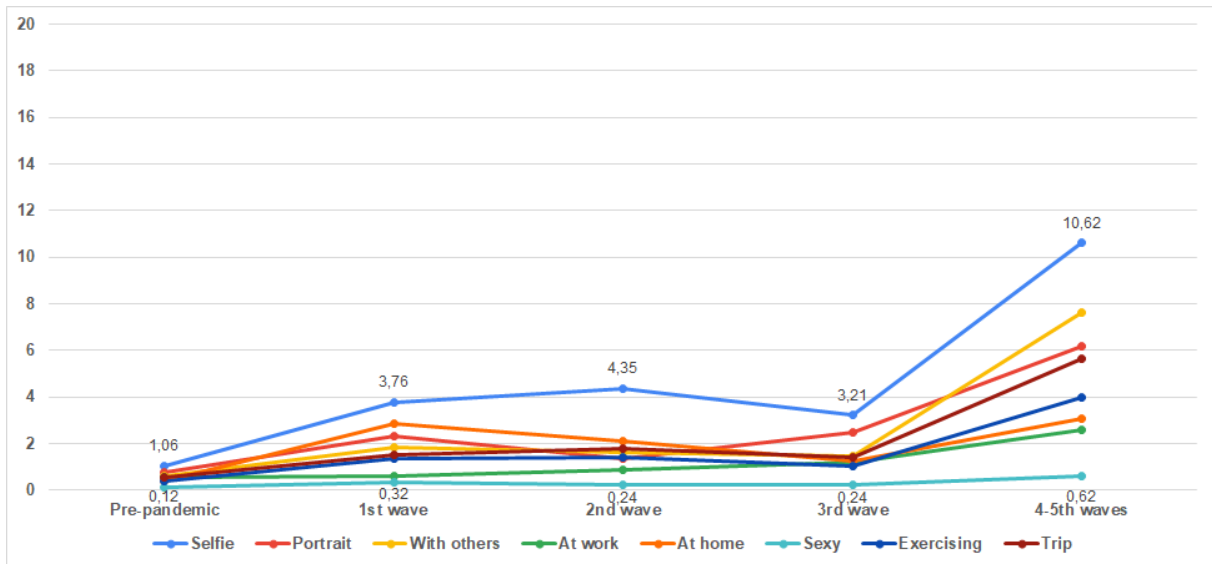
Source: the author

Figure 37: Changes in the average amount of photos and videos of self by type before and during the pandemic per person in Group C
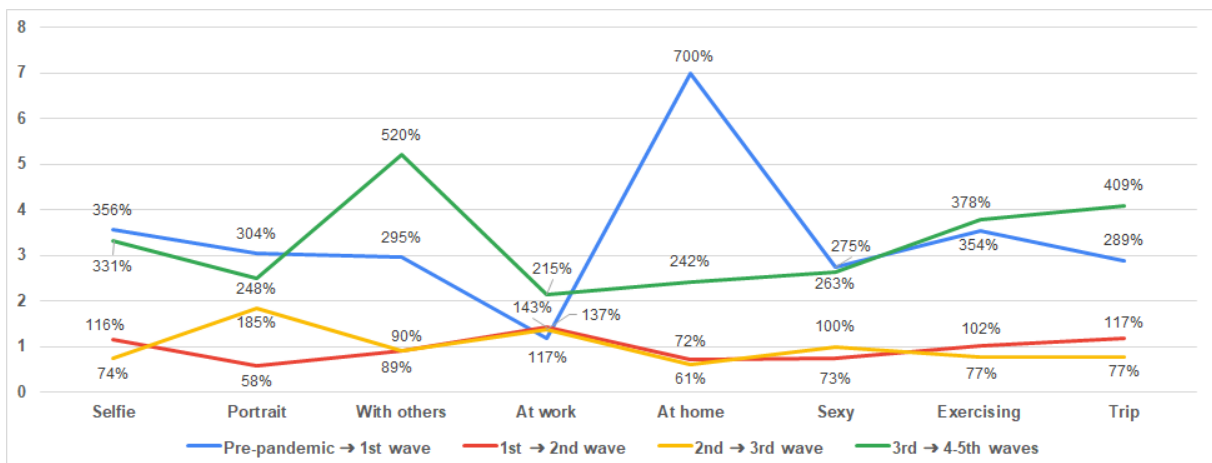
Source: the author

The **proportion of visibly modified self-representative photos and videos** was the highest in Group A and the lowest in Group C in all sub-periods examined [Figure 38]. The ratio returned to the pre-pandemic value only in the case of Group C. In the other two groups, it remained higher in all investigated waves; for Group A and Group B, a long-term change occurred in this aspect of self-representation in social media.

As for the statistics, in the pre-pandemic period, the proportion of visibly modified content was 62% for Group A, 57% for Group B, and 49% for Group C. During the first pandemic wave,

the proportion of modified content increased for all three groups: for Group A to 76%, for Group B to 73%, and Group C to 64%. The second wave brought the mildest drop in Group A, to 69%, and the most significant drop in Group B, to 63%. In the case of Group C, the proportion of modified images and videos decreased to 56%. During the third wave, Group A showed a rate similar to the second wave at 68%, while in the case of Groups B and C, there was a slight decrease to 63% and 56%. This may show a gradual reduction in the socio-psychological effects of the pandemic so far.

However, the trend is contradicted by the fact that during the longest study sub-period, i.e. during the merging fourth and fifth waves, which meant half of the entire three-year study period, the proportion of modified images and videos increased again for Groups A and B: to 71% and 66%; in Group C, however, it fell to the pre-pandemic 49%. On the other hand, it is important to note again that, based on what was discussed in the methodological part, there were no means available to establish without any doubt the fact or lack of modification, so the data was recorded based on visible signs, such as unnatural colours, contours (distortions), blurred parts, filters or effects.

Figure 38: Proportion of visibly modified self-representative photos and videos in all Groups before and during the pandemic
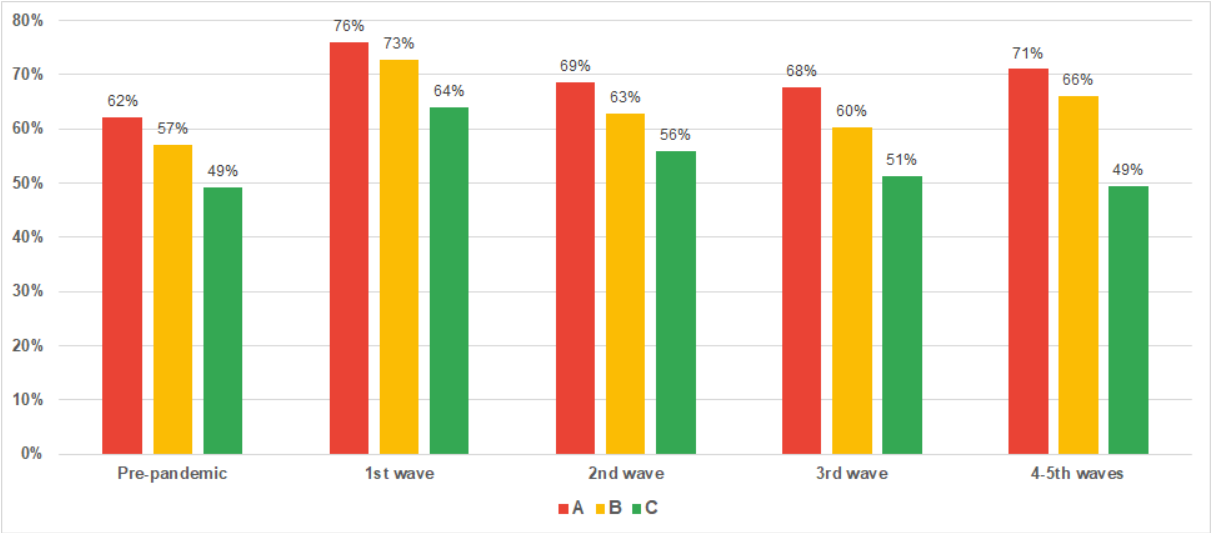
Source: the author

Situation-specific factors such as the so-called "Zoom dysmorphia" phenomenon could also be the reason behind the increased willingness to publish digitally modified self-representative photos and videos (in addition to the general reasons mentioned in Chapter 3.1). The essence

of this phenomenon is that people who, due to online education and/or online work, participate more often in video call meetings (e.g. through the Zoom platform, from which the name also comes), see their face from a certain angle more often. Because of this, their body image may be distorted. It can lead to such a level of dissatisfaction that it can increase not only the demand for a digital modification of photos and videos but also the demand for specific plastic surgery procedures (e.g. wrinkle filling or facial contouring) (Rice et al., 2020). Facial contouring means, for example, the shaping of the nose or the chin with a filler: hyaluronic acid. With this, the face can be made similar to what users see with the filters.

The peculiarities of the selfie angle seen during video meetings have already been discussed in Chapter 2.1 of this dissertation. However, as a reminder, it is worth mentioning that, unlike three-dimensional perception, it shows the proportions of the face differently; for example, the nose is larger and more prominent. The phenomenon of Zoom dysmorphia was rather pandemic-specific, or at least it came into the public consciousness at the time. With the predominance of online meetings (and their exclusivity during the most severe restrictive measures), users were constantly forced to see their faces in situations they would not otherwise see, such as school lessons or workplace meetings. Seeing oneself on a display while talking or paying attention to others can affect their body image. Therefore, it is not surprising that the demand for digital modification increased significantly during the pandemic among the research participants discussed in this subchapter. Anxiety and/or affective disorders are often accompanied by body dissatisfaction. This can explain why the ratio of visibly digitally modified self-representative contents remained higher in the long term among the members of Group A (with such a diagnosis) and Group B (with a self-suspected diagnosis based on their symptoms). Furthermore, as shown in the literature and Chapter 3.1, exposure to digitally modified photos and videos may also increase users' propensity to do so.

3.3.3. Conclusion

All six hypotheses of the research described in this subchapter (based on the literature and the research explained in Chapters 3.1 and 3.2) proved to be valid:

(3a) The BDI and BAI scores showed different patterns in all three groups (Group A: diagnosed with affective disorder and/or anxiety disorder; Group B: not diagnosed with either affective or

anxiety disorder but having such symptoms; Group C: without either such diagnosis or symptoms). In Group A, 86% had symptoms of severe depression, and 73% had symptoms of severe anxiety, 6% and 15% had moderate symptoms of depression and anxiety at the time of the first data collection when restrictive measures due to the pandemic were still in effect. During the second, restriction-free data collection period, 59% reported severe depressive symptoms and 45% reported severe anxiety symptoms, while 21% and 31% reported moderate symptoms. In Group B, 84% had severe depressive symptoms, and 41% had severe anxiety, with moderate rates of 3% and 43% at the first data collection. After the gradual relaxation and elimination of the restrictive measures, at the second data collection, the proportion of reporting severe depressive symptoms decreased to 48%, and 19% of those with severe anxiety, 16% and 35% fell into the "moderate" category.

In Group C, severe depressive symptoms were indicated in 14% by the BDI and severe anxiety symptoms by the BAI in 5%, with 14% and 10% "moderate" involvement. In the second data collection, this changed a significantly different way compared to the other two groups: during the pandemic period, which had been going on for almost three years at the time, 29% reported severe depressive symptoms, which means a more than two-fold increase, but the proportion of those showing severe anxiety symptoms dropped to 6%. However, the "moderate" category proportions are precisely the opposite: 6% for depression and 29% for anxiety.

Therefore, it can be concluded that the affective and anxiety symptoms of the members of Group A, which already showed evidence of a more serious condition, were less alleviated than the members of Group B. At the same time, Group C, which started with BDI and BAI scores that were much more favourable than both groups, saw a significant increase in the proportion of people at risk of depression despite lifting restrictive measures.

(3b) Self-representative content sharing showed different patterns in all three groups, with (3c) less large-scale changes in Group C. Namely, the (3d) willingness to share self-representative content significantly increased during the first wave of the pandemic, then decreased in accordance with the effects of the pandemic easing over time – in all three groups. Group A proved to be the most active self-representative content sharer in terms of the average amount of photos and videos of self before and during the pandemic per person and the average monthly (30-day) number of photos and videos of self before and during the pandemic. Group B's self-representation pattern had characteristics analogous to those of Group A and Group C. At the

pandemic's beginning, Group B's willingness to share self-representative content increased the most. In terms of the average amount of photos and videos, it was in second place behind Group A from the first to the third pandemic wave.

Considering the average monthly (30-day) number of photos and videos, Group B fell short of Group C even during the second wave. In every sub-period examined, selfies were the most common type of self-representative content in all three groups. The most significant increase in the entire sample, almost tenfold (948%), could be observed in Group A during the first wave compared to the pre-pandemic period. The second largest increase was produced by Group B at the same time (860%). Group C also produced a significant, seven-fold increase in the same period, but it also lagged behind the other two groups. Moreover, it started with a smaller pre-pandemic volume.

The amount of erotic self-representative photographs and videos during each study sub-period was significantly higher for Group A than for the other two groups. This may lead to the conclusion that people suffering from anxiety and/or affective disorders attempt to fulfil their need for positive reinforcement, also known in the literature.

Looking at the average published content per person, Group A was always in the first place, and Group B was in second place regarding selfies, portraits, photos and videos taken at home, and erotic content. However, during the pre-pandemic sub-period, the contents created in the company and depicting other people were more frequent in Group C than in Group B. During the merging fourth and fifth waves, they were the most popular in Group C.

It can be concluded that Group C may have had a greater need to show themselves in a company; only during the first three waves, this was affected by the restrictive measures, which were hardly or not at all present during the fourth and fifth waves. As for workplace content, Group C surpassed Group B only in the pre-pandemic sub-period, so its per capita average was closer to that of Group A. The trend was entirely different in the case of exercising photos and videos that also promote health care. During the first wave, they were the most common among Group C and the second most common during the other sub-periods. Another interesting thing about the exercise-related category is that it is the only one where Group A finished last at any time, namely during the first wave. This allows us to conclude that the drastic change in living

conditions and the sudden narrowing of the living space brought out the most need for presenting physical exercise from Group C, and the least from Group A.

Regarding travel content, during the pre-pandemic sub-period, Group A members posted them the most frequently of the three groups, while Group B posted them the least frequently. During the first three waves, the self-representative content category capturing trips and travels also had the order of Group A, Group B, and Group C. However, during the fourth and fifth waves, Group C overtook Group B again. This form of socialisation seemed more attractive to Group B than to Group C only during the more intensive presence of restrictive measures.

(3e) Visible digital modification (filters, editing) on self-representative photos and videos were more frequent in Group A and B than in Group C. It was the most common in Group A, the second most common in Group B, and the least common in Group C during each sub-period examined, which can be (3f) associated with higher Beck Depression Inventory (BDI) / Beck Anxiety Inventory (BAI) scores in Group A and Group B. The ratio of visibly digitally modified self-representative photos and videos remained higher in the long term among Group A and Group B members.

4. General Discussion and Conclusions

According to the author's hope, this dissertation will contribute to scientific knowledge to understand the short- and long-term socio-psychological effects of the COVID pandemic. In addition, it answers how self-representation in social media has changed during the pandemic and how this may be related to the most common anxiety and affective disorders.

The literature review (Chapter 2) focuses on the triple connection of social media, mental health and the COVID pandemic. However, since there was little literature on this triple connection at the time of writing the dissertation (which also supports its relevance), previous results on double connections were reviewed for the sake of thoroughness. Subchapter 2.1 points to the recognized connections between social media and mental health. Subchapter 2.2 presents the relationship between mental health and COVID-19 that has been discovered so far. Subchapter 2.3 sheds light on the multidimensional connections between social media and COVID-19. Relevant existing results on the tripartite connection can be found in Subchapter 2.4 – with the note that the authors of the studies exploring the listed connections did not specifically focus on self-representation in social media but only on the general or pandemic-specific activity there.

The three pieces of research presented in Chapter 3 can be interpreted independently. However, they provide a complete insight into the connections between self-representation in social media, mental health and the pandemic. All three pieces of research have separate "Methodology", "Results and Discussion", and "Conclusion" sections. (The merging of the Results and discussion sections was justified by the fact that during the international presentation of the results, it was requested to divide the text in this way several times.)

The purpose of the pilot study presented in Subchapter 3.1 is to take an initial step to explore the possible psychosocial impact of modifying face and body photographs in social media. With this, the following hypotheses were confirmed with the help of personal interviews with experts (a clinical psychologist, a social psychologist, a plastic surgeon, and a professional photographer) and social media users, during which the users also filled out the BDI questionnaire: (1a) the interviewed social media users were exposed to modified or manipulated face and body photographs through their connections; and those who reported seeing modified images of others (1b) tended to modify images of themselves on social media, and (1c) more

symptoms suggestive of depression could be observed in them based on a widely used, validated measuring instrument (BDI). Moreover, (1d) based on the results, presumably, it revealed such a relevant and multifaceted social-psychological phenomenon that deserves further investigation. Even this preliminary research resonates with the complexity of the double and triple connections discussed in the Literature Review (Chapter 2).

The cross-sectional research described in Subchapter 3.2 shows the correlations between self-representation in social media and the risk of depression during the lockdowns and restrictions of the first five waves of the COVID-19 pandemic. For this, data were collected using online questionnaires in four stages during the peak period of the first three pandemic waves and the fourth and fifth waves. The uniqueness of this research is that it was conducted in real-time, so it does not examine the changes that occurred during the pandemic retrospectively: the participants reported then and there, during the lockdowns and the most severe restrictive measures, about their use of social media, their self-representation and their mental health condition. Based on the data obtained in this way, it was shown that (2a) time spent on social media and (2b) willingness to share self-representative content increased during at least the first three COVID-19 waves among the participants, and were associated with (2c) a growing risk of depressive disorder among users and (2d) an even higher risk among the most active sharers (according to the embedded PHQ-2 questionnaire). The results confirm the correlation described in the Literature Review (Chapter 2) that the pandemic is associated with increased social media use and increased social media use with worse mental health status.

Subchapter 3.3 is a longitudinal analysis that focuses on the self-representation of users diagnosed with affective disorder and/or anxiety disorder, where the self-representation patterns of three groups of participants are identified (Group A: diagnosed with affective disorder and/or anxiety disorder; Group B: not diagnosed with neither affective nor anxiety disorder but having such symptoms; Group C: without either such diagnosis or symptoms). From the pre-pandemic sub-period to the mild phase of the fifth pandemic wave, in addition to the social media content analysis covering three years, the participants also filled out questionnaires twice, including the BDI and BAI. As it was confirmed, (3a) BDI and BAI scores and (3b) self-representative content sharing were both showing different patterns in all three groups (Group A: diagnosed with affective disorder and/or anxiety disorder; Group B: not diagnosed with either affective or anxiety disorder but having such symptoms; Group C: without either such diagnosis or symptoms), with (3c) less large-scale changes in Group C. Namely, the (3d) willingness to

share self-representative content significantly increased during the first wave of the pandemic, then started to decrease in accordance with the effects of the pandemic easing over time – in all three groups; and (3e) visible image modification (filters, editing) on self-representative photos and videos were more frequent in Group A and B, (3f) associated with higher Beck Depression Inventory (BDI) / Beck Anxiety Inventory (BAI) scores in these groups. The results of the longitudinal study help to understand at a deeper level the self-representation patterns of people with different mental health statuses in social media during the pandemic, also confirming the relationships suggested by the Literature Review (Chapter 2) in the tripartite context of social media use, mental health and the pandemic.

Compensating the limitations of the three pieces of research (Subchapter 3.1 is a pilot study, the cross-sectional study explained in Subchapter 3.2 is based on samples of convenience due to the peculiarities and methodological limitations of the pandemic situation, and the longitudinal research of Subchapter 3.3 was also carried out with the help of self-reported questionnaires, the use of which is widely accepted and even diagnostically important for affective or anxiety disorders), that together they give a complete picture and shed light on the connections between social media self-representation, mental health and the pandemic, using several methods and different approaches.

The pandemic timeline was such a challenge that even the international research scene recognized the expansion of the boundaries of science and the need to adapt methodological frameworks accordingly. This was also manifested in the fact that an international conference presentation and publication could be prepared from the research explained in Subchapter 3.2 during each pandemic wave, real-time – and every time it was accepted after a double-blind peer review. However, the author is aware that due to the limitations of the pandemic and the duration of the PhD training, the revealed connections may require further, more profound investigation. For this reason, it is recommended, for example, to compare the results with various future retrospective studies or even with big data research. Research on self-representation in social media is difficult because (1) published content can mostly only be analyzed with the express permission of the users, (2) the definition of analysis criteria can hardly be objective, (3) this kind of content analysis is challenging to carry out using an algorithm because it would require a more advanced operation of artificial intelligence, so (4) the manual analysis that remains as an option is exceptionally demanding on human resources. However, with the development of the technical conditions and the necessary resources, much

more detailed and thorough research is expected to be carried out on the subject than in this dissertation.

Taking all of this into account, the value of this dissertation is that it is one of the first scientific works to examine the triple connection between self-representation in social media, mental health problems and the COVID pandemic, hopefully contributing to a more conscious use of social media and mental health awareness.

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Összefoglaló

A disszertáció célja, hogy rávilágítson a közösségi médiabeli önreprezentáció és az affektív, illetve szorongásos zavarok összefüggéseire a Covid19-világjárvány perspektívájából, méghozzá úgy, hogy alapos szakirodalmi áttekintés után bemutatja a szerző kutatási eredményeit. A rövid bevezetőt követően - amely magában foglalja a témaválasztás indoklását, társadalmi jelentőségét, a kutatások módszertanát, valamint a szerző személyes motivációit - átfogó szakirodalmi áttekintés (2. fejezet) ismerteti a közösségi média, a mentális egészség és a Covid19-világjárvány összefüggéseit. Mivel eddig igen kevés kutatási eredmény vizsgálta ezt a hármas kapcsolódást, így a két-két tényező közötti összefüggések is bemutatásra kerülnek: először a közösségi média és a mentális egészség kapcsolata (2.1. fejezet), majd a mentális egészségé és a Covid19-világjárványé (2.2. fejezet), aztán a közösségi médiáé és a pandémiáé (2.3. fejezet), mielőtt a hármas összefüggés szakirodalomban fellelhető eredményei következnek (2.4. fejezet). Az áttekintést a szerző saját kutatási eredményei követik (3. fejezet) három külön, ám egymáshoz kapcsolódó részben; ezek külön is értelmezhetőek, ám együtt teljesebb képet nyújtanak. Az első kutatás a közösségi médiában fellelhető retusált képek szociálpszichológiai vonatkozásait veszi górcső alá (3.1. fejezet); a vegyes módszertannal készült kísérleti tanulmány kérdőíves adatgyűjtés, illetve felhasználói és szakértői interjúk nyomán mutat rá az önreprezentáció összefüggéseire. A második kutatás egy valós idejű keresztmetszeti analízis a közösségi médiabeli önreprezentációról és a depressziókockázatról az első öt járványhullám alatti korlátozó intézkedések idején (3.2. fejezet). Egyedülálló módon nem visszamenőleges adatgyűjtés történt, hanem valóban a járványhullámok csúcsán került sor az adatfelvételekre. A harmadik kutatás - ami a másodikkal párhuzamosan történt - egy longitudinális vizsgálat, amely az affektív vagy szorongásos zavarral élők önreprezentációjával foglalkozik. Itt Facebookon vagy Instagramon közétett fényképeket és videók kerültek elemzésre hároméves vizsgálati periódusban. Az elemzés három csoport eredményeinek összehasonlítására fókuszál: az első csoport tagjainak hivatalos diagnózisa volt a felsorolt affektív vagy szorongásos zavarok közül legalább egyre vonatkozóan; a második csoportnak nem volt ugyan diagnózisa, de gyanította magáról, hogy lehet ilyen mentális problémája; a harmadik csoportnak pedig sem diagnózisa, sem pedig gyanúja nem volt. A tartalomelemzés mellett kérdőíves adatgyűjtés is történt két ízben, hogy fény derüljön a közösségi médiabeli önreprezentáció és az affektív, illetve szorongásos zavarok összefüggéseire a Covid19-világjárvány perspektívájából.

Summary

The purpose of the current dissertation is to shed light on the relationship between self-representation and affective or anxiety disorders from the perspective of the COVID-19 pandemic by presenting the author's research results after a thorough literature review. After this short introduction – which includes the justification of the choice of topic, its social relevance, the methodology of the research, and the personal motivation of the author – an extensive literature review (Chapter 2) discusses the relationship between social media, mental health, and the COVID-19 pandemic. Since so far, very few research results have been published that examined this triple connection, the sources available on the double connections are introduced as well: first, on the connection between social media and mental health (Chapter 2.1), then on the connection between mental health and the COVID-19 pandemic (Chapter 2.2), and finally on the about social media and the pandemic (Chapter 2.3), before turning to examine the results of the triple connection so far (Chapter 2.4). The literature review is followed by the author's research results (Chapter 3) in three separate yet connected parts, which can be interpreted separately but give a more comprehensive picture together. The first research is about the possible psychosocial impact of modifying face and body photographs in social media (Chapter 3.1); this mixed-method pilot study helps explore the correlations of self-representation with questionnaire data collection and interviews with experts and users. The second research is a real-time cross-sectional analysis of self-representation on social media and depression risk during lockdowns and restrictions of the first five COVID-19 pandemic waves (Chapter 3.2). The unique feature is that the data was not collected retrospectively but took place at the peaks of the waves of the pandemic. The third research, which took place in parallel with the second, is a longitudinal analysis that focuses on the self-representation of users diagnosed with an affective disorder or anxiety disorder (Chapter 3.3). Here, self-representative photos and videos were analyzed on Facebook or Instagram over three years. The analysis covers three groups: the members of the first had an official diagnosis of one of the specified common anxiety or affective disorders; the members of the second group did not have such a diagnosis, but based on their symptoms, they suspected that they might have such mental illnesses; and the members of the third group had neither an official nor a self-suspected diagnosis. In addition to the content analysis, questionnaire data were collected twice to examine the relationship between self-representation on social media and affective or anxiety disorders in the perspective of the COVID-19 pandemic.