Longitudinal Analysis of Self-Representation of Users Diagnosed with Affective and/or Anxiety Disorders on Social Media During the COVID-19 Pandemic

Alexandra Valéria Sándor

Doctoral School of Sociology, Faculty of Social Sciences, Eötvös Loránd University, Budapest, Hungary. Email: sandor.alexandra.valeria@gmail.com

Abstract

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. On social media platforms, users publish virtual self-representations, which may be related to "real-life" events and changes. The COVID-19 pandemic brought sweeping changes worldwide, including at the level of society as a whole. During this research, 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, to contribute to the scientific knowledge of the COVID pandemic's short- and long-term socio-psychological effects (Sándor, 2023).

Keywords: affective disorders, anxiety disorders, COVID-19 pandemic, self-representation, social media.

Introduction

During the special, unique and unrepeatable period caused by the COVID pandemic, 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. The aim was 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 former research of the author (Sándor, 2022) 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. 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.

Methods

The research discussed here is based on mixed methodology. The recruitment period took place from September 19 to November 14, 2021, with a call posted on Facebook (both in the newsfeed and thematic groups) and Instagram. 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. From then on, the ID was contained in each Google Sheets questionnaire. The sending of personalized URLs could be solved with the help of Microsoft Flow.

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.

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. 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. 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 followed by BAI (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). Those who reported here that they had at least one of the listed mental illnesses diagnosed by a specialist, 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 (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

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. The second questionnaire also included the BDI and BAI.

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

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"). In addition, it was also recorded how many pictures or videos of each participant showed visible traces of digital modification (editing, retouching).

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. The data were stored anonymously, based on the IDs of the participants, without storing the contents themselves.

Results

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) 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 1].

When filling out the Mental health questionnaire 1, they stated that since the beginning of the COVID pandemic, 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 2]. 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. Based on the BDI scores, 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". 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 3]. Therefore, although 84.84% (n=28) of the members of Group A were undergoing diagnosis-specific treatment, they were showing signs of severe depression and anxiety.

Figure 1: Affective and anxiety disorder diagnoses in Group A

Figure 2: Current therapeutic statuses in Group A

Figure 3: BDI and BAI results in Group A during the merging 4th and 5th pandemic waves

In **Group B** (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): 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 4]. 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.

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 5].

Figure 4: Self-suspected affective and anxiety disorder diagnoses in Group B

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

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. They 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.

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. 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).

Figure 6: BDI and BAI results in Group C during the merging 4th and 5th pandemic waves

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. Ninety-four responses were received. 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, their complaint), and filled out the BDI and BAI questionnaires again.

Twenty-nine people from Group A who already had a diagnosis completed the Mental health questionnaire 2. Two 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, 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 [Figure 7]. 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, 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. 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 8].

Figure 7: New official and self-suspected diagnoses in Group A

Figure 8: BDI and BAI results in Group A nine months later (in a restriction-free period)

Thirty-one respondents from Group B filled out the Mental health questionnaire 2. Three (9.68%) of the group members reported an official diagnosis [Figure 9] that was not present before: 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 [Figure 9].

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. 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 10].

Figure 9: New official and self-suspected diagnoses in Group B

Figure 10: BDI and BAI results in Group B nine months later (in a restriction-free period)

From Group C, 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, 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. 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 11: New official and self-suspected diagnoses in Group C

Figure 12: BDI and BAI results in Group C nine months later (in a restriction-free period)

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. 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. 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 [Figure 13].

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. Group C showed the smallest quantitative increase in self-representative content during the pandemic outbreak, while Group A presented the most significant increase.

Figure 13: 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 14]. 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 Group C, the total amount of content made public during the second wave decreased to 30.82 on average per month, which is almost the same as the decrease measured in Group 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%). 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%), but this was the slightest change among the three groups in this sub-period compared to the previous one. 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.

In Group A and Group B, there was a sustained increase in the amount of self-representative content. On the other hand, in Group C, the average number of self-representative content published per month decreased below the pre-pandemic value by the third wave. 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 14: Average monthly (30-day) number of photos and videos of self before and during the pandemic per Group

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. 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 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 minor increase compared to Groups A and B during the first wave. However, even this smaller change represented an almost fourfold increase to 6.94 (375%). 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 minor increase also represented an almost fourfold increase to 6.94 (375%). 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 15: Average amount of photos and videos of self before and during the pandemic per person in each Group

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. For all three groups, selfies were the most popular in each sub-period [Figures 16-18].

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 16]. 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 17].

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). 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. During the second wave, the average per capita of the still most popular selfies dropped by four-fifths to 6.1 (80%), and "at home" content remained in second place, with a similar decrease in proportions (3.86, 78%). However, the third place was taken over by travel-related self-representative images and videos, the number of which even increased (3.38, 114%), so portraits fell slightly 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%).

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. Although, 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.

Figure 16: Average amount of photos and videos of self by type before and during the pandemic per person in Group A

Figure 17: Changes in the average amount of photos and videos of self by type before and during the pandemic per person in Group A

The average amount of self-representative content published by **Group B** per person per category can be seen in Figure 18. Selfies were the most popular 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 18], which is a significantly higher increase than what could be observed in the case of Group A [Figure 16]. 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 18-19]. 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.

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%). 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 this 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 18: Average amount of photos and videos of self by type before and during the pandemic per person in Group B

Figure 19: 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** 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 20] than Groups A and B [Figures 16 and 18]. However, they posed more often with others (0.62), while working (0.53), and travelling (0.52) or exercising (0.38) [Figure 20] than members of Group B [Figure 18].

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 20]. 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 21].

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. 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

ISSN 2411-9563 (Print)
ISSN 2312-8429 (Online)

European Journal of Social Science
Education and Research

October- December 2024
Volume 11, Issue 4

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 20: Average amount of photos and videos of self by type before and during the pandemic per person in Group C

Figure 21: Changes in the average amount of photos and videos of self by type before and during the pandemic per person in Group C

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 22]. 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.

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 22: Proportion of visibly modified self-representative photos and videos in all Groups before and during the pandemic

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. The essence of this phenomenon is that people who, due to online education and/or online work, participate more often in video call meetings, 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). 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).

Conclusions

All six hypotheses 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 BDI / 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.

References

[1]   Beard, C., & Björgvinsson, T. (2014). Beyond generalized anxiety disorder: Psychometric properties of the GAD-7 in a heterogeneous psychiatric sample. Journal of Anxiety Disorders, 28(6), 547-552.

[2]   Beck, A. T., Steer, R. A., & Brown, G. K. (1996). Manual for the Beck Depression Inventory-II. Psychological Corporation.

[3]   Boyd, D. (2014). It's complicated: The social lives of networked teens. Yale University Press.

[4]   Holmes, E. A., O'Connor, R. C., Perry, V. H., et al. (2020). Multidisciplinary research priorities for the COVID-19 pandemic: a call for action for mental health science. The Lancet Psychiatry, 7(6), 547-560.

[5]   Rice, S. M., Graber, E., & Kourosh, A. S. (2020). A pandemic of dysmorphia: "zooming" into the perception of our appearance. Facial Plastic Surgery & Aesthetic Medicine, 22(6), 401–402. https://doi.org/10.1089/fpsam.2020.0454

[6]   Sándor, A. V. (2022). Self-representation on social media during lockdowns in the first, second, and third covid-19 pandemic waves. The International Journal of Interdisciplinary Social and Community Studies, 17(1), 153–164. https://doi.org/10.18848/2324-7576/cgp/v17i01/153-164

[7]   Sándor, A. V., 2023. The Relationship between Self-Representation on Social Media and Affective or Anxiety Disorders in the Perspective of the COVID-19 Pandemic (PhD Thesis), Eötvös Loránd University, Budapest

[8]   T., & Steer, R. A. (2011). Manual for the Beck Anxiety Inventory. Psychological Corporation.

[9]   Xiong, J., Lipsitz, O., Nasri, F., et al. (2020). Impact of COVID-19 pandemic on mental health in the general population: A systematic review. Journal of Affective Disorders, 277, 55-64.

[10] Zhao, S., Grasmuck, S., & Martin, J. (2008). Identity construction on Facebook: Digital empowerment in anchored relationships. Computers in Human Behavior, 24(5), 1816-1836.

Endnote

The author declares that she has no relevant or material financial interests that relate to the research described in this paper.