





Digital media as COVID-19 lifeline or stressor? An exploratory study on the perception of media usage under isolation


Carlos Díaz*, Mario Alba-Marrugo**, Worawach Tungjitcharoen***, Nathaly Berrío García****, Andreas Lieberoth*****

*  Assistant Professor, Department of Architecture, Design and Media Technology, Aalborg University (cmcd@create.aau.dk)

**  Assistant Professor, Department of psychology, Fundación Universitaria María Cano (marioalejandroalbamarrugo@fumc.edu.co)

***  Assistant Professor, Department of psychology, Thammasat University (wortung@tu.ac.th)

****  Assistant Professor, Faculty of Human Sciences and Education, Corporación Universitaria Empresarial Alexander von Humboldt (nberrio18@cue.edu.co)

*****  Associate professor, Educational Psychology Master's Programme, Danish School of Education (andreas@edu.au.dk)

Abstract

To answer the question if Information and Communication Technologies (ICTs) were benefiting or hindering the mental health of people undergoing isolation during the early pandemics of SARS-CoV-2 (COVID-19), we inquired how people perceived the usage of five ICTs and their relationship with them. We addressed three hypotheses: there is a relationship between the increase in the use of specific ICTs during the isolation period due to COVID-19 and perception of positive psychological effects (H1), feelings of psychological discomfort (H2), and anxiety levels (H3). We found that using ICTs helped people feel less isolated and combat boredom. However, ICTs can cause psychological discomfort when people perceive they spend too much time using them or feel they cannot control their use. We also found that anxiety is related to how people perceive their relationship, with a positive media relationship linked to less anxiety and vice versa.

Keywords: COVID-19, Social Isolation, Information and Communication Technologies, Anxiety, Mental health.

Introduction

The pandemic of SARS-CoV-2 (COVID-19) has left an unprecedented mark in the contemporary world both in scale and duration. COVID-19 forced people to socially distance themselves from others, sometimes even within the same household.

Social isolation and social distancing during COVID-19 can be considered prosocial behaviour (Campos-Mercade et al., 2021; Dinić & Bodroža, 2021). However, when conceptualised, social isolation is defined as 'the inadequate quality and quantity of social relations with other people at the different levels where human interaction takes place (individual, group, community and the larger social environment)' (Zavaleta et al.,

2017, p. 370). In turn, isolation can generate psychological problems (Jeong et al., 2016; Santini et al., 2020) and problems re-adapting to social situations when the isolation has stopped (Huremović, 2019).

Previous studies on the psychological impact of social isolation and social distancing have revealed a negative impact on mental health and well-being. For example, Santini et al. (2020) found correlations between social isolation, depression, and anxiety. Similarly, Leigh-Hunt et al. (2017) found correlations between social isolation and poor physical and mental health. However, it has not been broadly studied how much the current Information and Communication Technologies (ICTs) impact (either positively or negatively) the mental health of people undergoing social isolation.

The present study emerged in the early 2020 COVID-19 pandemic as a question if ICTs were benefiting or hindering the mental health of people undergoing isolation due to governmental restrictions. We inquired how people related to different technologies, comparing how they perceived their usage before and during the pandemic; this included frequency of use, if they felt their use was beneficial or detrimental to their mental health, and if it influenced feelings of anxiety.

As a question emerging during a rapid societal change during unprecedented times, we decided to make an exploratory study (Stebbins, 2001) focusing more on understanding the phenomenon that was emerging before us than on framing it under a specific theory. Due to the unusual occurrence of a pandemic, it was difficult to find literature supporting our study, so we used tangential literature, which led us to create our main measurement inductively.

Literature review

Psychological benefits of ICTs during isolation

ICTs can have the properties of helping people feel connected and to breach distance, as is the case of teleconferences or phone calls (Arshad, 2020), but at the same time, they can be used to spread fear and misinformation (Allington et al., 2020; Gómez-Galán et al., 2020). Although epidemiologists (Huremović, 2019) have suggested that ICTs are a powerful way to keep good mental health during social isolation or quarantine during a pandemic, it has yet to be studied in detail how people are using ICTs during the COVID-19 pandemic, and how much this influences mental health.

Different studies have found that ICTs can be beneficial and even necessary to maintain good mental health during isolation. Gabbiadini et al. (2020) reported how ICTs (calling, multiplayer video games, shared board games, and watching movies in party mode) helped reduce loneliness, irritability and boredom during the 2020 pandemic while increasing feelings of belonging in the socially isolated population. Arshad (2020) reported how ICTs helped people continue relatively normal social lives despite the quarantine and social isolation restrictions worldwide, highlighting their essential role in governmental communication, teaching, and learning. Király et al. (2020) identified the use of the Internet and ICTs (gambling, video gaming, pornography, social media use, and shopping) as coping mechanisms during crises such as the COVID-19 pandemic.

As examples of how specific ICTs can help to cope with feelings of isolation and boredom during isolation, Coelho et al. (2017) conducted studies on remote shared television viewing on socially isolated elderly people using services such as *Facebook watch party*, finding that it helped the elderly to feel less isolated. Furthermore, Kim and Kim (2020) found that social live streaming services helped people decrease loneliness

feelings and enhance social interactions. Vandenberg et al. (2020) inquired about the use of stream services for concerts during the lockdown in Europe due to COVID-19, finding that these activities fostered feelings of collectivity, solidarity, and resilience.

Negative impact of ICTs during isolation

On the other hand, scientific literature suggests that people may feel distressed or guilty when they spend considerable time using ICTs. Panek (2014) found that college students were aware of media overuse (social network sites and online video), which was associated with feelings of guilt and lack of self-control. The feeling of guilt in social media users has also been found in other studies (e.g., Turel & Qahri-Saremi, 2016). As examples of how specific ICTs can foster feelings of lack of self-control and guilt, Allington et al. (2020) carried out three studies with UK samples regarding the use of social media during the COVID-19 pandemic. The three studies found negative relationships between COVID-19, conspiracy beliefs and health-protective behaviours (e.g., self-isolation). Gómez-Galán et al. (2020) researched Spanish students of 14 universities regarding their Social Media consumption during the isolation period due to COVID-19, finding patterns similar to addiction and other negative feelings (negative self-esteem, depression, and anxiety) as a product of unhealthy online communication (harassment, jealousy, misunderstandings, amongst others).

ICTs and anxiety

Media technology usage can also be related to general anxiety, defined as persistent worry about various life spheres and which includes feelings of restlessness, being on edge, being easily fatigued, difficulty focusing, irritability, muscular tension, and problems sleeping (American Psychiatric Association, 2013, p. 190). As an example of the relationship between media use and general anxiety, Brailovskaia et al. (2021) found that people from a group with symptoms of problematic social media use reported more mental health issues, including higher anxiety levels, compared to groups without problematic social media use. Furthermore, in a systematic review, Keles et al. (2020) found that social media overuse is a risk factor for anxiety and depression. Concerning media content, studies show that news and information related to COVID-19 coming from social media had negative consequences on mental health (Torales et al., 2022). While media uses have been implicated in the broader space of coping and well-being in the COVID-19 pandemic, it should be noted that broader research into technology effects find relatively small connections between technology use and (for example) depression symptoms (Orben & Przybylski, 2019; Przybylski & Weinstein, 2017). This gap points to a need to differentiate between types of media used, including active and passive participation in the spaces offered by ICTs (Escobar-Viera et al., 2018).

Hypothesis system

Based on the existing literature about the use of ICTs and their relationship to mental health, and seeking to explore how these relate to the COVID-19 pandemic, we hypothesised that (H1) the increase in the use of specific ICTs during the isolation period due to COVID-19 was related to the perception of positive psychological effects (i.e., combat loneliness, boredom, and decreased anxiety –Gabbiadini et al., 2020; Király et al., 2020). However, based on the contrasting findings of different authors, we also hypothesised

that (H2) the increase in the use of specific ICTs during isolation due to COVID-19 was related to feelings of psychological discomfort (i.e., overuse, guilt, and increased anxiety –Panek, 2014; Turel & Qahri-Saremi, 2016).

Thereupon, our first set of hypotheses related to the perception of positive psychological effects of phone calls (H1a), television (H1b), live streams (H1c), video games (H1d), and social media (H1e). Conversely, our second set of hypotheses relates to the feelings of psychological discomfort by phone calls (H2a), television (H2b), live streams (H2c), video games (H2d), and social media (H2e). These hypotheses emerge from the general literature about the relationship between ICTs and mental health during isolation situations and the necessity to understand the role of independent technologies in people's lives. In addition, we hypothesised that using ICTs was related to general anxiety depending if people perceived them as positive or discomforting (H3a). Similarly, we hypothesised that ICTs portraying content related to the pandemic would influence general anxiety (H3b). These hypotheses relate H1 and H2 to anxiety, as one of the psychological effects ICTs can have on mental health while inquiring if the content (related to the pandemic) of the media can act as a factor of anxiety not linked to the perception of the technology used as such. The hypotheses and the associated questions can be found in Appendix.

Methodology

Participants

Eight-hundred-and-ninety-six people from 25 different countries (See Table 1 for country distributions) participated in the study, which took place between 16-04-20 and 01-06-20 (47 days). Three-hundred-and-sixteen participants were excluded for not filling in the sociodemographic data (gender, age, and country of residence), thus totalling N=580 participants. The characteristics of the population are summarised in Table 1. The sampling method was snowball. Participants were recruited via social media such as Facebook and Twitter, as well as groups and networks of interest. Anyone 18 years old and above who could read and fill the survey. In addition, participants had to comply with the informed consent before taking the survey. The survey was designed so that participants could only proceed with it after they accepted the terms and purposes of the research. GDPR and Colombian ethical regulations require parental consent for minors. This population was excluded because we could not ensure virtual parental consent for people below 18 years.

Ethical considerations and data management

Participants took part in the research voluntarily and were not paid. The research was considered low-risk according to the regulations proposed by the Directorate-General for Research Science, Economy and Society (2010). All the data gathered was considered anonymous as no identifiable information was gathered from the participants, such as they could be directly or indirectly identified (gdpr-info.eu, 2018). Furthermore, the Bioethics Committee of the University of San Buenaventura (Colombia) evaluated and endorsed the execution of the research.

Materials and procedure

A cross-sectional survey design was conducted to inquire about the relationships between the use of five specific ICTs: telephone (used for calling or video calls), television (used for watching series, news, or movies), streaming services (used for watching live streams that allow interacting with people —e.g., Twitch), video games, and social media (such as Facebook, and including dating apps such as Tinder) during COVID-19 isolation. For this part of the survey, the sentence instruction was, 'Since my isolation (quarantine) time started', followed by items such as 'I find myself using social media more than before'. The survey provides a total of 31 items inquiring about the person's relationship with technology and a 7-point Likert type measurement (1 = Strongly disagree to 6 = Strongly agree, and 0 = It does not apply). Additionally, we included the General Anxiety Disorder Scale-7 (GAD-7; Spitzer et al., 2006) to measure general anxiety; however, this part of the survey was not mandatory. The GAD-7 has seven items to measure the degree a person has presented symptoms associated with general anxiety disorder. The questionnaire instruction was adapted to the isolation situation as follows 'Since your isolation period started, how often have you been bothered by any of the following problems?' which was followed by items such as 'Feeling nervous, anxious, or on edge'. Participants answer each question in a 4-point Likert type measurement (0 = Not at all to 3= Nearly every day).

We gathered sociodemographic data and different aspects of the use of the media (feeling of relative use, why people were using it, how they felt using it, and how they felt regarding their media use habits). The survey was designed so that people only had to answer questions related to technologies they used and were familiar with (see Table 2 for a distribution of technology use amongst the participants). The survey was presented in eight different languages (English, Spanish, Danish, Italian, German, French, Hungarian, and Thai). The first question presented to the respondents was the language they wanted to take the survey. Following, participants were presented with informed consent in their language of choice. We pre-registered our study in the Open Science Framework (osf.io). The data will be opened after publication.

Analytical procedure

First, we tested the reliability of the GAD-7. We conducted a Cronbach's alpha analysis as the test assumptions of continuity —our data is ordinal— and monotonicity —We evaluate only one factor— (Field et al., 2012, pp. 798–799). We did not conduct a reliability test for the ad hoc questionnaire as the questions inquired directly into the topics we wanted to discuss while segmented according to different ICTs (meaning they did not measure the same construct).

Second, we tested for moderation effects regarding language (as a proxy for culture) to see if there was an influence on the answers to the questionnaire concerning this variable. No mediation effects were found with $p > .05$ for both the technology use questionnaire and the GAD-7, so no further analyses were conducted. Third, we conducted linear regressions with each sub-hypotheses groups for H1 and H2 so that one linear regression was carried out for each group with the question regarding the increase of usage of the specific technology. We conducted linear regressions because we were analysing numerical data where our hypothesis already implied a direction in the relationship.

Finally, for H3, we conducted ANOVA analyses and paired them with Tukey posthoc test to inquire more in-depth about our sub-hypotheses. We conducted ANOVA analyses due to the nature of our variables (numeric and nominal) and the clustered nature of our data (each technology was evaluated independently). In

addition, the BoxM test for homogeneity was not possible to calculate, deeming MANOVA analysis unsuited for our study (Field et al., 2012).

Results

Sociodemographic analyses

Table 1 presents the descriptive analyses of the sociodemographic data from our sample for age and days of isolation (when the survey was taken), gender distribution, country of residence, education level, and employment status.

Table 1: Sociodemographic summary of the participants

Characteristics	Mean	SD
Age	31.02	10.39
Isolation (days)	34.58	14.38
	n	%
Gender		
Female	410	70.69
Male	158	27.24
Other	8	1.38
NA	4	0.69
Total	580	100.00
Country of residence		
Colombia	339	58.45
Thailand	169	29.14
USA	13	2.24
Other	59	10.17
Total	580	100.00
Education level		
Secondary school	19	3.28
High school	24	4.14
Technical studies or similar	126	21.72
Undergraduate	218	37.59
Postgraduate or higher	181	31.21
None	1	0.17
NA	11	1.89
Total	580	100.00
Employment status		
Employed	340	58.62
Unemployed	224	38.62
NA	16	2.76
Total	580	100.00

Source: Own elaboration

As the survey was designed so that people did not have to fill all the questions but only those which technology they knew and were familiar with, each technology had a different number of users, therefore, a different distribution. This distribution is presented in Table 2.

Table 2: Distribution of technology use amongst participants

Techologies	n	%*
Telephone	560	96.55
Television (TV)	543	93.62
Live Stream	346	59.66
Video Games	262	45.17
Social Media	491	84.66

*The percentage does not sum up to 100%, as some participants did not use all technologies.

Source: own elaboration

Reliability

We conducted a Cronbach's alpha analysis to assess the reliability of the GAD-7, and we found it to have acceptable reliability (7 items; $\alpha = .71$) (Cortina, 1993; Taber, 2017).

Hypothesis testing (H1 and H2).

We found positive associations between increased use of various types of ICTs and perceived positive psychological effects. The overall model where an increase in the use of telephone was the outcome variable was significant (Adj-R2 = .38, $F(3,481) = 99.52$, $p < .001$; Bonferroni correction $0.05/3 = p < .017$). An increase in the use of telephone calls was positively related to (H1a) 'feel connected and less socially isolated' ($\beta = .38$, $p < .001$), 'pass the time because I cannot find anything else to do' ($\beta = .26$, $p < .001$), and 'calling people because I worry about them' ($\beta = .16$, $p < .001$).

The overall model where an increase in the use of TV was the outcome variable was significant (Adj-R2 = .29, $F(4,459) = 48.30$, $p < .001$; Bonferroni correction $0.05/4 = p < .013$). An increase in the use of TV was positively related to (H1b) 'feel less socially isolated' ($\beta = .30$, $p < .001$), and 'pass the time because I cannot find anything else to do' ($\beta = .32$, $p < .001$).

The overall model where an increase in the use of streaming services was the outcome variable was significant (Adj-R2 = .29, $F(2,291) = 60.33$, $p < .001$; Bonferroni correction $0.05/2 = p < .025$). An increase in the use of streaming services was positively related to (H1c) 'feel connected to other people and less socially isolated' ($\beta = .44$, $p < .001$) and 'pass the time because I cannot find anything else to do' ($\beta = .17$, $p = .002$).

The overall model where an increase in playing video games was the outcome variable was significant (Adj-R2 = .38, $F(4,215) = 34.47$, $p < .001$; Bonferroni correction $0.05/4 = p < .013$). An increase in playing video games was positively related to (H1d) 'to pass the time because I cannot find anything else to do' ($\beta = .34$, $p < .001$).

The overall model where an increase in the use of social media was the outcome variable was significant (Adj-R2 = .35, $F(3,420) = 77.91$, $p < .001$; Bonferroni correction $0.05/3 = p < .017$). An increase in the use of social media was positively related to (H1e) 'feel connected and less isolated' ($\beta = .36$, $p < .001$), and 'pass the time because I cannot find anything else to do' ($\beta = .29$, $p < .001$).

We found positive associations between increased use of various types of ICTs and feelings of psychological discomfort. All the analyses were subject to the same Bonferroni correction: $0.05/2 = p < .025$ The overall

model where an increase in the use of telephone calls was the outcome variable was significant (Adj-R2 = .06, $F(2,484) = 17.62$, $p < .001$). An increase in the use of telephone calls was positively related to (H2a) 'feel I am spending too much time calling people and it makes me feel bad' ($\beta = .13$, $p = .019$) and 'feel I cannot control my behaviour of calling people' ($\beta = .16$, $p = .006$).

The overall model where an increase in the use of TV was the outcome variable was significant (Adj-R2 = .11, $F(2,466) = 28.50$, $p < .001$). An increase in the use of TV was positively related to (H2b) 'feel I am spending too much time watching TV and it makes me feel bad' ($\beta = .19$, $p < .001$) and 'feel I cannot control my behaviour of watching TV' ($\beta = .17$, $p = .002$).

The overall model where an increase in the use of streaming services was the outcome variable was significant (Adj-R2 = .17, $F(2,288) = 30.41$, $p < .001$). An increase in the use of streaming services was positively related to (H2c) 'feel I am spending too much time in live stream platforms and it makes me feel bad' ($\beta = .27$, $p < .001$).

The overall model where an increase in playing video games was the outcome variable was significant (Adj-R2 = .23, $F(2,220) = 34.57$, $p < .001$). An increase in playing video games was positively related to (H2d) 'feel I am spending too much time playing games and it makes me feel bad' ($\beta = .38$, $p < .001$).

The overall model where an increase in the use of social media was the outcome variable was significant (Adj-R2 = .22, $F(2,418) = 59.65$, $p < .001$). An increase in the use of social media was positively related to (H2e) 'feel I am spending too much time in social media and it makes me feel bad' ($\beta = .27$, $p < .001$) and 'feel I cannot control my behaviour of being in social media channels' ($\beta = .24$, $p < .001$).

The role of ICTs in general anxiety (H3).

To test H3, we conducted an ANOVA analysis between the questions related to H1, H2, and the derived GAD-7 scores (Table 3). Following, we carried out three Tukey posthoc tests to deepen the knowledge of the associations between the hypotheses and different levels of anxiety.

Table 3: Distribution of anxiety levels in the sample according to the GAD-7

Anxiety levels	n	%
Minimal	290	50.00
Mild	157	27.07
Moderate	74	12.76
Severe	32	5.52
Missing data	27	4.66
Total	580	100.00

Note: Levels of anxiety according to Spitzer et al. (2006): 0-4 = minimal severity, 5-9=mild severity, 10-14=moderate severity, and 15-21=severe. The missing data is the difference between the participants and the number of people who filled the GAD-7, which was not mandatory.

Source: own elaboration

The ANOVA analyses between general anxiety as measured by the GAD-7 and the feelings behind the usage of media showed an association (after Bonferroni correction for multiple measures — $0.05/21 = p < .002$) between the positive perception of technology use and the item: using social media because of boredom (p

< .001, $\eta^2 = .06$). We also found an association between negative perceptions of technology use and the following items: feeling they are watching TV too much ($p < .001$, $\eta^2 = .05$), feeling they cannot control the behaviour of using streaming services ($p < .001$, $\eta^2 = .06$), feeling they are using streaming services too much ($p < .001$, $\eta^2 = .08$), feeling they cannot control the behaviour of using social media ($p < .001$, $\eta^2 = .1$), feeling they are using social media too much ($p < .001$, $\eta^2 = .1$). Effect sizes were calculated according to Cohen (1988).

Regarding the relationship between general anxiety as measured by the GAD-7, the usage of media informing about COVID-19, and other media. We found association (after Bonferroni correction for multiple measures — $0.05/12 = p < .004$) with higher levels of anxiety and the following items: seeing information about COVID-19 on TV ($p < .001$, $\eta^2 = .05$), using social media more during the isolation period ($p < .001$, $\eta^2 = .07$), and seeing information about COVID-19 on social media ($p < .001$, $\eta^2 = .11$).

Concerning the question of whether levels of anxiety are related to the self-perception of psychological well-being (variables in H1) and self-perceived mental distress (Variables in H2) when using ICTs (H3a), we found that according to the Tukey post hoc, higher levels of anxiety were negatively associated with the positive perception of technology; i.e., people using more ICTs for feeling less isolated and passing the time depicted low levels of anxiety. Higher levels of anxiety were positively associated with the negative perception of technology; i.e., people whose increase in ICTs use led to the perception that they were using the technology excessively or could not control their use depicted higher anxiety levels.

In respect of whether the use of specific ICTs providing information about COVID-19 was related to higher levels of anxiety (H3b), we found that watching more TV, particularly looking for information about the virus, or using social media is related to general anxiety. None of the uses of other technologies were related to general anxiety, as indicated in the post hoc tests

Discussion

Our study inquired if ICTs benefited or hindered the mental health of people undergoing isolation during the early COVID-19 pandemic. To answer this question, we proposed a series of hypotheses to identify if (H1) a perceived increase in the use of specific technologies was related to the perception of positive psychological effects (i.e., combat loneliness, boredom, and decreased anxiety). (H2) A perceived increase in the use of specific technologies was related to psychological discomfort (i.e., overuse of technologies, guilt for feeling they could not stop using technology, and increased anxiety). (H3a) How people perceived the technologies and (H3b) COVID-19 related content was linked to anxiety levels.

After conducting multiple linear regressions, we found that increased use of all technologies analysed (telephone, TV, live streaming services, video games, and social media) was related to feeling connected to other people and feeling less bored. These findings were not only significant but had a medium to large effect size, meaning that the relationships between the variables were strong enough to be meaningful if the sample was bigger and closer to the population. In addition, people seemed to use social networks to forget about COVID-19.

We also found that an increased amount of use for all technologies analysed was related to spending too much time using the technology and feeling they had no control over their use. These findings were not only significant but had a small to medium effect size, meaning that the relationships between the variables

were strong enough to be meaningful if the sample was bigger and closer to the population. The only technology that seemed not to create guilt of the perceived lack of control of their use was video games. Additionally, we found that the average of people presenting severe symptoms of general anxiety at the beginning of the pandemic was higher (5.52%) than the global estimate by the World Health Organisation pre-pandemic (3.6%; World Health Organization, 2017). Anxiety was negatively associated with a positive perception of the use only for social media, using it to prevent boredom. This finding was significant while having a medium effect size, meaning that the relationships between the variables were strong enough to be meaningful if the sample was bigger and closer to the general population. However, it is notorious that only one ICT used in a particular way was negatively associated with anxiety and positive media perception. We also found a positive association between the negative perception of using some ICTs and anxiety when people perceive they were overusing or not being able to control the use of TV, live streaming services and social media. These findings were significant while having a medium effect size, meaning that the relationships between the variables were strong enough to be meaningful if the sample was bigger and closer to the general population. It is notorious that only more ICTs were positively associated with anxiety than negatively associated with it.

Finally, we found that using TV and social media to get information about the COVID-19 pandemic was strongly associated with anxiety. These findings also had medium effect sizes, meaning that the relationships between the variables were enough to be meaningful for the general population.

As previous pieces of research have pointed out, ICTs play an important role in the perceived mental well-being of people under isolation due to the COVID-19 pandemic (Arshad, 2020; Brooks et al., 2020; Gabbiadini et al., 2020; Huremović, 2019). Our current findings agree with these statements but add another element, that the role of ICTs is a double-edged sword.

When referring to our hypotheses, we found a relationship between perception of positive psychological effects when using all the different ICTs. Not only H1 was supported for each of the five technologies analysed, but the effect sizes were medium to big for all of them, suggesting a strong relationship between the variables associated.

We infer that using ICTs can help people cope with boredom and loneliness. Even when dividing H1 into specific technologies, there is parsimony in our findings related to how people use ICTs as a way to care for their mental health during isolation and social distancing times.

Boredom is one of the main problems during social isolation (Gabbiadini et al., 2020) because individuals find themselves in situations where they want to perform an activity but are externally forced not to perform it (i.e., COVID restrictions); this affects people's general mental health (Brooks et al., 2020), especially amongst vulnerable populations (Huremović, 2019; Tutzer et al., 2021). Our findings align with those of Yan et al. (2021), who suggest that during their COVID-19 isolation, people develop mechanisms to cope with boredom and reduce their levels of perceived stress and emotional distress.

Another problem derived from social isolation is loneliness. According to Loades et al. (2020) and Killgore et al. (2020), feelings of loneliness related to social isolation due to the pandemic are reflected in high rates of depression and anxiety in children, adolescents, and young adults, which makes it a public health concern. Our findings supporting H1 are in line with studies about loneliness due to social isolation (Cauberghe et al., 2021; Taylor-Jackson et al., 2021), which document how teenagers and young adults were using ICTs

(particularly social network services) for feeling less socially isolated, looking for ways to adapt to the new situation, keeping in contact with friends and family, and starting new relationships.

Nevertheless, we found similar results for H2, which was supported for each technology analysed (except for video games, which were only partially supported). Equally, the effect sizes for H2 were medium to strong. These results might be because people started using specific ICTs more than before the pandemic as they were home for long periods and other means of interaction or entertainment were not possible (Galvin et al., 2021; Vandenberg et al., 2020).

The change of routine, together with technology usage standards pre-pandemic (see, for example, Montag & Walla, 2016), could create the perception that an increase of use in technologies was a synonym for overuse and lack of self-control over the use of one or more ICTs (see for example Lageson & Maruna, 2017; Panova & Lleras, 2016; Salomon & Kolikant, 2016). Our findings (H2) support previous studies (Panek, 2014)(Bendau et al., 2021; Brailovskaia, Truskauskaitė-Kuneviviene, et al., 2021) on the extent to which people reported feeling bad concerning self-perception of overuse and lack of self-control on the use of ICTs, leading to self-perceived mental distress.

However, these results were not consistent through all the ICTs analysed. Participants did not report feeling they were calling too much or feeling a lack of self-control over their calling behaviour. While video game players reported feeling they were gaming too much, they did not feel a lack of self-control over their behaviours. More research needs to be conducted in this perspective to understand what makes people relate differently between these and the other ICTs analysed.

Accounting for this double perspective on the use of ICTs, we suggest future studies focus on the uses of media technologies as coping strategies (defined as the set of cognitive and behavioural efforts established to manage internal and external demands that are regarded as distressing or overwhelming for the resources the person has; Lazarus & Folkman, 1986, p. 468) against boredom and loneliness, while monitoring their use so alternative activities can be executed when their use starts to be perceived as problematic.

The coping style highlights the vulnerability to change and a primary tendency to respond to new circumstances (Beutler et al., 2011), as it is the isolation situation due to COVID-19 and its derived feelings of boredom and loneliness. Future studies can use these findings to understand the coping strategies of people undergoing isolation using standardised coping scales such as the COPE inventory (Carver et al., 1989).

Regarding H3a, it was partially supported. We only found a negative relationship between anxiety and the use of social media to prevent boredom, suggesting that although people use ICTs to combat boredom and loneliness, these ICTs do not effectively help combat anxiety, except for a specific use of social media. These findings contrast with those of Turel & Qahri-Saremi (2016), Király et al. (2020), Cauberghe et al. (2021), Taylor-Jackson et al. (2021), and Yan et al. (2021), suggesting that boredom and loneliness are important factors in the development of anxiety during social isolation. More research needs to be done to understand how and why using social media to prevent boredom seems to have a positive impact on anxiety, but not on the other ICTs studied.

Conversely, we found a positive association between anxiety and using several ICTs, such as TV, streaming services, and social media. Most of these associations were related to the feeling of overusing the technology and lack of control. These results are supported by previous research, such as that conducted by Turel and Qahri-Saremi (2016), Király et al. (2020), Cauberghe et al. (2021), and Galvin et al. (2021), suggesting that

the pervasive use of technology during isolation (i.e., working, socialising, seeking information, and entertainment) can cause problematic use associated with addictive traits and 'techno-overload' which can be reflected in increased anxiety and depressive symptoms, self-perception of overuse and lack of self-control over the use of ICTs.

For H3b, we found that content related to the COVID-19 pandemic and the ICTs associated was a source of anxiety. These findings are supported by Bendau et al. (2021), who found that media consumption and information-seeking behaviour about COVID-19 increased symptoms of depression, unspecific anxiety, and pre-existing fears in the studied population. Accordingly, when encapsulating factors such as information about COVID-19, arguments about the veracity of information, and fake news (Freiling et al., 2021; Klevor et al., 2022; Prpić & Kučič, 2022; Su, 2020), this particular ICT can act as an amplifier for anxiety.

Concerning the study's limitations, we found that the use of a non-probabilistic sample, snowball sampling, in particular, is not likely to be representative of the population as it tends to gather people within a similar network. Although the sampling method was helpful for gathering data from different countries quickly, we suggest that future studies use probabilistic sampling.

Another limitation we found was the ad hoc questionnaire. Although it made sense for an exploratory study at the beginning of the pandemic, future studies should use standardised tests created to evaluate technology use during isolation times. Although these tools did not exist when the study was conducted, some tools have been adapted after the pandemic (see, for example, Molino et al., 2020).

A final limitation is that the sample was cross-sectional and gathered only the impressions of the use of technology during the early pandemic, meaning that the perceptions of the use of media and people's relationship with this could have changed during the years that the pandemic lasted. The study could have benefited from a longitudinal or an A-B design (early vs late pandemic).

Ultimately, from our exploratory study, we gather that technologies could be used as coping mechanisms to overcome the mental discomfort brought by the isolation during the pandemic. These findings suggest that future research should inquire into this respect using standardised tests for coping mechanisms and media usage.

The current study explored how using ICTs helped and hindered mental health during the early COVID-19 pandemic. The findings of this study can help as step stones in future research on the use of ICTs and mental health for people undergoing isolation in different contexts, as well as general pointers regarding the use of technologies for mental health in isolation (e.g., into which extent they are helpful, into which extent they are harmful, and how to prevent the negative consequences).

Conclusion

In 2020, the COVID-19 pandemic forced people to isolate themselves and face negative feelings of isolation and boredom. People started to use media technologies, including calling, watching TV, watching streaming services, playing video games and using social media. Therefore, we set up an exploratory research inquiring about the benefits or drawbacks of using specific technologies and mental health during the early pandemic. Regarding our research question, if ICTs were benefiting or hindering the mental health of people undergoing isolation during the early COVID-19 pandemic, we can say that ICTs play a double role, helping people cope with boredom and loneliness while acting as stressors and sources of anxiety.

In summary, most of the study's hypotheses were supported, except for our hypothesis regarding the positive perception of the use of ICTs to be negatively related to anxiety and proving that the use of technology during isolation, when perceived as a stressor, can be related to high anxiety.

This research also showed that media overuse negatively affected people's well-being. Perception of ICTs usage and informative media content was relevant for predicting people's feelings. If media users perceive they cannot control their technology usage and consider spending much time on media, they may experience general anxiety. The same feelings were experienced when people used media to seek information about COVID-19.

Although this research was conducted in the early pandemic and the perception of the use of technology might have changed during the two years it lasted, the findings can still be relevant for studying media consumption in other isolation contexts.

Data availability statement

The data supporting findings in this study and supplementary documents are available on request from the corresponding author.

Acknowledgements

We would like to thank Andrés Marín-Cortés and Juan Pablo Sánchez Escudero, who helped us in the development of the survey and gathering the necessary data to carry out the research at an international level.

We also want to thank the people who volunteer their time and knowledge to translate the survey, making it possible to carry out the study in eight different languages: Patrícia Sofia Tóth (Hungarian and French), Thomas Alstrup (German), Alejandro Franco (French), Margarita Alba (Italian), Jesper Nissen and Rene Sjøland (Danish) David Lacagnina and Randi Zimmerman (English proofreading).

Bibliographical references

- Allington, D., Duffy, B., Wessely, S., Nayana, D., & Rubin, J. (2020). Health-protective behaviour, social media usage and conspiracy belief during the COVID-19 public health emergency. *Psychological Medicine*, 1–7. <https://doi.org/10.1017/S003329172000224X>
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)* (5th ed.).
- Arshad, M. (2020). COVID-19: It's time to be Thankful to our ICT Professionals. *Information Technology & Electrical Engineering Journal*, 9(2), 23–31. http://www.iteejournal.org/v9no2apr20_pdf4.pdf
- Bendau, A., Petzold, M., Pyrkosch, L., Maricic, L., Betzler, F., Rogoll, J., Grosse, J., Ströle, A., & Plag, J. (2021). Associations between COVID-19 related media consumption and symptoms of anxiety, depression and COVID-19 related fear in the general population in Germany. *European Archives of Psychiatry and Clinical Neuroscience*, 271, 283–291. <https://doi.org/10.1007/s00406-020-01171-6>

- Beutler, L., Harwood, M., Kimpara, S., Verdirame, D., & Blau, K. (2011). Coping style. *Journal of Clinical Psychology, 67*, 176–183. <https://doi.org/10.1002/jclp.20752>
- Brailovskaia, J., Cosci, F., Mansueto, G., & Margraf, J. (2021). The relationship between social media use, stress symptoms and burden caused by coronavirus (Covid-19) in Germany and Italy: A cross-sectional and longitudinal investigation. *Journal of Affective Disorders Reports, 3*. <https://doi.org/10.1016/j.jadr.2020.100067>
- Brailovskaia, J., Truskauskaite-Kuneviviene, I., Kazlauskas, E., & Margraf, J. (2021). The patterns of problematic social media use (SMU) and their relationship with online flow, life satisfaction, depression, anxiety and stress symptoms in Lithuania and in Germany. *Current Psychology*. <https://doi.org/10.1007/s12144-021-01711-w>
- Brooks, S., Webster, R., Smith, L., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet, 395*, 912–920. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)
- Campos-Mercade, P., Meier, A., Shneider, F., & Wengstöm, E. (2021). Prosociality predicts health behaviors during the COVID-19 pandemic. *Journal of Public Economics, 195*. <https://doi.org/10.1016/j.jpubeco.2021.104367>
- Carver, C., Scheier, M., & Weintraub, J. (1989). Assessing Coping Strategies: A Theoretically Based Approach. *Journal of Personality and Social Psychology, 56*(2). <https://doi.org/10.1037/0022-3514.56.2.267>
- Cauberghe, V., Van Wesenbeeck, I., De Jans, S., Hudders, L., & Ponnet, K. (2021). How Adolescents Use Social Media to Cope with Feelings of Loneliness and Anxiety During COVID-19 Lockdown. *CyberPsychology, Behavior, and Social Networking, 24*(4), 250–257. <https://doi.org/10.1089/cyber.2020.0478>
- Coelho, J., Rito, F., & Duarte, C. (2017). “You, me & TV”—Fighting social isolation of older adults with Facebook, TV and multimodality. *Int. J. Human-Computer Studies, 98*, 38–50. <https://doi.org/10.1016/j.ijhcs.2016.09.015>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (Second edition). Laurence Erlbaum Associates.
- Cortina, J. (1993). What Is Coefficient Alpha? An Examination of Theory and Applications. *Journal of Applied Psychology, 78*(1), 98–104. <https://doi.org/10.1037/0021-9010.78.1.98>
- Dinić, B., & Bodroža, B. (2021). COVID-19 Protective Behaviors Are Forms of Prosocial and Unselfish Behaviors. *Frontiers in Psychology, 09*. <https://doi.org/10.3389/fpsyg.2021.647710>
- Directorate-General for Research Science, Economy and Society. (2010). *European Textbook on Ethics in Research*. Publication office of the European Union.
- Escobar-Viera, C., Shensa, A., Bowman, N., Sidani, J., Knight, J., James, E., & Primack, B. (2018). Passive and Active Social Media Use and Depressive Symptoms Among United States Adults. *CyberPsychology, Behavior, and Social Networking, 21*(7), 437–443. <https://doi.org/10.1089/cyber.2017.0668>
- Field, A., Miles, J., & Field, Z. (2012). *Discovering statistics using R*. Sage Publications, Inc.

- Freiling, I., Krause, N., Scheufele, D., & Brossard, D. (2021). Believing and sharing misinformation, fact-checks, and accurate information on social media: The role of anxiety during COVID-19. *New Media & Society*, 1–22. <https://doi.org/10.1177/14614448211011451>
- Gabbiadini, A., Baldissarri, C., Durante, F., Valtorta, R., De Rosa, M., & Gallucci, M. (2020). Together Apart: The Mitigating Role of Digital Communication Technologies on Negative Affect During the COVID-19 Outbreak in Italy. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.554678>
- Galvin, J., Evans, M., Nelson, K., Richards, G., Mavritsaki, E., Giovazolias, T., Koutra, K., Mellor, B., Zurlo, M., Smith, A., & Vallone, F. (2021). Technostress, Coping, and Anxious and Depressive Symptomatology in University Students During the COVID-19 Pandemic. *Europe's Journal of Psychology*. <https://doi.org/10.5964/ejop.4725>
- gdpr-info.eu. (2018). *GDPR. Recital 26*. The General Data Protection Regulation. <https://gdpr-info.eu/recitals/no-26/>
- Gómez-Galán, J., Martínez-López, J., Lázaro-Pérez, C., & Sánchez-Serrano, J. (2020). Social Networks Consumption and Addiction in College Students during the COVID-19 Pandemic: Educational Approach to Responsible Use. *Sustainability*, 12, 7737. <https://doi.org/10.3390/su12187737>
- Huremović, D. (Ed.). (2019). *Psychiatry of Pandemics: A Mental Health Response to Infection Outbreak*. Springer Nature.
- Jeong, H., Yim, H., Song, Y.-J., Ki, M., Min, J.-A., Juhee, C., & Chae, J.-H. (2016). Mental Health Status of People Isolated Due to Middle East Respiratory Syndrome. *Epidemiology and Health*, 5(38), e2016048. <https://doi.org/10.4178/epih.e2016048>
- Keles, B., McKrae, N., & Grealish, A. (2020). A systematic review: The influence of social media on depression, anxiety and psychological distress in adolescents. *International Journal of Adolescence and Youth*, 25(1), 79–93. <https://doi.org/10.1080/02673843.2019.1590851>
- Killgore, W., Cloonan, S., Taylor, E., & Dailey, N. (2020). Loneliness: A signature mental health concern in the era of COVID-19. *Psychiatry Research*, 290. <https://doi.org/10.1016/j.psychres.2020.113117>
- Kim, H., & Kim, M. (2020). Viewing sports online together? Psychological consequences on social live streaming service usage. *Sport Management Review*, 23(5), 869–882. <https://doi.org/10.1016/j.smr.2019.12.007>
- Király, O., Potenza, M., Stein, D., King, D., Hodgins, D., Saunders, J., Griffiths, M., Gjoneska, B., Billieux, J., Brand, M., Abbott, M., Fineberg, N., & Demetrovics, Z. (2020). Preventing problematic internet use during the COVID-19 pandemic: Consensus guidance. *Comprehensive Psychiatry*, 100. <https://doi.org/10.1016/j.comppsy.2020.152180>
- Klevor, R., Chraa, M., Ait Taleb, K., Taouzer, H., Camara, F. I., & Kissani, N. (2022). Assessing the COVID-19 infodemic and misinformation among university students in Morocco. *Observatorio (OBS*)*, 16(3). <https://doi.org/10.15847/obsOBS16320222050>
- Lageson, S., & Maruna, S. (2017). Digital degradation: Stigma management in the internet age. *Punishment & Society*, 20(1), 113–133. <https://doi.org/10.1177/1462474517737050>
- Lazarus, R., & Folkman, S. (1986). *Estrés y procesos cognitivos*. Martínez Roca.
- Leigh-Hunt, N., Bagguley, D., Bash, K., Turner, V., Turnbull, S., Valtorta, N., & Caan, W. (2017). An overview of systematic reviews on the public health consequences of social isolation and loneliness. *Public Health*, 152, 157–171. <https://doi.org/10.1016/j.puhe.2017.07.035>

- Loades, M., Chatburn, E., Higson-Sweeney, N., Reynolds, S., Shafran, R., Bridgen, A., Linney, C., McManus, M., Borwick, C., & Crawley, E. (2020). Rapid Systematic Review: The Impact of Social Isolation and Loneliness on the Mental Health of Children and Adolescents in the Context of COVID-19. *Journal of the American Academy of Child & Adolescent Psychiatry*, 59(11), 1218–1239. <https://doi.org/10.1016/j.jaac.2020.05.009>
- Molino, M., Ingusci, E., Signore, F., Manuti, A., Giancaspro, M., Russo, V., Zito, M., & Cortese, C. (2020). Wellbeing Costs of Technology Use during Covid-19 Remote Working: An Investigation Using the Italian Translation of the Technostress Creators Scale. *Sustainability*, 12(15). <https://doi.org/10.3390/su12155911>
- Montag, C., & Walla, P. (2016). Carpe diem instead of losing your social mind: Beyond digital addiction and why we all suffer from digital overuse. *Cogent Psychology*, 3(1). <https://doi.org/10.1080/23311908.2016.1157281>
- Orben, A., & Przybylski, A. (2019). The association between adolescent well-being and digital technology use. *Nature Human Behaviour*, 3, 173–182. <https://doi.org/10.1038/s41562-018-0506-1>
- Panek, E. (2014). Left to Their Own Devices: College Students' "Guilty Pleasure" Media Use and Time Management. *Communication Research*, 41(4). <https://doi.org/10.1177/0093650213499657>
- Panova, T., & Lleras, A. (2016). Avoidance or boredom: Negative mental health outcomes associated with use of Information and Communication Technologies depend on users' motivations. *Computers in Human Behavior*, 249–258. <https://doi.org/10.1016/j.chb.2015.12.062>
- Prpić, H., & Kučič, V. (2022). Confidence and attitudes of the citizens of the Republic of Croatia towards the sources and information about the COVID-19 virus. *Observatorio (OBS*)*, 16(2). <https://doi.org/10.15847/obsOBS16220221903>
- Przybylski, A., & Weinstein, N. (2017). A Large-Scale Test of the Goldilocks Hypothesis: Quantifying the Relations Between Digital-Screen Use and the Mental Well-Being of Adolescents. *Psychological Science*, 28(2), 204–215. <https://doi.org/10.1177/0956797616678438>
- Salomon, A., & Kolikant, Y. (2016). High-school students' perceptions of the effects of non-academic usage of ICT on their academic achievements. *Computers in Human Behavior*, 64, 143–151. <https://doi.org/10.1016/j.chb.2016.06.024>
- Santini, Z., Jose, P., Cornwell, E., Koyanagi, A., Nielsen, L., Hinrichsen, C., Meilstrup, C., Madsen, K., & Koushede, V. (2020). Social disconnectedness, perceived isolation, and symptoms of depression and anxiety among older Americans (NSHAP): A longitudinal mediation analysis. *The Lancet Public Health*, 5, e62–e70. [https://doi.org/10.1016/S2468-2667\(19\)30230-0](https://doi.org/10.1016/S2468-2667(19)30230-0)
- Spitzer, R., Kroenke, K., Williams, J., & Löwe, B. (2006). A Brief Measure for Assessing Generalized Anxiety Disorder: The GAD-7. *Archives of Internal Medicine*, 166, 1092–1097. <https://doi.org/10.1001/archinte.166.10.1092>
- Stebbins, R. (2001). *Exploratory research in the social sciences*. Sage Publications, Inc.
- Su, Y. (2020). It Doesn't Take a Village to Fall for Misinformation: Social media use, discussion heterogeneity preference, worry of the virus, faith in scientists, and COVID-19-related misinformation beliefs. *Telematics and Informatics*. <https://doi.org/10.1016/j.tele.2020.101547>

- Taber, K. (2017). The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. *Research in Science Education*, 48, 1273–1296. <https://doi.org/10.1007/s11165-016-9602-2>
- Taylor-Jackson, J., Abba, I., Baradel, A., Lay, J., Herewini, J., & Taylor, A. (2021). Chapter 16—Social media use, experiences of social connectedness and wellbeing during COVID-19. In A. Moustafa (Ed.), *Mental health effects of COVID-19* (pp. 283–300). Elsevier. <https://doi.org/10.1016/B978-0-12-824289-6.00013-1>
- Torales, J., Barrios, I., O'Higgins, M., Almirón-Santacruz, J., Gonzales-Urbieta, I., García, O., Rios-González, C., Castaldelli-Maia, J., & Ventriglio, A. (2022). COVID-19 infodemic and depressive symptoms: The impact of the exposure to news about COVID-19 on the general Paraguayan population. *Journal of Affective Disorders*, 298, 599–603. <https://doi.org/10.1016/j.jad.2021.11.036>
- Turel, O., & Qahri-Saremi, H. (2016). Problematic Use of Social Networking Sites: Antecedents and Consequence from a Dual-System Theory Perspective. *Journal of Management Information Systems*, 33(4). <https://doi.org/10.1080/07421222.2016.1267529>
- Tutzer, F., Frajo-Apor, B., Pardeller, S., Plattner, B., Chernova, A., Haring, C., Holzner, B., Kemmler, G., Marksteiner, J., Miller, C., Schmidt, M., Sperner-Unterweger, B., & Hofer, A. (2021). Psychological Distress, Loneliness, and Boredom Among the General Population of Tyrol, Austria During the COVID-19 Pandemic. *Frontiers in Psychiatry*, 12. <https://doi.org/10.3389/fpsy.2021.691896>
- Vandenberg, F., Berghman, M., & Schaap, J. (2020). The 'lonely raver': Music livestreams during COVID-19 as a hotline to collective consciousness? *European Societies*. <https://doi.org/10.1080/14616696.2020.1818271>
- World Health Organization. (2017). *Depression and other common mental disorders. Global health estimates*. apps.who.int/iris/bitstream/handle/10665/254610/WHO-MSD-MER-2017.2-eng.pdf
- Yan, L., Gan, Y., Ding, X., Wu, J., & Duan, H. (2021). The relationship between perceived stress and emotional distress during the COVID-19 outbreak: Effects of boredom proneness and coping style. *Journal of Anxiety Disorders*, 77. <https://doi.org/10.1016/j.janxdis.2020.102328>
- Zavaleta, D., Samuel, K., & Mills, C. (2017). Measures of social isolation. *Social Indicators Research*, 131(1), 397–391. <https://doi.org/10.1007/s11205-016-1252-2>

Appendix

Question relationship

Hypothesis	Question
H1	

H1a	<p><i>DV (outcome)</i></p> <ul style="list-style-type: none"> • I find myself calling people more than before <p><i>IV (predictor)</i></p> <ul style="list-style-type: none"> • Calling people helps me feel connected and less socially isolated • I call people to pass the time because I cannot find anything else to do • I call people because I worry about them
H1b	<p><i>DV</i></p> <ul style="list-style-type: none"> • I find myself watching television/movies more than before <p><i>IV</i></p> <ul style="list-style-type: none"> • Watching television/movies (including streaming services such as Netflix) helps me feel less socially isolated • I watch television/movies (including streaming services such as Netflix) to pass the time because I cannot find anything else to do • I watch television/movies in a shared way with other people, so I don't feel so socially isolated (e.g. Facebook watch party) • I watch television/movies (including streaming services such as Netflix) to forget about the COVID-19
H1c	<p><i>DV</i></p> <ul style="list-style-type: none"> • I find myself using live stream platforms (such as Twitch or YouTube) more than before <p><i>IV</i></p> <ul style="list-style-type: none"> • Using live stream platforms (such as Twitch or YouTube) helps me feel connected to other people and less socially isolated • I find myself using living stream platforms (such as Twitch or YouTube) to pass the time because I cannot find anything else to do
H1d	<p><i>DV</i></p> <ul style="list-style-type: none"> • I find myself playing more video games than before <p><i>IV</i></p> <ul style="list-style-type: none"> • Playing video games helps me feel less socially isolated • Playing video games helps me feel connected to other people • I play video games to pass the time because I cannot find anything else to do • I play more multiplayer video games now that I am in isolation • I play video games to forget about COVID-19

H1e	<p><i>DV</i></p> <ul style="list-style-type: none"> • I find myself using social media more than before <p><i>IV</i></p> <ul style="list-style-type: none"> • Social media helps me feel connected and less isolated • I use social media to pass the time because I cannot find anything else to do • I use social media to forget about COVID-19
H2	
H2a	<p><i>DV</i></p> <ul style="list-style-type: none"> • I find myself calling people more than before <p><i>IV</i></p> <ul style="list-style-type: none"> • I feel I am spending too much time calling people and it makes me feel bad • I feel I cannot control my behaviour of calling people
H2b	<p><i>DV</i></p> <ul style="list-style-type: none"> • I find myself watching television/movies more than before <p><i>IV</i></p> <ul style="list-style-type: none"> • I feel I am spending too much time watching TV and it makes me feel bad • I feel I cannot control my behaviour of watching TV
H2c	<p><i>DV</i></p> <ul style="list-style-type: none"> • I find myself using live stream platforms (such as Twitch or YouTube) more than before <p><i>IV</i></p> <ul style="list-style-type: none"> • I feel I am spending too much time in live stream platforms and it makes me feel bad • I feel I cannot control my behaviour of watching live stream platforms

H2d	<p><i>DV</i></p> <ul style="list-style-type: none"> • I find myself playing more video games than before <p><i>IV</i></p> <ul style="list-style-type: none"> • I feel I am spending too much time playing games and it makes me feel bad • I feel I cannot control my behaviour of playing games
H2e	<p><i>DV</i></p> <ul style="list-style-type: none"> • I find myself using social media more than before <p><i>IV</i></p> <ul style="list-style-type: none"> • I feel I am spending too much time in social media and it makes me feel bad • I feel I cannot control my behaviour of being in social media channels • I think seeing more about COVID-19, using social media, makes me feel bad or worse than before
H3	
H3a	<p><i>IV</i></p> <ul style="list-style-type: none"> • GAD score <p><i>DV</i></p> <ul style="list-style-type: none"> • Calling people helps me feel connected and less socially isolated • I call people to pass the time because I cannot find anything else to do • I feel I am spending too much time calling people and it makes me feel bad • I feel I cannot control my behaviour of calling people • Watching television/movies (including streaming services such as Netflix) helps me feel less socially isolated • I watch television/movies (including streaming services such as Netflix) to pass the time because I cannot find anything else to do • I watch television/movies in a shared way with other people, so I don't feel so socially isolated (e.g. Facebook watch party) • I feel I am spending too much time watching TV and it makes me feel bad • I feel I cannot control my behaviour of watching TV • Using live stream platforms (such as Twitch or YouTube) helps me feel connected to other people and less socially isolated • I find myself using living stream platforms (such as Twitch or YouTube) to pass the time because I cannot find anything else to do

	<ul style="list-style-type: none"> ● I feel I am spending too much time in live stream platforms and it makes me feel bad ● I feel I cannot control my behaviour of watching live stream platforms ● Playing video games helps me feel less socially isolated ● Playing video games helps me feel connected to other people ● I feel I am spending too much time playing games and it makes me feel bad ● I feel I cannot control my behaviour of playing games ● Social media helps me feel connected and less isolated ● I use social media to pass the time because I cannot find anything else to do ● I feel I am spending too much time in social media and it makes me feel bad ● I feel I cannot control my behaviour of being in social media channels
H3b	<p><i>IV</i></p> <ul style="list-style-type: none"> ● GAD score <p><i>DV</i></p> <ul style="list-style-type: none"> ● I find myself calling people more than before ● I find myself watching television/movies more than before ● I watch television (news) to know more about the COVID-19 ● I think seeing more about COVID-19 on television makes me feel bad or worse than before. ● I seek information about the COVID-19 mostly by official communications made by the government, press talks, and news ● I find myself using live stream platforms (such as Twitch or YouTube) more than before ● I find myself playing more video games than before ● I find myself using social media more than before ● I use social media to know more about the COVID-19 ● I seek information about the COVID-19 mostly using social media posts and groups ● I seek information about the COVID-19 mostly by means of chain mails like WhatsApp groups ● I think seeing more about COVID-19, using social media, makes me feel bad or worse than before