

# **The Effect of COVID-19 News Reporting on Sleep and the Role of Stress, Anxiety and Depression as possible Moderators**

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## **Abstract**

The recent COVID-19 epidemic had widespread effects on society, among other things with regards to the mental health of people, e.g. in the case of sleeping problems. This study aimed to investigate the relationship between the consumption of news related to the COVID-19 epidemic and sleeping problems, and the role that the factors of stress, anxiety and depression play in that regard. It was hypothesized that the more people consume COVID-19 news, the higher their level of sleeping problems will be, and that the factors of stress, anxiety and depression will moderate this relation. In order to investigate this an online survey was set-up which measured different aspects of sleep quality (general sleep quality, level of chronic sleep reduction and level of insomnia symptoms), the participants frequency and duration of engagements with COVID-19 news and their level of stress, anxiety and depression. The analysis revealed a significant negative correlation between average duration of engagement with COVID-19 news and level of general sleep quality and positive correlation with chronic sleep reduction, and that stress, anxiety and depression moderate the relation between average duration of engagement with COVID-19 news as a predictor of a lower level of general sleep quality.

**Keywords:** news, COVID-19, Sleep, Sleeping problems, Insomnia, Stress, Anxiety, Depression

## **Introduction**

Sleep is an essential aspect of human life and occupies a significant part of our time on this earth. While new-borns spend a majority of their day sleeping, adults generally – at least in the ideal case - should spend approximately around one third of their day asleep (Hirshkowitz et. al. 2015). Good sleep depends on several different factors like quality of sleep, timing and duration of sleep and sleep continuity or efficiency (Buysse, 2014). However, it is not always possible for everyone to have a good sleep and there is a large amount of people suffering from an array of different kinds of sleeping problems.

There are many different factors which can play a role in the emergence of bad sleep. Factors like the use of mobile phones and internet use in evening hours can have a negative effect on the sleep circle (Bruni et. al., 2015). Furthermore, one factor which plays a role in sleep quality is stress. According to a study by Lund et. al. (2010), high levels of academic and emotional stress can negatively impact the sleep of university students. In a sample of university students, 53.3% reported sleeping problems in a period one month prior to an exam period compared to 25.4% reporting sleeping problems outside of the exam period (Zunhammer, Eichhammer, & Busch, 2014). Decrease in sleep quality is characterized by factors like less total sleep time, lower level of sleep efficiency, lower level of subjective sleep quality, increases in sleep latency and higher levels of sleepiness during the day.

One group which is especially vulnerable to sleeping problems are university students (Lund, Reider, Whiting & Prichard, 2010). According to a study by Van Der Heijde, Van Weeren and Vonk (2019) around two thirds in a sample of Dutch university students suffered from sleeping problems. Sleeping problems and bad sleep can express themselves in different ways, ranging from disorders like insomnia, hypersomnia, sleep apnoea to other forms of sleeping problems like general difficulties falling asleep and difficulties waking up.

Insufficient sleep and sleep deprivation can cause adverse effects on individuals and society in total. It can cause a decline in life aspects like mental health, cognitive functioning and bodily functions. According to Goel, Durmer and Dinges (2009) lack of sleep can have a negative impact on mood, cognitive performance, motor functioning and neurocognitive functioning especially with regards to executive attention, working memory, and other higher cognitive functions. These changes in the mental functioning can on the other hand cause problems in daily life, like a reduced learning capability or an increased risk for vehicle accidents (Pizza et. al., 2010). Furthermore, when relating to the academic context, sleep disturbances are shown to have a negative impact on academic performance causing lower grades and increasing the likelihood of dropping out of a study course (Hartmann & Prichard,

2018; Schlarb et. al. 2017).

Sleeping problems can cause several different types of sleeping disorders. One of the most prevalent sleeping disorders is insomnia, which is characterized by several types of sleeping problems like difficulties staying or falling asleep or having regular awakenings during the night and often also includes negatives effects on daytime functioning like a low level of energy and a decreased level of cognitive functioning (DSM-5, 2017; Morin & Benca, 2012). According to a study by Schlarb, Friedrich and Claßen (2017) around 7.7% of students suffer from insomnia. Insomnia is related to several factors in a bidirectional way, meaning insomnia can be affected by, or affect these factors. These factors can range from things like worry and illness (Armstrong & Dregan, 2014) over to disorders like anxiety, depression and oppositional defiant disorder (Shanahan, Copeland, Angold, Bondy & Costello, 2014) and lifestyle factors like shift work (Akerstedt, 2003) or study load during exam-period at universities (Zunhammer, Eichhammer & Busch, 2014). Insomnia and suffering from symptoms of insomnia have been in some cases found to be causal factors in psychotic occurrences like paranoia and hallucinations (Freeman et. al. 2017) and were associated with depression, anxiety, fatigue, difficulties in emotion regulation and a general decrease in quality of life (Taylor, Bramoweth, Grieser, Tatum, & Roane, 2013; Altena et. al., 2020).

There are several explanations which establish the underlying mechanisms that play a role in the development of insomnia and other sleeping problems. One possible explanatory model in that regard is the 3-p model (Perlis, Shaw, Cano & Espie, 2011), according to which insomnia emerges as the result of three factors, namely predisposing and precipitating factors, which are factors that explain how the insomnia came to be, and perpetuating factors, which explain the behaviour of the insomniac person as a result of the insomnia. In this model one predisposing factor which plays a role in the emergence of insomnia is worry and excessive rumination, which are both subdimensions of stress. Furthermore, the precipitating factors are likely to be related to different types of life stress events. It can therefore be concluded that the experience of life stress and other underlying factors of stress like worry and rumination can play a role in the emergence of insomnia.

The factors of depression and anxiety also may play a role in the emergence of sleeping disorders. It has been shown that there is a high level of comorbidity between the sleep disorders and depression and anxiety (Alvaro, Roberts & Harris, 2013). This level of comorbidity can be explained in different ways. On the one hand there are studies (Johnson, Roth & Breslau, 2006; Ohayon & Roth, 2003) which imply a unidirectional relationship

where anxiety precedes insomnia. On the other hand, according to a meta-analysis by (Alvaro, Roberts & Harris, 2013) there are studies which suggest that there might be a bidirectional relationship between sleeping problems and depression and anxiety, where both factors enhance each other in magnitude and it is not entirely clear which factor was first. However, these results are not consistent over all studies and there has been conflicting evidence about the existing relationship between them.

Furthermore, certain events can have a widespread negative effect on the sleep quality of large populations of people. One phenomenon which may play a role regarding that and which had a significant impact on daily life is the recent Corona Virus (COVID-19) outbreak. Until now it has been established that the emergence of the COVID-19 pandemic plays a role in the sleep quality of people. A study by Rossi et. al. (2020) showed that during the initial 4 weeks of the COVID-19 crisis there was a significant increase in scores for PTSD, depression, anxiety, high perceived stress, adjustment disorder and also for insomnia in a sample of Italian participants.

People react in different ways to global occurrences like the COVID-19 pandemic. One way how people react in situations like these is by searching for relevant information at different sources, and especially nowadays, in many cases online (Lu et. al., 2007; Silver & Matthews, 2016). In this regard the level and the way of information seeking depends on different factors and is different depending on the person. Factors like threat perception, emotions and risk perception and bias towards optimism are shown to influence the information seeking behaviour in relation to information about COVID-19. People who have a higher level of negative emotions are likely to seek out and rely more on negative news and information when compared to people with a lower level of negative emotions (Bavel et. al., 2020). Furthermore, there is a higher level of information seeking between people who perceive a danger as more present and more real when compared to people who perceive this as less (Lachlan, Westerman & Spence, 2010).

In relation to the above stated issues, there are also studies that show that the exposure to negative news might cause an increase in stress levels (Marin et. al., 2012 Hoog & Verboon, 2020). For example, in the case of the 2009 swine flu (H1N1), pandemic people who followed the developments more closely and showed a higher level of involvement into the developments showed a higher level of worry and concern of being infected when compared to people who were following the developments to a lesser degree (Mesch, Schwirian & Kolobov, 2012).

Furthermore, exposure to negative news has been shown to increase levels of anxiety

and depression. According to a study by McNaughton-cassill (2001) in participants with low levels of optimism, exposure to negative news was predictive of high levels of anxiety. Similar to that, other studies were able to show that exposure to negative news were able to show an increase in anxious and sad mood and that participants exposed to this type of news also showed higher levels of catastrophising personal worry (Johnston & Davey, 1997). Also in a study measuring the depression rate amongst a sample in the Israeli population during the 1982 Israel-Lebanon war it was possible to establish a relationship between reports about negative events in the media about the war and the depression rate of that population (Hobfoll, Lomranz, Eyal, Bridges & Tzemach, 1989).

Until now, the effect that stress, anxiety, and depression have on sleep quality was explored. Stress and anxiety are shown to be predictors for sleeping problems, while also anxiety and depression seem to have a bidirectional relationship with sleeping problems. Furthermore, the effect that exposure to news, especially in the case of negative news can have on the stress level, the level of anxiety and depression level and their sleeping quality of people was also explored. Exposure to negative news has been shown to increase levels of stress, depression and anxiety and to decrease quality of sleep. However, there has been no study to date which examined the possible moderation effect that the factors of stress, anxiety and depression have on the factors of exposure to negative news and sleeping problems. According to this the following research questions emerge:

**Q1:** ‘What is the relation between level of engagement with news about the COVID-19 pandemic and sleep quality and chronic sleep reduction of people?’

**Q2:** ‘What is the influence of the factors stress, depression and anxiety on this relation?’

With regards to the first research question, when looking at the current state of the literature it can be hypothesized that the more the participants are engaged with news about COVID-19 the lower their sleep quantity and quality are (H1).

With regards to the second research question the hypothesis is that the three factors of stress, anxiety and depression are moderator variables for sleep quality and chronic sleep reduction with engagement with COVID-19 related news as an independent variable (H2).

## **Methods**

### **Design**

The design of the study was a cross-sectional survey design and included several questionnaires.

### **Participants**

The sample of participants consisted of a convenience sample which was recruited through means of Sona Systems and through sharing of the survey on social media. Sona Systems is a website utilized by the University of Twente, where students have the possibility to recruit participants for their studies and give these participants credit points, which are necessary for graduation. This study had 133 participants in total, of which 107 accepted the informed consent and finished the study, 19 did not finish and 7 gave questionable answers which made them not eligible for analysis (e.g. indicating that they sleep more than 24 hours per night) and were therefore omitted from the analysis of the data.

31 (29%) of the participants identified as male, 74 (69.2%) as female and 2 (1.8%) as a different gender. 73 (68.2%) of the participants were of German origin, 12 (11.2%) were Dutch while 22 (20.6%) participants were of different origin. On average, the participants were 22.2 years old with a standard deviation of 3.8 years and an age range from 18 to 34.

### **Materials**

The study consisted of several questionnaires which are described below in the order as they were presented to the participants. Sleep characteristics were measured with the Pittsburgh Sleep Quality Index (PSQI) (Buysse et. al., 1989) the Sleep Reduction Screening Questionnaire (SRSQ) (van Maanen et. al., 2014), and the Insomnia Severity Index (ISI) (Bastien, 2001). The PSQI consists of seven components and a total of 19 different items that measure the overall sleeping quality of participants during the last month. The first four items of the PSQI were questions about the usual times the participants go to bed, how long it takes for them to fall asleep, when they generally wake up and how long they are actually asleep at night. The following 10 questions dealt with the reasons why the participants are having sleeping problems during the last four weeks and how many times per week on average they

are having these problems. Example questions included ‘During the past month, how often have you had trouble sleeping because you wake up in the middle of the night or early morning?’ or ‘During the past month, how often have you had trouble sleeping because you have to get up to use the bathroom?’. The participants had to indicate for each question on a 4-point Likert scale ranging from ‘Not during the past month (0)’ over to ‘Three or more times a week (3)’ to what level they agree with the statement at hand. The last of these questions was an open question about reasons for sleeping problems other than the ones which were asked for before. The four final questions dealt with the use of prescription drugs for sleeping purposes, and the ability to stay awake while engaging in different types of activities. The score of the PSQI was calculated by adding the scores of the individual components together and calculating a total score for the PSQI. For each component it was possible to reach a score between 0 and 3 and it is therefore possible for the PSQI total score to reach between 0 and 21. The questionnaire has a good level of reliability with a Cronbach’s  $\alpha$  of .87 and a good level of validity (Backhaus, Junghanns, Broocks, Riemann, & Hohagen, 2002).

Furthermore, three additional items were added to the PSQI, which dealt with the topics of at what time the participants turn off the light before going to sleep, how long the participants are awake during each night on average, and at what time the participants actually get up from bed in the morning. However these items were implemented by another student who collaborated in the construction of this study and was doing research on a topic of his own. The data of these items was ultimately omitted from the data analysis for this study, but was still present in the survey nonetheless.

The SRSQ is a questionnaire which measures symptoms of sleep reduction. It consists of 9 items which are rated on a 3-point Likert scale, which measures the degree the participants agree with a statement about sleeping or tiredness, or which measures how frequently participants experience a feeling such as being so tired that they do not want to go to class. The SRSQ has been shown to have a good internal consistency with a Cronbach’s  $\alpha$  of .79 and a good reliability (van Maanen et. al, 2014).

The ISI consists of 7 items which assess different types of insomnia, such as sleep onset insomnia, and excessive daytime sleepiness due to insomnia and others. The individual items are scored on a 5-point Likert scale with scores ranging from ‘None (0)’ to ‘Very severe (4)’. The score of the ISI was calculated by adding the scores of all 7 individual items to a total score which can range from 0 to 28. The questionnaire has a good level of reliability and validity (Bastien, 2001).

Following this questionnaire were two questions which measure the engagement of the participants with news related to COVID-19. The first question assessed how many times the participants engaged with COVID-19 news in the last month, indicated on a 6-point Likert scale ranging from 'More than once per day (1)' to 'Less than once per week (5)' and additionally 'N/A (6)'. The second item asked for the average time the participants spent on each engagement with the COVID-19 news on a 3-point Likert scale which was ranging from 'less than 5 minutes', to 'between 5 and 10 minutes' and 'more than 10 minutes' for each engagement. The items were individually assessed in the data analysis.

Following that was the COVID-19 knowledge questionnaire which consisted of 13 items which were measuring the level of knowledge the participants have about the COVID-19 pandemic and the effects and ways of dealing with COVID-19. In this questionnaire the participants had to indicate 'true', 'false', or 'don't know' for each statement about COVID-19. The final score of the questionnaire was calculated by adding the number of right answers that were achieved.

The next questionnaire was the Hospital Anxiety and Depression Scale (HADS), which measures the severity of depression and anxiety. It consists of 14 items in total of which seven measure depression and seven measure anxiety. Participants had to indicate on a 4-point Likert scale ranging from 'Not at all' to 'Most of the time', how often they experience certain occasions and emotions related to depression and anxiety. Examples are '1. You feel tense or "wound up"' or '2. You still enjoy the things you used to enjoy'. The HADS was able to calculate the scores of two subscales, namely a score which measures the depression level and one that measures the anxiety level. The depression score was calculated by adding the scores of items 2, 4, 12 and 14 and the reverse scores of items 6, 8 and 10. The anxiety score was calculated by adding the scores of items 7 and 9 and the reverse scores of items 1, 3, 5, 11 and 13. The scores of the individual subscales can range between 0 and 21. The HADS has been shown to have good reliability ( $\alpha=.89$ ) and validity (Boxley et. al., 2016; Bjelland, Dahl, Haug, & Neckelmann, 2002).

The final questionnaire used in this survey was the Perceived Stress Questionnaire-20 (PSQ20). The PSQ20 aims to investigate the level of stress experienced by participants. It consists of 20 items for which the participants have to indicate on a 4-point Likert scale how often they had certain experiences in the last 4 weeks. Answer possibilities were ranging from 'Almost never (1)' to 'Usually (4)'. The PSQ-20 consists of 4 subscales, namely worries, tension, joy and demands, whose scores can be individually calculated. The total score of the PSQ-20 can be calculated by adding the individual scores of all the items of the questionnaire

except for items 1, 4, 6, 8, 12, 14, 16 and 19, of which the reverse scores were added. Furthermore the score was calculated by applying the following formula  $((\text{total score items} / 20) - 1) / 3 \times 100$ . The PSQ-20 has a good level of reliability and validity ( $\alpha=.80$ ) (Fliege, Rose, Arck, Levenstein, & Klapp, 2001; Mollayeva et. al., 2016).

## **Procedure**

The study was approved by the ethics committee of the University of Twente. The participants were either able to access the study by means of the website of Sona Systems or by receiving the link to the study on social media.

The survey started first with an introductory text in which an explanation about the topics of the research was given. Also, a guarantee of confidentiality of the data was given and the participants were informed about their right to withdraw from the study and to withdraw their information. Furthermore, two e-mail addresses were given which the participants could contact for further questions. In the next part of the Introduction the participants were asked regarding their demographic information including their country of origin (Netherlands, Germany or other), their age and their gender (male, female or other).

After the introduction, the participants were able to take part in the individual questionnaires of the survey in the following order. The first of them was the PSQI. The PSQI was divided into two parts. In the first part the participants had to fill out seven items which dealt with their sleeping and waking up times and durations and the times and durations of when they go to bed and actually get up after waking up. After that, in the second part the participants had to answer 14 further questions which dealt with their sleeping behaviour and assessed their sleeping quality in the last month. Next, the participants had to respond to the nine items of the SRSQ. This was followed by the seven items of the ISI. After that the participants encountered the two items which measured their level of engagement with news about COVID-19 which was followed by the 13 items of the COVID-19 knowledge questionnaire on the same page. Following that the participants had to fill out the 14 items of the HADS. This was followed by the last questionnaire of the survey namely the PSQ, whose 20 items also had to be answered by the participants. At the end the participants encountered a screen which told them that they finished the survey and that their data was being saved.

## Data analysis

IBM SPSS Statistics 24 was used in order to analyse the data collected in this study. Before analysis, the data of participants who did not finish the study or gave no informed consent was deleted because of unreliability of the answers and/or missing informed consent.

In the next step, some of the scores had to be adjusted in order to make it possible for them to be used in the data analysis. Some items of the PSQI (item 5-j) and the PSQ (item 3 and item 18) were not usable anymore due to mistakes made during the implementation of the questionnaires into the online study. The scores for these items were substituted with the help of mean imputation (Donders et. al. 2006). Furthermore, in some cases items had to be reverse coded in order to be eligible for analysis.

Afterwards, the final scores of the questionnaires and, if necessary, their sub-scores were calculated.

In order to assess the relation between people's sleep quality and their level of engagement with COVID-19 news, Pearson correlational analyses were conducted. The scores of the items measuring engagement with news about COVID-19 were correlated with the scores of the PSQI, the SRSQ and the ISI in order to find out if there is correlation on any of these scores. Further, in order to measure if the factors of stress, anxiety and depression can be moderators a linear regression analysis was conducted, with COVID-news engagement as predictor variable.

## Results

### Descriptive statistics

Table 1 shows the mean scores of the participants for all questionnaires that were part of the study.

Table 1. *Mean score and standard deviations of the questionnaires used in the survey*

Survey	Mean (SD)
PSQI	7.01 (2.94)
SRSQ	17.98 (3.33)
ISI	9.4 (5.13)
Frequency of Covid-19 news engagements	3.24 (1.17)
Duration per Covid-19 news engagement	1.55 (0.62)

HADS depression scale	7.89 (4.49)
HADS anxiety scale	8.1 (4.22)
PSQ worries scale	47.48 (24.1)
PSQ tension scale	49.62 (19.9)
PSQ joy scale	64.3 (18.14)
PSQ demands scale	48.61 (18)
PSQ global scored	49.32 (18.25)

## Hypothesis testing

### Correlation analysis

Several Pearson correlation analyses of engagement with COVID-19 related news and the surveys which were measuring sleep quality as variables, gave the following results. There were no significant correlations between the score frequency of COVID-19 news checking and sleep measures from the PSQI, the SRSQ and the ISI ( $r=-0.34$ ,  $p=0.732$ ;  $r=0.023$ ,  $p=0.815$   $r=0.029$ ,  $p=0.766$ , respectively, all non-significant).

However, correlation analyses revealed that there were significant correlations between duration of COVID-19 news engagement and the score of the sleep measures for the PSQI and the SRSQ ( $r=0.247$ ,  $p=0.010$ ,  $r=0.216$ ,  $p=0.026$ ), but not with the ISI ( $r = 0.189$ ,  $p=0.052$ ), which was close to being significant but still insignificant. Therefore, the first hypothesis that ‘the more the participants are engaged with news about COVID-19 the lower their sleep quantity and quality are’ (H1) can partly be accepted at least with regards to the correlation of duration of interaction with the corona news with sleeping quality and level of sleep reduction.

Table 2. *Correlation coefficients of the variables assessed*

Variables	1	2	3	4	5
1. Frequency of COVID-19 news checking	-				
2. Duration of COVID-19 news checking	-.317*	-			
3. PSQI global score	-.034	.247*	-		
4. SRSQ global score	.023	.216*	.608*	-	
5. ISI global score	.029	.189**	.654*	.700*	-

\*p<0.05; \*\*p=0.052; \*p-value significant at <.05 level

### **Stress as a moderator for COVID-19 news engagement on sleep quality**

In order to test for the moderation effect that stress can have on sleep quality with time spent on interacting with COVID-19 news as a depended variable, three regression analyses were conducted. The score for the ISI was included in these and all the following analyses due to the fact that in the correlational analysis, which was conducted beforehand, their score was at least close to being significant and therefore deemed worthy to be analysed in the regression analyses. The fit for the model using stress as a moderator variable was good in case of the PSQI ( $R^2=0.302$ ), the SRSQ ( $R^2=0.329$ ) and the ISI ( $R^2=0.379$ ). Furthermore, the interaction effects were significant for the PSQI and the moderator variable ( $F=11.07$ ;  $p=0.001$ ), but not for the SRSQ ( $F=0.05$ ;  $p=0.818$ ) and the ISI ( $F=1.47$ ;  $p=0.228$ ).

Table 3. *Results of the moderation analyses for variable stress*

Variables	$R^2$	$p$
CORNEWS_TIME*PSQI	0.302	0.001
CORNEWS_TIME*SRSQ	0.329	0.818
CORNEWS_TIME*ISI	0.379	0.228

### **Anxiety as a moderator for COVID-19 news engagement on sleep quality**

Three regression analyses were conducted in order to test for the possible moderation effect of anxiety on sleep quality. The fit for the model with stress as a moderator variable was good in the case of the PSQI ( $R^2=0.310$ ), the SRSQ ( $R^2=0.288$ ) and the ISI ( $R^2=0.314$ ). The interaction effects were significant for the PSQI ( $F=7.12$ ;  $p=0.009$ ), but not for the SRSQ ( $F=1.15$ ;  $p=0.286$ ) and the ISI ( $F=0.05$ ;  $p=0.821$ ).

Table 4. *Results of the moderation analyses for variable anxiety*

Variables	$R^2$	$p$
CORNEWS_TIME*PSQI	0.310	0.009
CORNEWS_TIME*SRSQ	0.288	0.286
CORNEWS_TIME*ISI	0.314	0.821

### **Depression as a moderator for COVID-19 news engagement on sleep quality**

Furthermore, three regression analyses were conducted in order to test if there is a possible moderation of depression on sleep quality. The fit for the model was moderate in the case of the PSQI ( $R^2=0.210$ ), the SRSQ ( $R^2=0.277$ ) and the ISI ( $R^2=0.212$ ). The interaction effects were significant for the PSQI ( $F=7.0$ ;  $p=0.009$ ), but not for the SRSQ ( $F=0.288$ ;  $p=0.593$ ) and the ISI ( $F=0.4$ ;  $p=0.529$ ).

Table 5. *Results of the moderation analyses for variable depression*

Variables	$R^2$	$p$
CORNEWS_TIME*PSQI	0.210	0.009
CORNEWS_TIME*SRSQ	0.277	0.593
CORNEWS_TIME*ISI	0.212	0.529

As a conclusion it can be said that the hypothesis that the factors of stress, anxiety and depression could be moderators for the predictor effect of engagement with news about COVID-19 on sleep quality can partly be accepted due to fact that interaction effects of the factors stress, anxiety and depression were found in the case of the PSQI.

## **Discussion**

This study aimed to investigate the relationships among engagement with COVID-19 news, stress, anxiety, depression and sleeping problems. The results show that a high level of engagement with news about COVID-19 correlates with a low-level of general sleep quality as well as a high level of sleep reduction but only with regards to time spent on each engagement with COVID-19 related news but not with regards to frequency of news checking, thus partly confirming the first hypothesis ‘that the more the participants are engaged with news about COVID-19 the lower their sleep quantity and quality are (H1)’.

Secondly, it was investigated if stress, anxiety and depression have a moderating effect on sleep quality with duration per COVID-19 news engagement as a predictor. This moderation effect could be established in this study, however only in the case of general level of sleep quality, but not the level of sleep reduction or the extent of insomnia symptoms. In the case of general level of sleep quality an increase in the levels of stress, anxiety and depression resulted in a decrease in sleep quality when moderating for duration of engagement with Covid-19 news. Therefore, the second hypothesis that ‘stress, anxiety and depression are moderators between the factor of engagement with news about COVID-19 and sleeping problems (H2)’ is accepted, but only with regard to the lack of general sleep quality.

## **Theoretical implications**

The results of this study can be interpreted and understood in several ways. Firstly, one important finding regarding the correlation of the engagement with Covid-19 news and level of sleep quality and sleep reduction is that the correlation was existing only in the case of duration of engagement with Covid-19 news but not with regards to the frequency. This implies that there is a significant relationship between long engagement with Covid-19 news and suffering from low sleep quality, however this relationship does not exist with regards to a high frequency, when it is looked at independent of duration of checking these news. It seems like there are significant differences in how the news are being consumed depending on if they are either shortly but frequently engaged with or engaged with for a long duration but independent of frequency, because of which a correlation in the case of news engagement frequency could not be found.

When trying to understand the reasons why and how these correlations exist it is important to take a look at what crucial differences there are between ways of news consumption that might have caused the difference in the results. In a study by Tewksbury et al. (2008) two different ways of news consumption populations were identified: selectors and

browsers. Selectors can be described as people that are specifically selecting the individual news topics they are engaging with and are spending a significant amount of time and focus on these selected topics. On the other hand, browsers can be described as people who engage with many different types of topics without focusing too much on any specific topic and without paying a lot of attention to the selection of each topic. When applied to the current study the situation could be that people who have a long duration of engagement with COVID-19 news read the news articles they engage with more thoroughly than people with a lower average duration per engagement, therefore showing selector behaviour. This thorough reading might effect them to a higher degree when compared to having only short engagements with regards to their sleep quality. On the other hand frequent engagements with Covid-19 news might not be important in that regard, because even if there is a high number of engagements, the person might not actively read and not pay proper attention to the news after all during these short engagements, like in the case of people with browsing behaviour. For example it could be the case that people who have long engagement times with Covid-19 news are actively searching for these news and are reading them in detail, because they have interest in that topic, while people with short engagement times but frequent engagement do not actively look for these types of news and read them because they happen to encounter them while just browsing the internet, but not because they are particularly interested in reading about Covid-19 news. Therefore, it could be that when spending more time on reading an article, people are exposed to more details in the reporting which therefore has a bigger effect on them, which is not necessarily the case with frequent but short engagements.

Another important thing regarding the correlational relationship between duration of engagement with Covid-19 news and low sleep quality and high levels of sleep reduction is that it is not entirely clear if the relationship is correlational or causational. On the one hand it is possible that the low sleeping quality and sleep reduction emerge as a result of and are therefore caused by the long engagement with Covid-19 news. On the other hand there is the possibility that people who spent a lot of time (per each engagement) reading news about COVID-19 have a higher probability of having been suffering from sleeping problems already, implying only correlation without causality. More research is needed in order to determine which of these possible explanations is the most applicable.

Furthermore, this study was able to determine how the relationship of engagement with COVID-19 news, the moderators stress, anxiety and depression entail with regards to sleep quality and other specific types of sleeping problems, and which aspects and subdimensions were not relevant in this relationship. When talking about the moderation

effects in this study this implies that while long engagements with Covid-19 news are predicting a low level of sleep quality, this predicted outcome level is depending on other additional factors of which stress, anxiety and depression were identified in this study. The moderation effect was only present for general sleep quality, but not for sleep reduction and insomnia, which means that these sleeping disorders are not moderated by stress, anxiety or depression.

There are several ways to explain why the moderation effect was not existing for every variable. Even though sleep reduction and insomnia are constructs related to sleep quality, they still have their own specific characteristics that differentiate them from sleep quality. It can be theorized that the characteristics in which they differ from each other are crucial parts in the interaction with the moderator variables. Because of these different characteristics sleep reduction and insomnia happen not to be directly effected or at least not significantly effected and moderated by stress, anxiety and depression in the way that general sleep quality is. Sleep reduction and sleep deprivation happen to be both variables that are to a large degree defined by lack of sleep or difficulties falling asleep and staying asleep (DSM-5, 2017) while sleep quality assesses general sleep quality and therefore includes a broader characterisation which includes different other factors (Buysse, 2014).

The results of this study help us gain a better understanding into the nature of how low levels of sleep quality emerge, which factors play a role in this and how these factors interact with each other, while also clarifying which factors do not play a role in the emergence of sleep reduction and insomnia. While it was already established in literature that stress, anxiety and depression play a role in the emergence of low levels of sleeping quality (Alvaro et al, 2013; Benavente et al, 2014) this study was a first in that it was able to show the interaction effect that these variables have with duration of engagement with Covid-19 news, while also showing that there is no such interaction in the case of frequency of engagement with Covid-19 news.

### **Practical implications**

When it comes to the practical application of the information which was gained in this study it can be said that it gave us new knowledge which can be applied in dealing with sleeping problems. It helped us to better identify at risk groups for sleeping problems and develop ways in how to tackle the emergence of them through the development of interventions that aim to reduce ongoing sleeping problems and other variables which are enhancing the sleeping problems. Furthermore, the newly identified information can help us

develop methods which can pre-emptively decrease the effect of the moderating factors for low sleep quality which were identified in this study. There were previous studies which dealt with the possible role of stress, anxiety and depression in the emergence of sleeping disorders, which established people suffering from these disorders as being at risk groups for different kinds of sleeping problems (Alvaro et. al. 2013; Benavente et. al. 2014), this study gave further clarification about the working mechanism of these factors.

It was possible to establish the role of duration of engagement with Covid-19 news as a possible factor in the emergence of low sleep quality and also explain its relationship with stress, anxiety and depression. In order to combat the possible increase of sleeping problems in society today it is important to make the public aware about the existence of these factors in order to combat their possible effects. It can be expected that clients who have a high level of stress, anxiety or depression and have long interaction times with Covid-19 news are at a higher risk of having low levels of sleeping quality. Future interventions can be established that are targeting the populations that have the aforementioned characteristics and that are designed in a way to help to improve sleep quality by mitigating stress, anxiety or depression. By decreasing the level of these factors it can be expected that their level of moderation also gets lower which will ultimately achieve a reduction in sleeping problems.

When developing future interventions that aim to mitigate the interaction effect that stress, anxiety and depression have on sleeping quality it should be noted that a lowering of these variables is most likely only going to have a significant positive effect on sleeping quality but not on levels of sleep reduction or insomnia. For these sleeping disorders, different types of interventions which aim to tackle different factors should be applied for treatment.

Furthermore, it might be useful to gain more insight into the specific factors of news reporting which play a role in their effect on stress, anxiety, depression and ultimately sleeping problems which could be found in this study. For example according to a study by Lopes et. al. (2020) sensationalist reporting during COVID-19 news played a role in increasing the level of paranoia and hallucinations of participants and it was therefore advised to decrease the level of sensationalist reporting. Analysing which factors of news reporting played a role for the factors that were assessed in this study and adapting the news reporting accordingly might be helpful in combatting the effect of stress, anxiety and depression and the level of sleeping problems.

## **Strengths, limitations, recommendations and suggestions for future research**

The study had a number of strengths and limitations. One strength that could be identified was that it included multiple different questionnaires that assess sleep. This made it possible to assess sleeping difficulties, -quality and -reduction and its possible relations to engagement with COVID-19 news and the relationship to the moderator variables from different angles. Ultimately this showed itself in the results of this study where a moderation effect was found for general sleep quality level but not for sleep reduction level and insomnia level.

One further strength is that the participants of this study were from a relatively homogenous sample recruited from a sampling pool of students that were similar in their occupation (students) and were relatively similar in their age (average of 22.2 years with a standard deviation of 3.8 years) and therefore had similar characteristics when compared to other populations. The fact that the sample was relatively homogenous lowered the effect of possible confounding variables other than the ones which were assessed in the study, which increased the validity of the data.

However, there were also some limitations to the study. Firstly, the study had a cross sectional design. While it was possible to find correlations between duration of Covid-19 news engagement and sleeping quality and sleep reduction, it was not possible to determine causality or direction of the relationship due to the nature of the study. This limitation makes it harder to make conclusive comments about the information that was gathered and as a result there is less opportunity to make use of possible applications that could help people in the future.

Furthermore, the engagement with COVID-19 news was assessed through two independent items, one assessing the frequency of engagement and the other the duration per engagement. While it was good on the one hand that there were two measures assessing the engagement with COVID-19 news, it would have been preferable not to use single items for the measurement. Rather the use of questionnaires which measure these variables might have been more reliable and valid, and therefore advisable to do in the future.

One other limitation which might have an effect on the research results is the fact that the study was done during a time where the news reporting about COVID-19 was frequently changing, which could constitute a confounding variable and could have an effect on the participants depending on the content of the news that were reported about and were consumed by the participants at each time. It could be the case that a participant who takes part in the study at a different time period than another participant might be differently effected in his sleep quality by the different news content that was reported at that time even

though there is no significant difference in extend of news consumption behaviour. For example, during the data collection period at some point there was an increase in the content and frequency of reports regarding the development of vaccines for COVID-19, due to the fact that there were new successes in the development of COVID-19 vaccines at that time, which might have been reassuring for some people and in turn could cause differences in their sleeping quality as well as their level of stress, anxiety and depression. In order to tackle this and minimize this kind of effect it was tried to keep the recruitment phase for participants relatively short. Using different methods which might decrease period of data collection to a smaller time period might be helpful to decrease the effect that was mentioned above even more.

With regards to further research, which might help gain more understanding about the variables and their relations of this study, one recommendation that would be worthwhile to investigate is if stress, anxiety and depression are possible mediator variables for sleep quality and/or sleeping disorders like sleep reduction or insomnia. There is the possibility that engagement with Covid-19 news increases levels of stress, anxiety and depression and that these variables in turn are effecting sleep quality and the level of sleep disorders. According to that, stress, anxiety and depression would be mediators. Investigating this could be especially worthwhile with regards to a possible mediation effect of duration of engagement with Covid-19 news and stress, anxiety and depression on levels of sleep reduction, due to the fact that a correlation was found between the engagement variable and sleep reduction level that could not be explained through moderation but might be explained through mediation.

## **Conclusion**

Given the situation the world finds itself in right now with the current COVID-19 pandemic it is important to explore and gain insight into the effects this situation can have on the mental health of people. This study was a first in that it was able to establish the relationship that engagement with COVID-19 news and sleeping quality have, and the interaction effect that depression, anxiety and stress cause in this relationship. While the results after all were confirming the hypotheses it is still noteworthy to say that the predicted effects and relationships were different for sleep quality and sleep reduction in that no significant correlation could be found between engagement with Covid-19 news and insomnia and no moderation effect could be found for sleep reduction and insomnia. Furthermore, one important finding is the fact that duration of engagement with Covid-19 news was possible to

be identified as a factor playing a role in the emergence of sleeping problems while the frequency of engagements was not, therefore clarifying the role these factors play. Research into reasons for this might be useful in giving us a better understanding of the nature of sleeping problems, the effect that exposure of negative news reports and stress, anxiety and depression can have and might be helpful in developing methods aimed at tackling sleeping problems and understanding the effect of the COVID-19 epidemic on society better.

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## Appendix

### Survey that was utilized in this study

#### Introduction

*11.* Dear respondent,

we are measuring sleep quality and stress/anxiety symptoms, especially during the COVID-lockdown. Please only go further if you are okay with giving your data. All data will be anonymized and be treated confidentially. You can at any time quit the study and withdraw your information.

When you have any questions regarding the study contact us @  
l.steffen@student.utwente.nl or e.chouseinoglouorhusseinoglu@student.utwente.nl

*12.* What is your country of origin?

- The Netherlands
- Germany
- Other

*13.* How old are you?

*14.* Please indicate your gender

- Male
- Female
- Other

## PSQI-Sleepdiary

*SD1.*

The first questions are about your usual bed- and sleep-times on weekdays (not in weekends) over the past month. If you don't know the exact answers, please indicate your best estimate.

Over the past month, on weekdays:

*SD2.* At what time did you usually get into bed ? (e.g. 22:40)

hours (e.g. 22 for 10pm)

minutes (0-59)

*SD3.* After getting into bed, at what time did you usually turn off the light to go to sleep? (e.g. 23:10)

hours (e.g. 22 for 10pm)

minutes (0-59)

*SD4.* How long (in minutes) did it usually take you to fall asleep? (e.g. 15)

*SD5.* How long (in minutes) were you usually awake during the night (after first falling asleep but before waking up for the last time in the morning)? (e.g. 5)

*SD6.* At what time did you usually wake up in the morning? (e.g. 07:50)

hours (e.g. 7 for 7am)

minutes (0-59)

SD7. At what time did you usually get up in the morning? (e.g. 08:00)

hours (e.g. 7 for 7am)

minutes (0-59)

SD8. How many hours of actual sleep do you get at night? (This might be different than the number of hours you spent in bed) (e.g. 7.5)

### PSQI

PSQI-a. During the past month, how often have you had trouble sleeping because you cannot get to sleep within 30 minutes?

- Not during the past month (0)
- Less than once a week (1)
- Once or twice a week (2)
- Three or more times a week (3)

PSQI-b. During the past month, how often have you had trouble sleeping because you wake up in the middle of the night or early morning?

- Not during the past month (0)
- Less than once a week (1)
- Once or twice a week (2)
- Three or more times a week (3)

PSQI-c. During the past month, how often have you had trouble sleeping because you have to get up to use the bathroom?

- Not during the past month (0)
- Less than once a week (1)

- Once or twice a week (2)
- Three or more times a week (3)

*PSQI-d.* During the past month, how often have you had trouble sleeping because you cannot breathe comfortably?

- Not during the past month (0)
- Less than once a week (1)
- Once or twice a week (2)
- Three or more times a week (3)

*PSQI-e.* During the past month, how often have you had trouble sleeping because you cough or snore loudly?

- Not during the past month (0)
- Less than once a week (1)
- Once or twice a week (2)
- Three or more times a week (3)

*PSQI-f.* During the past month, how often have you had trouble sleeping because you feel too cold?

- Not during the past month (0)
- Less than once a week (1)
- Once or twice a week (2)
- Three or more times a week (3)

*PSQI-g.* During the past month, how often have you had trouble sleeping because you feel too hot?

- Not during the past month (0)
- Less than once a week (1)
- Once or twice a week (2)

- Three or more times a week (3)

*PSQI-h.* During the past month, how often have you had trouble sleeping because you have bad dreams?

- Not during the past month (0)
- Less than once a week (1)
- Once or twice a week (2)
- Three or more times a week (3)

*PSQI-i.* During the past month, how often have you had trouble sleeping because you have pain?

- Not during the past month (0)
- Less than once a week (1)
- Once or twice a week (2)
- Three or more times a week (3)

*PSQI-j.* Other reason(s), please describe, including how often you have trouble sleeping because of this reason(s)

- Click to write Choice 1
- Not during the past month (0)
- Less than once a week (1)
- Once or twice a week (2)
- Three or more times a week (3)

*PSQI7.* During the past month, how often have you taken prescribed medicine (prescribed or "over-the-counter") to help you sleep?

- Not during the past month (0)

- Less than once a week (1)
- Once or twice a week (2)
- Three or more times a week (3)

*PSQ/8.* During the past month, how often have you had trouble staying awake while driving, eating meals, or engaged in social activity?

- Not during the past month (0)
- Less than once a week (1)
- Once or twice a week (2)
- Three or more times a week (3)

*PSQ/9.* During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done?

- Not during the past month (0)
- less than once a week (1)
- Once or twice a week (2)
- Three or more times a week (3)

*PSQ/6.* During the past month, how would you rate your sleep quality overall?

- Very good (0)
- Fairly good (1)
- Fairly bad (2)
- Very bad (3)

## **SRSQ**

*SRSQ/1.* Do you have trouble getting up in the morning?

- No

- Sometimes
- Yes

SRSQ2. Do you feel sleepy during the day?

- No
- Sometimes
- Yes

SRSQ3. Are you immediately wide awake when you wake up?

- No
- Sometimes
- Yes

SRSQ4. When I am in class for a while I have trouble keeping my eyes open

- No
- Sometimes
- Yes

SRSQ5. Do you have enough energy during the day to do everything?

- No
- Sometimes
- Yes

SRSQ6. I am active during the day

- Agree
- Partly agree
- Do not agree

*SRSQ7*. I have to struggle to stay awake in class

- Never
- Once in a while
- Often

*SRSQ8*. I don't feel like going to class because I feel too tired.

- This never happens
- This happens once a week
- This happens twice or more often a week

*SRSQ9*. I am a person who does not get enough sleep

- Agree
- Partly agree
- Do not agree

## **ISI**

*ISI-intro*.

For each question, please indicate the option that best describes your answer.  
Please rate the CURRENT (i.e. LAST 2 WEEKS) SEVERITY of symptoms of sleep problem(s).

Over the past 2 weeks I have had:

*ISI1*. Difficulty falling asleep

- None (0)
- Mild (1)

- Moderate (2)
- Severe (3)
- Very severe (4)

*IS/2. Difficulty staying awake*

- None (0)
- Mild (1)
- Moderate (2)
- Severe (3)
- Very severe (4)

*IS/3. Problems waking up too early*

- None (0)
- Mild (1)
- Moderate (2)
- Severe (3)
- Very severe (4)

*IS/4. How SATISFIED/DISSATISFIED are you with your CURRENT sleep pattern?*

- Very satisfied (0)
- Satisfied (1)
- Moderately satisfied (2)
- Dissatisfied (3)
- Very dissatisfied (4)

*IS/5. How NOTICEABLE to others do you think your sleep problems in terms of impairing the quality of your life?*

- Not at all noticeable (0)
- A little (1)

- Somewhat (2)
- Much (3)
- Very much noticeable (4)

*IS/6.* How WORRIED/DISTRESSED are you about your current sleep problem?

- Not at all worried (0)
- A little (1)
- Somewhat (2)
- Much (3)
- Very much worried (4)

*IS/7.* To what extent do you consider your sleep problem to INTERFERE with your daily functioning CURRENTLY?

- Not at all Interfering (0)
- A little (1)
- Somewhat (2)
- Much (3)
- Very much worried (4)

## **CORNEWS**

*CORNEWS1.* How often do you check/read corona related news during the past month?

- More than once per day
- Once per day
- Between 2 and 6 times per week
- Once per week
- Less than once per week
- N/A

*CORNEWS2.* When checking or reading corona-related news, how much time on average do you spent per corona news engagement?

- Less than 5 minutes
- between 5 and 10 minutes
- more than 10 minutes

*COVIDTEST.* In the following we would like to ask you about your knowledge about the current Covid-19 epidemic. Could you please answer the following questions?

	True	False	I'm not sure
1. The main clinical symptoms of COVID-19 are fever, fatigue, dry cough, and body aches.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Unlike the common cold, stuffy nose, runny nose, and sneezing are less common in persons infected with the COVID-19 virus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. There currently is no effective cure for COVID-19, but early symptomatic and supportive treatment can help most patients recover from the infection.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Not all persons with COVID-19 will develop to severe cases. Only those who are elderly and have chronic illnesses are more likely to be severe cases.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Eating or touching wild animals could result in the infection by the COVID-19 virus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	True	False	I'm not sure
6. Persons with COVID-19 cannot infect the virus to others if they do not have a fever.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The COVID-19 virus spreads via respiratory droplets of infected individuals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. The COVID-19 virus is airborne.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Ordinary residents can wear face masks to prevent the infection by the COVID-19 virus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. It is not necessary for children and young adults to take measures to prevent the infection by the COVID-19 virus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. To prevent the infection by COVID-19, individuals should avoid going to crowded places and avoid taking public transportations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Isolation and treatment of people who are infected with the COVID-19 virus are effective ways to reduce the spread of the virus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. People who have contact with someone infected with the COVID-19 virus should be immediately isolated in a proper place. In general, the isolation period is 14 days.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## HADS

Q223.

For each sentence, mark the number that describes how often it applies to you during the last week. There are no right or wrong answers. Please work quickly, without bothering to check your answers, and do not skip any question.

	Not at all	Occasionally	A lot of time	Most of the time
1. You feel tense or "wound up"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. You still enjoy the things you used to enjoy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. You get sort of frightened feelings as if something awful is about to happen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. You can laugh and see the funny side of things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Worrying thoughts go through your mind	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. You feel cheerful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. You can sit at ease and feel relaxed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. You feel as you are slowed down	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. You get a frightened feeling like "butterflies" in the stomach	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. You have lost interest in your appearance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. You feel restless as you have to be on the move	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. You look forward with enjoyment to things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. You get a sudden feeling of panic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. You can enjoy a good book, radio or TV program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## PSQ

Q226. For each sentence, mark the number that describes how often it applied to you during the last 4 weeks. There are no right or wrong answers. Please work quickly, without bothering to check your answers, and do not skip any question.

	Almost never	Sometimes	Often	Usually
1. You feel rested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. You feel that too many demands are being made on you	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. You feel that too many demands are being made on you	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. You feel you're doing things you really like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. You fear you may not manage to attain your goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. You feel calm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. You feel frustrated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. You are full of energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. You feel tense	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Your problems seem to be piling up	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. You feel you're in a hurry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. You feel safe and protected	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. You have many worries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. You enjoy yourself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. You are afraid for the future	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. You are lighthearted	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Almost never	Sometimes	Often	Usually
17. You feel mentally exhausted	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. You feel mentally exhausted	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. You have enough time for yourself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. You feel under pressure from deadlines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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