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An investigation of the relation between Covid-19 anxiety, climate anxiety, and locus of control

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Abstract

The Covid-19 pandemic and climate change are two current crises happening at the same time. Prior research found that both crises have the potential to influence a person's anxiety levels and mental health in general. The two types of anxiety Covid-19 anxiety and climate anxiety are still largely unexplored, and little is known about their association with each other. This study investigated Covid-19 anxiety and climate anxiety in relation to each other as well as the association of each concept with the concept of locus of control (LoC) and a set of explorative variables in a sample of 127 adult participants living in Germany or Sweden. The results showed that Covid-19 anxiety and climate anxiety were positively associated with each other. While Covid-19 anxiety was negatively associated with internal LoC and positively associated with powerful others LoC, climate anxiety showed positive associations with powerful others LoC and chance LoC. Both Covid-19 anxiety and climate anxiety were found to be more prevalent among individuals living in Germany and women. There was also a positive association between exposing oneself to media regarding the crises and Covid-19 anxiety as well as climate anxiety. Further research regarding the relationship between Covid-19 anxiety, climate anxiety, and LoC is needed for improved understanding of the relation between the two crises, politics and mental health in society with the final aim to optimize the planning of actions to counteract the crises and improve crisis-related psychological health in society.

Keywords: Covid-19, climate change, anxiety, climate anxiety, Covid-19 anxiety, locus of control, perceived control

Since being discovered in the end of the year 2019, the virus SARS-CoV-2, causing the Coronavirus disease (Covid-19), started spreading in countries all over the world (World Health Organization [WHO], 2020b; WHO, 2020c). Due to its rapid spread across the globe, the WHO (2020b) classified the situation as a pandemic. The development of this virus' spread and the dangers an infection brings for risk groups led to governments all over the world deciding on restrictions of everyday life in many countries (WHO, 2020a; WHO, 2020c). Despite every country dealing with the same pandemic, some countries differ in regard to the measures they take in order to counteract the spread of Covid-19. Germany and Sweden are examples for two countries with different strategies for fighting Covid-19 (Jung et al., 2020). Besides influencing people's physical health, Covid-19 also showed to influence people's well-being and mental health (Lee, 2020). A form of anxiety related to the Covid-19 pandemic is the so-called Covid-19 anxiety (Lee, 2020).

Another form of anxiety caused by an ongoing global crisis is climate anxiety. Climate anxiety is a psychological reaction to the threat of climate change (Clayton, 2020; Clayton & Karazsia, 2020). According to the Intergovernmental Panel of Climate Change (IPCC) (Hoegh-Guldberg et al., 2018), there is solid evidence for climate change being caused by human influence. Being exposed to changes in their physical environment due to climate change and information about climate change, people react to it on a psychological level (Clayton et al., 2017; Clayton, 2020). The Covid-19 pandemic and climate change are happening in parallel and are therefore also referred to as a double global crisis (Baldwin & English, 2020). The United Nations (n.d.) stress the importance of focusing on both crises, climate change and Covid-19, even in times when Covid-19 draws a lot of political attention due to difficult health situations all over the world.

Climate anxiety and Covid-19 anxiety are two types of anxiety caused by the real threats Covid-19 and climate change. People's psychological reaction to the challenges and threats they face in their lives have been connected to the extent to which they feel in control over things happening in their lives (Rotter, 1966; Levenson, 1973). Research found that this concept, called locus of control (Rotter, 1966), can be connected to the extent to which a person reacts anxious to certain situations (Hoehn-Saric & McLeod, 1985; Kohli et al., 2011).

As Covid-19 anxiety, and climate anxiety are recent concepts, there are still many open questions in research regarding both. Especially the gain of new knowledge about their

interaction can be important since society currently faces both crises at the same. There seems to be little data on how the crises' psychological effects are associated with each other and what characterizes groups of people with higher or lower crisis specific anxiety.

Anxiety

Anxiety disorders are one of the most common forms of mental ill-health in the 21st Century, with up to 33.7 % prevalence in the population (Bandelow, & Michaelis, 2015). According to Kowalski (2000), anxiety is defined as an emotion with physical as well as psychological effects. On a physical level, anxiety comes with an increased activity of the autonomous nervous system. Specific key features of physical anxiety reactions are for example increased heart rate and blood pressure. Psychologically, anxiety expresses itself with cognitions such as worry and apprehension. There are many different subtypes of anxiety which have been identified by research over the years, such as social anxiety or speech anxiety (Kowalski, 2000). Anxiety can have effects on the way a person behaves and perceives situations but is not necessarily a bad thing. The general concept of anxiety can be divided into adaptive and maladaptive anxiety. Adaptive anxiety refers to reactions which are objectively rated as reasonable and helpful in relation to the stimulus. An example for this is according to Kowalski (2000) the scenario of a person fearing heights. Since falling from heights can cause physical injury, a certain degree of anxiety in connection to heights is appropriate in order to avoid danger. Other forms of anxiety are rated as maladaptive which means that the anxiety is dysfunctional and from a more objective point of view not a reasonable reaction to the specific stimulus. Whilst maladaptive anxiety can influence behavior and performance negatively, adaptive anxiety can have a positive activation effect increasing performance (Kowalski, 2000). In case this activation gets too strong, and the affected person feels too responsible to prevent certain situations which might cause harm to themselves or others, this can have maladaptive effects (Sugiura, & Fisak, 2019). Perceiving oneself strongly personally responsible is a predictor for the development of symptoms of anxiety disorders such as obsessive compulsive disorder (OCD) or general anxiety disorder (GAD) (Sugiura, & Fisak, 2019).

Some groups of people are more prone to developing anxiety than others. Several studies showed that anxiety is more prevalent among women (Regier et al., 1990; McLean et al., 2011). Also, younger people seem to show a higher prevalence of anxiety disorders (Regier et al., 1990). More specifically, Regier et al. (1990) found that people younger than 45 had more anxiety symptoms than people older than 45 years. Another factor which has been connected to anxiety is personality. Studies showed anxiety to show negative correlations with extraversion and positive correlations with neuroticism (Kaplan et al, 2015). In people who are prone to anxiety in general, different types of anxiety being comorbid with other types of anxiety is not unusual. An example is GAD which has high comorbidity rates with other anxiety disorders (Beesdo et al., 2010). Being in certain private or societal circumstances such as living in poverty or experiencing adverse life events is another factor which can lead to disorders such as anxiety (Spence et al., 2002; Tiet et al., 2001). One of those aversive life events are societal crises (Miloyan et al., 2018). Society faces a variety of crises and threats of different intensities at different points in time. One concrete example for such crises are financial crises like the one in Greece in the year 2008. In studies on the mental health effects of this financial crisis on the Greek population, Mylona et al. (2014) concluded that the socioeconomic changes due to the financial crisis were associated with increased levels of mental health issues. Investigating the effects of an economic crisis in Turkey in 2001, Ünal-Karagüven (2009) found a strong relationship between anxiety and the economic consequences of this crisis. Other examples of crises with potential to impact anxiety are wars or threats of wars like the cold war. Poikolainen et al. (2004) found that the fear of nuclear wars was associated with high trait anxiety.

Covid-19

The Covid-19 pandemic is a current crisis. On December 31, 2019, a new Coronavirus disease caused by the virus SARS-CoV-2 was identified in Wuhan, China (WHO, 2020b). The Coronavirus disease Covid-19 is, according to the WHO (2021), classified as infectious disease. Spreading through saliva and nasal discharge, in most cases it causes a moderate respiratory disease. The disease's mode of spread indicates the importance of respiratory hygiene (WHO, 2021). While young and healthy people are at lower risk of becoming seriously ill, older people and people with preexisting medical conditions like diabetes or

cardiovascular disease are at increased risk of severe illness (WHO, 2021). After the virus had rapidly spread across countries all over the world, the WHO characterized Covid-19 as a pandemic on March 11, 2020 (WHO, 2020b). The WHO's (2020a) aim is for all countries to slow down transmission globally up to low to non-transmission. They state that the most important thing in order protect oneself and others is to stay informed about the disease and its spread and to act upon this information (WHO, 2021).

As mentioned prior, according to the WHO (2020a), there are differences between countries regarding measures taken. Whilst Sweden mostly focused on giving recommendations to the public and only introduced few binding restrictions, countries like Germany implemented harder restrictions such as lockdowns in order to slow down the virus' transmission on a national level (Jung et al., 2020). There were also differences in mortality. During the first wave of Covid-19 in the beginning of 2020, Sweden had a three times higher death rate of Covid-19 cases than Germany (Jung et al., 2020). After lower incidences in the summer months, incidences were on a rising trend again in autumn 2020 (Bundesregierung, 2020a). Due to those high incidences and mutations of the Coronavirus spreading in Germany, the German Federal Government decided on new guidelines regarding limitations in Germany during a conference on October 14 ,2020 (Bundesregierung, 2020a). Those guidelines include strong restrictions for people's everyday life such as always keeping at least one and a half meters distance, wearing a facemask in public and reducing private meetings to a maximum of five people. On a societal level, universities were for example asked to switch to online school whenever possible. On December 13th, the German Federal Government decided on prolonging existent measures and on even stricter rules such as closing stores not essential to everyday life and encouraged home office and the reduction of social contacts to an absolute minimum (Bundesregierung, 2020b). This so-called *lockdown light* was decided to be prolonged until at least March 7, 2021 (Deutschland.de, 2021). Despite having fewer and less intense restrictions than Germany, Sweden published a list of restrictions and recommendations. The binding restrictions and recommendations were published on, amongst others, *Krisinformation.se* (2021) which is a website informing about government decisions regarding crisis situations in Sweden. Public meetings got for example restricted to a maximum of eight people, travel to Sweden got limited and shops and sports centers were to control the number of people inside the building (Krisinformation.se, 2021). On the 18th of February, 2021, the Swedish government announced the prolonging of the restrictions of public life in Sweden due to a continuously high spread of Covid-19

(Regeringskansliet, 2021). Comparing countries, some things such as wearing a mask in public were binding in Germany (Bundesregierung, 2021b) while only being recommended in Sweden (Krisinformation.se, 2021).

The Covid-19 pandemic and its restrictions on people's lives have been associated with negative influences on people's mental health and well-being in general (Lee, 2020; Marotta et al., 2020). According to Courtney et al. (2020), increased mortality awareness is caused by humans all over the world being exposed to high rates of death in society due to the virus. The Covid-19 pandemic and the worry it causes showed associations with several signs of distress such as fear, extreme worry and avoidance (Taylor et al., 2020). A strong form of worry caused by the Covid-19 pandemic which recently has been identified is Covid-19 anxiety (Lee, 2020).

Covid-19 anxiety

The term Covid-19 anxiety, also referred to as Coronavirus anxiety, describes a certain form of anxious reactions directly related to fear of the Covid-19 pandemic (Lee, 2020). According to Lee (2020), Covid-19 anxiety can be a dysfunctional psychological reaction to the threat of the Covid-19 pandemic which can lead to impairments and decreased functionality in everyday life. During the first weeks of the breakout in China, people showed significantly higher levels of, amongst others, anxiety (C. Wang et al., 2020). Studies found an increased vulnerability among women when it comes to anxiety and other negative psychological effects of the pandemic (Maaravi & Heller, 2020; C. Wang et al., 2020). Studies also revealed an increased vulnerability in younger people (Carson et al., 2020; Varma et al., 2021).

As mentioned prior, one measure against Covid-19 is called *lockdown*. The WHO (2020d) refers to the term lockdown as a set of strict measures for limiting interpersonal contact for slowing down the spread of Covid-19. In this context, the WHO (2020d) stated concerns regarding a lockdown's potentially negative influence on a person's economic and social life. Coulthard et al. (2020) found that people's psychological reactions on the Covid-19 pandemic changed in lockdown, especially in regard to health anxiety and eating habits.

According to this study, people with higher values of Covid-19 specific health anxiety, female gender and problematic eating behavior were more likely to consume unhealthy food during lockdown. People with adaptive coping strategies on the other hand tended to healthy eating during lockdown. Díaz-Jiménez et al. (2020) found significantly increased anxiety levels during lockdown in a sample of Spanish university students.

Double global crisis

Covid-19 is not the only global crisis influencing politics and people's lives all over the world. Climate change has been an increasing problem since unnatural changes in the earth's climate have been identified in context of the beginning of the industrial period (Hoegh-Guldberg et al., 2018). In recent research, the co-occurrence of those two crises has been referred to as a double global crisis (Baldwin & English, 2020). The United Nations (n.d.) warn in their climate related goal 13 that there must be a focus on both, climate change and the Covid-19 pandemic, in order to protect the lives of people and habitats at the same time. They and other governmental sources like the Government Offices of Sweden (2020) stress that, despite the pandemic happening, there is no pause in climate change and that climate change should not be overshadowed by the pandemic and still needs attention.

Climate change

According to the IPCC (Hoegh-Guldberg et al., 2018), this planet's climate has changed in comparison to pre-industrial times with a rise of average temperature of about 0.87°C between 1850 and 2015. There is strong evidence for those changes in the earth's global mean surface temperature (GMST) being caused by human action. Those changes such as long-lasting heatwaves and rising sea levels impact ecosystems and organisms all over the globe. The rise of temperature and its effects can also lead to long term consequences such as loss of entire eco systems (Hoegh-Guldberg et al., 2018). Those consequences, in turn, are likely to affect humans through for example water scarcity (UN-Water, 2021), loss of farmland and damage through wildfires (United Nations Environment Programme, 2020). The United Nations (n.d.) state that the recent year 2019 was the second warmest year in the

warmest decade with new recorded of greenhouse gases. There are political agreements between countries such as the 2015 Paris Agreement which aims keeping the rise of the earth's GMST below 2°C (United Nations, n.d.). Despite the suggestions regarding what society can do to counteract climate change (Arguedaz Ortiz, 2018; United Nations, n.d.), newspapers and other media sources often portray that what is done is not enough (e.g., Endres, 2021).

Climate change has the potential of influencing people's health on three levels, which are their physical-, community-, and mental health (Clayton et al., 2017; Watts et al., 2021). Despite climate change being discussed all over the world, according to Clayton et al. (2017), some people are at higher risk to experience negative health impacts than others. Risk factors they state are for example pre-existing medical conditions, disabilities or geographic location. According to Clayton et al. (2017), despite being less obvious than physical effects of climate change, psychological effects of climate change can be severe too. The distress caused by climate change can lead to for example post-traumatic stress disorder, anxiety and even suicide (Clayton et al., 2017; Clayton, 2020). A climate change related mental health phenomenon which has recently gained attention in research is climate anxiety (Clayton, 2020; Clayton & Karazsia, 2020).

Climate anxiety

Climate anxiety, also referred to as climate change anxiety, is a psychological and emotional reaction to the threat of climate change (Clayton, 2020; Clayton & Karazsia, 2020). According to S. Wang et al. (2018), people experiencing anxiety related to climate change feel forms of worry related to the environment's future, their own future, and future generations. Despite being a new phenomenon in terms of research, certain degrees of climate anxiety seem to already exist in parts of society. Clayton and Karazsia (2020) found in an US American sample that it was not uncommon that people show some degree of climate anxiety. Despite much of the research about the health effects of climate change being done in American and in general in Western samples, there seem to be differences when it comes to geographical location (Clayton et al., 2017). As mentioned earlier, there are several risk factors for climate anxiety. Clayton and Karazsia (2020) found higher levels of climate

anxiety among younger people. Reser and Swim (2011) use the moderating effect of media representations to explain why climate change impacts people who are not directly exposed to severe physical effects of climate change. Being exposed to medial information about a threat can therefore psychologically impact a person. But those impacts do not have to be negative per se. Just as anxiety in general is not necessarily maladaptive (Kowalski, 2000), moderate levels of climate anxiety can also be an adaptive reaction to climate change, motivating people to behave in ways which counteract the threat (Reser et al., 2012, as cited in Clayton, 2020; Clayton & Karazsia, 2020). One psychological concept which has recently been connected to people's behavior and reactions regarding both Covid-19 and climate change is locus of control (Kuthe et al., 2019; Marotta et al., 2020).

Locus of control

The concept of locus of control (LoC) is based on the assumption that people develop generalized expectancies regarding the degree to which they perceive being in control over things happening to them in their lives (Rotter, 1966). Rotter (1966) distinguishes between an external and internal LoC. An internal LoC puts focus on people's own behaviors and their power to influence and control the events in their lives. Having an external LoC, on the other hand, means that a person perceives things happening in their lives as controlled by outer forces such as luck, fate, or other people's control, but not their own doing. According to Rotter (1966), it depends on a person's history and experiences whether they attribute things happening in their lives to themselves or to outer forces. Whether a person has developed an external or internal LoC influences their choices and behaviors. Rotter (1966) described and measured LoC mainly on the internal-external dimension. Since research suggests that the focus on those two dimensions alone underestimates the construct's dimensionality, Levenson (1973) constructed a measure of LoC which divides external LoC into two dimensions, namely powerful others LoC and chance LoC. Research found an association between anxiety and a perceived control or lack of control over negative events happening in a person's life. A rather internal LoC has been associated with lower levels of anxiety while a rather external LoC was associated with increased anxiety (Hoehn-Saric & McLeod, 1985; Kohli et al., 2011). The concept of LoC has also been applied to the current crises Covid-19 and climate change in recent studies. According to Marotta et al. (2020), during lockdown in Italy, people

showed a rather external LoC. Regarding climate change, Kuthe et al. (2019) found an association between a rather internal LoC and increased willingness to act in climate friendly ways.

The present study

As stated prior, Covid-19 and climate change are happening at the same time in form of a double global crisis (Baldwin & English, 2020; Government Offices of Sweden, 2020; United Nations, n.d.) and have the potential to cause negative effects on a person's psychological well-being (Clayton et al., 2017; Clayton, 2020; Lee, 2020; Taylor et al., 2020). Regarding Covid-19 anxiety and climate anxiety, there are still many gaps in the research, especially when it comes to their association with each other.

The first goal of this study was to further investigate the recent concepts Covid-19 anxiety and climate anxiety and their relationship with each other as well as with the concept of LoC. By identifying differences and similarities between Covid-19 anxiety and climate anxiety, society might be able to learn from one crisis for the other and also learn how to combat both at the same time. Gaining further information on both types of anxiety might even help to find similarities between those and earlier crises. This might open the possibility to apply knowledge gained in prior crisis situations to the current ones. Since prior studies regarding Covid-19 and LoC, such as the study by Díaz-Jiménez et al. (2020), mainly made use of tools measuring general forms of anxiety, this study aims at providing additional knowledge by measuring crisis specific anxiety in the context of LoC.

The second main goal was to identify groups with either very high or low Covid-19 anxiety and climate anxiety by investigating participant's LoC as well as several explorative variables. Those variables were perceived own responsibility for solving both crises, perceived responsibility of politicians to solve both crises, and media exposure to them. Perceived responsibility of politicians was chosen as a variable in this study since both crises are largely steered by politicians deciding on crisis-counteracting regulations (e.g., Bundesregierung, 2021a; Regeringskansliet, 2021; United Nations, n.d.). Furthermore, there was a comparison of gender, age groups and country of residency. Regarding country of

residency, this study focused on the countries Germany and Sweden which differed noticeably in their strategies for combating the Covid-19 pandemic (Jung et al., 2020). This is especially interesting since Germany was in a light version of a lockdown during the time of this study (Deutschland.de, 2021) while Sweden did not have any form of lockdown by that time. Since prior studies suggest that mental health worsens during measures like lockdowns (Coulthard et al., 2020; Díaz-Jiménez et al., 2020), in the present study participants living in Germany were expected to score higher on the anxiety variables, especially Covid-19 anxiety, compared to participants living in Sweden. The identification of groups which show very low degrees of anxiety related to the two crises is important since a certain degree of anxiety is needed as adaptive response to a threat and helps to motivate people to take action against the threat (Kowalski, 2000). When knowing which groups of people lack anxiety responses to the two crises, society and politics might be able take measures to address those groups more effectively. Groups with maladaptively high anxiety are also important to be identified since they might be in need of special support regarding their anxiety.

Summarizing, the focus in this study lies on three main hypotheses. Since Covid-19 and climate change are happening at the same time and the constructs show similarities, it was hypothesized that climate anxiety and Covid-19 anxiety are positively associated with each other (H1). Furthermore, it was expected that inhabitants of Germany show higher levels of Covid-19 anxiety than people living in Sweden (H2), since hard restrictions such as lockdowns showed to influence people's mental health and anxiety levels negatively (Coulthard et al., 2020; Díaz-Jiménez et al., 2020). In this study, it was also hypothesized that people with a rather internal locus of control have lower degrees of climate anxiety respective Covid-19 anxiety whereas a rather external locus of control was expected to be associated with higher anxiety regarding both crises (H3). The three main hypotheses were supplemented with an explorative part of the study focusing on identifying groups prone to Covid-19 anxiety and climate anxiety.

Methods

Participants

Participants for this study were recruited online by sharing the link to the online survey on the social media platforms Facebook and WhatsApp. This convenience sample consisted of participants who did not get any form of reward for their participation. Participants needed to understand English, to be at least 18 years old, and to have been living in either Sweden or Germany for at least one year and still live there. The total of 127 participants in this study ranged from ages 18 to 80 years, while the mean age of participants was $M=37.65$ ($SD=13.30$) years. Regarding reported gender, 46 participants (36.2%) identified as male and 81 (63.8%) as female. No participant chose the option *other* for gender. A majority of the participants ($n=87$; 68.5%) were residents of Germany and 40 (31.5%) reported residence in Sweden.

Materials

Coronavirus Anxiety Scale (CAS)

Covid-19 anxiety was assessed using Lee's (2020) Coronavirus Anxiety Scale (CAS). This short mental health screener consists of five items which are rated on a five- point Likert-scale from *not at all* to *almost every day over the past two weeks*, depending on how often the participants felt the symptoms described in the items. This scale was chosen since it appeared to be the shortest available screener for Covid-19 anxiety with good psychometric properties. The Coronavirus Anxiety Scale showed excellent reliability in factor analysis ($\alpha=.92$) in a validation study (Lee et al., 2020). In the current study, Cronbach's alpha was $\alpha=.55$. In his paper, the scale's author gives permission to people to use his scale in research (Lee, 2020).

Climate Change Anxiety Scale

Climate anxiety was measured using Clayton and Karazsia's (2020) Climate Change Anxiety Scale. This scale measures climate anxiety using thirteen items which can be divided

into the two subscales *cognitive-emotional impairment* which includes the first eight items and *functional impairment* including the remaining five items. The two scales can also be combined to one scale measuring general climate anxiety. In the present study, the scales were used combined as one scale since the variable of interest was general climate anxiety. The thirteen statements are rated on a five-point Likert-scale from *never* to *almost always*, depending on how often the participants experience the symptoms described in the statements. In the original validation study, both subscales showed good psychometric properties with a Cronbach's alpha of α=.96 for cognitive-emotional impairment and α=.93 for functional impairment. In the current study, Cronbach's alpha for the entire scale was α=.83. Permission for usage of this scale in the study at hand was given by Susan Clayton, one of the scale's authors.

Multidimensional Locus of Control Scale

Locus of Control was measured using Levenson's (1973) Multidimensional Locus of Control Scale. This instrument was chosen since it measures LoC on the three dimensions internal control, powerful others, and chance. A multidimensional approach to measuring LoC has been suggested by research since Rotter's (1966) original scale is suspected to underestimate the construct's dimensionality (Levenson, 1973). Levenson's (1973) scale combines Rotter's (1966) classical internal-external dimension of LoC with more specific investigations regarding the external LoC, differentiating between an external LoC focused on powerful other people who are perceived to be in control of one's life and an external LoC which focuses on chance as the determining factor for events in a person's life. In the scale's validation study, the scale showed only moderately high values of internal consistency with Kuder-Richardson reliabilities of .67 for the internal LoC scale, .82 for the powerful others LoC scale and .79 for the chance LoC scale (Levenson, 1973), which, according to the author, had to be expected since the items represent a large diversity of different situations. The values for Cronbach's alpha calculated in the current study were α=.71 for internal LoC, α=.69 for powerful others LoC and α=.63 for chance LoC. The questionnaire consists of 24 items in total with eight items for each subscale. The items contain statements which are to be rated on a six-point Likert-scale from *strongly disagree* to *strongly agree*. For each of the three subscales, the participant can reach a value between zero and 48. High scores on a

specific subscale indicate that this subscale reflects the person's LoC. According to Levenson (1973), it is theoretically possible to score high on all three subscales. High scores on both or one of the subscales powerful others and chance indicate a rather external LoC. Permission for using this scale in this thesis was granted by its author Hanna Levenson.

Additional Items

In addition to the three scales used in this study, there were eleven additional items (see Appendix A). Those were written by this thesis' author to gain further information on the participants' perceptions and attitudes in regard to Covid-19 and climate change. Items one and two in the section of additional items measure how often the participants followed the news regarding Covid-19 and climate change respectively over the course of the last two weeks. Those items were rated on a five-point Likert-scale from *never* to *almost always*. This was done in order to find out to how much medial information regarding the crises they exposed themselves to during the last two weeks. Furthermore, there were two items asking to which extent participants perceive that their behavior can make an impact on Covid-19 respective climate change. Those two items, item three and four, were rated on a five-point Likert-scale from *do not agree at all* to *agree completely*. Items five to eight asked for to which extent people perceived themselves and politicians responsible for reducing Covid-19 cases and climate change. These items were presented in form of statements which were rated on a five-point Likert-scale from *do not agree at all* to *agree completely*. Three additional items asked for the participant's demographics age, gender and country of residence.

Design

The scales and additional questions were implemented into the survey tool Sunet Survey which is a tool used at Lund University. The online survey started with an informed consent which gave the participants important information regarding the study's content, format, and their rights as participants. After giving consent, they were able to begin the survey. The survey started with the Coronavirus Anxiety Scale, followed by the Climate Change Anxiety Scale. After that, the participants were presented the Multidimensional Locus

of Control Scale. Thereafter, they answered the additional questions, ending with the demographics. After having sent in the survey they came to a page with debriefing information.

The study was published on February 17, 2021 and ended on March 3, 2021. This rather short interval of two weeks was chosen to make sure that the situation in regard to the Covid-19 pandemic is a similar one for all participants. According to the survey tool's statistics, the last day someone submitted an answer to the survey was February 25, 2021 which means that the actual period where people answered to the questions was one and a half weeks long.

Ethical considerations

In line with the ethical guidelines for psychological research in Sweden, the data were collected anonymously and cannot be linked to specific persons. Participants had to be at least 18 years old, had to read an informed consent, and give their consent before being able to see the study's questions. The informed consent stated that participants were free to end the study at any given time without explaining why, that they stay anonymous, that any information entered was treated confidentially, and included further important information regarding the study's content. This information included a disclaimer that the study's questions were anxiety related. In this study, there are several questions regarding the participant's anxiety levels regarding Covid-19 and climate change. This kind of information is classified as sensitive information since it is related to mental health. Besides an anonymous data collection, the demographic information collected was limited to gender, age, and country of residence since the sample was a convenience sample and further information might have made it possible for the author to identify participants. Moreover, the data were handled and stored only by the thesis' author. The sequence in which the scales were presented was chosen to make sure that the participants finished the study with anxiety unrelated questions in case they get a little stressed by questions related to anxiety. Despite that there was no notice by the authors of both anxiety related scales that they could induce anxiety or stress in participants, there was a notice in the beginning and end of this study that participants were welcome to contact clinical psychologist Kajsa Järvholm, this thesis' supervisor, in case they

felt any distress as a result of this study. No participant made use of this offer. Before the study was conducted, a declaration of the thesis' status with respect to research ethics was signed by both the thesis' author and supervisor, declaring that the study is in line with the ethical guidelines. This declaration was approved by the course coordinator.

Data analysis

The data collected in this study was analyzed using IBM SPSS Statistics 26. There were no missing values. A search for outliers revealed an extreme value on the variable Covid-19 anxiety and outliers on the variables internal LoC, chance LoC, Covid-19 anxiety, and climate anxiety. Furthermore, only the three variables internal LoC, powerful others LoC, and chance LoC were normally distributed. All other variables were not normally distributed, skewed and had outliers, as mentioned prior. This is something which is rather common especially among anxiety related items and occurs when working with various tools measuring anxiety. For example, Nordhagen (2001) stated in a validation study that almost every item on the BAI, one of the most frequently used anxiety measures, showed a non-normal kurtosis and skew in his validation study of the BAI. In the present study, no case or variable was removed since outliers and non-normality are expected when testing clinical variables like different forms of anxiety and cannot be seen as measuring errors or as anything unexpected. It was discussed whether a transformation of the data could be used to solve the problem with the outliers and non-normal distributions in the study at hand since transformation is a way to make it possible to run parametric tests in conformity with parametric tests' assumptions (Tabachnick & Fidell, 2013). When transforming a variable, the goal is to transform the distribution of values into a more normally distributed shape which also leads to that the impact of outliers and skew on that variable is reduced (Tabachnick & Fidell, 2013). It was decided that the non-normality and outliers were important and central parts of this clinical research which were seen as characteristic for the specific sample and variables. Therefore, non-parametric tests were chosen as a more conservative approach instead of a transformation of the variables in question. For non-parametric comparison of groups, Mann-Whitney U-tests were conducted. To investigate associations between variables, Spearman's rank-order correlations were run.

Results

Reliability analyses

Table 1 presents the descriptive statistics for all variables analyzed in this study as well as reliability analyses for the scales used. For the instruments Coronavirus Anxiety Scale, Climate Change Anxiety Scale and Multidimensional Locus of Control Scale, Cronbach's alpha was calculated in order to obtain the scales' reliability in this study. For the Coronavirus Anxiety Scale, there was a poor reliability obtained. Reliability analyses for the entire Climate Change Anxiety Scale revealed a Cronbach's alpha which is to be interpreted as good reliability. The Multidimensional Locus of Control Scale was split into the three subscales for reliability analysis. The internal LoC scale showed a Cronbach's alpha interpretable as acceptable. For the external LoC scales, both powerful others and chance LoC scales showed questionable reliability (see Table 1).

Table 1

Descriptive Statistics and Cronbach's Alpha for Scales (N=127)

Variable	*M*	*SD*	*Mdn*	Mode	α
Covid-19 anxiety	1.47	1.94	1	0	.55
Climate anxiety	18.08	5.08	16	13	.83
Internal LoC	33.97	7.41	35	36	.71
Powerful Others LoC	16.28	7.79	16	21	.69
Chace LoC	17.91	7.53	17	17	.63
Perceived Behavioral Impact Covid-19	4.17	1.04	4	5	-
Perceived Behavioral Impact climate change	3.54	1.01	4	3	-
Perceived responsibility politicians Covid-19	3.73	1.00	4	4	-
Perceived responsibility politician's climate change	4.05	1.00	4	5	-
Perceived own responsibility Covid-19	4.27	1.01	5	5	-
Perceived own responsibility climate change	4.02	1.04	4	5	-
Media exposure Covid-19	4.01	0.96	4	4	-
Media exposure climate change	2.09	1.01	3	3	-

Hypothesis 1

For the first hypothesis, it was expected that Covid-19 anxiety and climate anxiety were associated with each other. The two variables Covid-19 anxiety and climate anxiety showed a moderate positive correlation (see Table 2).

Hypothesis 2

For the second hypothesis, participants from Germany and Sweden were compared regarding their Covid-19 anxiety. There was a significant difference between values of Covid-19 anxiety on the Coronavirus anxiety scale between residents of Germany (*Mdn*=1) and residents of Sweden (*Mdn*=0) with people in Germany scoring higher on Covid-19 anxiety than residents of Sweden, $U=969.50$, $z=-4.21$, $p<.001$. For comparison between Covid-19 anxiety and climate anxiety, a country comparison between Germany and Sweden regarding climate anxiety has been conducted. Participants living in Germany (*Mdn*=17) scored significantly higher on climate anxiety than participants living in Sweden (*Mdn*=15), $U=1313.50$, $z=-2.23$, $p=.026$.

Hypothesis 3

The third hypothesis aimed at investigating the association between a person's LoC and their degree of Covid-19 anxiety and climate anxiety, respectively. For Covid-19 anxiety, results showed a weak negative association with internal LoC (see Table 2). For the correlation between internal LoC and climate anxiety, on the other hand, there was no significant correlation (see Table 2). Furthermore, the third hypothesis expected external LoC to be positively associated with both Covid-19 anxiety and climate anxiety. High values on both or either of the powerful others LoC scale and chance LoC scale suggest a rather external locus of control. There was no significant correlation between Covid-19 anxiety and chance LoC (see Table 2), but a weak positive correlation between powerful others LoC and Covid-19 anxiety obtained (see Table 2). Results revealed a weak positive correlation between the variables powerful others LoC and climate anxiety (see Table 2) and a weak positive correlation between chance LoC and climate anxiety (see Table 2).

Table 2

Spearman Correlations all Variables (N=127)

	1	2	3	4	5	6	7	8	9	10	11	12	13
Covid-19 anxiety	-												
Climate anxiety	.42**	-											
Internal LoC	-.18*	-.16	-										
Powerful Others LoC	.18*	.19*	-.04	-									
Chance LoC	.05	.30**	-.12	.51**	-								
Own Responsibility Covid-19	.10	.16	.28**	-.01	-.03	-							
Own Responsibility Climate Change	.04	.30**	.24**	-.02	.11	.78**	-						
Politician's Responsibility Covid-19	.07	.06	.05	.24**	.11	.27**	.25**	-					
Politician's Responsib. Climate Change	.10	20*	.08	.20**	.17	.45**	.43**	.61**	-				
Behavioral Impact Covid-19	.03	-.03	.24**	-.02	-.12	.60**	.43**	.20*	.34**	-			
Behavioral Impact Climate Change	-.02	.17	.12	-.03	-.07	.35**	.47**	.17	.31**	.45**	-		
Media Exposure Covid-19	.24**	.14	.08	.11	-.02	.21*	.09	.15	.14	.09	-.16	-	
Media Exposure Climate Change	-.03	.34**	.09	-.17	.01	.27**	.38**	.10	.22*	.16	.25**	.41**	-

*p<.05, **p<.01

Explorative analysis

Anxiety Groups

To identify groups that score either very high or low on both Covid-19 anxiety and climate anxiety, both variables were divided into quartiles, as presented in Table 3. The first quartile for both types of anxiety was seen as the low anxiety group for this type of anxiety while the fourth quartile was seen as high anxiety group. Using the division into quartiles made it possible to find out which characteristics can be found in groups of participants reporting either very high or very low on Covid-19 anxiety and climate anxiety. For Covid-19 anxiety, people in the first quartile did not report any Covid-19 anxiety at all. Also, participants in the second and third quartile of Covid-19 anxiety all reported low values as well, considering that the total scores on the Coronavirus Anxiety Scale can reach from zero to 20. Participants in the fourth quartile ranged from the value two to nine. For climate anxiety, the first quartile consisted of participants with no climate anxiety which has the value 13 to very low climate anxiety. Considering that 65 is the highest possible score on the Climate Change Anxiety Scale, people in the second and third quartile reported low anxiety as well (see Table 3). Participants in the third quartile ranged from 21 to 35 regarding their climate anxiety.

Participants in the first and fourth quartile for both Covid-19 anxiety and climate anxiety formed the low-anxiety and high-anxiety group for each type of anxiety. As a next step, using a cross table, participants were identified who were in the high-anxiety and low-anxiety group for both types of anxiety, in the following called *double high-anxiety group* and *double low-anxiety group*. Then, the double low-anxiety and double high-anxiety groups were investigated in a descriptive way using cross tables. The double low-anxiety group consisted of 25 participants of which 11 were men and 14 were women. Ten of the participants were from Germany while 15 were from Sweden. Regarding age, 20 people were younger than 45 and five were older. In the double high-anxiety group which consisted of 11 participants in total, one participant was male while ten were female. Nine lived in Germany and two in Sweden and seven were younger than 45 while four were older.

Table 3

Quartiles Covid-19 Anxiety and Climate Anxiety (N=127)

Percentile	Covid-19 anxiety*	Climate anxiety**
.25	0	14
.50	1	16
.75	2	21

* highest value for Covid-19 anxiety in percentile

** highest value for Climate anxiety in percentile

Gender

Female participants (*Mdn*=1) and male participants (*Mdn*=0) differed significantly in regard to their Covid-19 anxiety with female participants scoring higher than male participants, $U=1149.00$, $z=-3.77$, $p<.001$. Gender differences were also investigated for climate anxiety with the result that female participants (*Mdn*=17) showed significantly higher climate anxiety than male participants (*Mdn*=15.5), $U=1410.00$, $z=-2.29$, $p=.022$.

Age

The results for the association between Covid-19 anxiety and age as a continuous variable revealed no significant correlation, $rs(127)=.10$, $p=.260$. As shown in Figure 1 (see Appendix B), there are no patterns regarding age groups identifiable when it comes to Covid-19 anxiety. Moreover, age did not correlate significantly with climate anxiety, $rs(127)= -.09$, $p=.302$. As visualized in Figure 2 (see Appendix B), similarly to Covid-19 anxiety, there are no clear patterns of age groups visible when it comes to climate anxiety.

LoC and perceived responsibility for change

The relation between LoC and people's perceived responsibility for reducing Covid-19 cases and climate change was investigated. Results reveled a weak positive association between people's internal LoC and their perception of their own responsibility to reduce climate change (see Table 2). There was also a weak positive correlation between people's internal LoC and perceived own responsibility to reduce numbers of Covid-19 cases (see Table 2). Powerful others LoC scale was weakly positive associated with perceiving politicians responsible for reducing climate change (see Table 2). A similar result was found for Covid-19 since there was a weak positive correlation between powerful others LoC and the perceived responsibility of politicians to reduce Covid-19 cases (see Table 2). There was a strong positive correlation between people's perceived own responsibility to reduce covid-19 cases and people's perceived own responsibility to reduce climate change (see Table 2). Also, there was a moderate positive correlation between perceived responsibility of politicians to reduce Covid-19 cases and perceived responsibility of politicians to reduce climate change (see Table 2).

Moreover, it was analyzed how the variables perceived own responsibility for reducing Covid-19 cases, perceived responsibility of politicians for reducing Covid-19 cases, and perceived behavioral impact on Covid-19 were associated with Covid-19 anxiety. There were no significant correlations between Covid-19 anxiety and those variables (see Table 2). Exposure to media regarding Covid-19 on the other hand showed a weak positive association with Covid-19 anxiety (see Table 2).

The same analysis was conducted for variables regarding climate change. Results revealed a weak positive correlation between climate anxiety and perceived own responsibility to reduce climate change (see Table 2). There was no significant correlation between climate anxiety and perceived behavioral impact regarding climate change (see Table 2). Climate anxiety correlated weakly positive with perceived responsibility of politicians to reduce climate change (see Table 2). Exposing oneself to media regarding climate change also showed a weak positive association with climate anxiety (see Table 2).

Discussion

Until now, few studies have investigated anxiety as a psychological reaction to both Covid-19 and climate change. Furthermore, there is a lack of comparisons between the two types of anxiety as well as their relation with each other. The aim of the present study was to further investigate the two concepts of Covid-19 anxiety and climate anxiety and their association with each other. Furthermore, there was an investigation of their relationship with LoC as well as perceived responsibility and media exposure.

First main hypothesis (H1)

As expected, Covid-19 anxiety and climate anxiety showed a positive association with each other in this study. This supports prior theoretical findings indicating that people experiencing one type of anxiety also are more prone to showing other types of anxiety (Beesdo et al., 2010). Since the two crises Covid-19 and climate change happen simultaneously and are also present in political discussions at the same time (Baldwin & English, 2020; Government Offices of Sweden, 2020; United Nations, n.d.), this finding shows that there is a tendency for the same group of people to report both types of anxiety at the same time.

Second main hypothesis (H2)

The second main hypothesis (H2) focused on a country comparison regarding Covid-19 anxiety. It was expected that participants living in Germany would report higher Covid-19 anxiety than participants living in Sweden. Since some studies suggest that people's anxiety intensifies during strict measures against Covid-19 such as lockdowns (Díaz-Jiménez et al., 2020), it was expected that people in Germany score higher than people in Sweden when it comes to Covid-19 anxiety due to the light lockdown in Germany (Deutschland.de, 2021), and absence of lockdown in Sweden. The results of the study at hand were in line with this expectation. In order to find out whether this effect only applies to Covid-19 anxiety or also other types of anxiety, there was a country comparison in regard to climate anxiety as well. Since this comparison also revealed higher climate anxiety among participants in Germany, it

could be possible that the high levels of anxiety during strict Covid-19 measures such as lockdowns is not limited to Covid-19 anxiety. One possible explanation for this difference regarding climate anxiety may be that the measures against Covid-19 in Germany might have affected other types of anxiety negatively as well. This possibility is supported by the fact that the study by Díaz-Jiménez et al. (2020) measured a general form of anxiety and not specific Covid-19 related anxiety and still found a significant increase of this anxiety during lockdown. Another possible explanation might be that climate anxiety was generally higher in Germany due to other factors than the Covid-19 lockdown light. Germany and Sweden might also differ systematically regarding other variables than the ones measured in the current study which might lead to climate anxiety being higher in the sample living in Germany than in the sample living in Sweden.

Third main hypothesis (H3)

The third main hypothesis investigated the association between both Covid-19 anxiety and climate anxiety with LoC. The negative association between Covid-19 anxiety and internal LoC is in line with the theory regarding LoC that people who feel an internal control over situations in their lives feel less anxiety (Hoehn-Saric & McLeod, 1985; Kohli et al., 2011). Regarding external LoC, the finding that powerful others LoC was positively associated with Covid-19 anxiety also fits to the prior findings regarding LoC stating that people with a rather external LoC show more anxiety (Hoehn-Saric & McLeod, 1985). In the current study it was found that powerful others LoC was associated with Covid-19 anxiety while there was no significant association between chance LoC and Covid-19 anxiety. This might be explained by the special role played by powerful others such as politicians when it comes to combating the Covid-19 pandemic. The governments of Germany and Sweden make decisions about Covid-19 restrictions (e.g., Bundesregierung 2021a; Regeringskansliet, 2021) which puts the politicians in the powerful position to be the ones to decide how the country is dealing with this threat. This might lead to people feeling like Covid-19 is a threat which is controlled by powerful others rather than chance since the restrictions are not just happening by chance but are made and controlled by people in power. People who feel that their lives are controlled by powerful others might therefore feel higher Covid-19 anxiety since powerful others make important pandemic-related decisions. This is supported by a finding from the

explorative part of this study. The finding that powerful others LoC was positively associated with perceiving politicians responsible for solving Covid-19 underlines the special role politicians play regarding Covid-19 when it comes to powerful others. Generally, Covid-19 is not a threat which one can combat alone. Other people in society might play an important role as well since everyone has to take precautions to protect each other in order for everyone to be safe (WHO, 2021). The finding that powerful others LoC was positively associated with perceiving politicians responsible for reducing Covid-19 cases and climate change is consistent with the finding that for internal LoC, there was an association with perceived own responsibility for reducing climate change and Covid-19 cases.

In the current study, climate anxiety and Covid-19 anxiety differed regarding their association with internal LoC since climate anxiety was not associated with internal LoC. This might be explained by a possible difference in feedback for measures taken against both crises. For Covid-19 anxiety there are very specific indications regarding Covid-19 given by governments (e.g., Bundesregierung, 2020a) which might give people a certain feeling of control over the situation since they are supplemented by regular feedback on how well they worked (e.g., Bundesregierung 2020a). When it comes to climate change, there are many different suggestions on what to do such as to fly less (Arguedaz Ortiz, 2018) which the media on the other hand portrays it like what is done is not enough, especially regarding countries' politics (e.g., Endres, 2021), which might be the reason why people might feel anxious about climate change even if the feel like they are in control of their lives in general.

Climate anxiety was positively associated with both powerful others LoC and chance LoC which further is in line with the theory regarding LoC suggesting that a rather external LoC is generally associated with higher levels of anxiety (Hoehn-Saric & McLeod, 1985). This finding indicates that people who attribute things happening in their lives externally also feel more climate anxiety. The role of politicians for combating climate change was supported by the explorative finding that powerful others LoC and perceived responsibility for politicians to solve climate change were positively associated. This can be seen as another similarity between Covid-19 anxiety and climate anxiety. As mentioned earlier, powerful others make important decisions regarding the combat of both crises such as Covid-19 restrictions or whether to join the Paris agreement against climate change (e.g., Bundesregierung, 2021a; Regeringskansliet, 2021; United Nations, n.d.), which can be an explanation for why both types of anxiety are associated with powerful others LoC. The

finding that chance LoC is only associated with climate anxiety supports the possibility mentioned in context with internal LoC that people might perceive climate change as threat whose development is to some degree up to chance and hard to be controlled. This, again, might be caused by the problem that the suggested measures against climate change are at the same time portrayed as not enough by the media like for example German newspaper *Die Zeit* (Endres, 2021).

Explorative analysis

The explorative part of this study had the purpose to both support the discussion of the main hypotheses and to further explore Covid-19 anxiety and climate anxiety. Additionally, it was aimed to investigate further variables which might be characteristic to either low- or high-anxiety groups for Covid-19 anxiety and climate anxiety.

Anxiety Groups

This study generally aimed at identifying characteristics of people being at either high or low risk for developing Covid-19 anxiety and climate anxiety. The double low-anxiety group consisted of 25 out of 127 participants, which shows that there is a considerable number of people, approximately one out of five, who reported very low or no degree of both Covid-19 and climate anxiety. Since according to previous research, a certain degree of anxiety is important for being motivated to take actions against a threat (Kowalski, 2000; Clayton & Karazsia, 2020), this finding indicates that there is a high number of people who seemingly lack this moderate degree of anxiety. This is supported by the descriptive finding that everyone in the first quartile of Covid-19 anxiety did not report any Covid-19 anxiety at all. Also, the mode for Covid-19 anxiety was at zero which means that the most commonly reported degree of Covid-19 anxiety was not having any Covid-19 anxiety. Climate anxiety also showed a rather low mode and median in this study.

On the other side of the spectrum there were 11 people in the double high-anxiety group who scored high on both Covid-19 anxiety and climate anxiety. As suggested in the

literature, a very strong anxiety reaction to a threat can be maladaptive (Kowalski, 2000). Since both median and mode were very low on Covid-19 anxiety and climate anxiety in this sample, the double high-anxiety group stands out with comparably high degrees of both types of anxiety. This finding in combination with the general positive correlation between Covid-19 anxiety and climate anxiety supports the hypothesis that people who report high levels one type of anxiety might also report a comparably strong degree of the other type of anxiety.

Gender

The finding that female participants reported higher levels of Covid-19 anxiety as well as climate anxiety than male participants is in line with the general theory behind anxiety stating that women are more likely to develop anxiety (Regier et al., 1990; McLean et al., 2011). Furthermore, the findings also support prior more specific research regarding Covid-19 anxiety stating that women are more likely to show higher levels of Covid-19 anxiety than men (Maaravi & Heller, 2020; C. Wang et al., 2020). Those results identify gender as another variable on which Covid-19 anxiety and climate anxiety have a similarity. This supports the assumption of those two types of anxiety being prevalent in the same groups of people, in case of this variable gender wise.

Age

Another variable of interest in the explorative analysis part of this study was age. Regarding climate anxiety, prior findings suggest that younger people were more prone to climate anxiety than older people (Clayton & Karazsia, 2020). In the present study, there was no association found between age and climate anxiety. A possible explanation is that the convenience sample might have included a larger number of people of all age groups interested in climate change. This may be because the study was shared on the author's social media sites where the author is active in climate activism and has social media contacts with similar interests. Since there is prior research which revealed an association between climate anxiety and the willingness to take action against climate change (Reser et al., 2012, as cited

in Clayton, 2020), it might be that people who are active in climate activism have increased levels of climate anxiety independent of age.

That this study's results furthermore did not obtain a significant association between Covid-19 anxiety and age might have been influenced by the poor reliability of the Coronavirus Anxiety Scale. Despite the Covid-19 generally being a higher risk for older people (WHO, 2021), prior studies found that younger people were more likely to develop anxiety related to Covid-19 (Carson et al., 2020; Varma et al., 2021). Another possible explanation to why there was no association with age obtained in this study may be that young and old people may be afraid of different things. Since this study only investigates Covid-19 anxiety in general and did not ask for the reasons why people were worried about Covid-19, it is possible that there were different underlying factors for anxiety in younger and older people in this sample which were missed. A possible example for this may be a difference in personality in the participants in this particular study. Since the sample was a convenience sample, it might not represent the population well and might have caused biases in the results. Since there is a general association between personality and anxiety, stating negative correlations with extraversion and positive correlations with neuroticism (Kaplan et al., 2015), personality and the spread of personality traits among the age groups may have been a potential underlying factor for anxiety in the different age groups.

Explorative variables

The last part of the exploratory analysis focused on investigating how the explorative variables used in this study were associated with Covid-19 anxiety and climate anxiety. This was done in order to contribute to identifying characteristics of high and low anxiety-groups. The finding that neither perceived behavioral impact, perceived own responsibility, nor perceived politician's responsibility for reducing Covid-19 showed a significant association with Covid-19 anxiety might be caused by the Coronavirus anxiety scale's poor reliability.

Since Covid-19 anxiety and climate anxiety both showed positive associations with media exposure to the specific crisis, exposing oneself to much media regarding Covid-19 and climate change, respectively, may be a characteristic of people with high crisis specific

anxiety. In similarity with the people with high anxiety, exposing oneself to little crisis-specific media might be characteristic for the people with low Covid-19 anxiety and climate anxiety.

For climate anxiety, the result that participants who reported higher climate anxiety perceived themselves as more responsible for reducing climate change is in line with prior research findings stating that perceiving oneself as highly responsible for certain things is associated with different types of anxiety (Sugiura, & Fisak, 2019). In general, there seemed to be associations between climate anxiety and responsibility since perceiving politicians responsible for solving climate change was associated with climate anxiety as well. Another similarity between Covid-19 anxiety and climate anxiety in relation to perceived responsibility in the current study was that people had very similar attribution patterns regarding both crises. If discussed considering Sigiura and Fisak's (2019) finding that increased feelings of responsibility are associated with different forms of anxiety, those findings support the hypothesis that there might be similar traits behind a proneness to Covid-19 anxiety and climate anxiety.

Limitations

Sample specific limitations

One major limitation in this study is the use of a convenience sample. With a convenience sample, it is not known how well the sample represents the population. Because of that, generalizability of the study's results might be limited. Since this study's author spread the study online through social media, the group of people was limited to social groups the author is in contact with. Due to that, it is unlikely that the sample represents the entire population. Only 40 of the 127 participants were residents of Sweden while 87 were living in Germany. It would have been more ideal to compare groups with more balanced numbers of participants. The same can be applied to the gender since only 46 of the participants were male in comparison to 81 female participants. Also, in this convenience sample, the demographic information collected was limited to a necessary minimum only including age, gender and country of residence in order to not make it possible to identify the participants.

Another consequence of the use of a convenience sample is that all participants were living in Germany and Sweden. Since there are differences regarding the degree to which countries suffer from direct consequences of climate change (European Commission, n.d.), this study's results might not be generalizable to all countries. As proposed by Reser and Swim (2011), media representations play a big role in the development of anxiety in people who are not directly confronted with threats through climate change. There might be differences in climate anxiety between countries directly confronted with climate change in their physical environment and countries confronted with climate change mainly through the media. This is not taken into regard in this study.

Methodological limitations

A limitation regarding scales used in this study is the poor reliability of the Coronavirus Anxiety Scale obtained in this study. The scale's poor reliability might be the cause for many of the analyses regarding Coronavirus anxiety not becoming significant even though similar analyses had become significant in prior studies. An example is the Mann-Whitney U-test searching for a difference between age-groups in regard to Covid-19 which was close to significance. It might be that the reason for the test not becoming significant was the poor reliability of the Coronavirus Anxiety Scale. Also, the powerful others LoC scale and chance LoC scale showed questionable reliability. Results regarding those should be viewed with caution as well. Furthermore, the additional items used in this study were written by the study's author for the purpose of this specific study and are therefore not validated. It is questionable whether they can be trusted to measure what they imply to measure.

An additional limitation regarding this study's methods is the decision for non-parametric tests due to non-normally distributed data with outliers on a high number of variables. The decision for non-parametric tests was done due to the fact that a transformation of all the variables would have aimed at reducing the skewness and impact of outliers (Tabachnick & Fidell, 2013) despite those characteristics being one of the main interests of this study. Since one of the main goals of this study was to identify characteristics of groups with very low or very high scores on specific variables, it would have been against the purpose of this study to remove the impact of the way the data was distributed. The non-

parametric approach chosen in this study limited the statistical methods to group comparisons and correlations. Regression analyses in order to find out to which extend variables in this study were capable of predicting each other could not be conducted.

Another methodological limitation is that the study was cross-sectional which does not allow for causal interpretation of the results. Furthermore, another weakness of this study is that there were no items controlling for social desirability.

Implications

Based on this study's findings, a set of implications can be derived. In the following, those implications are divided into implications for research and practical implications for both psychological practice and dealing with the crises Covid-19 and climate change in society.

Implications for research

Covid-19 anxiety and climate anxiety correlated in this study and also showed a high number of similarities. This can be used as an implication for future clinical studies investigating whether strategies to help people with either high Covid-19 anxiety or climate anxiety also help against the other type of anxiety, respectively. In this context, it would also be interesting for future research to compare anxiety related to Covid-19 and climate change with anxiety related to other previous crises like for example the cold war or financial crises. If there are many similarities, it might be beneficial to apply mental health strategies developed for those previous crises to the current ones. Furthermore, in order to make the findings regarding the relationship between Covid-19 anxiety and climate anxiety more generalizable, they should be compared in a sample which is confronted with stronger direct effects of climate change due to geographic location as well.

Another implication for future research is to find out whether Covid-19 anxiety and climate anxiety can be predicted based on for example trait anxiety. Since both types of anxiety correlated in the sample used in this study and generally showed many similarities, it

may be possible that there is an underlying anxiety trait. Especially since anxiety reactions to prior crises already have been connected to trait anxiety, like for example the fear of nuclear war (Poikolainen et al., 2004), it would be interesting to find out whether one of the factors which lay behind people being prone to both Covid-19 and climate anxiety might be trait anxiety. It may be that people with increased trait anxiety react with increased crisis specific anxiety to any form of societal crisis, independently from the source of the crisis. In order to find this out, different forms of crisis related anxiety, including Covid-19 anxiety and climate anxiety, should be investigated regarding their relationship with each other as well as trait anxiety. This way, it can be analyzed whether societal crisis specific types of anxiety generally correlate with trait anxiety. In this context, it should also be tested whether Covid-19 anxiety and climate anxiety correlate more with trait anxiety or state anxiety to strengthen the assumption of an underlying anxiety trait as risk factor for Covid-19 anxiety and climate anxiety. This might be done in form of a hierarchical regression analysis testing if trait anxiety predicts Covid-19 and climate anxiety better than state anxiety and for example gender, country of residence or LoC.

Despite showing excellent reliability in Lee et al.'s (2020) validation study, the Coronavirus anxiety scale showed poor reliability in the current study. This is why the results obtained must be viewed as questionable. More research using scales measuring Covid-19 anxiety that show better reliability in the actual study can be beneficial for investigating the relation between Covid-19 anxiety, climate anxiety and LoC as well as the explorative variables used in this study in a more reliable way. This can be helpful to figure out whether this study's results were obtained due to bad reliability or because the relationships between the variables are as the study findings imply.

This study revealed that there was a relatively large number of people who scored low on Covid-19 anxiety and climate anxiety including some people who did not report any anxiety at all. Since, as discussed prior, a certain degree of anxiety is necessary for being motivated to react in an adaptive way to a threat (Clayton & Karazsia, 2020; Kowalski, 2000; Reser et al., 2012, as cited in Clayton, 2020), for future research it would be of interest to investigate to which degree people with no to low anxiety perform actions combating Covid-19 respective climate change. This knowledge can support the selection of measures to motivate society for taking action against the crises at hand and indicate which groups of people to address with measures. In case future research shows low motivation for crisis

combating action among the low anxiety group, the next aim should be to find out how to effectively address them in order to motivate them to act against climate change and Covid-19.

When it comes to LoC, this study's results imply that people with higher internal LoC also tend to show less Covid-19 anxiety. For psychological practice, this finding could suggest strengthening internal LoC in patients with high Covid-19 anxiety. Still, it is important to keep in mind that this finding was based on a correlation analysis which only reveals that low Covid-19 anxiety and high internal LoC tended to be found in the same participants and does not imply causality. In order to find out whether strengthening a person's internal LoC decreases climate anxiety, longitudinal clinical studies with experimental design are needed.

Practical implications

Groups with high anxiety may need special support in order to deal with their anxiety. Since the fact that people who scored high on one of the two types of anxiety Covid-19 anxiety and climate anxiety also had the tendency to score high on the other, people turning to health care services due to problems with either Covid-19 or climate anxiety should also be asked whether they are anxious about the other crisis situation too. It may also be beneficial to ask patients for their amount of media consumption regarding the two crises and the degree to which they feel responsible for solving the crises since those were variables associated with Covid-19 and climate anxiety in this study.

When it comes to the other side of the spectrum, meaning people with low or no anxiety, an important question when it comes to societal crisis situations can be who to address with information regarding how to battle the crisis at hand. Since a certain degree of anxiety can cause people to act in a way which helps solving a crisis (Kowalski, 2000; Lee, 2020), people with low anxiety might need other sources of motivation to contribute optimally to solving a crisis. In this study, people in Sweden reported lower Covid-19 anxiety than people living in Germany. Also, men reported lower Covid-19 anxiety and climate anxiety than women. It might be beneficial to put special efforts into addressing the groups

with lower anxiety with information about the crises in order to motivate them to show crisis-combating behaviors to compensate for potential anxiety-activated motivation. However, before such attempts are made, there is need for future studies investigating whether there is an actual behavioral difference between high- and low anxiety groups in how they contribute to solving the crises Covid-19 and climate change.

Conclusion

The aims of this study were to both investigate the associations between Covid-19 anxiety, climate anxiety and LoC and to identify groups with low and high anxiety respectively regarding both crises. This study was able to deliver a basic understanding regarding the associations and similarities between Covid-19 and climate anxiety. People who scored high on either Covid-19 anxiety or climate anxiety tended to also score high on the other and the two types of anxiety showed similarities in regard to gender, country of residence, powerful others LoC, medial exposure and attribution of responsibility for solving the crises. However, those results should be treated with caution due to the poor reliability of the Coronavirus anxiety scale and questionable reliability of the powerful others LoC and chance LoC scales in this particular study and future research strengthening the results obtained is recommended. Due to the similarity of both crises and their association with each other, a variable of special importance which should be investigated in relation to Covid-19 anxiety and climate anxiety is trait anxiety. When it comes to groups with high Covid-19 anxiety and climate anxiety, this study found that people living in Germany, women, people with rather external LoC, and people who expose themselves to media regarding the crises reported higher anxiety. This study failed to obtain an association between age and both Covid-19 and climate anxiety. In future studies, it should be investigated to which extent all those variables can predict Covid-19 anxiety and climate anxiety. A better understanding of the relation between Covid-19 anxiety and climate anxiety and the variables influencing them can be beneficial for handling people's psychological reactions to the double crises as well as working on an effective way to address people with measures regarding the crises and make them aware of the importance of counteracting both, Covid-19 and climate change.

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Appendix

Appendix A

Additional Items

1. Under the course of the last two weeks: How often did you follow the news regarding Covid-19 in the media?

2. Under the course of the last two weeks: How often did you follow the news regarding climate change in the media?

Scale item 1 and 2: never - almost never- sometimes - often - almost always

3. With my choice of behavior, I can contribute to reducing climate change.

4. With my choice of behavior, I can contribute to reducing the number of Covid-19 cases.

5. Politicians have the responsibility to reduce climate change.

6. Politicians have the responsibility to reduce the number of Covid-19 cases.

7. People like me, as part of society, have the responsibility to reduce climate change.

8. People like me, as part of society, have the responsibility to reduce case numbers of Covid-19.

Scale item 3 to 8: do not agree at all – do not agree – agree partly – agree – agree completely

9. Gender

Possible answers: female – male – other

10. Age
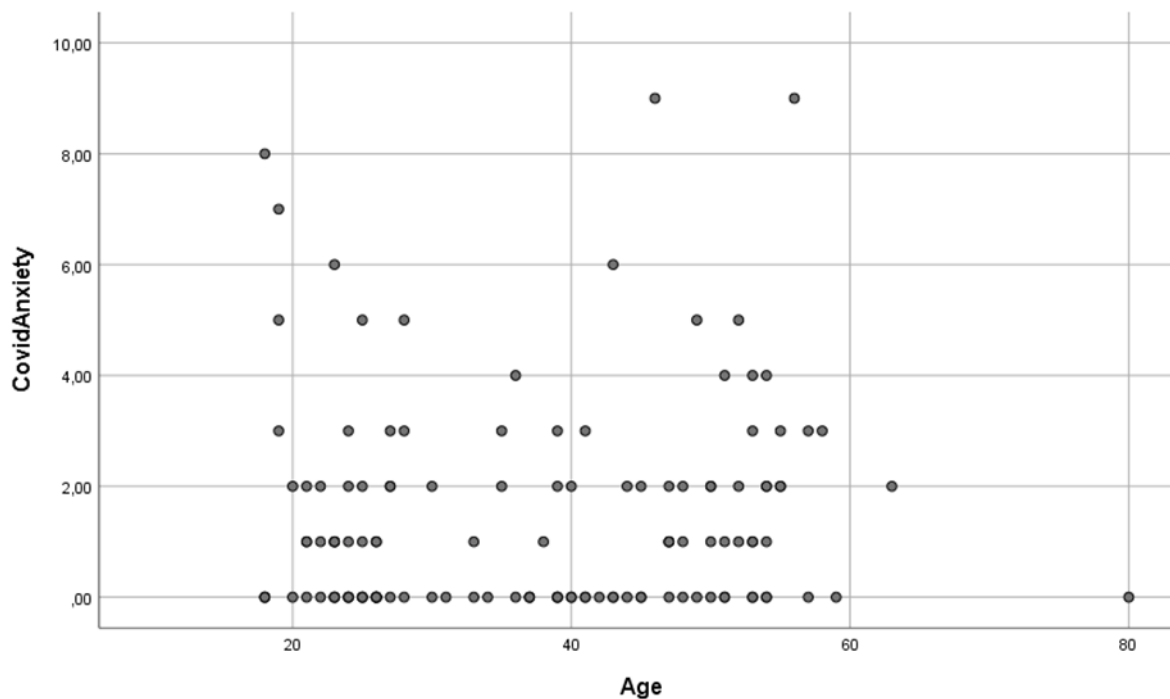
Answer: number

11. Country of residence

Possible answers: Germany – Sweden

Appendix B

Figures

Figure 1

Correlation Covid-19 Anxiety and Age (N=127)

Figure 2

Correlation Climate Anxiety and Age (N=127)