

**Scrolling Through the Climate Crisis: Exploring the Impact of Climate Change Related
Doomscrolling on Helplessness and Depression**

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Abstract

Background: Climate change (CC) and excessive news consumption, like doomscrolling, have been linked to mental health issues such as helplessness and depression (HD). Doomscrolling is the excessive and obsessive consumption of negative news. Perceived social support has been deemed an important factor in both relationships. The present study integrates these findings and investigates the impact of doomscrolling on mental health in the context of climate while assessing the role of social support.

Methods: The study uses an exploratory sequential mixed method research design. In the first phase, 15 people were interviewed, and their responses were analysed using thematic analysis to develop a questionnaire as a measurement instrument for CC doomscrolling ($\alpha = .75$). In the second phase, 130 people completed an online survey containing the questionnaire from the first phase and questionnaires for doomscrolling, resilience for HD, and perceived social support.

Results: Participants with higher levels of doomscrolling showed lower resilience to helplessness and depression. Furthermore, a moderation analysis revealed that CC doomscrolling and perceived social support did not significantly moderate the effect of doomscrolling on resilience to helplessness and depression. A post hoc analysis also did not reveal moderation of social support on the effect of CC doomscrolling on resilience to helplessness and depression.

Conclusion: The present research provides a measurement instrument to assess levels of doomscrolling in the context of CC. The statistical analysis findings did not suggest a role of social support in the relationship between doomscrolling and helplessness, and depression. Further research is needed to improve and validate the measurement instrument and to confirm the findings on perceived social support.

Keywords: doomscrolling, climate change, news consumption, social support, mental health, helplessness, depression, mixed methods, exploratory study.

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Scrolling Through the Climate Crisis: Exploring the Impact of Climate Change Related Doomscrolling on Helplessness and Depression

Climate change has been described as one of the biggest global problems of the 21st century. According to the Intergovernmental Panel on Climate (2022), climate-related catastrophes increase in frequency, adversely impacting the ecosystem, people, and infrastructure. The World Health Organization (n.d.) describes climate change as the “single biggest threat to health.” Both organizations urge governments to act and mitigate the impact of climate change. Due to its threat, climate change became part of the public discourse in the mid-to-late 1980s and has changed from the publication of scientific findings to a pervasive topic in media (Moser, 2010).

These warnings are reflected in the emotional response of most people. In 2022, more than 70% of respondents of a worldwide survey believed climate change would severely impact their environment and life (Ipsos, 2022). Although climate change is seen as a threat, people often do not engage actively in climate protection since they feel helpless (Salomon et al., 2017). The negative emotional response towards climate change has been studied increasingly in recent years, and specific reactions to climate change have been discovered. For instance, “eco-anxiety”, which describes “anxiety or worry they felt about climate change and its effects” (Clayton, 2020, p. 3) as well as “ecological grief”, “eco-guilt”, and “solastalgia” (Ágoston et al., 2022; Albrecht et al., 2007). However, there are numerous other adverse effects of climate change linked to mental health. The effects of climate change on mental health range from minor stress to clinical disorders. The clinical disorders associated with climate change are depression, posttraumatic stress disorder (PTSD), suicidal ideation, and substance abuse in response to climate change-related events (Cianconi et al., 2020).

Psychological research found several factors influencing how individuals cope with environmental stress that triggers mental health issues. Factors associated with coping are economic recourses, personality and knowing and being prepared for a disaster beforehand (Bonanno et al., 2010). Besides individual approaches to coping, like emotional regulation (Folkman & Moskowitz, 2004), the social aspect is also considered important. For instance, Bonanno and colleagues (2010) highlight the importance of social support when coping with environmental stressors.

Another aspect of climate change-related mental health issues is consuming negative climate change news. Cianconi and colleagues (2020) suggest that besides the immediate impact of extreme climate events or long-term environmental changes due to climate change

on mental health, being exposed to climate change news causes uncertainty, stress, depression, and feelings of powerlessness. Thus, constant exposure to climate-related news is associated with adverse impacts on mental health and a reduction in the quality of life of individuals.

Doomscrolling and Mental Health

The question to which degree news consumption impacts individuals' psyche has occupied researchers for decades. A meta-analysis by Rubin (1983) investigates the viewing patterns and motivations of people watching TV and raises questions about the potential psychological consequences for individuals. Recent studies on the impact of negative news consumed through TV suggest a correlation between consuming negative news and declining mental well-being (Boukes & Vliegenthart, 2017; Villi et al., 2021). Research investigating excessive news consumption in the digital space (Diddi & LaRose, 2006) suggests evidence that online news addiction is predicted by low interpersonal trust, future anxiety, and fear of missing out (Shabahang et al., 2021).

Building on the idea of excessive news consumption and its negative impact on mental health, the newly coined phenomenon of *doomscrolling* started to interest researchers. Doomscrolling is the repetitive and compulsive behaviour of continually scrolling through negative or distressing news content, including social media and online news websites (Satici et al., 2022; Sharma et al., 2022). However, it can also be compared to 24/7 TV news coverage (Ytre-Arne & Moe, 2021). Thus, the present study continues to investigate the long-established ideas of excessive and habitual news consumption and its impact on the psyche while putting it in the context of the digital age. Due to its similarities to decade old research, doomscrolling might be therefore a new term for a long existing phenomenon in psychological research.

Reasons for doomscrolling vary. Firstly, uncertainty about situations leads to uncomfortable and uncontrollable thoughts. These thoughts may incline a behaviour to get all the facts about an event for self-protection, to gain feelings of control and to ease the thoughts by constantly checking new information (Satici et al., 2022). Secondly, platforms are aware of the behaviour of the users due to their algorithms and serve them with content to increase their profit (Satici et al., 2022). Moreover, research has found a positive relationship between the personality trait neuroticism and doomscrolling (Sharma et al., 2022).

Doomscrolling is associated with different adverse effects on mental health and behaviour. Satici and colleagues (2022) suggest that doomscrolling is related to lower well-being, life satisfaction and harmony in life. Furthermore, Ytre-Arne and Moe (2021) suggest a link between doomscrolling and news avoidance. According to the study, news avoidance is a response to the overload of information and emotional distress caused by doomscrolling. Thus,

news avoidance may be a form of coping with doomscrolling. Doomscrolling can also be understood as the opposite of complete or selective news avoidance, which has increased recently, according to Reuters (Newman et al., 2022).

Perceived Social Support and Doomscrolling

As most recent research on doomscrolling was conducted during the COVID-19 pandemic, the research has several limitations. Ytre-Arne and Moe (2021) identify the exceptional circumstances arising from COVID-19 measures, which disrupted regular working hours and hindered the ability to engage in typical daily activities. Sharma and colleagues (2022) also suggest that the research is limited due to the unique circumstances of the COVID-19 measurements and point out, besides possible cultural differences, that doomscrolling may be conditioned by social distancing. Both articles suggest that the results of doomscrolling may be distorted by the unique social conditions due to the COVID-19 measurements.

Perceived social support refers to providing others with aid or comfort to assist them in coping with physical, mental, or social stressors. Such assistance can come from any individual within an individual's social network, including family, friends, neighbours, religious institutions, colleagues, caregivers, or support groups. Support can take various forms, such as practical aid like completing tasks and offering advice, direct material support such as financial assistance, or emotional support, which fosters feelings of being esteemed, accepted, and empathized with (American Psychological Association, n.d.). However, perceived social support also involves the perception of having such support available if needed (Taylor, 2011).

Isolation and the accompanying lack of social support for individuals have been linked with a decline in mental health even before the COVID-19 pandemic (Reynolds et al., 2008). There has also been research that suggests a link between loneliness and increased media consumption (Canary & Spitzberg, 1993) and problematic social media consumption (Cauberghe et al., 2021; O'Day & Heimberg, 2021).

Perceived Social Support and Mental Health

Perceived social support has been deemed an important factor when regarding mental health. Studies investigating the well-being of children and adolescents found that high levels of social support are associated with high levels of well-being (Chu et al., 2010). Furthermore, Harandi and colleagues' (2017) findings suggest that social support from family and friends increases the feeling of security, lowering anxiety. Multiple studies investigated whether there is a moderation effect of perceived social support on the impact of stress on mental health with contradicting results (Chao, 2012; Rodriguez et al., 2003 as cited in; Shelton et al., 2017).

Furthermore, perceived social support is also linked to depression and learned helplessness. Harandi and colleagues' findings indicate a link between social support and good communication skills, which in turn can prevent depression. These findings are confirmed by research conducted with college students who felt little social support. They were more likely to report mental health problems, such as depression symptoms (Hefner & Eisenberg, 2009). Furthermore, several studies investigating learned helplessness in the context of physical illness have found that perceived social support is a moderating factor (Cicero et al., 2009; Smallheer & Dietrich, 2019). Thus, existing literature suggests that social support is an important factor when investigating changes in mental health.

Overview of the Research

As presented above, previous research has linked helplessness and depression (HD) to doomscrolling and climate change, while perceived social support has been associated as a moderating factor in dealing with distress caused by climate change. However, previous research on doomscrolling and its impact on mental health has been limited due to COVID-19 measurements and has not addressed climate change or examined the role of social support. Thus, the present research aims to provide insights into how doomscrolling in the context of climate change could affect HD and what role social support plays. While previous research has made substantial progress in increasing the understanding of the impact of doomscrolling and climate change news consumption on HD, research which integrates both is needed to gain an understanding of how doomscrolling manifests in the context of climate change news consumption and what impact it has on individuals. Furthermore, understanding the role of perceived social support on the impact of doomscrolling is required to understand the phenomenon of doomscrolling further. The research might offer more insights into already existing research that showed the negative impact of climate change news consumption on HD.

Since there is no research on climate change related to doomscrolling, to the researchers' best knowledge, there is a lack of measurement instruments for doomscrolling in the context of climate change. Therefore, a sequential exploratory mixed methods design was used for this study. This study design enables the researcher to develop a quantitative measurement instrument based on qualitative research to answer the hypotheses (Creswell & Clark, 2017). The two-phase design began with an exploratory interview study investigating the experiences regarding climate change doomscrolling and related behaviour. The interviews are analysed using thematic analysis due to their flexibility, usefulness in explorative research, and the possibility of analysing in a shorter time compared to other forms of analysis. After the

qualitative phase, quantitative data is collected through an online survey containing questions based on the interviews and subsequent analysis.

The research aimed to answer the following research question: *To what extent is perceived social support from family, friends, and colleagues, as well as climate change doomscrolling, related to the occurrence of doomscrolling and the adverse impact of doomscrolling on helplessness and depression?* The following hypotheses were formulated to answer the research question.

Hypothesis 1: Increasing levels of doomscrolling are associated with decreasing levels of resilience to helplessness and depression.

Hypothesis 2: Climate change-related negative news consumption moderates the relationship between doomscrolling and resilience to helplessness and depression.

Hypothesis 3: Perceived social support moderates the relationship between doomscrolling and helplessness and depression.

Study I: Qualitative Study

In this section, the first phase of the research will be discussed. The first phase consists of an interview study and the construction of a questionnaire. The section begins with a description of the methodology used and is followed by the results.

Methods

To provide precise and thorough reporting of the research, the qualitative phase of the study adheres to the *Consolidated Criteria for Reporting Qualitative Research (COREQ)* framework for reporting developed by Tong and colleagues (2007). An overview of the COREQ checklist and the corresponding implementations in the present paper with page numbers can be found in Appendix A. The study was submitted with the request number 230202 to the ethics committee of the BMS and was approved.

Research team and reflexivity

Personal Characteristics The interview was conducted by the author of the present bachelor thesis and three fellow bachelor students. Two of the interviewers were women, and two were men between the age of 23 and 25. Three of them were German, and one Dutch. The interviewers are all in their last semester of the B.Sc. program in psychology at the University of Twente. The interviewers have essential interviewing experience due to their study program, but there was no previous training for the specific interviews for the present research.

Relationship with Participants The participants were the researchers' family, friends, and acquaintances due to the use of convenience sampling. A social media campaign was used to find participants (see Appendix A). It was ensured that the interviewer did not know the

interviewee before the interview to avoid bias during the interviews. The participants took part with the knowledge that the interview is part of the bachelor thesis of the researcher and that the thesis investigates the impact of climate change-related news consumption and doomscrolling. The participants did not have extensive knowledge about the research, such as the research questions.

Study Design

Theoretical Framework The data were analysed using thematic analysis following Braun and Clarke (2006). The analysis aimed to explore the experience of climate change-related doomscrolling, motivations for consuming climate change-related news, and potential relationships with depression, helplessness, and social support. No predefined codes or themes were used in the analysis since there is no theory about climate change-related doomscrolling that can be built on. Instead, codes were created via an inductive approach while focusing on the semantic meaning of the interview data.

Participant Selection Participants were recruited between March 18, 2023, to March 28, 2023 through a combination of convenience and snowball sampling by distributing advertisement for the research (See Appendix A) on the social media platforms Facebook, LinkedIn, Reddit, Instagram, and WhatsApp. Initially, 18 participants were recruited, but three dropped out. One participant stopped to respond to emails, and two other participants dropped out because they did not find time to take part in the interview, which resulted in a final sample of 15 participants. Participants were eligible to take part in the study if they were 18 years or older, were living in Germany or the Netherlands, were not in treatment for a psychological disorder, and did not experience a climate change-related crisis. Prior to the interview, all participants signed a written consent form which the ethics committee of the University of Twente approved.

Setting

Participants were contacted via email to find an interview appointment. A written informed consent form was provided in the email, signed digitally by participants, and returned to the researchers. On the day of the interview, participants were invited to a video conference via an invitation link or called via phone. The researcher and participant attended the meeting from home without another person attending the call. The participants were informed about the interview procedure and reminded that participation is voluntary and that they can stop or withdraw at any time. Subsequently, the interview and the recording started. The final sample included 15 adults (men = 9, women = 6) between the age of 20 and 59, with a mean age of 35,6.

Data collection

The researchers created the questions used in the interviews in collaboration based on literature about climate change, doomscrolling depression, anxiety, helplessness, and social support for the study. The questionnaire includes items on anxiety since another student needed information about anxiety for their research. See Appendix A for an overview of the interview questions and the related literature. Due to time constraints, it was not feasible to conduct a pilot test. A pilot test could have contributed to detecting potential ambiguities in the questions. The interviews were semi-structured, which means that every researcher asked the questions in the same order, but sometimes questions were reworded or clarified if needed or asked follow-up-question. Furthermore, researchers used prompts such as rephrasing the participant's replies or vocal prompts to keep the conversation moving.

Every participant was interviewed only once with no repetition due to the limited time of the schedule for the bachelor thesis. Audio recordings of the interviews were saved, transcribed, and translated into English. Transcripts were not returned to participants for review. The researchers discussed experiences and ideas to improve interviews, and the question "Do you see a difference in generations?" was added as a possible follow-up question to question 8 (see Appendix A). Data saturation was not accounted for due to the time limits of the bachelor thesis. The interviews lasted between 14.47 and 44.29 minutes, with an average duration of 24.5 minutes.

Data Analysis

All interview transcripts were coded by the four researchers with ATLAS.ti Mac v23.1.1 (2023). The analysis aimed to explore the experience of climate change-related doomscrolling and its relationship with depression, helplessness, and social support of the participants. No predefined codes or themes were used since the thematic analysis was conducted inductively. After the coding was finished, themes were defined and reviewed collectively based on the extracted codes of each researcher. Due to limited time, no subsequent meetings took place with participants to discuss the findings. Subsequent meetings could have helped to ensure the accuracy of the researcher's interpretations. While the themes were created in collaboration with all four researchers, a coding tree (see Figure 1) was created based on each researcher's interpretation of the themes. Finally, based on the themes, questions were developed for the survey of the quantitative part of the study.

Results

The results consist of 13 themes of doomscrolling related to climate change news consumption and its relation to mental health (Table 1). The themes are listed from highest to

lowest frequency in this interview data, assigned with the primary codes used to develop the themes. Most participants reported negative emotions or coping behaviour that are evoked due to negative climate change-related news consumption. As Table 1 shows, the most prevalent themes in the interviews were paralysis (106), followed by individual responsibility (92), incidental and actively searched news (87) and media scepticism (82).

The following section describes the themes ordered according to the three broader themes. The prevalent codes in each theme will not be discussed in detail. Primary codes for each theme can be seen in Table 1. However, the relationship between the themes is presented in Figure 2. The participant number refers to participants. Interview extracts that revealed the personal information of participants were modified to ensure anonymity. The theme served as the basis for developing questions for the quantitative part of the analysis. The results section is concluded with further explanation for developing the 11 questions for the quantitative part of the thesis.

Table 1

Frequency Table of Codes for each Theme

Main Theme	Primary Codes	n
Paralysis	- Distressed	106
	- Individual action does not matter.	
	- Powerless	
	- Repression	
	- Sad	
	- Worried about future	
Individual responsibility	- Distress	92
	- Hope	
	- Individual climate action	
Incidental and actively searched news	- Active search for news	87
	- Indifference	
	- Indirect media consumption	
	- Interest in topic	
Media scepticism	- Anger	82
	- Hope	
	- Interest in topic	
	- Sensationalist Journalism	
Motivation: Optimism and pessimism	- Hope	80
	- Interest in topic	
	- Worried about future	
Threat	- Anger	73
	- Interest in topic	
	- Worried about future	
Need to stay informed	- Active search for news	69
	- Interest in topic	
	- Social reinforced	
	- Social reinforced	

Detachment	- Distress - News avoidance - Overwhelming - Powerless - Repression	66
Concern for others	- Anger - Hope - Sympathy for CC victims	58
Desensitization	- Indifference - Omnipresence - Repression	51
Personal involvement	- Connection to location - Connection to people affected by cc - Socially reinforced	38
Privilege	- Indifference - Lives in a location	30
Resentment towards system	- Anger - Political failure - Societal failure - Worried about future	127

Note. Frequency for each code for each participant can be seen in Appendix A

Paralysis

One effect reported by participants that might be rooted in similar sources as the detachment coping mechanism is paralysis. Participants stated that given the uncertainty around climate change, they feel that they are rendered powerless, as Participant 16 explains.

Participant 16: We probably won't have it so nice on earth for that long and then by... well, fifty, sixty [years], things will surely go down the drain and that's it, so... Yes, it's like [things] *happened* but... and it does, it makes you sad, but unfortunately you as an individual won't change anything about it.

Participant 16 explains how they believe that they expect that “things will [...] go down the drain,”—showing that the current climate change developments make them hopeless. At the end of the quote, they point out that they do not feel that an individual can change climate change from happening, which shows that they feel powerless. Participant 12 is more transparent in the formulation of their helplessness.

Participant 12: I can't really do anything about it makes me feel weird, some kind of helplessness. Maybe also worry but knowing that I can't really change anything would thus make me feel helpless.

Participant 12 points out that they do not have the feeling to stop climate change by individual actions, similar to Participant 16. They explain that they feel helpless. They

are paralyzed in their response and cannot deal with it. They tend to be less likely to engage with climate change news because they perceive it useless.

Individual Responsibility

Some participants who seemed to have significant concerns for climate change and are in peer groups that share their attitudes reported being informed about climate change and initiating individual climate-aware behaviours as an individual responsibility or obligation. For example, Participant 17 states the following when asked about their desire to be informed about climate change.

Participant 17: I've had some conversations about it [Climate Change], for example, and I noticed that I don't really know what's what at that moment. So, it's often with my sister, for example, because she's totally informed about it, or from my mother, and I then notice that I don't know what the latest report said right now, erm, that's mostly where it is coming from.

They state that they noticed in conversations with family members that they lack knowledge about new developments and events regarding climate change and started searching for news about the topic to close possible gaps in their knowledge. Also, Participant 10 reports feeling a responsibility to know about climate change.

Participant 10: "I watched it on Netflix for an hour and a half, no, and after that I didn't feel so good. But I think you just have to do that in order to see for yourself, what I can do on a small scale to change that. I probably can't make much of a difference on a large scale."

Participant 10 states that they consume educational media to know what they can do to combat climate change even though they "didn't feel so good" afterwards. Thus, feeling the responsibility to know about climate change could be an initiator for doomscrolling.

Incidental and Actively Searched News

Participants reported contradicting ways of news consumption and reasons. Climate Change news is either actively searched or consumed incidentally. The example of Participant 3 shows how climate change news can be incidentally consumed.

Participant 3: "the only thing I really notice on social media [regarding climate change news], because of those discovery pages on Instagram ... sometimes something like that is displayed and then I read something, but otherwise..."

In the example, Participant 3 states that the only way they consume climate change news is when they sometimes appear on their social media feed, and they might read it but do not go further in their consumer behaviour. This suggests that such behaviour is not associated with

doomscrolling. Some participants also suspected that it would negatively affect their mental health, which shows a negative association of climate change on mental health. The example of Participant 12 might give an outlook on how active media consumption manifests.

Participant 12: “I want to know if it is really that bad, so I look for more articles and different sources to see if I can confirm or reject my own thoughts and feelings about it.”

The participant describes that they are motivated to understand the phenomenon further after reading about climate change. They subsequently look deeper into the topic and go to different sources. Such behaviour might be related to doomscrolling.

Scepticism Towards Media

Participants often describe news on climate change as “sensationalist media coverage” and not giving a complete or wrong picture. This becomes clearer in the example of Participant 1.

Participant 1: Actually, I'm not sure if everything is 100% correct on the factual level. Now, 90% of all events are somehow caused by climate change, but the other 5% are also quickly consumed and dealt with in my understanding, and I'm not a geologist. But they are quickly dealt with as being caused by climate change, and perhaps not caused by our intervention in nature as humans, such as the way we build our rivers, which has nothing to do with the Ahrtal Valley.

Participant 1 states that they are suspicious and think the media is covering climate change events incorrectly, and they disagree with their assessments of climate change-related events. This gives an example of people that show scepticism toward the media. Furthermore, Participant 17 also believes that the media creates a false picture of climate change-related events.

Participant 17: “I have the feeling that the event is of course in the foreground, first of all. So, the flood or the earthquake, because there are a lot of human lives involved and a lot of their own little stories and that it's not like at first, well, *that's the result of climate change*. And then I think it depends a bit on which, well, which sources you read through, I think.”

They criticize that not all news institutions talk clearly about the cause of climate change-related events like floods. They point out that it depends on the source of the news.

Optimism and Pessimism as Motivation

Participants reported contradicting motivations for their news consumption as well. Some participants stated that their optimism for solutions to climate change was a driving factor for continuing consuming news about the topic. As the example of Participant 8 shows.

Participant 8: “If I hear about any projects that counteract this [Climate Change] or something like that, then I might dig a little deeper and see that I find out how, how big the whole thing really is now.”

Another participant explains how initiatives that counteract climate change motivate them to consume more climate-related news. However, others reported that they were pessimistic about climate change. The same participants mentioned that the problems of climate change are rooted in the organisation of politics and the economy, which will be discussed further in the theme *of resentment towards the system*. One example is the following snippet of the interview with Participant 12.

Participant 12: “I want to know if it is really that bad, so I look for more articles and different sources to see if I can confirm or reject my own thoughts and feelings about it.”

Participant 12 portrays that they have a negative view of climate change and want to see whether they are correct in their assessment. They seem pessimistic about the topic and want to assess whether they are correct and whether something gives a reason to be more optimistic.

Threat

Participants who perceive that the consequences of climate change pose a threat to them now or in the future are sometimes inclined to have an increased interest in climate change news to assess the scope of the threat, like in the example of Participant 12.

Participant 12: “I want to know if it is really that bad, so I look for more articles and different sources to see if I can confirm or reject my own thoughts and feelings about it.”

In the example, Participant 12 states to perceive the climate change news as something “bad” and wants to understand the phenomenon to a greater degree. The participant is starting to dig deeper, which may be an initiator for doomscrolling on climate change.

Need to Stay Informed

Some participants who are interested in climate change or report that their social environment is concerned with the phenomenon state that climate change motivates them to keep themselves informed. The participant describes a related situation.

Participant 17: I even watched a live stream of them while [YouTube Channel of Lützerath activists] I was studying, while I was studying for uni. Well, simply because I was so interested, it was just a live stream and I knew I couldn't look it up or anything, uh, right.

Participant 17 reports how they follow a live stream of an activist group that protests the clearing of a forest in Germany. They consume this live stream while studying for university, which may show doomscrolling-related behaviour. They state they are motivated because they are interested in how the events are developing and staying up to date.

Detachment

Participants reported that a form of coping with climate change-related news is detaching from the topic and news. In the example of Participant 16, they tell how they accept the current and try not to think about the topic.

Participant 16: "Acceptance and repression yes, well... I don't know... I accept it because I know that I can't do anything about it at the moment... It's just the way it is and then I have to deal with it."

Climate change is seen as something that cannot be changed from an individual level and therefore is something thought about, are avoided. This means that the topic of climate change and related news may also be actively avoided, as the example of Participant 3 shows:

Participant 3: "I stopped watching the news somehow. It's just for these reasons that there are only negative reports."

The example of Participant 3 shows that the topic of climate change is seen as something burdensome that affects them negatively participants. The participants described that they stopped consuming news to avoid those negative feelings.

Concern for Others

Some participants stated that their tendency to want to know more about climate change increases when there is a direct impact on people. It can be understood as an empathetic response towards those suffering from the immediate consequences of the climate crisis. Participant 2 gives an example.

Participant 2: And then the question also arises: Does it make sense to bring children into the world? How would you deal with the issue if you had to do something like that now? Yes, it's not easy. If I had to stand before the decision.

Participant 2 raises the question of whether one should get children because of climate change. They express concern for those children that come into a world affected by climate change but also show empathy to the people that potentially must make decisions. Another

example of concern for others can be seen when the participants talked about the flooding in Ahrtal, 2021. Some state that they were shocked by the extent of the crisis, pushing them to read more news.

Desensitization

Another phenomenon reported by participants that is a result of climate change news and has also affected consumption behaviour is desensitization. Climate change is described by participants as something ubiquitous, as the example of Participant 3 shows.

Participant 3: “There are always these main issues and one of them is climate change and then there are the current problems. I would say that climate change is now the main issue which is always present”.

Participant 3 describes climate change as the "main issue" that is omnipresent in the media. For example, Participant 2 states, "At the moment you can't really avoid the news." A high frequency of news about climate change seems to have a dulling effect on participants' interest in the topic. Due to the perceived omnipresence of climate change-related news and personally not being affected by climate change events, the topic decreases in perceived severity within the eyes of the participants. Participants reported that they are not interested in the topic or are not emotionally affected by climate change news. Thus, there were less likely to consume climate change news and doomscrolling when desensitized to the topic.

Personal Involvement

Another recurrent theme was that participants stated that their interest in climate change news increased when they had a personal relationship with people, they know in an affected area involved in a climate change-related event. For instance, Participant 11 described the following situation.

Participant 11: “Would [climate change] affect me personally for any reason. That it's happening regionally or that it's happening anywhere. We have friends in America, for example... if, there... if I read about someone there, for example a snowstorm or something similar, and I mean America is big, then of course I go deeper and ask myself where is that what's happening there right now and so forth? But there has to be a personal connection”.

The participant explains in their example that due to their friends in America, they are inclined to read more about climate change-related events, such as snowstorms that affected part of America. They close their statement by pointing out that it is essential to them that there is a personal connection to the event that occurs for them to show interest.

Privilege

Some participants stated they were not consuming climate change news since they were not personally affected by its consequences. The example of Participant 4 shows that they do not engage in climate change news consumption due to the privilege of not feeling affected by its consequences. They do not see the necessity to inform themselves about the topic and report to have limited knowledge about it.

Participant 4: “I don’t really care about the climate change, so I don’t check the news and therefore there aren’t really patterns. I just don’t really care; it does not really have an effect on me. I mean sometimes I do hear something about it, but then I think, well this group thinks that, and the other group thinks something different, and I don’t really waste energy on it also because I don’t really know anything about it, so I can’t really think something of it because my knowledge is limited. “

However, Participant 4, later in their interview, adds that they would have a different perspective on climate change and related news if they were affected by climate change.

Participant 4: “[If] I would be a person that feels influenced by climate change and negative media about it, I would probably feel really down by looking at the media, or maybe depressed.”

They show awareness of their privileged position and suspect that it would have negative consequences on their mental health if they lived in circumstances that were affected by climate change. However, Participant 4, later in their interview, adds that they would have a different perspective on climate change and related news if they were affected by climate change.

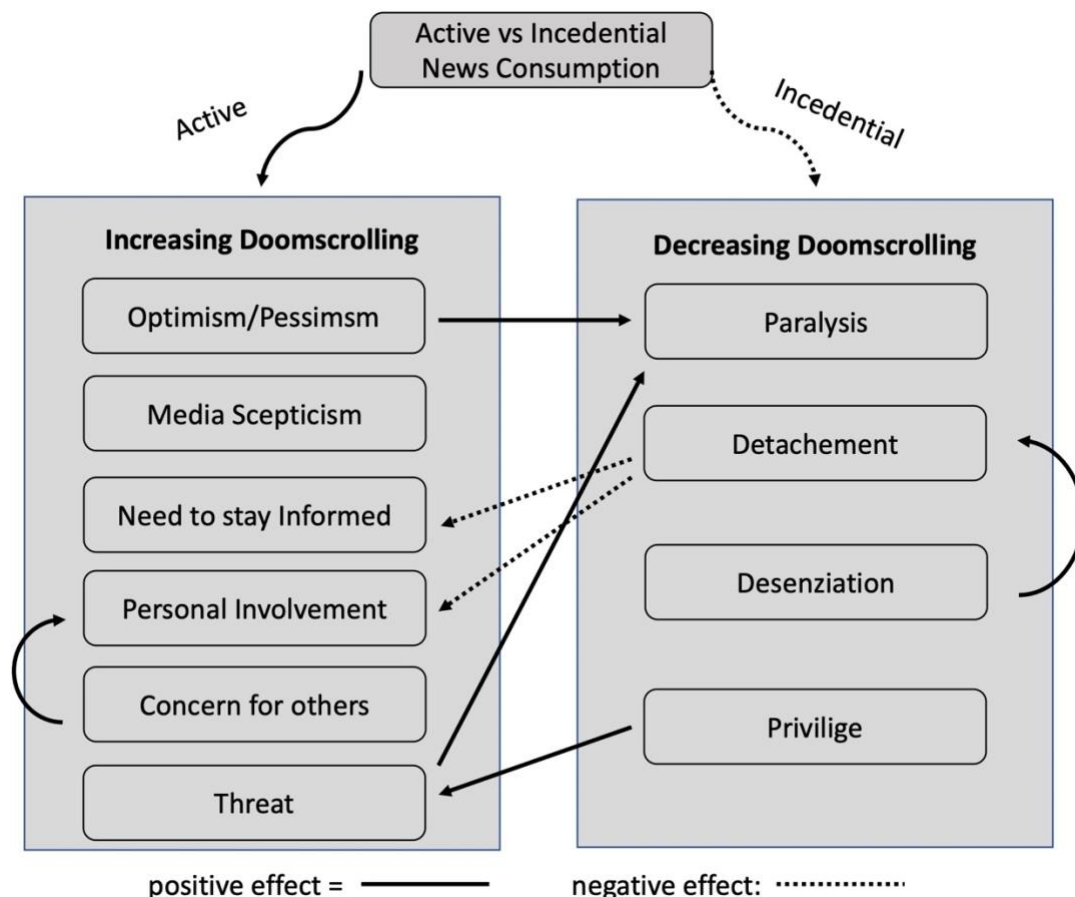
Resentment Towards System

Another prominent response to negative climate change-related news is criticism and resentment towards larger, overarching structures and individuals that determine the global or national action against climate change but respond inadequately to the crisis. There is seemingly no direct connection to doomscrolling. However, due to the high prevalence in the interview, it is considered a noteworthy theme regarding climate change news consumption and will be briefly explained. In the example, Participant 18 points out that people’s individual actions do have a negligible effect on climate change and do not mitigate its effects on the environment, and they feel left alone by the government. Another example by Participant 1 criticises that there are no internationally organized actions against climate change and that the demand for

profits in a capitalistic organized economy is more important than tackling climate change issues.

Figure 1

Relationships Between the Themes



Relationships Between Themes

The themes derived from the participants' reports show relations and overlap with each other. Those relationships are shown in Figure 1. There seems to be a relationship between incidental and active news consumption. According to participants, there seems to be a link between active news consumption and behaviour that could indicate doomsscrolling, such as spending more time-consuming climate change-related news. Incidental news consumption seems not to trigger doomsscrolling behaviour. Besides that, *Individual Responsibility* seems also to have a regulating effect on doomsscrolling. Seemingly, participants that reported feeling responsible for engaging in climate change action also tended to be inclined to doomsscrolling behaviour.

Furthermore, *Desensitization* seems to be closely related to *Detachment* and may be seen as a necessary step before becoming detached from climate change-related news. If

someone has reached the state of *Detachment*, it has a negative effect on the Need to Stay Informed and *Personal Involvement*.

Furthermore, although it has been linked to a decrease in climate change, privilege can play a role in doomscrolling motivating behaviour when events seem to threaten this privilege. On the other hand, *threat* can be a decreasing factor when the threat becomes something that is too big to handle. This, in turn, can be a contributing factor to *paralysis*. Lastly, the concern for others is closely related to personal involvement and may be seen as a step before. *Personal involvement* has great similarities with *concern for others* since both themes are about negative emotions resulting from climate change's impact on individuals. However, personal involvement adds to the dimension of a personal relation to people affected by climate change.

Construction of Questions

All the themes were used to create questions for the quantitative part of the study except the theme of *resentment towards the system* and *optimism and pessimism as motivation*. The development of the questions aimed to create items that measure doomscrolling related to climate change that can be used in quantitative research. The questions Nr. 3, Nr. 4, and Nr. 10 are reversed items. The developed questions and their related themes can be seen in Table 2.

Table 2

Self-Developed Questions about Climate Change Related Doomscrolling

Questionnaire Items	Theme
1. I am actively searching for news when a climate-change related catastrophe occurs in my proximity.	Incidental and actively searched news
2. I feel the need to avoid climate change news because I feel overwhelmed when reading them.	Detachment
3. The climate change topic is too pervasive; therefore, I pay less attention to it.	Desensitization
4. Uncertainty in the media about the impact of climate change in the future makes me refrain from engaging with the topic.	Paralysis
5. My concern for other people makes me check news more frequently when a climate-catastrophe is presented in the media.	Concern for others
6. If a climate-catastrophe would occur near me or near people who are close to me, I would feel the urge to look up more news about the event.	Personal involvement

- | | |
|---|---------------------------|
| 7. Negative news about climate change makes me want to assess the truthfulness of the information. Therefore, I actively search for more information. | Scepticism towards media |
| 8. I feel it's my duty to keep up to date with climate change news and be knowledgeable about the topic. | Individual responsibility |
| 9. My concern about the threat climate change poses to the environment makes me consume news more frequently about the topic. | Threat |
| 10. Given my location on the planet, I am less urged to consume news about the changing climate and its consequences. | Privilege |
| 11. Consuming news about the environment urges me to stay informed and up to date with the topic of climate change. | Need to stay informed |

Note. The items employ a 7-Point-Likert scale from “completely disagree” to “completely agree”

Study II: Quantitative Study

In this section, the second phase of the research will be discussed. The second phase consists of an online survey. The section begins with a description of the methodology used and is followed by the results.

Methods

The quantitative phase of the study was reported following the *Strengthening the Reporting of Observational Studies in Epidemiology* (STROBE) initiatives recommendations for reporting of observational studies (Vandenbroucke et al., 2007) to provide precise and thorough reporting of the research. An overview of the STROBE checklist and the corresponding implementations in the present study with page numbers can be found in Appendix B.

Design

A cross-sectional design in the form of an online survey was employed to investigate the relationship between doomscrolling and its impact on depression and helplessness while controlling for perceived social support and climate change as possible moderators (see Figure 2).

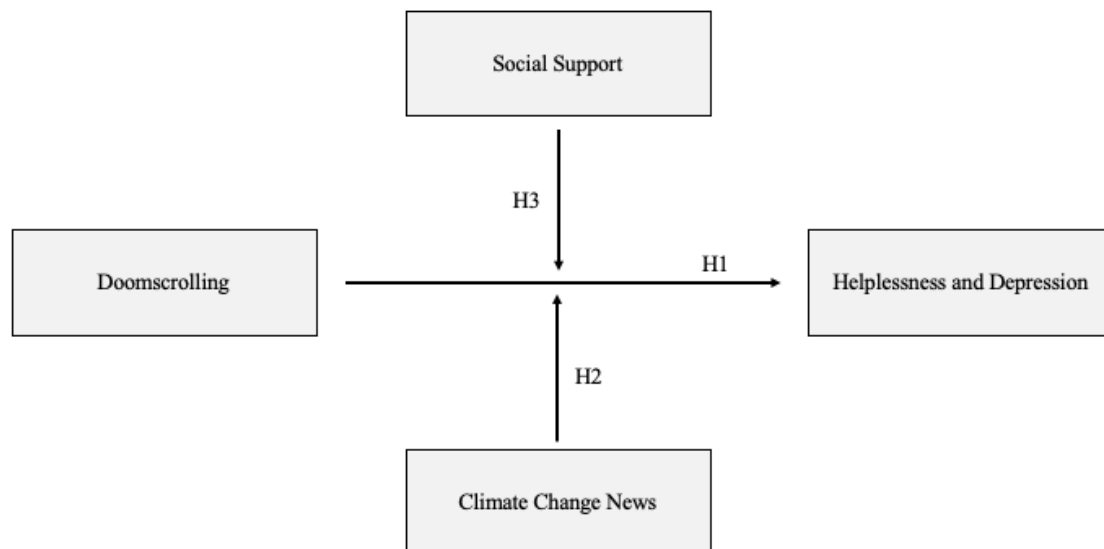
Participants

The participants were recruited via a combination of snowball and convenience sampling from undergraduate students at the University of Twente in the Netherlands and non-students. Non-students were recruited through social media advertisement (Appendix B), while

students were recruited through the Sona subject pool of the University of Twente. They received 0.25 Sona points as a reward. Students from the Faculty of Behavioural, Management and Social Sciences (BMS) at the University of Twente need 15 Sona points to be eligible for graduation.

Figure 2

Hypothesized Model of Moderation Effects



Participants were permitted to take part in the study if they were 18 years or older, had a good command of the English language, were not in treatment for a psychological disorder, did not have a suicide attempt in the past two years, agreed to a consent form, and did not experience a climate change-related crisis. The study was submitted with request number 230202 to the ethics committee of the BMS and was approved.

Materials

The online survey consisted of a welcome message and informed consent that gave an overview of the risk and benefits of the survey and a page asking for demographical data—followed by the eleven-question questionnaire created in the qualitative part of the thesis and standardized questionnaires to measure doomscrolling, helplessness, and perceived social support. The order of the standardized questionnaires was randomized to counter the potential bias of the data due to the order effect and fatigue effect. In addition, the survey contained the Beck Depression Inventory and the Hamilton Anxiety Scale, used by two of the fellow bachelor students for their analysis.

Subsequently to the questions, the participants received an anonymous personal identifier code which can be used to request the researchers to delete their survey response if

they decide so. Finally, the survey concluded with a debriefing giving more details on the purpose of the study and links to counselling hotlines in German, Dutch, and English in case the survey was perceived as distressing. The following instruments were used:

Climate Change Doomscrolling Scale. The Climate Change Doomscrolling scale (CCDS) is a 7-point Likert scale used to measure the level of doomscrolling related to climate change and is based on the interview study of the qualitative phase of the present thesis. The scale ranges from "strongly agree" to "strongly disagree". Scores are calculated by summing up the scores of each question. The CCDS consists of 11 items, and the value for Cronbach's Alpha for the survey was $\alpha = .75$. Thus, the scale is deemed acceptable internal consistency.

Doomscrolling Scale. The Doomscrolling Scale (DSS) is a 15-item self-report questionnaire used to measure individuals' tendencies to engage in excessive and compulsive consumption of negative news using a 7-point Likert scale (Sharma et al., 2022). The scale ranges from "strongly agree" to "strongly disagree". Scores are calculated by summing up the scores of each question. A high score indicates high levels of doomscrolling, and a low score indicates low levels of doomscrolling.

A factor analysis performed on the DSS using a cross-cultural data set indicates a unidimensional structure and a reliability coefficient (.96) is reported as excellent (Sharma et al., 2022). A factor analysis on a Turkish sample indicates a unidimensional structure with factor loadings ranging from 0.63 to 0.84 and excellent reliability (α ranged = .938 – 0.94) for all 15 items (Satici et al., 2022).

Coping Competence Questionnaire. The Coping Competence Questionnaire (CCQ) is a 21 items self-reported questionnaire used to measure individuals' resilience against HD using a 6-point Likert scale. The CCQ will serve as measurement instrument for HD in the present study. The scale ranges from "very characteristic of me" to "very uncharacteristic of me" (Schroder & Ollis, 2013). Scores are calculated by summing up the scores of each question to a total score. A high score indicates high levels of resilience against helplessness and depression, and a low score indicates low levels of resilience against helplessness and depression. A factor analysis performed on data consisting of a population of undergraduate students in the US indicates one underlying factor and a Cronbach's alpha (α ranged = .90 – .94) indicating excellent reliability.

F-SozU K-6. The F-SozU K-6 is a six-item self-reported questionnaire that measures participants perceived social support. The questionnaire employs a five-point Likert scale which ranges from "not true at all" to "very true" (Kliem et al., 2015). Scores are calculated by

summing up the scores of each question to a total score. A high score indicates high levels of perceived social support, and a low score indicates low levels of perceived social support.

The internal consistency measured with Cronbach's alpha ($\alpha = .90$) for a German sample is excellent, and the factor loadings (.70 - .84) indicate a meaningful measure of the latent construct through the items (Kliem et al., 2015). Research by Lin and colleagues (2019) validated the scale in a cross-cultural study, including student samples from the United States, Russia, and China. The study reports good psychometric properties in all samples.

Procedure

The survey was published on the 19th of April 2023, and the data collection ended on the 5th of May 2023. Participants were directed to the online survey hosted on Qualtrics via a link they received through social media advertisement, or which was provided on the Sona subject pool of the University of Twente. Subsequently, participants filled out questions regarding demographic information and the questionnaire. Upon completing the survey, participants were debriefed and provided with the researchers' contact information and links to the counselling website if the survey was perceived as stressful. The survey took 14 minutes on average to complete.

Data Analysis

The survey data was obtained via Qualtrics, downloaded as a CSV file, and analysed using R Statistical Software v4.3.0 (R Core Team, 2023). The complete R code can be found in Appendix C. After tidying and screening the data with the ExcludeR v0.5.0 (Stevens, 2021) and the Tidyverse v2.0.0 (Wickham et al., 2019) R packages, the demographic background was summarised in a table using the gtsummary R package v1.7.1 (Sjoberg et al., 2021). Subsequently, the descriptive statistics and Pearson correlations of doomscrolling, climate change-related doomscrolling, helplessness and perceived social support were computed and presented in a table generated with the apaTables R package v2.0.8 (Stanley, 2021). The Pearson correlation of doomscrolling and helplessness was used to examine whether there is a positive relationship between doomscrolling and helplessness to answer hypothesis 1.

Afterwards, two linear models were created with helplessness as the dependent variable and doomscrolling as the independent variable. One model had perceived social support as the additional independent variable, while the other had climate change doomscrolling as the additional independent variable. The remspsyc R package v0.1.1 (Thériault, 2022) was used to generate tables for the linear models. G*Power analysis was used to ensure that the sample size was sufficient for a moderation analysis, and the four assumptions of linearity were assessed visually by using plots and the Durbin-Watson test.

After that, a linear regression analysis was performed using the first model to examine whether social support moderates the relationship between doomscrolling and helplessness to answer hypothesis 2. Another linear regression analysis was performed using the second model to answer hypothesis 3. A posthoc analysis was performed that assesses whether perceived social support moderates the relationship between climate change-related doomscrolling and helplessness. The significance testing threshold for linear models was $p < .05$.

Results

Demographic Background

Of the 210 recorded responses from volunteers who took part in the online survey, 80 (38.10%) participants were excluded from the survey in total. Two (0.95%) of the participants were excluded because they withdrew from the study after reading the consent form, and 78 (37.14%) participants were excluded because they did not complete the survey. Thus, the final sample size is 130. The sample includes 40 men, 89 women, and one person who did not report their gender. The participants are aged between 19 and 62, with a mean age of 27.6 (SD = 10.39).

Nearly half of the participants were qualified for higher education (see Table 3), while nearly the other half held a degree in higher education (47.3%). A minority did not have a high school degree or followed non-academic education (4.1%). Most of the participants were German (63%), followed by Dutch participants (13%) and other European (13.4 %) or other Western participants (4.7%), while non-western participants (5.9%) are the minority (see Table 3).

Table 3

Education Level and Nationality of Participants

Characteristic	n (%)
Highest Educational Level	
Highschool (qualified for university)	59 (48)
Bachelor's degree	34 (28)
Master's degree	20 (16)
Other	4 (3.3)
PHD	4 (3.3)
No Highschool	1 (0.8)
Prefer not to say	8
Nationality	
German	82 (64)
Dutch	17 (13)
France	6 (4.7)

Australia	4 (3.1)
Romania	3 (2.3)
Austria	2 (1.6)
Portugal	2 (1.6)
United Kingdom	2 (1.6)
USA	2 (1.6)
Indonesia	1 (0.8)
Japan	1 (0.8)
Malaysia	1 (0.8)
Mexico	1 (0.8)
Poland	1 (0.8)
Switzerland	1 (0.8)
Taiwan	1 (0.8)
Viet Nam	1 (0.8)
Prefer not to say	2

Descriptive Statistics

Means, standard deviations, and intercorrelations for *Helplessness and Depression* and *Climate Change Doomscrolling*, *Perceived Social Support*, and *Doomscrolling* are provided in Table 2. The descriptive statistics for *perceived social support* show a positively skewed distribution, which indicates that the population mostly scored low levels in perceived social support. *Doomscrolling* shows similar tendencies, being positively skewed as well, which generally indicates a low level of doomscrolling. Based on the results presented in the Pearson correlation (Table 2), the null hypothesis related to hypothesis 1 cannot be rejected at a significance level of $p < .05$. The correlation shows a significant positive relationship between doomscrolling and resilience for learned helplessness. Thus, based on the evidence, hypothesis 1 is rejected since it cannot be claimed that there is a positive relationship between doomscrolling and learned helplessness.

Inferential Statistics

Assumption of Linearity. To investigate the hypothesized interaction model (Figure 1), a moderation analysis was used by constructing two linear models. The first model consists of helplessness as the dependent variable, doomscrolling as the independent variable, and social support as the moderator variable. In contrast, the second model uses Climate Change doomscrolling as the moderator variable. Since the sample size used for the analysis is small, the assumptions of linear models: *normality*, *linearity*, *independence*, and *homoskedasticity* for

both models, are determined to check whether a linear model is an appropriate statistical method.

Plots of the residuals are used to assess the assumptions visually. The histogram of the residuals (see Appendix B) suggests that the models meet the assumption of *normality*. The plot of the residuals (see Appendix B) shows models with randomly scattered residuals which suggests that both models meet the assumption of *linearity*. Lastly, the second plot of residuals (see Appendix B) shows some clustering. A Durbin-Watson test was performed on both models to ensure that the assumption of independence was met. The model with social support ($d = 2.16$, $p = .22$) as moderator and the model with climate change doomscrolling ($d = 2.15$, $p = .34$) as moderator both show no serious autocorrelation. Thus, both models do meet the assumptions of *independence* and *homoskedasticity*. Hence, a parametric analysis is appropriate for the constructed model, and a linear regression model is used for the moderation analysis.

Table 4

Descriptive Statistics and Correlations for Study Variables

Variable	<i>n</i>	<i>Mean</i>	<i>SD</i>	1	2	3
1. CCD	130	48.3	9.9	-		
2. DS	130	2.2	1	.32**	-	
3. HD	130	36.6	12.4	.16	.31**	-
4. SS	130	1.7	.8	-.01	.11	.18*

Note. *SD* = *Standard Deviation*. * Indicates $p < .05$. ** indicates $p < .01$.; CCD = Climate Change Doomscrolling, HD = Helplessness and Depression, DS = Doomscrolling, SS = Social Support

G*Power Analysis. Employing the G*Power software v3.1.9.6 (Faul et al., 2009) for sample size calculation, an a priori power analysis with a significance criterion of and power of = .80 with two tails was performed. The minimal sample size required for a multiple linear regression using a fixed model and a single regression coefficient with three predictors is a sample size of $N = 55$ (see Appendix B). Hence, the obtained sample size of $N = 130$ is sufficient to test the study's null hypotheses.

Moderation Analysis. Based on the moderation analysis, the null hypotheses related to hypothesis 2 and hypothesis 3 cannot be rejected at a significance level of $p = .05$ (see Table 4 and Table 5). There is insufficient evidence to support the claim that social support or climate change doomscrolling moderates the relationship between learned HD and doomscrolling. See

Table 4 for the moderation analysis estimating the effect of social support and Table 5 for the moderation analysis estimating the effect of climate change doomscrolling.

A post-hoc moderation analysis that tests whether social support moderates the relationship between climate change doomscrolling and social support showed no significant evidence that social support interacts with the relation of climate change doomscrolling on HD (see Table 5). The test for the assumptions of linearity for the posthoc analysis can be seen in Appendix B.

Table 5

Results of Multiple Regression Analyses

Effect	Estimate	SE	95% CI		p
			LL	UL	
<i>Social Support as Moderator of Doomscrolling</i>					
(Intercept)	19.71	6.3	7.23	32.2	.00
DS	5.96	2.74	.53	11.40	.03
SS	5.21	3.43	-1.6	12.02	.13
DS × SS	-1.28	1.43	-4.13	1.56	.37
<i>Climate Change Doomscrolling as Moderator of Doomscrolling</i>					
(Intercept)	20.41	11.47	-2.29	43.12	.08
DS	6.20	5.76	-5.20	17.61	.28
CCD	.17	.24	-0.30	.65	.48
DS × CCD	-.05	.12	-.27	.18	.66
<i>Social Support as moderator of Climate Change Doomscrolling</i>					
(Intercept)	20.07	12.16	-4.00	44.14	.10
CCD	.24	.24	-.24	.72	.32
SS	4.31	6.80	-9.14	17.76	.53
CCD × SS	-.03	.13	-.29	.24	.84

Note. Total N = 130. Degrees of Freedom = 130. CI = confidence interval; LL = lower limit; UL = upper limit. DS = Doomscrolling, SS = Social Support, CCD = Climate Change Doomscrolling

Table 6*Hypothesis Acceptance and Rejection*

Hypothesis	Result
H1: Increasing levels of doomscrolling are associated with decreasing levels of resilience to helplessness and depression.	Rejected
H2: Climate change-related negative news consumption moderates the relationship between doomscrolling and resilience to helplessness and depression.	Rejected
H3: Perceived social support moderates the relationship between doomscrolling and helplessness and depression.	Rejected

Discussion

The objective of the present study was to explore the impact of doomscrolling on helplessness and depression (HD) in the context of climate change and whether social support is a factor in the relationship between doomscrolling and helplessness. The results of the qualitative phase helped to conceptualize climate-change related doomscrolling. The quantitative results determined the impact of climate-change related doomscrolling on helplessness and the role social support within the relationship between doomscrolling and depression and helplessness.

The qualitative results indicate that most participants struggled with different kinds of psychological distress due to the consumption of negative climate change news. Participants who are negatively affected by climate change news reported that news about climate change generally puts them in a negative mood, making them sad, angry, or feel powerless. These findings align with previous studies investigating the impact of climate change news consumption (Cianconi et al., 2020) and doomscrolling (Sharma et al., 2022) on mental health and well-being. However, there is no known previous research on climate change doomscrolling to which the findings could be compared.

The participants report to employ various coping mechanisms to deal with the stress. While some participants start to avoid climate change-related news and repress thoughts about the topic, others are motivated by the news to actively consume more news, dive into the topic, engage in minor climate actions, or criticize media and politics. Noteworthy is that participants report to be in a state of paralysis regarding climate change. They are worried about the future but feel powerless. Participants stated that they feel overwhelmed and do not see individual actions as effective in fighting climate change. Some participants report something that may be

described as detachment or even desensitization to the topic. Others point out how necessary individual actions are and see this as motivation to inform themselves about the topic. These ambivalent reactions to the threat of climate change align with previous research on climate change (Stollberg & Jonas, 2021). Especially the reported news avoidance is interesting when putting the news consumption in the context of doomscrolling since news avoidance can be seen as the response to the decrementing effect of doomscrolling on mental health (Ytre-Arne & Moe, 2021).

The quantitative phase of the study revealed a significant relationship between climate change doomscrolling with doomscrolling, resilience to HD with doomscrolling, and resilience to HD with social support. However, linear regression analysis did not show a moderating effect of climate change doomscrolling on the relationship between doomscrolling and helplessness and depression. Furthermore, the study did not show a moderating effect of social support on the relationship of doomscrolling with HD nor on the relationship between climate change doomscrolling on HD. Thus, the analysis does not support the hypothesized model of moderation (see Figure 1).

Contrary to the hypothesized relationships, the evidence suggests that doomscrolling is not negatively correlated with hopelessness and depression. Thus, the results contradict the claims of Sharma, et al (2022), which concludes that doomscrolling is associated with psychological stress. Instead, the results might suggest a slight positive correlation between doomscrolling and hopelessness. However, based on the findings of similar studies, a more plausible explanation is that doomscrolling harms mental health and well-being (Sharma et al., 2022; Ytre-Arne & Moe, 2021).

Opposing the hypothesized moderation of social support as a moderator for doomscrolling, the results suggest no interaction effect. Previous studies were conducted during COVID-19 when isolation measurements were set up by most governments. Isolation was listed as a possible factor in the relationship between doomscrolling and its impact on mental health and well-being (Sharma et al., 2022). Thus, the results suggest that perceived social support does not moderate the relationship between doomscrolling and the negative impact on mental health. This strengthens the findings of previous studies conducted during COVID-19 lockdown periods worldwide.

Countering the hypothesised moderation of climate change related doomscrolling on doomscrolling, this study's findings suggest no significant interaction effect. The results contradict the claims of Cianconi and colleagues (2020) that suggests that consumption of negative news related to climate change harms mental health, as well as the claims of Sharma

and colleagues (2022) that doomscrolling has negative mental health implications. The results suggest that climate change doomscrolling has no impact on doomscrolling.

Implications

The study's findings have several implications for researchers. The analysis of the interview data identifies several themes that occur in doomscrolling related to the context of climate change. It showed that climate change news is seen as mainly negative and pervasive. However, the response varies from signs of doomscrolling to news avoidance. The response is related to different perceptions of participants regarding their self-efficacy in climate action. Participants who feel overwhelmed and incapable of making a change tend to engage in news avoidance, while participants who perceive that their actions matter are willing to keep up to date with news. This dynamic might help to develop approaches to help people to develop a more balanced way of news consumption. For instance, while it might be helpful for individuals that feel like it is their duty to be always informed about climate change to learn the limits of their actions, individuals that avoid news about climate change might benefit from learning to consume climate change-related news in a way they gain a will to understand how they can contribute to climate protection.

Furthermore, while previous research focused on doomscrolling in the context of COVID-19, this study expands the context of climate change. It investigates possible limitations of previous studies by including perceived social support in the analysis. The results of this research do not align with previous research that doomscrolling and climate change have a negative impact on mental health (Cianconi et al., 2020; Sharma et al., 2022). However, the results suggest that perceived social support can be excluded as a possible factor in the relationship between doomscrolling and HD since the analysis of the survey data did not show that perceived social support interacts with the impact of doomscrolling on HD. These findings underpin the result of previous research on doomscrolling during COVID-19 isolation and suggest that the results of these studies were not biased due to a lack of social support.

Additionally, the present research is an example of the benefits of conducting exploratory sequential mixed methods research in psychology. The study was able to gain first insights into how participants experience climate change related news and to construct a potential measurement instrument. The value of the study lies in the possibility of multiple ways of future research by further developing the questionnaire or further looking into the qualitative findings. Thus, the study design is efficient when attempting to understand unexplored phenomena and should be used more often.

Limitations

The generalisability of the results of both studies is limited by the research sample. The sample for the interview study consists primarily of German and Dutch participants from the middle class that are part or adjacent to the researchers' social environment. Furthermore, the analysis of the demographical characteristics of the survey participants reveals that the sample mainly consists of individuals from Germany, the Netherlands, and other Western countries, who have high education and are two-thirds of women. This sample fits partly the description of what Henrich and colleagues (2010) describes as western, educated, industrialized, rich and democratic societies (WEIRD) samples. Such samples skew research to the perspective of western people from an affluent socio-economic background. Thus, the interview and survey study results may not represent a broader population that includes individuals from non-western countries, from less affluent social and economic backgrounds and not being a woman.

Another limitation is that the present study and previous studies that investigated doomscrolling (e.g., the impact of doomscrolling on well-being in the context of COVID-19) differ in their sample sizes. The present study has a significantly smaller sample size (N=130) than for example the study of Satici and colleagues (2022) (N = 430). Research on the equivalence of groups suggests that sample size is a crucial factor when comparing the results of two groups (Rusticus & Lovato, 2019). Thus, a larger sample size is needed to compare the results to previous research on doomscrolling.

The reliability of the data is impacted in both studies by the used measurement instruments. The interviews were conducted by psychology bachelor students that did not have extensive training in interviewing, while the interview was also not pilot tested. It must also be acknowledged that three interviewers were Germans, and one was Dutch and came from a middle-class white background which might lead to bias in the interviews. So, more experienced interviewers and interview questions that were pilot tested may lead to other results. Moreover, the reliability of the climate change doomscrolling scale (CCDS) is seeming to be acceptable according to Cronbach's alpha. However, the sample size is too small to ensure to be considered as a good basis to assess the instrument. In addition to the previously mentioned limitations due to the sample, the limitation due to the data collection through a self-administered online survey must be considered as well. Furthermore, research on the use of online surveys in research pointed out that little is known about the population that takes part in the study even when demographics are inquired (Wright, 2005). Furthermore, it was out of the scope of the thesis to ensure validity of the CCD regarding measuring climate change related

doomscrolling. Thus, one must account for these limitations, when assessing the results of the analysis using the CCDS.

Strengths

The present study has several strengths worth mentioning. To the best of the researchers' knowledge, the climate change doomscrolling phenomena have not been studied yet. The mixed methods approach made it possible to successfully develop a scale that showed acceptable internal consistency and made it possible to collect valuable data. This lays the ground for further research that investigates the phenomenon. Additionally, previous research on doomscrolling often did not include qualitative research (Satici et al., 2022; Sharma et al., 2022). Only Ytre-Arne and Moe (2021) used qualitative data in their research. Another strength is that previous research included Turkish (Satici et al., 2022; Sharma et al., 2022) and Norwegian (Ytre-Arne & Moe, 2021) participants, but the present study has an international sample with primarily German and Dutch participants, introducing more diversity in the research on doomscrolling.

Furthermore, researchers of doomscrolling have mentioned in previous studies that social environment may be a confounding variable influencing the relationship between doomscrolling and mental health. Previous research struggled with accounting for this factor since it was conducted during the COVID-19 lockdowns, which isolated individuals. The present study had a sufficiently large sample size for an analysis that gave evidence to exclude social support as a moderating factor for the relationship between doomscrolling and the mental health-related symptoms of depression and helplessness. Thus, the present study contributed to a further understanding of different aspects of the phenomenon of doomscrolling, even outside the climate change context.

Future Research

To improve the generalisability of future research, the diversity in the population should be considered. This can be done, for instance, by recruiting people from different socio-economic backgrounds, gender, and cultures. However, such a recruiting process requires a lot of effort, funding for such a freshly researched subject and may be a limited solution to the issue. Another approach could be to investigate different experiences of climate change doomscrolling by employing quantitative intersectional analysis (Bauer et al., 2021), qualitative intersectional research (Christensen & Jensen, 2012) approaches. It could also be incorporated in a mixed methods approach which takes intersectionality of participants into account, which are the inequities between individuals as differences in social locations, power relations and experiences (Hankivsky, 2014).

Furthermore, grounded theory instead of thematic analysis in future research may be used to improve qualitative methodology since grounded theory is a form of analysis that specifically aims to generate new concepts in regard to a topic (Corbin & Strauss, 1990). Grounded theory may yield a more detailed picture of how individuals experience climate change doomscrolling. Furthermore, to get a better idea about the mental health implications future research could employ pre-existing theories to code for symptoms of negative mental health.

The present study took the first steps to develop a quantitative measurement instrument with acceptable reliability. However, the present study sample is, in addition to the previously mentioned issues, too small to determine a reliable Cronbach's Alpha. Furthermore, the present study did not test the validity of questionnaire items. So, it can be questioned whether the CCDS is measuring climate change doomscrolling and no other confounding variables. Thus, to further improve the ability to quantify climate change doomscrolling behaviour future research should work on establishing a reliable and valid measurement instrument by testing the reliability of the CCDS on a larger sample size as well as validating whether the scale is measuring climate change doomscrolling by conducting factor analysis.

Conclusion

To the best knowledge of the researcher, the present study is the first attempt to investigate doomscrolling in the context of climate change and develop a measurement instrument for the phenomenon. In addition, it also tries to close the gap on how social support moderates the effect of doomscrolling on psychological distress.

To answer the research question, an exploratory mixed methods approach was used. Firstly, an interview study explored how participants experience doomscrolling in relation to climate change news. The transcripts of the 15 participants were analysed using thematic analysis to generate themes. Afterwards, the themes were used to develop a questionnaire to measure climate change doomscrolling, with a Cronbach Alpha of $\alpha = .75$.

Secondly, a cross-sectional study was conducted using an online survey. The participants (n=130) completed the survey containing the climate change doomscrolling questionnaire, developed in the first part of the study, and standardised questionnaires to measure doomscrolling, resilience towards depression and helplessness, and perceived social support. Subsequently, it was investigated whether there is a positive correlation between doomscrolling and resilience towards depression and helplessness and whether the relationship is moderated by climate change doomscrolling and perceived social support. There is a weak negative relationship between doomscrolling and depression and helplessness which does not

align with the hypothesis. Contrary to the remaining hypotheses, the findings suggest no moderation of social support and climate change doomscrolling in the relationship between doomscrolling and mental health. A post hoc analysis investigating whether there is a moderation in the effect of climate change doomscrolling on perceived social support revealed that there is also no evident moderation.

This research lays the first basis for further research on climate change doomscrolling. It provides the first insight into how doomscrolling is experienced in the context of climate change. Furthermore, it provides the first measurement instrument for quantitative research about climate change doomscrolling. However, the generalisability of the present study's findings is limited due to the small and biased sample. Thus, future research on the moderation effect of social support on the impact of doomscrolling is needed to confirm the present study's findings. Furthermore, future research is also needed to improve the reliability and validity of the climate change doomscrolling measurement instrument.

References

- Ágoston, C., Urbán, R., Nagy, B., Csaba, B., Kőváry, Z., Kovács, K., Varga, A., Dúll, A., Mónus, F., Shaw, C. A., & Demetrovics, Z. (2022). The psychological consequences of the ecological crisis: Three new questionnaires to assess eco-anxiety, eco-guilt, and ecological grief. *Climate Risk Management*, *37*, 100441. <https://doi.org/10.1016/j.crm.2022.100441>
- Albrecht, G., Sartore, G.-M., Connor, L., Higginbotham, N., Freeman, S., Kelly, B., Stain, H., Tonna, A., & Pollard, G. (2007). Solastalgia: The Distress Caused by Environmental Change. *Australasian Psychiatry*, *15*(1_suppl), S95–S98. <https://doi.org/10.1080/10398560701701288>
- American Psychological Association. (n.d.). Social Support. In *APA Dictionary of Psychology*. Retrieved 5 March 2023, from <https://dictionary.apa.org/social-support>
- ATLAS.ti Scientific Software Development GmbH (ATLAS.ti 23 MAC). (2023). <https://atlasti.com>
- Bauer, G. R., Churchill, S. M., Mahendran, M., Walwyn, C., Lizotte, D., & Villa-Rueda, A. A. (2021). Intersectionality in quantitative research: A systematic review of its emergence and applications of theory and methods. *SSM - Population Health*, *14*, 100798. <https://doi.org/10.1016/j.ssmph.2021.100798>
- Bonanno, G. A., Brewin, C. R., Kaniasty, K., & Greca, A. M. L. (2010). Weighing the costs of disaster: Consequences, risks, and resilience in individuals, families, and communities. *Psychological Science in the Public Interest*, *11*(1), 1–49.
- Boukes, M., & Vliegenthart, R. (2017). News consumption and its unpleasant side effect: Studying the effect of hard and soft news exposure on mental well-being over time. *Journal of Media Psychology*, *29*(3), 137–147. <https://doi.org/10.1027/1864-1105/a000224>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Canary, D., & Spitzberg, B. (1993). Loneliness and Media Gratifications. *Communication Research - COMMUN RES*, *20*, 800–821. <https://doi.org/10.1177/009365093020006003>
- Cauberghe, V., Van Wesenbeeck, I., De Jans, S., Hudders, L., & Ponnet, K. (2021). How Adolescents Use Social Media to Cope with Feelings of Loneliness and Anxiety During COVID-19 Lockdown. *Cyberpsychology, Behavior, and Social Networking*, *24*(4), 250–257. <https://doi.org/10.1089/cyber.2020.0478>

- Chao, R. C.-L. (2012). Managing Perceived Stress Among College Students: The Roles of Social Support and Dysfunctional Coping. *Journal of College Counseling, 15*(1), 5–21. <https://doi.org/10.1002/j.2161-1882.2012.00002.x>
- Christensen, A.-D., & Jensen, S. Q. (2012). Doing Intersectional Analysis: Methodological Implications for Qualitative Research. *NORA - Nordic Journal of Feminist and Gender Research, 20*(2), 109–125. <https://doi.org/10.1080/08038740.2012.673505>
- Chu, P. S., Saucier, D. A., & Hafner, E. (2010). Meta-Analysis of the Relationships Between Social Support and Well-Being in Children and Adolescents. *Journal of Social and Clinical Psychology, 29*(6), 624–645. <https://doi.org/10.1521/jscp.2010.29.6.624>
- Cianconi, P., Betrò, S., & Janiri, L. (2020). The Impact of Climate Change on Mental Health: A Systematic Descriptive Review. *Frontiers in Psychiatry, 11*. <https://www.frontiersin.org/articles/10.3389/fpsy.2020.00074>
- Cicero, V., Lo Coco, G., Gullo, S., & Lo Verso, G. (2009). The role of attachment dimensions and perceived social support in predicting adjustment to cancer. *Psycho-Oncology, 18*(10), 1045–1052. <https://doi.org/10.1002/pon.1390>
- Clayton, S. (2020). Climate anxiety: Psychological responses to climate change. *Journal of Anxiety Disorders, 74*, 102263. <https://doi.org/10.1016/j.janxdis.2020.102263>
- Corbin, J. M., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology, 13*(1), 3–21. <https://doi.org/10.1007/BF00988593>
- Creswell, J. W., & Clark, V. L. P. (2017). *Designing and conducting mixed methods research*. Sage publications.
- Diddi, A., & LaRose, R. (2006). Getting Hooked on News: Uses and Gratifications and the Formation of News Habits Among College Students in an Internet Environment. *Journal of Broadcasting & Electronic Media, 50*(2), 193–210. https://doi.org/10.1207/s15506878jobem5002_2
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*(4), 1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>
- Folkman, S., & Moskowitz, J. T. (2004). Coping: Pitfalls and Promise. *Annual Review of Psychology, 55*(1), 745–774. <https://doi.org/10.1146/annurev.psych.55.090902.141456>
- Hankivsky, O. (2014). *Intersectionality 101*. The Institute for Intersectionality Research & Policy, SFU.

- Harandi, T. F., Taghinasab, M. M., & Nayeri, T. D. (2017). The correlation of social support with mental health: A meta-analysis. *Electronic Physician*, *9*(9), 5212–5222. <https://doi.org/10.19082/5212>
- Hefner, J., & Eisenberg, D. (2009). Social Support and Mental Health Among College Students. *American Journal of Orthopsychiatry*, *79*(4), 491–499. <https://doi.org/10.1037/a0016918>
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). Most people are not WEIRD. *Nature*, *466*(7302), Article 7302. <https://doi.org/10.1038/466029a>
- Intergovernmental Panel on Climate. (2022). *Climate change 2022: Impacts, adaptation and vulnerability* (pp. 3–33). Cambridge University Press.
- Ipsos. (2022). *Share of respondents who expect climate change to have a very or somewhat severe effect in the area they live over the next ten years as of 2022, by country* [Graph]. Statista. <https://www.statista.com/statistics/1334280/global-expectation-of-the-severity-of-climate-change-effects-by-country/?locale=en>
- Kliem, S., Mößle, T., Rehbein, F., Hellmann, D. F., Zenger, M., & Brähler, E. (2015). A brief form of the Perceived Social Support Questionnaire (F-SozU) was developed, validated, and standardized. *Journal of Clinical Epidemiology*, *68*(5), 551–562. <https://doi.org/10.1016/j.jclinepi.2014.11.003>
- Lin, M., Hirschfeld, G., & Margraf, J. (2019). Brief form of the Perceived Social Support Questionnaire (F-SozU K-6): Validation, norms, and cross-cultural measurement invariance in the USA, Germany, Russia, and China. *Psychological Assessment*, *31*(5), 609–621. <https://doi.org/10.1037/pas0000686>
- Moser, S. C. (2010). Communicating climate change: History, challenges, process and future directions. *WIREs Climate Change*, *1*(1), 31–53. <https://doi.org/10.1002/wcc.11>
- Newman, N., Fletcher, R., Robertson, C. T., Eddy, K., & Nielsen, R. K. (2022). *Reuters Institute Digital News Report 2022*. https://reutersinstitute.politics.ox.ac.uk/sites/default/files/2022-06/Digital_News-Report_2022.pdf
- O’Day, E. B., & Heimberg, R. G. (2021). Social media use, social anxiety, and loneliness: A systematic review. *Computers in Human Behavior Reports*, *3*, 100070. <https://doi.org/10.1016/j.chbr.2021.100070>
- R Core Team. (2023). *R: A language and environment for statistical computing* [Manual]. R Foundation for Statistical Computing. <https://www.R-project.org/>

- Reynolds, D. L., Garay, J. R., Deamond, S. L., Moran, M. K., Gold, W., & Styra, R. (2008). Understanding, Compliance and Psychological Impact of the SARS Quarantine Experience. *Epidemiology and Infection*, *136*(7), 997–1007. <https://www.jstor.org/stable/30221568>
- Rodriguez, N., Mira, C. B., Myers, H. F., Morris, J. K., & Cardoza, D. (2003). Family or friends: Who plays a greater supportive role for Latino college students? *Cultural Diversity & Ethnic Minority Psychology*, *9*(3), 236–250. <https://doi.org/10.1037/1099-9809.9.3.236>
- Rubin, A. M. (1983). Television uses and gratifications: The interactions of viewing patterns and motivations. *Journal of Broadcasting*, *27*(1), 37–51. <https://doi.org/10.1080/08838158309386471>
- Rusticus, S., & Lovato, C. (2019). Impact of Sample Size and Variability on the Power and Type I Error Rates of Equivalence Tests: A Simulation Study. *Practical Assessment, Research, and Evaluation*, *19*(1). <https://doi.org/10.7275/4s9m-4e81>
- Salomon, E., Preston, J. L., & Tannenbaum, M. B. (2017). Climate change helplessness and the (de)moralization of individual energy behavior. *Journal of Experimental Psychology: Applied*, *23*(1), 15. <https://doi.org/10.1037/xap0000105>
- Satici, S. A., Gocet Tekin, E., Deniz, M. E., & Satici, B. (2022). Doomscrolling Scale: Its Association with Personality Traits, Psychological Distress, Social Media Use, and Wellbeing. *Applied Research in Quality of Life*. <https://doi.org/10.1007/s11482-022-10110-7>
- Schroder, K. E. E., & Ollis, C. L. (2013). The Coping Competence Questionnaire: A measure of resilience to helplessness and depression. *Motivation and Emotion*, *37*(2), 286–302. <https://doi.org/10.1007/s11031-012-9311-8>
- Shabahang, R., Aruguete, M. S., & Shim, H. (2021). Online News Addiction: Future Anxiety, Fear of Missing Out on News, and Interpersonal Trust Contribute to Excessive Online News Consumption. *Online Journal of Communication and Media Technologies*, *11*(2), e202105. <https://doi.org/10.30935/ojcm/10822>
- Sharma, B., Lee, S. S., & Johnson, B. K. (2022). The Dark at the End of the Tunnel: Doomscrolling on Social Media Newsfeeds. *Technology, Mind, and Behavior*, *3*(1: Spring 2022). <https://doi.org/10.1037/tmb0000059>
- Shelton, A. J., Wang, C. D., & Zhu, W. (2017). Perceived Social Support and Mental Health: Cultural Orientations as Moderators. *Journal of College Counseling*, *20*(3), 194–207. <https://doi.org/10.1002/jocc.12062>

- Sjoberg, D. D., Whiting, K., Curry, M., Lavery, J. A., & Larmarange, J. (2021). Reproducible summary tables with the gtsummary package. *The R Journal*, *13*(1), 570–580.
<https://doi.org/10.32614/RJ-2021-053>
- Smallheer, B. A., & Dietrich, M. S. (2019). Social Support, Self-Efficacy, and Helplessness Following Myocardial Infarctions. *Critical Care Nursing Quarterly*, *42*(3), 246.
<https://doi.org/10.1097/CNQ.0000000000000265>
- Stanley, D. (2021). *apaTables: Create american psychological association (APA) style tables* [Manual]. <https://CRAN.R-project.org/package=apaTables>
- Stevens, J. R. (2021). excluder: An R package that checks for exclusion criteria in online data. *Journal of Open Source Software*, *6*(67), 3893. <https://doi.org/10.21105/joss.03893>
- Stollberg, J., & Jonas, E. (2021). Existential threat as a challenge for individual and collective engagement: Climate change and the motivation to act. *Current Opinion in Psychology*, *42*, 145–150. <https://doi.org/10.1016/j.copsyc.2021.10.004>
- Taylor, S. E. (2011). *Social Support: A Review*. Oxford University Press.
<https://doi.org/10.1093/oxfordhb/9780195342819.013.0009>
- Thériault, R. (2022). *rempsyc: Convenience functions for psychology*. <https://rempsyc.remi-theriault.com>
- Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, *19*(6), 349–357.
<https://doi.org/10.1093/intqhc/mzm042>
- Vandenbroucke, J. P., Elm, E. von, Altman, D. G., Gøtzsche, P. C., Mulrow, C. D., Pocock, S. J., Poole, C., Schlesselman, J. J., Egger, M., & Initiative, S. (2007). Strengthening the reporting of observational studies in epidemiology (STROBE): Explanation and elaboration. *Annals of Internal Medicine*, *147*(8), W-163.
- Villi, M., Aharoni, T., Tenenboim-Weinblatt, K., Boczkowski, P. J., Hayashi, K., Mitchelstein, E., Eugenia Mitchelstein, Mitchelstein, E., Tanaka, A., & Kligler-Vilenchik, N. (2021). Taking a Break from News: A Five-nation Study of News Avoidance in the Digital Era. *Digital Journalism*, 1–17.
<https://doi.org/10.1080/21670811.2021.1904266>
- Wickham, H., Averick, M., Bryan, J., Chang, W., McGowan, L. D., François, R., Grolemund, G., Hayes, A., Henry, L., Hester, J., Kuhn, M., Pedersen, T. L., Miller, E., Bache, S. M., Müller, K., Ooms, J., Robinson, D., Seidel, D. P., Spinu, V., ... Yutani, H. (2019).

Welcome to the tidyverse. *Journal of Open Source Software*, 4(43), 1686.

<https://doi.org/10.21105/joss.01686>

World Health Organization. (n.d.). *Fast Facts on Climate and Health* [Fact sheet]. Retrieved

14 February 2023, from [https://cdn.who.int/media/docs/default-source/climate-](https://cdn.who.int/media/docs/default-source/climate-change/fast-facts-on-climate-and-health.pdf?sfvrsn=157ecd81_5)

[change/fast-facts-on-climate-and-health.pdf?sfvrsn=157ecd81_5](https://cdn.who.int/media/docs/default-source/climate-change/fast-facts-on-climate-and-health.pdf?sfvrsn=157ecd81_5)

Wright, K. B. (2005). Researching Internet-Based Populations: Advantages and

Disadvantages of Online Survey Research, Online Questionnaire Authoring Software

Packages, and Web Survey Services. *Journal of Computer-Mediated Communication*,

10(3), JCMC1034. <https://doi.org/10.1111/j.1083-6101.2005.tb00259.x>

Ytre-Arne, B., & Moe, H. (2021). Doomscrolling, Monitoring and Avoiding: News Use in

COVID-19 Pandemic Lockdown. *Journalism Studies*, 22(13), 1739–1755.

<https://doi.org/10.1080/1461670X.2021.1952475>

Appendix A
Material of the Qualitative Study

Table 1
COREQ Criteria and Corresponding Pages

Criterion	Description	Page
Interviewer/facilitator	Which author/s conducted the interview or focus group?	8
Credentials	What were the researcher's credentials?	8
Occupation	What was their occupation at the time of the study?	8
Gender	What experience or training did the researcher have?	8
Experience and training	What experience or training did the researcher have?	8
Relationship established	Was a relationship established prior to study commencement?	8
Participant knowledge of the interviewer	What did the participants know about the researcher?	8
Interviewer characteristics	What characteristics were reported about the interviewer/facilitator?	8
Methodological orientation and theory	What methodological orientation was stated to underpin the study?	8
Sampling	How were participants selected?	9
Method of approach	How were participants approached?	9
Sample size	How many participants were in the study?	9
Non-participation	How many people refused to participate or dropped out? Reasons?	9
Setting of data collection	Where was the data collected?	9
Presence of non-participants	Was anyone else present besides the participants and researchers?	9
Description of sample	What are the important characteristics of the sample?	
Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	9
Repeat interviews	Were repeat interviews carried out? If yes, how many?	9
Audio/visual recording	Did the research use audio or visual recording to collect the data?	10

Field notes	Were field notes made during and/or after the interview or focus group?	10
Duration	What was the duration of the interviews or focus group?	10
Data saturation	Was data saturation discussed?	10
Transcripts returned	Were transcripts returned to participants for comment and/or correction?	10
Number of data coders	How many data coders coded the data?	10
Description of the coding tree	Did authors provide a description of the coding tree?	19
Derivation of themes	Were themes identified in advance or derived from the data?	10
Software	What software, if applicable, was used to manage the data?	10
Participant checking	Did participants provide feedback on the findings?	10
Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified?	12-18
Data and findings consistent	Was there consistency between the data presented and the findings?	-
Clarity of major themes	Were major themes clearly presented in the findings?	12-18
Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	11

Consent Form for the Interviews

Background

The study you are about to participate in is exploring the relatively new phenomenon of doomscrolling or *doomsurfing*. These terms describe a behaviour in which a person engages in constantly seeking out negative news about a certain topic on social media or in other (online) news media. The specific phenomenon that is examined in this study is *doomscrolling* related to negative *climate change news*. The research team will also investigate the consequences of doomscrolling on mental health.

The aim of this study is to gain clearer insights into the new phenomenon of doomscrolling about climate change. As this study is part of a Bachelor thesis, you will receive the link to the thesis when it is published and will be informed about the results.

In the following interview, a Bachelor psychology student will ask you questions about your news consumption behaviour and your thoughts about climate change. The interview will take about 30 minutes. The interview will be audio-recorded. The recordings will be safely stored in the University of Twente Cloud service. The audio recordings will be transcribed into written texts. All identifying data

will be anonymized. The recordings cannot be traced back to you. The audio recordings will be deleted at latest 6 months after the recording. The transcriptions will be deleted after 2 years. Please keep in mind, that this thesis might get published in a scientific journal after its completion.

If you feel uncomfortable, answering some of the questions, you do not need to answer them. If you want to quit being part of the study, you can state that at any point and the interview will be stopped. You do not need to give a reason for quitting your participation.

If you have remaining questions, please contact one of the researchers; Frederic Apprich (n.f.a.apprich@student.utwente.nl), Luzie Grossekemper (l.grossekemper@student.utwente.nl), Moritz Hau (m.hau@student.utwente.nl), Lisanne te Pas (l.tepas@student.utwente.nl), or one of their supervisors, Dr. Alejandro Dominguez Rodriguez (a.dominguezrodriguez@utwente.nl), Dr. Shenja van der Graaf (shenja.vandergraaf@utwente.nl), Dr. Alex van der Zeeuw (a.vanderzeeuw@utwente.nl), or Dr. Mercedes Almela Zamorano (almela@tilburguniversity.edu)

Please tick the appropriate boxes

Yes No

Taking part in the study

I have read and understood the study information, or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction. Yes No

I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason. Yes No

I understand that taking part in the study involves an audio-recorded interview that will be transcribed verbatim, and that the recordings will be destroyed after the reports have been submitted. Yes No

I am currently not receiving any kind of treatment (medical or therapy) for a mental disorder.

- I am receiving treatment
 I am NOT receiving treatment

I have not had a suicide attempt in the last two years.

- I have
 I have NOT

I am not currently suffering from suicidal ideation / thoughts.

- I am
 I am NOT

Risks associated with participating in the study

I understand that taking part in the study involves the following risks: mental discomfort by talking about a sensitive topic such as climate change. Yes No

Use of the information in the study

I understand that information I provide will be used for research reports that aim to investigate the impact of doom scrolling on the topic of climate change impacts mental health.

I understand that personal information collected about me that can identify me, such as [e.g. my name or where I live], will not be shared beyond the study team.

I agree that my information can be anonymously quoted in research outputs.

Consent to be Audio/video Recorded

I agree to be audio/video recorded. Yes/no

Future use and reuse of the information by others

I give permission for the answers that I provide to be archived in anonymised transcripts, audio recording so it can be used for future research and learning.

Signatures

Name of participant [printed]

Signature

Date

I have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands to what they are freely consenting.

Researcher name [printed]

Signature

Date

Study contact details for further information: [*Name, email address*]

Contact Information for Questions about Your Rights as a Research Participant

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Secretary of the Ethics Committee/domain Humanities &

Social Sciences of the Faculty of Behavioural, Management and Social Sciences at the University of Twente by ethicscommittee-hss@utwente.nl

Advertisement for the Interviews

Figure 1

Social Media Advertisement Campaign



Note. This is the English version of the advertisement. It was translated in German and Dutch for the advertisement.

Questions for the Interviews

Table 2

Interview Questions

Questionnaire Items	Related Concepts
1) What patterns of news checking have you noticed in yourself when reading something negative about climate change? a) Do you think that this behaviour of reading climate change news is excessive and compulsive? Can you elaborate? b) Do you believe, people feel motivated to take action against climate change when reading about it in the news?	Doomscrolling

c) Do you see differences between generations?	
2) How – in your opinion – is climate change displayed in the news media if there is a current climate event, (such as the flooding in Germany)?	Helplessness
a) What feelings are evoked when you read climate change news online in news media or social media?	
b) Do you find yourself reading climate-related news more often if there is a catastrophe? Can you elaborate?	
3) When you think about the way you are feeling when you see negative news regarding climate change, what words come to your mind?	Helplessness
4) If such feelings occur; what do you do to counteract feelings of helplessness when reading news about climate change?	Helplessness
5) In what way do climate change news make you feel discouraged or encouraged to take action against it?	Depression
6) Can you describe what effect climate change has on your mental state of well-being?	Depression
7) When reading news about climate change, do you turn to others to discuss what you read, or for emotional comfort and understanding?	Social Support
8) Do you share your attitude towards climate change and the news about it with friends, family, and colleagues?	Social support
9) Does news consumption about climate change increase negative thoughts about the future (with regards to the environment)?	Anxiety
a) Follow-up question: Can you describe what negative thoughts about the future arise when you watch/ read about news on climate change?	
10) Do you feel anxious (and stressed/ afraid) when thinking about climate change and its negative ramifications for humanity (and the environment)?	Anxiety
a) Can you describe your feelings further and explain what causes them in particular?	

Sources for Interview Questions

Question 1: Doomscrolling

Satici, S. A., Gocet Tekin, E., Deniz, M. E., & Satici, B. (2022). Doomscrolling Scale: Its Association with Personality Traits, Psychological Distress, Social Media Use, and Wellbeing. *Applied Research in Quality of Life*. <https://doi.org/10.1007/s11482-022-10110-7>

Sharma, B., Lee, S. S., & Johnson, B. K. (2022). The Dark at the End of the Tunnel: Doomscrolling on Social Media Newsfeeds. *Technology, Mind, and Behavior*, 3(1: Spring 2022). <https://doi.org/10.1037/tmb0000059>

Question 2-4: Helplessness

Salomon, E., Preston, J. L., & Tannenbaum, M. B. (2017). Climate change helplessness and the (de)moralization of individual energy behavior. *Journal of Experimental Psychology: Applied*, 23(1), 15–28. <https://doi.org/10.1037/xap0000105>

Schroder, K. E. E., & Ollis, C. L. (2013). The Coping Competence Questionnaire: A measure of resilience to helplessness and depression. *Motivation and Emotion*, 37(2), 286–302. <https://doi.org/10.1007/s11031-012-9311-8>

Gunderson, R. (2022). Powerless, Stupefied, and Repressed Actors Cannot Challenge Climate Change: Real Helplessness as a Barrier Between Environmental Concern and Action. *Journal for the Theory of Social Behaviour*, 1-25. <https://doi.org/10.1111/jtsb.12366>

Question 5-6: Depression

Anonym. (n.d.). Concept Elicitation Interview Guide – Depressive Symptoms. In depts.washington.edu. University of Washington. <https://depts.washington.edu/seaqol/docs/interview-guides.pdf>

Norgaard, K. M. (2006). “People Want to Protect Themselves a Little Bit”: Emotions, Denial, and Social Movement Nonparticipation. *Sociological Inquiry*, 76(3), 372–396. <https://doi.org/10.1111/j.1475-682x.2006.00160.x>

Question 7-8: Perceived Social Support

American Psychological Association. (n.d.). Social Support. In *APA Dictionary of Psychology*. Retrieved 5 March 2023, from <https://dictionary.apa.org/social-support>

Kliem, S., Mößle, T., Rehbein, F., Hellmann, D. F., Zenger, M., & Brähler, E. (2015). A brief form of the Perceived Social Support Questionnaire (F-SozU) was developed, validated, and standardized. *Journal of Clinical Epidemiology*, 68(5), 551–562. <https://doi.org/10.1016/j.jclinepi.2014.11.003>

Question 9-10: Anxiety

Boluda-Verdú, I., Senent-Valero, M., Casas-Escolano, M., Matijasevich, A., & Pastor-Valero, M. (2022). Fear for the future: Eco-anxiety and health implications, a systematic review. *Journal of Environmental Psychology*, 84, 101904. <https://doi.org/10.1016/j.jenvp.2022.101904>

Coffey, Y., Bhullar, N., Durkin, J., Islam, M. S., & Usher, K. (2021). Understanding Eco-anxiety: A Systematic Scoping Review of Current Literature and Identified Knowledge Gaps. *The Journal of Climate Change and Health*, 3, 100047. <https://doi.org/10.1016/j.joclim.2021.100047>

Grupe, D. W., & Nitschke, J. B. (2013). Uncertainty and anticipation in anxiety: an integrated neurobiological and psychological perspective. *Nature Reviews Neuroscience*, 14(7), 488–501. <https://doi.org/10.1038/nrn3524>

Table 3*Frequency for each Primary Code of themes*

Code	Participant ID															Totals
	6	7	2	8	3	9	11	12	10	16	17	18	1	14	15	
Active search for news	0	0	2	6	1	4	2	1	4	2	1	1	1	1	1	27
Anger	0	3	5	0	0	0	0	1	0	0	3	2	0	0	1	15
Connection to location	0	0	0	0	0	0	4	0	2	1	3	0	1	0	0	11
Connection to people	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	4
Depressed	0	1	0	0	0	1	0	0	1	3	1	1	0	0	1	9
Distress	0	2	1	3	3	3	0	1	0	0	3	2	0	0	4	22
Hope	1	0	3	2	3	2	1	0	4	0	0	1	4	2	0	23

Indifference	8	8	0	3	2	2	0	1	1	0	0	0	1	0	1	27
indirect media consumption	2	3	0	4	2	2	0	1	1	0	3	0	0	0	0	18
Individual action does not matter.	2	2	1	2	0	0	2	2	0	3	0	0	2	2	3	21
individual climate action	0	0	6	4	4	3	3	2	11	2	1	6	0	4	1	47
Interest in topic	0	0	2	0	1	0	4	1	4	7	1	1	0	1	0	22
Lives in a location not affected	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	3
news avoidance	5	3	0	1	3	0	0	1	0	0	2	0	0	0	1	16
not affected by CC news	5	1	0	0	0	1	1	0	2	3	0	1	0	1	1	16
Omnipresence	0	0	1	1	4	0	2	1	0	1	2	0	1	0	0	13
Overwhelming	0	1	0	7	0	0	0	0	0	0	0	0	0	0	0	8
political failure	0	1	5	1	2	1	2	0	10	1	0	6	11	3	2	45

Powerless	1	0	0	2	1	0	0	3	0	1	0	1	0	0	3	12
Repression	0	0	1	4	0	1	0	0	0	1	1	0	0	1	2	11
Sensationalist journalism	2	0	2	1	4	0	2	1	1	1	2	1	4	0	1	22
Socially reinforced interest	1	2	1	2	2	3	2	0	1	4	6	1	0	1	1	27
Societal failure	1	3	2	1	5	0	1	0	4	5	6	4	1	0	1	34
Sympathy for effected people	3	1	1	4	1	2	0	0	0	1	5	1	1	0	0	20
Too old to worry	0	1	1	1	0	0	0	0	2	0	0	2	1	2	1	11
Worried about future	0	2	1	3	4	3	3	3	1	3	3	2	2	1	5	36
Concern for others	4	4	9	6	4	4	1	1	4	1	8	4	5	2	1	58
Desensitization	8	8	2	8	6	3	2	2	1	2	3	0	2	1	3	51
Detachment	6	6	2	17	7	4	0	5	0	2	5	2	0	1	9	66

Incidental and actively searched news	10	11	2	13	5	7	6	4	8	8	5	2	2	2	2	87
Individual Responsibility	1	2	10	9	10	8	4	3	15	2	4	9	4	6	5	92
Media Scepticism	3	3	12	3	8	2	7	3	9	8	6	5	8	3	2	82
Motivation: Optimism and pessimism	1	2	6	5	8	5	8	4	9	10	4	4	5	4	5	80
Need to stay informed	1	2	3	8	3	7	8	2	7	11	8	3	1	3	2	69
Paralysis	3	10	9	13	8	8	5	10	2	11	11	7	4	4	16	121
Personal involvement	1	2	1	2	2	3	6	0	3	5	9	1	1	1	1	38
Privilege	9	8	0	3	2	3	1	1	1	0	0	0	1	0	1	30
Resentment towards system	1	9	13	5	10	4	6	4	15	8	12	13	14	4	9	127
Threat	0	5	8	3	5	3	7	5	5	10	7	5	2	2	6	73

Appendix B
Material of the Quantitative Study

Table 1*STROBE Criteria and Corresponding Pages*

Criterion	Description	Page
Study design	Present key elements of study design.	21
Setting	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection.	23
Participants	Give the eligibility criteria, and the sources and methods of selection of participants.	21
Variables	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	23-24
Data sources/measurement	For each variable of interest, give sources of data and details of methods of assessment. Describe comparability of assessment methods if there is more than one group.	23-24
Bias	Describe any efforts to address potential sources of bias.	22
Study size	Explain how the study size was arrived at.	24
Quantitative variables	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why.	24
Statistical methods	(a) Describe all statistical methods, including those used to control for confounding. (b) Describe any methods used to examine subgroups and interactions. - Explain how missing data were addressed. (d) If applicable, describe analytical methods taking account of sampling strategy. - Describe any sensitivity analyses.	24

Consent Form for the Online Survey

Background

The study you are about to participate in is exploring the relatively new phenomenon of doomscrolling or *doomsurfing*. These terms describe a behaviour in which a person engages in constantly seeking out negative news about a certain topic on social media or in other (online) news media. The specific phenomenon that is examined in this study is *doomscrolling* related to negative *climate change news*. The research team will also investigate the consequences of doomscrolling on mental health.

The aim of this study is to gain clearer insights into the new phenomenon of doomscrolling about climate change. As this study is part of a Bachelor thesis, you will receive the link to the thesis when it is published and will be informed about the results.

In the following, you will answer scientific surveys about your mental health and about your news consumption behaviour. You are allowed to quit the study at any point, without giving a reason. There will be six surveys for you to answer. These are the Doomscrolling Scale (DS), the Coping Competence Questionnaire (CCQ), the Beck's Depression Inventory (BDI), the Perceived Social Support Questionnaire (F-SozU K-6) and the Hamilton Anxiety Scale (HAM-A). Additionally, you will answer question that the researchers developed themselves. All questions will be in English.

All identifying data will be anonymized. The data cannot be traced back to you. The data from the survey will be deleted after 2 years (2025). Please keep in mind, that this thesis might get published in a scientific journal after its completion.

If you have remaining questions, please contact one of the researchers; Frederic Apprich (n.f.a.apprich@student.utwente.nl), Luzie Grossekemper (l.grossekemper@student.utwente.nl), Moritz Hau (m.hau@student.utwente.nl), Lisanne te Pas (l.tepas@student.utwente.nl), or one of their supervisors, Dr.Alejandro Dominguez Rodriguez (a.dominguezrodriguez@utwente.nl), Dr.Shenja van der Graaf (shenja.vandergraaf@utwente.nl), Dr.Alex van der Zeeuw (a.vanderzeeuw@utwente.nl), or Dr.Mercedes Almela Zamorano (almela@tilburguniversity.edu)

Please tick the appropriate boxes

Yes No

Taking part in the study

I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.

I understand that taking part in the study involves a survey questionnaire completed by the participant.

I am currently not receiving any kind of treatment (medical or therapy) for a mental disorder

- I am receiving treatment
 I am NOT receiving treatment

I have not had a suicide attempt in the last two years

- I have
 I have NOT

I am not currently suffering from suicidal ideation / thoughts

- I am

I am NOT

Risks associated with participating in the study

I understand that taking part in the study involves the following risks: mental discomfort by talking about a sensitive topic such as climate change.

Use of the information in the study

I understand that information I provide will be used for research reports that aim to investigate the impact of doom scrolling on the topic of climate change impacts mental health.

I understand that personal information collected about me that can identify me, such as [e.g. my name or where I live], will not be shared beyond the study team.

Future use and reuse of the information by others

I give permission for the answers that I provide to be archived in survey database so it can be used for future research and learning.

Have you answered all the questions above with yes, and do you consent to participate in this study?

I consent to participating in this study

No, I do not consent

Contact Information for Questions about Your Rights as a Research Participant

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Secretary of the Ethics Committee/domain Humanities & Social Sciences of the Faculty of Behavioural, Management and Social Sciences at the University of Twente by ethicscommittee-hss@utwente.nl

Advertisement for the Online Survey

Figure 1

Advertisement of Social Media Campaign



Note. On the left is the advertisement for the Sona Pool advertisement and on the right the advertisement for the general social media advertisement.

G*Power Analysis

Figure 2

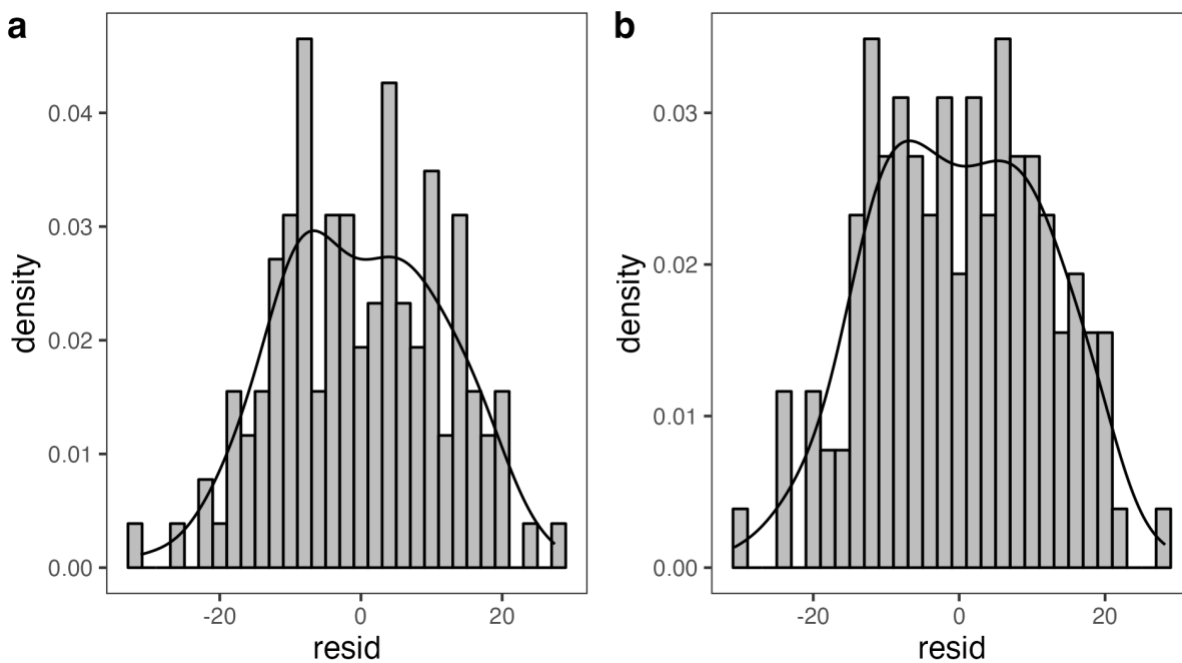
*G*Power Analysis*



Test of Assumption of Linearity

Figure 3

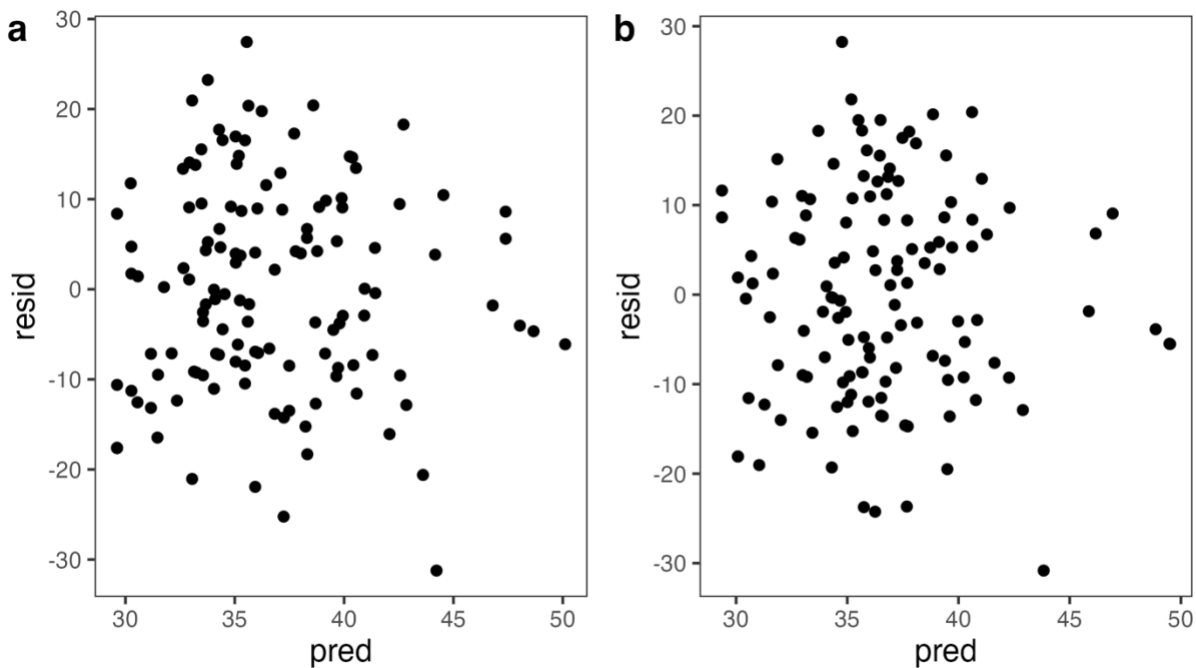
Histogram of Residuals for Linear Models



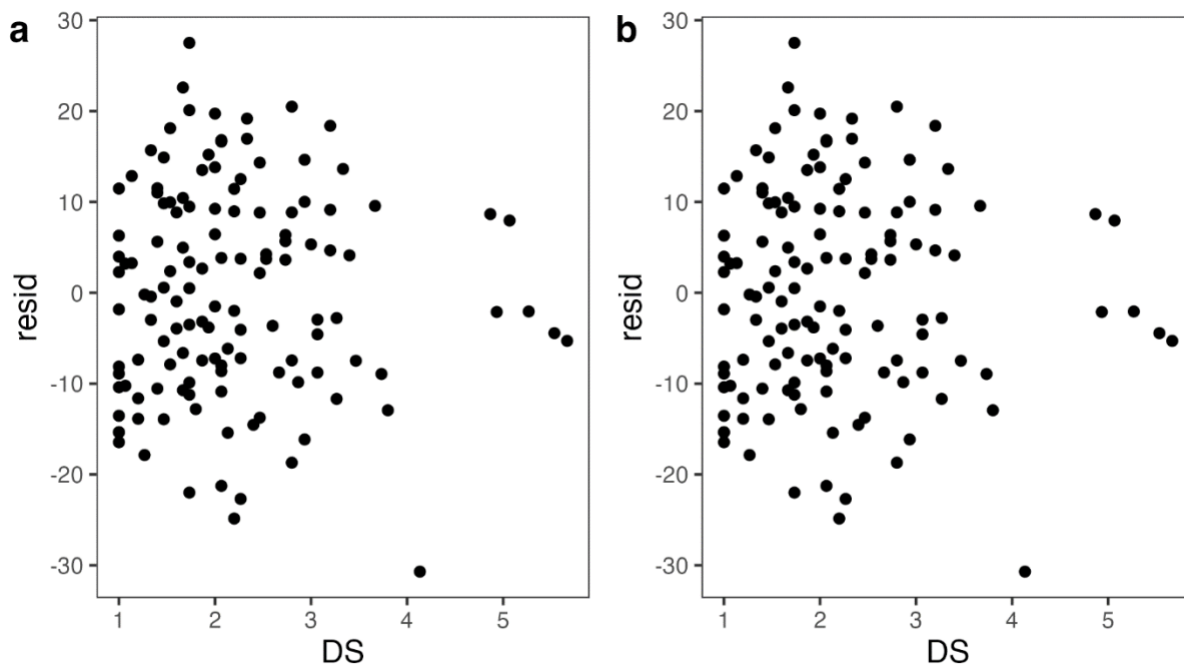
Note. Plot **a** shows the histogram for social support and Plot **b** shows histogram for climate change doomscrolling.

Figure 4

Plot of the Residuals



Note. **a** shows the residual plot for social support and **b** shows residual plot for climate change

Figure 5*Plot of the Residuals with Doomscrolling on Y-Axis*

Note. Image **a** shows the residual plot for social support and image **b** shows residual plot for climate change.

Posthoc Analysis: Test of Assumption of Linearity

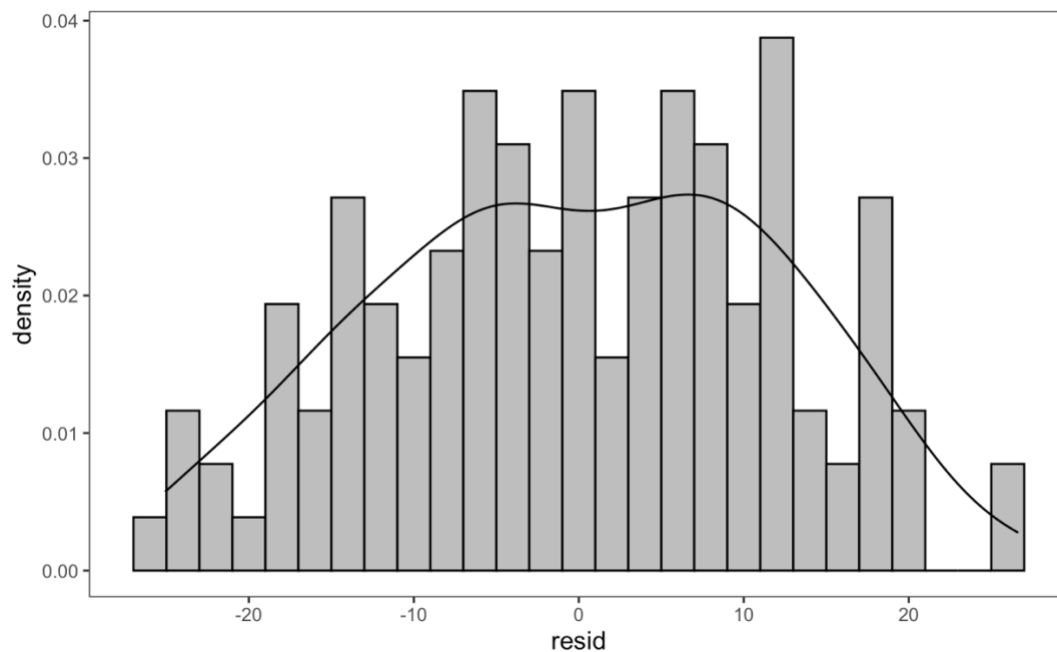
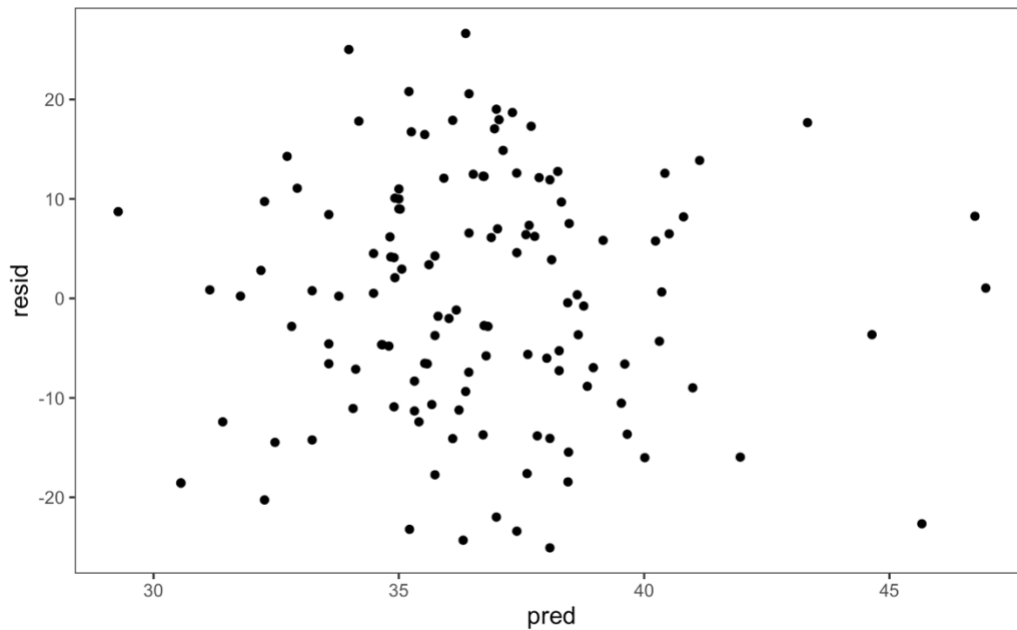
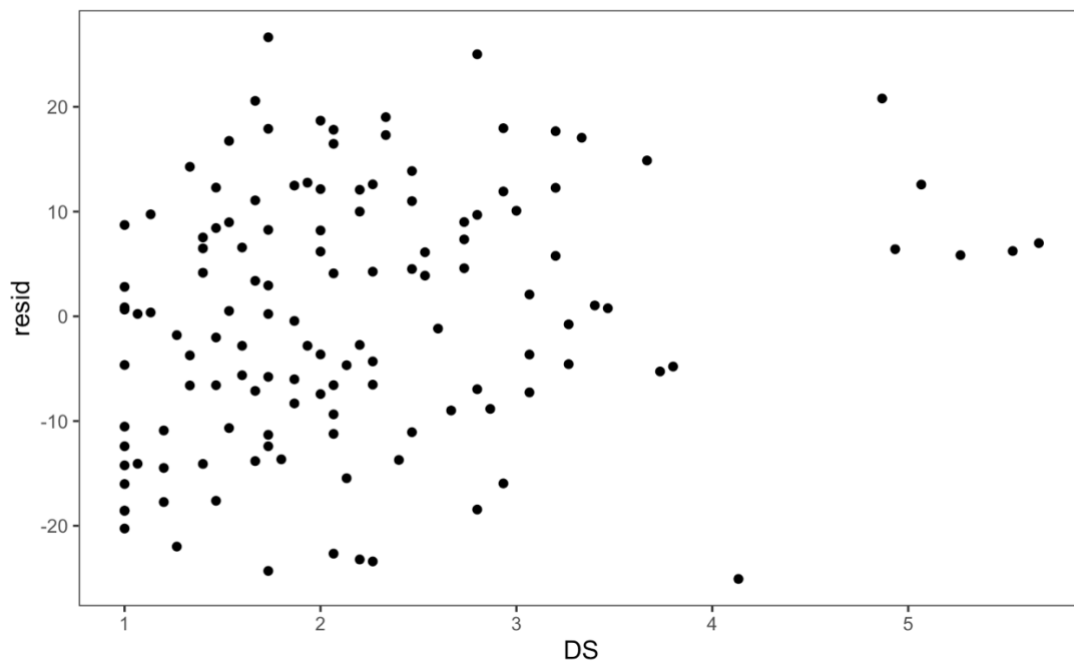
Figure 6*Histogram of Residuals for Posthoc Linear Model*

Figure 7*Plot of the Residuals for Posthoc Analysis***Figure 8***Plot of the Residuals with Climate Change Doomsscrolling on Y-Axis***Durbin Watson Test**

A Durbin-Watson test was performed on both models to ensure that the assumption of independence was met. The model with social support ($d = 2.24$, $p = .17$) as moderator for climate change doomsscrolling shows no serious autocorrelation. Thus, both models do meet the assumptions of *independence*.

Appendix C

R Code for the Statistical Analysis

Cleaning Data

```

1 # Load Packages----
2 pkgs <- c("tidyverse","excluder","tidylog","here") # used packages
3 lapply(pkgs, library, character.only = TRUE) # load them
4 # Load Data ----
5 Data <- read_csv(here("Data/Data.csv"))
6 # Exclude R Package to quickly process Qualtrics data ----
7 Data <- Data %>%
8   remove_label_rows() %>% # removes first two rows with meaningless
9   data
10  exclude_preview() %>% # exclude preview responses
11  exclude_progress(min_progress = 98) %>% # excludes responses not
12  finished
13  # responses
14  deidentify() # deletes data that could identify participant (e.g.
15  IP)
16
17 # rename variables ----
18 Data <- Data %>%
19   rename("Duration" = `Duration (in seconds)`,
20          "Informed_Consent" = `Informed Consent`,
21          "Gender" = Q1,
22          "Education_Level" = Q2,
23          "Education_Level_Other" = Q2_7_TEXT,
24          "Age" = Q3,
25          "Nationality" = Q4)
26
27 # Re-code CCD and CCQ Scales ----
28 Data <- Data %>%
29   mutate_at(c("CCD_Q3","CCD_Q4","CCD_Q10"), # CCD recode negative items
30             ~recode(., "1" = "7", "2" = "6", "3" = "5", "4" = "4", "5" = "3",
31                    "6" = "2", "7" = "1"), # recode reversed items
32             c("CCQ_1", "CCQ_2", "CCQ_3","CCQ_4", "CCQ_5", "CCQ_6",
33              "CCQ_7","CCQ_8",
34              "CCQ_9", "CCQ_10", "CCQ_11","CCQ_12"), # CCQ recode negative items
35             ~recode(., "1" = "6", "2" = "5", "3" = "4", "4" = "3", "5" = "2",
36                    "6" = "1") # reverse code all items
37   )
38 # safe data as numeric
39 Data <- mutate_all(Data,function(x) as.numeric(as.character(x)))
40 # calculate total scores for surveys
41 Data <- Data %>%
42   mutate(
43     CCD = rowSums(across(contains("CCD"))), # sum score
44     DS = rowMeans(across(contains("DS"))), # mean score
45     CCQ = rowSums(across(contains("CCQ"))), # sum score
46     F_SozU = rowMeans(across(contains("F-SozU"))) # mean score
47   )
48 # Re-code Demographics ----
49 Data <- Data %>%
50   mutate(across(c("Informed_Consent",
51                  "Gender",

```

```

52         "Education_Level",
53         "Education_Level_Other",
54         "Nationality"), as.character),
55   Informed_Consent = case_when(
56     Informed_Consent == 1 ~ "YES",
57     Informed_Consent == 2 ~ "NO"
58   ),
59   Gender = case_when(
60     Gender == 1 ~ "Man",
61     Gender == 2 ~ "Woman",
62     Gender == 3 ~ "Non-Binary",
63     Gender == 4 ~ "PNS"
64   ),
65   Education_Level = case_when(
66     Education_Level == 1 ~ "No Highschool",
67     Education_Level == 2 ~ "Highschool
68     (qualified for applied university)",
69     Education_Level == 3 ~ "Highschool
70     (qualified for university)",
71     Education_Level == 4 ~ "Bachelors Degree",
72     Education_Level == 5 ~ "Master Degree",
73     Education_Level == 6 ~ "PHD",
74     Education_Level == 7 ~ "Other",
75   ),
76   Nationality = case_when(
77     Nationality == 95 ~ "German",
78     Nationality == 180 ~ "Dutch",
79     TRUE ~ "Other"),
80   Duration = Duration/60 # seconds to minutes
81 )
82 # select relevant data for analysis
83 Data <- Data %>%
84   select("Duration", "Informed_Consent": "Nationality",
85         "CCD": "F_SozU") %>% # select data for further analysis
86   filter(Informed_Consent == "YES") %>%
87   select(!"Education_Level_Other")
88 # Safe as R.data for higher performance in analysis
89 save(Data, file = here("Data/Tidy_Data.Rdata")) # save dataset as Rdata
90 file
91
92

```

Inferential Analysis

```

1 ## ----preamble, collapse=TRUE, message=FALSE-----
2 # packages
3 pkgs <- c("tidyverse", "flextable", "modelr", "scales",
4           "gtsummary", "here", "scales", "report", "broom",
5           "apaTables", "rempsyc", "ggpubr", "psych", "car", "tidylog")
6 # lapply(pkgs, install.packages, character.only = TRUE) to load packages
7 lapply(pkgs, library, character.only = TRUE) # load them
8 # load data
9 load(here("Data/Tidy_Data.Rdata"))
10 ## ---- collapse=TRUE-----
11 Data %>%
12   select(Education_Level, Nationality) %>%

```

```

13 tbl_summary(Statistic = list(
14     all_categorical() ~ "{n} ({p}%)",
15     label = list(Education_Level ~ "Highest Educational
16 Level"),
17     missing_text = "Prefer not to Say") %>%
18     as_gt() %>%
19     gt::gtsave(filename = "demographics.docx")
20
21 ## -----
22 round(psych::alpha(select(Data, CCD_Q1:CCD_Q11),
23     warnings = F)$total$std.alpha, digits = 2)
24
25 ## -----
26 Data %>% select(CCD:F_SozU) %>%
27   apa.cor.table(., filename="cor.table.doc")
28
29 Data %>% summary
30 ## -----
31
32 model_F_SozU <- Data %>%
33   lm(CCQ ~ DS*F_SozU, data = .)
34
35 model_CCD_mod <- Data %>%
36   lm(CCQ ~ DS*CCD, data = .)
37
38 model_CCD <- Data %>%
39   lm(CCQ ~ CCD*F_SozU, data = .)
40
41 # Gather summary statistics
42 F_SozU.table <- as.data.frame(report(model_F_SozU))
43 my_table <- nice_table(F_SozU.table)
44 (F_SozU.table <- tidy(model_F_SozU, conf.int = TRUE))
45 flextable::save_as_docx(my_table, path = "F_SozU_Table.docx")
46
47 CCD_mod.table <- as.data.frame(report(model_CCD_mod))
48 my_table <- nice_table(CCD_mod.table)
49 (CCD_mod.table <- tidy(model_CCD_mod, conf.int = TRUE))
50 flextable::save_as_docx(my_table, path = "CCD_mod_Table.docx")
51
52 CCD.table <- as.data.frame(report(model_CCD))
53 my_table <- nice_table(CCD.table)
54 (CCD.table <- tidy(model_CCD, conf.int = TRUE))
55 flextable::save_as_docx(my_table, path = "CCD_Table.docx")
56
57 ## -----
58 # histogram
59 lm_hist <- function(model) {
60   Data %>%
61     add_residuals(model) %>%
62     ggplot(aes(x = resid)) +
63     geom_histogram(aes(y = ..density..), binwidth=2, colour=1, fill =
64 "grey") +
65     geom_density() +
66     jtools::theme_apa()
67 }
68
69 CCD_mod_hist <- lm_hist(model_CCD_mod)

```



```

70 F_SozU_hist <- lm_hist(model_F_SozU)
71
72 hist_plot <- ggarrange(F_SozU_hist, CCD_mod_hist, labels = c("a", "b"))
73
74 ggsave("hist_plot.png",
75         path = here("Figures/"), width = 1920, height = 1080, units =
76 "px")
77
78 # residual plot linearity
79 resid_plot1 <- function(model){
80 Data %>%
81   add_residuals(model) %>%
82   add_predictions(model) %>%
83   ggplot(aes(x = pred, y = resid)) +
84   geom_point() +
85   jtools::theme_apa()
86 }
87
88 resid_plot1_F_SozU <- resid_plot1(model_F_SozU)
89 resid_plot1_CCD_mod <- resid_plot1(model_CCD_mod)
90
91 ggarrange(resid_plot1_F_SozU, resid_plot1_CCD_mod, labels = c("a", "b"))
92
93 ggsave("resid_plot1.png",
94         path = here("Figures/"), width = 1920, height = 1080, units =
95 "px")
96
97 # residual plot independence and equal variance
98 resid_plot2 <- function(model){
99   Data %>%
100   add_residuals(model) %>%
101   ggplot(aes(x = DS, y = resid)) +
102   geom_point() +
103   jtools::theme_apa()
104 }
105
106 dwt(model_F_SozU)
107 dwt(model_CCD_mod)
108
109 resid_plot2_F_SozU <- resid_plot2(model_F_SozU)
110 resid_plot2_CCD_mod <- resid_plot2(model_CCD_mod)
111
112 ggarrange(resid_plot2_F_SozU, resid_plot2_CCD_mod, labels = c("a", "b"))
113
114 ggsave("resid_plot2.png",
115         path = here("Figures/"), width = 1920, height = 1080, units =
116 "px")
117
118 # posthoc linear assumptions
119 CCD_hist <- lm_hist(model_CCD)
120 ggsave("hist_plot_posthoc.png",
121         path = here("Figures/"), width = 1920, height = 1080, units =
122 "px")
123 CCD_plot1 <- resid_plot1(model_CCD)
124 ggsave("resid_plot1_posthoc.png",
125         path = here("Figures/"), width = 1920, height = 1080, units =
126 "px")

```

```
127 resid_plot2_CCD <- resid_plot2(model_CCD)
128 ggsave("resid_plot2_posthoc.png",
129         path = here("Figures/"), width = 1920, height = 1080, units =
130 "px")
131 dwt(model_CCD)
```