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Eco-anxiety in college students: Assessment and intervention in populations vulnerable to climate change related mental health disorders

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Publication Date

2024-06-01



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Reflective Essay

To start, I began developing my research proposal with a small amount of prior experience with the researching process. As such, I looked to bridge the gap between two of my scientific interests: psychology, my major, and climate science. At the time this project started, I was working with Dr. Qinghua Ding in the geography department on analyzing atmospheric river data in relation to climate change. However, I was quickly overwhelmed by the complexity of the research landscape and so I sought a consultation with my mentor and, subsequently, a subject librarian.

After consulting with my mentor, Dr. Martella Amedee, I had a topic for my research, eco-anxiety in college students, but lacked any direction for exploring the current literature. One of my primary concerns with my research project was identifying accessible peer-reviewed journals, scholarly articles, and reputable publications. Coincidentally, librarian Kristen LaBonte was asked to visit my research methods class.

During her guest lecture, Kristin gave the class a brief overview of all the library resources available to students and, importantly, the library's research consultation appointment system. Directly following her guest lecture, I made an appointment to speak one-on-one with the subject librarian for psychology, Kristen LaBonte. During our consultation, Kristen helpfully and patiently walked me through the library's various databases for searching through the current field of academic research. In particular, Kristen introduced me to and gave me a thorough walkthrough of an academic database available through the library: PsycINFO.

By using PsycINFO, I was able to find a large breadth of journals and scholarly articles during my literature review process and build a foundation for my research proposal based on established theories on anxiety and the impacts of climate change awareness on mental health.

Importantly, I learned how to identify reputable resources by looking for peer-reviewed articles indexed in major bibliographic databases or journals in the relevant field. Another criteria for reputable sources in my search was high impact factor journals/articles which are rated on the number of citations over a two-year period.

During this process, my primary search strategy was to access PsycINFO and use the advanced search function to search via keywords (i.e. eco-anxiety, climate change and mental health, etc.) while limiting the date range to articles published in the last ten years. If needed, I would further refine my search parameters (i.e. only scholarly articles or journals) until the number of articles was about 100 or less; a strategy recommended by Kristen.

Another helpful resource during my project was access to quiet study spaces at the library including the library's website showing the occupancy of each study space in the library with recommended floors/spaces to study. Likewise, practice presentation rooms available via appointment were crucial for working through my research proposal talk in a more appropriate forum than my dorm room.

Overall, the research consultation with a relevant subject librarian was critical for developing my research proposal and greatly impacted the quality of my writing and subsequent grade in the class. As a result, I've continued to use the library databases for every paper or research project I've written since my initial consultation with a librarian. In the end, having access to the UCSB library sources and staff allowed me to confidently step into the world of academic research and develop my own ideas and proposals for the future of psychological research in a world more affected by climate change every year.

**Eco-anxiety in college students: Assessment and intervention in populations vulnerable to
climate change related mental health disorders**

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PSY 10A: Research Methods

Dr. Amedee Martella

June 12, 2023

Introduction

Climate change is an ever-present threat in the modern age and not enough is being done to address the issue. According to NOAA (2022), the 10 hottest years on record have all occurred since 2010 (see appendix C). Climate activism has been on the rise in recent years but research on the effects of climate change on human wellbeing is sorely lacking. It stands to reason that the slow decline of the global ecosystem will have a negative impact on the mental and physical health of populations in the affected areas. Consequently, populations that are especially vulnerable to the effects of climate change are beginning to feel the impact on their mental health. Studies have identified people living in places disproportionately affected by climate change (i.e. the Pacific islands) and younger people are the main vulnerable populations of interest to the scientific community (Brophy et al., 2022; Burke et al., 2018; Gibson et al., 2020). Unsurprisingly, people experiencing distress related to climate change have been shown to experience a range of negative emotions (depression, anxiety, etc.) that are being referred to as eco-emotions (Stanley et al., 2021). Eco-emotions can cause disruption in the daily activities of individuals experiencing the strongest symptoms (Gibson et al., 2020). For example, Gibson et al. interviewed adults living in the Pacific Atoll Islands currently experiencing the consequences of climate change and they reported significant mental health distress so severe it was affecting their lives on a daily basis. It would be easy to conflate eco-emotions with a typical clinical condition (i.e. depression, anxiety, etc.) in which the patient was only temporarily concerned with climate change. However, studies have shown that eco-anxiety is not correlated with behavioral engagement that would be typically associated with non-climate change related depression or anxiety (Clayton & Karazsia, 2020). Clearly, eco-emotions are a novel condition emerging in response to the ever growing threat of climate change. In this study, eco-anxiety is

the eco-emotion of interest and will be defined in accordance with the APA definition used most prevalently by the scientific community: a chronic fear of environmental doom (Coffey et al., 2021). Furthermore, this study will be focusing on the incidence and impacts of eco-anxiety in young people (18-25) and exploring a potential treatment pathway synthesized from the literature.

Talk-Therapy Treatment

In particular, common themes have been identified in reviews of published studies containing effective treatments for eco-anxiety (Baudon & Jachens, 2021). All of the studies involved talk-therapy in a clinical setting. Based on these findings, a trained therapist will be recruited to facilitate the treatment stage of this experiment. The therapist will be instructed to focus on providing talk-therapy in alignment with the themes and sub-themes provided in appendix B. Specifically, the therapist will assist the patient in reframing their personal relationship with climate change and recommend that the patient take action. Additionally, self-care with an emphasis on enjoying green spaces (referred to as forest bathing) has been shown to decrease cortisol levels among other physiological benefits (Lee et al., 2011). Finally, patients will be encouraged to join social/activism groups; if they show a drive for large-scale change. Talk-therapy will be used as the intervention method in this experiment because eco-anxiety is not a pathological condition and medicalization is not advised by the scientific community (Brophy et al., 2022). Additionally, talk-therapy has been shown to be an effective treatment but the literature has not yet reached a consensus on a homogenized method; which is the aim of this study (Hayes et al., 2018). Regarding treatment, this experiment will be working closely with licensed professionals to develop a clinical treatment regime that can be generalized to a wider population. Also, all participants will be working with the same therapist as a

moderator to avoid any differences in outcome that may result from a difference in clinical methods between individual providers. In sum, eco-anxiety has been shown to negatively affect individual well-being and this study aims to benefit vulnerable populations by creating and testing a single, generalizable treatment method.

Vulnerable Populations

So far, research in the field of eco-anxiety has been scarce but is expanding as the issue becomes more prevalent in the population. Even so, most work has focused on adults, and so the field is missing critical information on the mental health outcomes of young people and children (Burke et al., 2018). Young people are considered a vulnerable population because they will disproportionately experience the consequences of climate change compared to the older populations whose actions are mostly to blame; with children in the developing world suffering the greatest impacts (Burke et al., 2018). In a study conducted in the Pacific Atoll Islands (an area already dealing with climate change disasters), adults were already showing severe symptoms of depression and anxiety in response to climate stressors (Gibson et al., 2020). Likewise, young people are likely to be experiencing a similarly negative response to the same stimuli considering they will be living in the affected areas longer and during more severe conditions as time passes. To illustrate, the interviewed participants in the Gibson et al. study reported higher levels of distress correlated with a better understanding of the local and global scale and effects of climate change. Simply, being more aware of climate change can cause someone to experience higher levels of eco-anxiety. In the age of the internet and growing concerns about climate change, it is implausible to shelter children from the truth in an attempt to negate the potential negative consequences on their mental health. Furthermore, adverse effects on mental health outcomes can affect every aspect of a young person's life including grades in

school and/or performance at work. Therefore, this study aims to reduce the levels of eco-anxiety in young people while protecting the population of interest and greatest potential benefit. Due to the difficulty of working with subjects under 18, this study will only be accepting young adult participants from 18-25 years of age. The 18-25 demographic is suspected to be heavily affected by eco-anxiety and the pre-screening survey will assess the aforementioned population's risk level. An institutional review board (IRB) will be consulted to ensure the treatment methods and control condition benefits outweigh the risks; another reason only licensed therapists will be carrying out any mental health treatment required by the experiment.

Eco-Anxiety Operationalized

Currently, eco-anxiety is a relatively new phenomena and so the scientific community has not come to a consensus of the definition of the term. One integrative literature review found 23 studies with different definitions for eco-anxiety (Brophy et al., 2022). Therefore, this study will be using the APA definition (mentioned above) when referring to eco-anxiety throughout, in an effort to normalize a single definition. Additionally, measuring eco-anxiety can present its own difficulties, if an appropriate measure is not available. For example, a participant could be experiencing anxiety or depression unrelated to climate change which could skew the effects of the study. Also, if the participants are experiencing a temporary high/low mood then an inaccurate measure would prove insufficient. Thankfully, Clayton & Karazsia (2020) have recently developed a scale that can measure a participants level of eco-anxiety independent of other cognitive or behavioral disorders (see appendix A). As part of the validation of the scale, Clayton & Karazsia performed Cronbach's alpha analysis which found a high correlation (>80%) for all questions involving climate change related anxiety and negative correlation with measures of other behavioral engagement. Subsequently, this study will be using the eco-anxiety scale to

assess pre- and post-test levels of eco-anxiety within subjects. There is a likelihood that eco-anxiety levels could naturally vary over time which could make it difficult to assess the overall effectiveness of this experiment. To offset such a result, this study will include a control group; allowing post-experiment data analysis to calculate the effect size of the treatment.

Current Study

As discussed above, this study is a synthesis of the current research in the field of eco-anxiety. Briefly, the identified gaps this study aims to address include: missing community consensus on the definition of eco-anxiety, a lack of mixed methods (quantitative and qualitative) designs to understand and treat eco-anxiety, and statistical data to understand and quantify the direct impacts of eco-anxiety on young people. The framework for this study is based on the eco-anxiety scale developed and validated by Clayton & Karzsia (2020) as well as the major patterns of effective treatments identified by Baudon & Jacehns (2021). In tandem, the work of these other researchers has laid a foundation to begin clinical trials. It is of utmost importance that a treatment becomes available before climate change becomes more widespread and/or severe; thus increasing the number of people negatively impacted by climate stressors. If the treatment causes a statistically significant decrease in participants levels of eco-anxiety then the treatment may also be effective in other vulnerable populations such as the people living in geographical regions that are currently experiencing the onset of many climate change related problems.

Hypotheses

Eco-Anxiety in Young Adults Main Effect: According to prior research, populations that are more likely to experience the effects of climate are more susceptible to eco-anxiety. As such, the 18-25 year old population surveyed in the study will have a high percentage of people

currently experiencing eco-anxiety as measured by the Clayton & Karazsia scale (see appendix A).

Intervention Main Effect: The therapeutic treatment reframing an individual's personal responsibility for climate change and focusing on establishing inner resilience and realistic goals that can be achieved by the individual in accordance with the themes (see appendix B) present across effective treatments will result in lower levels of eco-anxiety in the treatment group.

Methods

Participants

For this study, 128 participants in the young adult age range (18-25) will be recruited from the campus of UC Santa Barbara (UCSB). All participants will be pre-screened to ensure that the subject is currently experiencing eco-anxiety. In order to recruit participants, pre-screening surveys will be available online through the UCSB research application website SONA and follow-up emails will be sent to qualified participants inviting them to join the full study. The pre-screening pool has no limit and will run the full duration of one full school quarter (10 weeks). Upon completion of the survey, the 128 participants experiencing the experimental condition will be randomly sampled from the available pre-screened pool. The responses from the entire surveyed population will be used to assess the percentage of young adult respondents that are experiencing eco-anxiety. The only requirements to be considered for participation are the age of the subject (must be 18-25) and if they are currently experiencing eco-anxiety. After, the 128 participants will be randomly assigned to 2 groups of 64. The number of participants was calculated using an anticipated incidence (%) increase of 80% for group 1 (treatment) and 20% for group 2 (control) with an alpha of 0.05 and a power of 80%. In this calculation we used a dichotomous endpoint of whether or not treatment was effective at reducing eco-anxiety in a

statistically significant way; effect size will be calculated separately and considered in the analysis of the data.

Design

The experiment follows a pretest/posttest independent-groups design with an intervention group and a control group. The intervention is the main focus of this study and will be provided to 1 group at the beginning of the study and, if effective, will be made available to the control group. The variables will be operationalized as follows: the independent variable will be the treatment received by the participants and the dependent variable will be the level of eco-anxiety the participants are experiencing following either condition (treatment or no treatment). Levels of eco-anxiety in both the pre-screening and post-testing will be assessed using self-report answers on the eco-anxiety scale (see appendix A). Additionally, a control variable will be present in this experiment requiring participants in both groups to be experiencing eco-anxiety at the start of the experiment to properly assess the effect size of the treatment. Finally, the treatment group will experience a moderator in which every participant will meet with the same therapist to receive as similar an intervention as possible.

Measures and Apparatus

The participants experiencing the treatment condition will receive the treatment on the UCSB campus in a quiet room within the Psychology building. The participant will be in the room with the therapist and a research observer who will interact with the participant. Finally the participant will be provided a chair and be allowed to take breaks as needed to remain comfortable.

The survey scale is a measure of eco-anxiety developed by Clayton & Karazsia (2021) as described previously. It consists of 22 self-report questions, rated on how often the participant

feels a statement is true about themselves from 1 (never) to 5 (almost always). The questions represent the following: cognitive-emotional impairment (1-8); functional impairment (9-13); experience of climate change (14-16) and the climate anxiety scale (1-13); behavioral engagement (17-22) (see appendix A). In addition, a second questionnaire will be created for this study to collect demographic data (gender, age, etc.) and will be attached to the beginning of the eco-anxiety survey. The surveys will require participants to access them via the internet on their preferred device outside of the lab. All data from the survey will be processed and analyzed by the research team through the statistical program SPSS.

Procedure

All participants will fill out a pre-screening survey (see appendix A) used to identify individuals that are currently experiencing eco-anxiety. The pre-screening survey will be available through the UCSB research participation website and provide a participation credit required by some classes. All students will also sign a consent form notifying them that they may withdraw from the study at any time and still receive credit. The survey will remain available online even after the 128 subjects are selected to provide a larger sample and better understanding of the percentage of students that are experiencing eco-anxiety. Next, once enough participants enter the selection pool, follow-up notifications will be sent to 128 randomly selected applicants that are currently experiencing eco-anxiety. After, the new pool of participants will be evenly split and randomly assigned to either the intervention (n=64) or the controlled condition (n=64). Then, over the next month, individuals in the intervention group will be asked to schedule a 30-minute therapy session with the experiment therapist. During the therapy sessions, the therapist will begin by asking the participant about their relationship to climate change and their experience with eco-anxiety. Throughout, the therapist will validate the

patient's concerns about climate change and provide the patient with resources to get involved in climate activism (individual and group resources will be made available) (Baudon & Jachens, 2021). Also, the session will focus on promoting inner resilience through self-care and emotion-focused interventions including grief awareness and fostering optimism and hope for the future (Baudon & Jachens, 2021). Treatment group subjects will be debriefed after each therapy session to assess their current mental health condition and will be provided additional resources as necessary. Upon completion of all the therapy sessions, all participants (treatment and control) will be sent the same survey previously completed to assess their eco-anxiety levels following their condition. At this time, the control group will be debriefed on the study and allowed to opt-in to the treatment condition if a beneficial effect is found.

Threats to validity

Considering the scope of the current study, a few threats to validity are clear from the start. First, internal validity is likely to be threatened by both maturation and regression to the mean. To explain, if any of the participants are having a particular high or low mood with regard to eco-anxiety during the pre-test survey, then the post-test results could be skewed in either direction based on the perceived change in any number of subjects. This is because outliers in the first survey are likely to regress towards the mean in the follow-up survey. Also, maturation of the participants presents a large threat to the internal validity of the study. Anxiety is a complicated mental health disorder that can differ in severity over time. Especially in the case of non-pathological anxiety, it's possible that the subjects could experience wide swings in mood (particularly in the non-treatment control group) independent of the experiment. For the subjects, the anxiety does not disappear after the study and, as discussed in previous studies, is likely to worsen as climate change becomes more prevalent in the daily zeitgeist (Gibson et al., 2020). For

this reason, the study is operating in a relatively short 1-month period. On the other hand, the external validity of the study is threatened by the sampling method and the resulting potential selection effect. Ultimately, the participants for this experiment will be sampled from the population of UCSB students due to the convenience in reaching the desired population via already established campus resources. As such, there is a potential selection effect since UCSB (a university with a strong environmental science department) students may have an atypical knowledge and understanding of climate change compared to the rest of the public.

Generalization to the wider public is an important focus of this study and so, random sampling and moderation are being used to the extent possible using the resources available.

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Appendix A

Full Climate Change Anxiety Scale (Clayton & Karazsia, 2020)

Please rate how often the following statements are true of you.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Almost always

1. Thinking about climate change makes it difficult for me to concentrate.
2. Thinking about climate change makes it difficult for me to sleep.
3. I have nightmares about climate change
4. I find myself crying because of climate change
5. I think, “why can't I handle climate change better?”
6. I go away by myself and think about why I feel this way about climate change
7. I write down my thoughts about climate change and analyze them
8. I think, “why do I react to climate change this way?”
9. My concerns about climate change make it hard for me to have fun with my family or friends.
10. I have problems balancing my concerns about sustainability with the needs of my family.

11. My concerns about climate change interfere with my ability to get work or school assignments done.
12. My concerns about climate change undermine my ability to work to my potential.
13. My friends say I think about climate change too much.
14. I have been directly affected by climate change
15. I know someone who has been directly affected by climate change
16. I have noticed a change in a place that is important to me due to climate change
17. I wish I behaved more sustainably
18. I recycle
19. I turn off lights
20. I try to reduce my behaviors that contribute to climate change
21. I feel guilty if I waste energy
22. I believe I can do something to help address the problem of climate change

Note: Items 1–13 constitute the climate change anxiety scale. Items 1–8 represent cognitive-emotional impairment; 9–13 measure functional impairment; 14–16 measure experience of climate change; 17–22 measure behavioral engagement.

Appendix B

Common Themes in Therapeutic Treatment of Eco-Anxiety (Baudon & Jachens, 2021)

Table 1. Eco-anxiety themes.

Main Themes	N *	Sub Themes	Sub-Sub Themes
Fostering clients' inner resilience.	31	Cognitive interventions.	Shifting from catastrophizing towards a less black-and-white picture.
		Meaning-focused and existential interventions.	Discussing and relativizing the social and systemic dimensions of climate change.
		Emotion-focused interventions.	Fostering optimism and hope. Grief-focused interventions.
		Self-care interventions.	Differentiating between clients' distress related to their history and distress related to eco-anxiety.

		Interventions	
		connecting clients	Interventions focused on
		with their lyrical	creative expression and the arts.
		self.	
			Interventions focused on
			dreams.
Helping clients find social		Joining established	
connection and emotional	21	groups and	
support by joining groups.		organizations.	
		Group rituals.	
Encouraging clients to		Individual action.	
take action.	15	Collective action	
Practitioner's inner work		Grief awareness.	
and education.	13		
<hr/>			
Connecting clients with			
nature	9		
<hr/>			

* N = number of articles/papers.

Appendix C

Ten Warmest Years; NOAA Annual report (1880-2022)

1 = Warmest

	Year	Anomaly °C	Anomaly °F
Period of Record: 1880–2022			
1	2016	0.99	1.78
2	2020	0.98	1.76
3	2019	0.94	1.69
4	2015	0.93	1.67
5	2017	0.91	1.64
6	2022	0.86	1.55
7	2021	0.84	1.51
8	2018	0.82	1.48
9	2014	0.74	1.33
10	2010	0.72	1.30
