Master Thesis

Utrecht University

MSc Clinical Psychology

**Self-Determination Theory and Climate Anxiety: Investigating the role of
Motivation for Pro-environmental Behaviour**
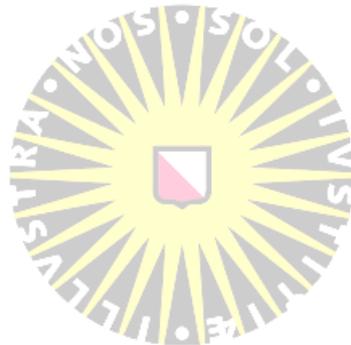
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SUMMARY

The present study attempted to shed more light on the phenomenon of Climate Change Anxiety, based on the central principles of Self-Determination Theory. The data were collected via online questionnaire. A sample of N=98 participants showed a positive relationship between Climate Change Anxiety and Pro-Environmental Behavior. This relationship was examined through the role of autonomous and controlled motivation as an explanatory process. The main relation was analyzed via regression analysis. Then, mediation analysis showed partial mediating effects of Integrated and Introjected motivation on the studied relationship. The mediating effect of Integrated motivation was bigger than that of Introjected motivation, highlighting that when anxiety is internally integrated by the person experiencing it, it is becomes a healthy behavioral force. The positive relation between Climate Change Anxiety and features of Generalized Anxiety Disorder, indicated a clinical subsistence of the phenomenon.

1. INTRODUCTION

The research aims to focus on SDT and Climate Change Anxiety, clarifying the way how the rapid climate changes on the planet are affecting people's psychological functioning and well-being. The physical consequences of natural disaster on humans are considered more obvious than the consequences on their mental wellbeing. Therefore, more research in the field of climate change psychology is needed, in order to raise awareness of the problem and the various ways that humans are affected by the state of planet earth. The purpose of this research is to examine the relationship between climate change anxiety and pro-environmental behavior, explained through the different types of motivation of Self Determination Theory (SDT , Ryan & Deci, 2000a, 2017).

1.1 Climate Change Anxiety

Climate Change anxiety (CCA) is not a recognized clinical term, but it is used to describe a mental condition with clinical features that is becoming more common in humans. The term refers to the continuing and serious worrying, about the dangers of climate change and the environmental disasters that are caused by the destruction of the planet earth (Clayton, 2020).

In terms of this phenomenon, the research field is relatively scarce with little research on reliable tools to measure this phenomenon. After 1990s' more evidence was found, indicating a link between geophysical climate changes and negative effects on mental health. One of the first related works was that of the Australian philosopher Glenn Albrecht (2005), who introduced the term "solastalgia" as the chronic discomfort of people due to negative changes in their environment, and more specifically when their home environment is affected. Many terms have emerged, including:, environmental distress, ecological grief, ecological stress, eco-anxiety and climate change distress, having slightly different implications and describing different emotional responses. Finally, the term "Climate Change Anxiety" was used be Clayton & Karazsia (2020) to summarize the emotional response towards climate change.

CCA has been linked to adverse reactions, such as loss of appetite, insomnia and panic attacks among those affected (Ingle & Mikulewicz, 2020). The negative

emotions associated with climate change are likely to be considered strong enough to contribute to mental illness for a portion of people (Clayton, 2020).

In a survey conducted by the American Psychological Association (2018) 51% of the American participants responded that climate change was a somewhat significant cause of stress, while in 2020 approximately two thirds of respondents were found to experience a little of worry about the consequences of climate anxiety (American Psychological Association, 2020). In a large-scale research (Carleton, 2017) it is estimated that warming over the last 30 years is responsible for 6.8% of the total upward suicide trend in India.

Miles-Novelo & Anderson (2019) found that global warming is related to increased aggression and violence, and they developed a model that correlates rapid global warming with anti-social behaviors. Obradovich, et al. (2018) concluded that short-term exposure to more extreme climate conditions associate with worsened mental health. Additional findings even indicate a link between air pollution and mental health, particularly depressive symptoms (Buoli et al.,2018).

1.2   *The factor of Generalized Anxiety Disorder.*

One of the questions that had entered the research was whether the climate affects are related to general stress measures or not (Clayton, 2020). It is rational to think that the excessive worry about climate change might be a symptom of underlying mental health problems or comorbidity of anxiety disorders, rather than a reasonable response. Given the fact that the worry about ecological issues has been linked to symptoms of pathological worry and anxiety, in multiple researches, it could be expected that individuals who experience Climate Change Anxiety show indications of dysfunctional anxiety-related conditions (Verplanken &Roy, 2013).

Furthermore, there is also a possibly more adaptive side of CCA, as it can be viewed as a reasonable response. Verplanken & Roy (2013) found a near zero correlation between ecological worrying and pathological worry. Homburg & Stolberg (2006) considered the factor of stress to be crucial for pro-environmental behavior, (i.e. behavior that aims to reduce a negative impact on the environment). In another research by Lin et al. (2019) the participants who expressed stronger concerns about the future and community were likely to perform behaviors like recycling and waste management.

Although Clayton and Karazsia (2020) described CCA as clinically relevant, being associated with impaired functioning, it was also defined as an effective response to environmental circumstances. Taking the above facts into account, they concluded that, similarly to the clinical representations of anxiety, worrying about planet issues may reflect a realistic perception of danger, but it becomes problematic when it begins to affect one's life (Clayton and Karazsia, 2020). One of the topics for further research, suggested by Clayton & Doherty (2011), was in regard to the relationship between climate change and forms of psychopathology. Those facts are indicating that studying the relationship between Climate Change Anxiety and Generalized Anxiety Disorder could be an interesting aspect.

Li et al. (2019) found motivation to be one of the psychological factors that influence pro-environmental behavior. Therefore Motivation could be a mediating factor between Climate Change Anxiety and Pro- Environmental Behavior. This section focuses on the elements of Self-Determination Theory (SDT, Ryan & Deci, 2017) related to motivation and the relationship with the factors of Climate Change Anxiety and Pro-environmental Behavior.

1.3 *The factor of Motivation through Self-Determination Theory.*

A main assumption of SDT is that humans are endowed with innate motivation that leads them to action. These motives can be either external, such as rewards, punishments, and evaluations or internal, such as interest, curiosity, values (Ryan & Deci, 1985). Motivation works alongside the Basic Needs of the individual creating the humans' psychological framework of SDT.

According to SDT there are three types of motivation: Intrinsic motivation, Extrinsic motivation and Amotivation (Ryan & Deci, 2017). Firstly, Amotivation describes a lack of intentionality. An a-motivated individual has no sense of purpose, or motivation to make a change with their behavior. It represents the least self-determined of all motivation types. Intrinsic motivation concerns behaviors that are made because they are by nature interesting or satisfactory and they are not dependent on external inducements (Deci & Ryan, 2000b). In contrast to intrinsic motivation is extrinsic motivation, which pertains activities that are done, due to reasons other than inherent satisfaction (Ryan & Deci, 2020). SDT distinguishes four qualitatively

different types of extrinsic motivation that can be ordered from the least to the most autonomous as follows: external regulation, introjection, identification and integration (Figure1. *External regulation* reflects the least autonomous type of extrinsic motivation, when behaviors are driven by rewards, punishments and other external pressures. A typical example would be recycling because other people insist so. *Introjection* is the type of motivation defined by feelings of internal pressure or personal obligation, (e.g. recycling because one would feel shame they did not). The individual acts in order to avoid negative feelings such as guilt, shame or anxiety, or to gain positive feelings such as self-approval (Pelletier et al., 2001). *Identification* represents the case in which the activities are part of one's values, so their actions are viewed as personal choices (e.g. Recycling because that is the way they chose to help the planet). The individual comprehends the importance of pro-environmental behavior and makes a conscious decision to do so (Ryan & Deci, 2020). *Integration* is the most autonomous type of extrinsic motivation. It refers to when one's behavior identify with the individual's self-definition. An example would be recycling because pro-environmentalism is a part of who I am.

Figure 1.
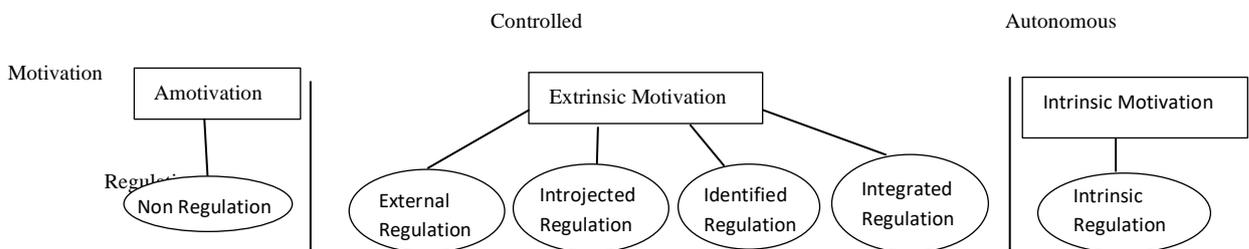
According to SDT, the more autonomous and self-determined one's motivation is, the more likely to continue their behavior and to experience more psychological freedom. As such, identified and intrinsic types of motivation are positively associated with positive results and proactive coping (Ryan et al., 2016). Villacorta et al. (2003) came up with important findings. Autonomous motivation was significantly positively related to pro-environmental attitudes, and significantly negatively related to anti-environmental attitudes (i.e. attitudes that ignore or do not benefit the environment). Greater autonomy was found to be linked to more pro-environmental attitudes and fewer anti-environmental attitudes over time (Pelletier et al., 2011). Moreover, the results indicated that those pro-environmental attitudes remain stable over time.

In contrast, Ryan et al. (2016) argue that autonomy malfunctions, which are caused by biological and psychological factors, are central in various forms of psychopathology. External and introjected types of motivation are correlated with maladaptive coping (Ryan et al., 2016). Specifically disorders with anxiety features, like Obsessive Compulsive Disorders and Self-Critical Depression, are linked to controlling motivation (Ryan & Deci, 2017). Ryan et al. (2016) highlighted the relationship of Introjection with anxiety, post-failure stress, low self-esteem and inner distress.

The Present Study

This research aims to explore the relation between Climate Change Anxiety and Pro-environmental Behavior, explained by qualitatively different types of Motivation, according to SDT. According to previously mentioned research findings (Higginbotham et al., 2014, Homburg & Stolberg, 2006, Clayton & Karazsia, 2020), it is hypothesized that Climate Change Anxiety is strongly positively related to Pro-environmental behavior *(Hypothesis 1)*.

Moreover, empirical evidence suggests that higher levels of autonomy are associated with better mental health and well-being (Ryan et al., 2008). Therefore, it is hypothesized that more autonomous forms of motivation (Intrinsic Motivation, Integration and Identification) are negatively associated with Climate Anxiety. The less autonomous types of motivation (Introjection, External Regulation and Amotivation) are hypothesized to be positively associated with Climate Change Anxiety (*Hypothesis 2a*).

An additional research question is about which type of motivation relates to more pro-environmental engagement. Based on Villacorta et al. (2003), it could be hypothesized that autonomous types of motivation would be strongly positively related to more pro-environmental engagement (*Hypothesis 2b*). Based on Higginbotham et al. (2014) and Homburg& Stolberg (2006), who considered stress to be a forceful motivator for pro-environmental behaviors, it could be hypothesized that introjected motivation, that has been linked to anxiety, would also be positively related to more pro-environmental engagement, to a lesser extent than types of autonomous motivation. Controlled types of motivation (External Regulation and Amotivation) are expected to be negatively associated with pro-environmental behavior. Since introjection is

positively related to anxiety (Ryan et al., 2016), which is positively related to PEB (Verplanken & Roy, 2013), It is hypothesized that the (positive) relation between climate anxiety and pro-environmental behavior is mediated by a type of introjected motivation behind it (*Hypothesis 3*).

Finally, based on the clinical aspect of Climate Change Anxiety, examined by the questionnaire (Clayton & Karanzia,2020) , it is assumed that GAD is a predictor for Climate Change Anxiety *(Hypothesis 4),* since the cognitive, physical and functional impairment appears to be quite similar to that of GAD.

2. METHODS

2.3 *Participants*

Anyone over the age of 18 was welcome to participate in the research. The sample consisted of 103 participants, 5 of whom did not continue to complete the questionnaire for unknown reasons (N=98). Out of the total sample, 67 people self-identified as women 26 as men and 5 people reported themselves as non-binary. (M_{age}= 24.65 years, *SD*= 6.01, range 19-59 years). Most the participants were high school or bachelor graduates (78%). 93% of the participants were living in Greece, 7% were living in different places in Europe and one participant was a Canadian citizen.

2.4 *Procedure*

The questionnaire was published after first being approved by Faculty Ethics Review Committee (FERB) in order to ensure compliance with applicable codes of conduct and business codes and (European, national and international) laws and regulations. The participants were asked to complete a questionnaire through the online platform Qualtrics, in English. After reading an information letter of participation, which contained a brief reflection on climate change and a description of this research, they filled a consent form. The questionnaire was anonymous and consisted of items about demographic information (Age, Gender, Country of Living and Educational Level) and scales that measured pro-environmental behavior engagement, motivation towards the environment, levels of Climate Change Anxiety and features of Generalized Anxiety Disorder.

2.5 *Measures*

The Climate Change Anxiety Scale. Clayton and Karazsia (2020) developed this 13 item scale to assess the effect of Climate Change on mental well-being. They based their items on extensive literature review about the range of climate change's emotional impact and they made adaptations on various pre-existing instruments. The scale was shown to have adequate internal reliability (Cronbach's α>.90), as well as concurrent and discriminant validity (Clayton and Karazsia, 2020). On a Likert-type scale, ranging from 1 ("Never") to 5 (Almost always), participants indicated their level of experienced cognitive-emotional impairment (e.g. "Thinking about climate change makes it difficult for me to concentrate.") and functional impairment (e.g. My concerns about climate change undermine my ability to work to my potential) (M=22.85, SD=8.30, α=.90).

Pro-environmental Behavioral Engagement. This scale was also based on the work of Clayton & Karazsia (2020) who developed a 6 item scale, with the addition of a the 7th item ("I follow a low waste lifestyle"). The scale is shown to have moderate internal reliability (M=26.00, SD=3.57, α=.65), as well as concurrent and discriminant validity. Participants indicated their pro-environmental behaviors on a five point Likert scale (1=never, 5=Almost Always) that measures the pro-environmental behavioral engagement (e.g. "I recycle").

Motivation Towards the Environment Scale (MTES). Autonomous and controlled types of motivation behind pro-environmental behaviors were assessed by the MTES, shown to have an adequate reliability and validity (Pelletier et al., 1998). The MTES consisted of 24 items in random order that represent possible responses to the question: "Why are you doing things for the environment?" (see Table 1). Participants indicated whether each item corresponded with their motivation, on a Likert scale, ranging from 1 (Does not correspond at all) to 7 (Corresponds exactly). Six subscales of four items are used to measure each type of motivation: (1) Intrinsic Motivation (e.g. For the pleasure I get from contributing to the environment"); (2) Integrated Motivation (e.g. "Because being environmentally-conscious has become fundamental part of who I am."); (3) Identified Motivation (e.g. Because it's a way I've chosen to contribute to a better environment"); (4) Introjected Motivation (e.g. "Because I would feel ashamed of myself, if I was doing nothing to help the environment."); (5) External Regulation (e.g. "Because other people will be upset if I don't".); (6) Amotivation (e.g. "I don't really

know; I can't see what I'm getting out of it"). Principal component analysis (with promax rotation) was performed on these 24 items, because of the possible high correlations between identified and introjected regulation (Table 1). The motivation scales were computed based on this factor solution.

GAD-7. This scale by Spitzer et al. (2006) was used to assess features of Generalized Anxiety Disorder. On a four-point Likert-type scale, the participants indicated how often they were bothered over the last 2 weeks by a list of 7 items (e.g., "feeling anxious, nervous or on edge"), from the frequency of 0 (not at all) to 4 (nearly every day). The GAD-7 has demonstrated good test-retest reliability, criterion validity, construct validity and internal reliability (Cronbach's α >.90).

Table 1. Results From a Factor Analysis of the Motivation Towards the Environment Scale (MTES) Questionnaire.

MTES Item	Factor Loading					
	1	2	3	4	5	6
Factor 1: Intrinsic Motivation						
1. For the pleasure I experience while I am mastering new ways to help the environment.	**.87**					
3. For the pleasure I experience when I find new ways to improve the quality of the environment.	**.84**					
5. Because I like the feeling I got when I do things for the environment.	**.73**					
9. For the pleasure I get from contributing to the environment.	**.78**					
Factor 2: Integration						
15. Because taking care of the environment is an integral part of my life.		**.70**				
17. Because it seems to me that taking care of myself and taking care of the environment are inseparable.		**.70**				
19. Because being environmentally-conscious has become a fundamental part of who I am.		**.87**				
20. Because it's part of the way I've chosen to live my life.		**.88**				
Factor 3: Identification						

10. Because it's a sensible thing to do in order to improve the environment.	**.64**			
11. Because it's the way I've chosen to contribute to a better environment.	**.80**			
22. Because I think it's a good idea to do something about the environment.	**.64**			
Factor 3: Introjection				
7. I think I'd regret not doing something for the environment.		**.61**		
18. Because I would feel guilty if I didn't.		**.86**		
21. Because I would feel ashamed of myself if I was doing nothing to help the environment.		**.73**		
Factor 4: External Regulation				
13. For the recognition I get from others.			**.86**	
16. Because my friends insist that I do it.			**.77**	
23. To avoid being criticized.			**.89**	
Factor 5: Amotivation				
2. Honestly, I don't know; I truly have the impression that I am wasting my time doing things for the environment.				**.79**
8. I wonder why I'm doing things for the environment; The situation is simply not improving.				**.89**
24. I don't know; I can't see how my efforts to be environmentally- conscious are helping the environmental situation.				**.81**

*Note: N=98. The extraction method was principal axis factoring with an oblique (Varimax and Kaiser Normailization) rotation. Small factor loadings(<.40) are not included.
*Note: The factor solution of the problematic items excluded

3. RESULTS

Preliminary Analyses

Firstly, potential effects of background variables (gender, age, educational level, country of living) were examined. Statistically significant differences were found between gender groups. One-way ANOVA tests were performed in order to examine possible gender differences in scores on the studied variables (Table 2). The results showed that in the Climate Anxiety Scale men were found to have significantly lower scores than

women and non-binary people ($F_{(2,95)}$ =5.998, p = .004). Significant differences were also found in the Pro-Environmental Behaviors (PEB) of each gender ($F_{(2,95)}$=8.281, p=.000). Significant differences are also visible in the GAD scores ($F_{(2,95)}$=6.307, p=.003) where the scores of men where significantly lower than women's and non-binary people. Gender also appears to be a predictor or the different types of motivation. According to the post-hoc tests with Bonferroni correction, women[b] scored significantly higher than men[a] on Intrinsic Motivation ($F_{(2,95)}$=4.672, p=.012). Women[c] also scored higher than men[d] on Integrated Motivation ($F_{(2,95)}$=5.222, p=.007), while their scores[e] remained higher than men's[f] on Introjected Motivation ($F_{(2,95)}$=4.142, p=.019). Therefore, gender will be used as a control variable in further analysis.

Age was found to be moderately negatively associated with GAD scores (r= -.216, p=.032), something that is compatible with previous research (e.g., Kahraman, 2020). No other significant relationships with age were found, therefore it will not be used as a covariate in further analysis.

Table 2.Means and Standard Deviations of 3 gender ANOVA

	P.E.B.	G.A.D.	C.A.	Intrinsic	Integrated	Indentified	Introjected	External	Amotivation
Gender	*M (SD)*	*M(SD)*	*M(SD)*	*M(SD)*	*M(SD)*	*M(SD)*	*M(SD)*	*M(SD)*	*M(SD)*
Male	23.85 (3.90)	14.00 (5.78)	18.62 (7.20)	16.12[a] (5.29)	16.19[d] (5.84)	16.69 (3.69)	12.35[f] (4.37)	2.85 (2.20)	7.08 (4.20)
Female	26.91 (3.05)	17.33 (5.37)	24.03 (8.05)	19.70[b] (5.23)	20.28[c] (5.46)	18.13 (2.41)	14.91[e] (3.91)	5.84 (3.07)	5.84 (3.68)
Non-Binary	24.80 (3.83)	22.40 (5.23)	29.00 (9.43)	18.77 (5.35)	19.40 (3.13)	15.00 (2.35)	12.80 (2.86)	12.2 (8.87)	11.40 (7.96)

Note: *M* and *SD* represent Mean and Standard Deviation, respectively.

Primary Analyses

In order to assess the relationship among the researched variables, bivariate Pearson's Correlations were computed (Table 3). There was a strong positive correlation between Climate Anxiety and PEB. Climate Anxiety was also positively correlated with GAD. Strong positive correlations were found between PEB and intrinsic motivation, while external regulation and amotivation were negatively correlated with PEB. Interestingly, both intrinsic and integrated motivations were positively correlated with CCA. It is noteworthy that these correlations were even bigger than the positive correlation of introjected with CCA.

Hierarchical linear regression analysis was used to test the total effect of the relationship between PEB and Climate Anxiety after controlling for gender (Table 4). Hypothesis 1 is confirmed, since Climate Change Anxiety (CCA) appears to be a significant predictor for PEB (β=.18, p<.001). Gender was added in Step 1 and explained 7.6% of the variance in PEB. In step 2 the analysis, including Climate Anxiety, the model explained a total 22.9% of the variance in PEB ($F_{(2,95)}$=14.109, p<001). Hypothesis 1 is therefore confirmed.

Table 3. Bivariate Pearson Correlations between the studied variables

	1.	2.	3.	4.	5.	6.	7.
1. P.E.B.	1						
2. GAD	.25*	1					
3. C.C.A.	.46**	.36**	1				
4. Intrinsic	.30**	.25*	.31**	1			
5. Integrated	.65**	.13	.44**	.45**	1		
6. Identified	.34**	-.01	.09	.20	.38**	1	
7. Introjected	.44**	.14	.29**	.27**	.43**	.53**	1
8. External	-.15	.08	.09	-.04	-.17	-.22*	.00	1
9. Amotivation	-.26**	.00	-.07	-.18	-.23*	-.33**	-.11	.46**

Note: *The correlation is significant at the 0.05 level.**The correlation is significant at the 0.01 level
PEB= Pro-Environmental Behavior, GAD= Generalized Anxiety Disorder, CCA=Climate Change Anxiety.

Multiple Mediation analyses were performed in order to test Hypothesis 3, in which each of the six qualitatively different motivational regulations were entered as a mediator in the relationship between CCA and PEB. Integrated Motivation showed a partial mediating effect on the relationship between CCA and PEB (Figure 1), since the direct effect (β=.08) it is still significant, but smaller than the total effect (β=.18, p<.001).

β=.27, p<.001   Integrated Motivation β=.34, p<.001

CCA   Total effect: β=.18, p<001   PEB

Direct effect: β=.08, p=.02
Indirect effect: β=.09, 95% CI [.04, .15]
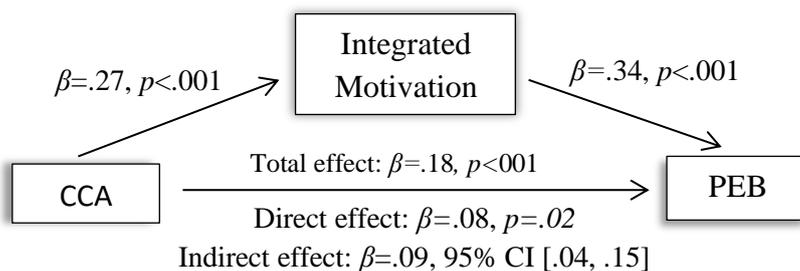
Figure 2. Model of the mediating role of Integrated Motivation, on the relationship between Climate Change Anxiety (CCA) and Pro-Environmental Behavior (PEB).

CCA was positively related to Integrated motivation (Figure 1), hence Hypothesis 2a for integration is rejected. Integrated Motivation is positively related to PEB, so hypothesis 2b is confirmed for Integrated motivation.

Moreover, Introjected Motivation showed a partial mediating effect, as well. The direct effect ($\beta=.14$, $p<.001$) was smaller than the total effect ($\beta=.18$, $p<.001$) but still statistically significant (Figure 2). Introjected motivation was positively linked to CCA and positively, but to a lesser extent than integration, linked to PEB therefore hypothesis 2a is rejected and hypothesis 2b is confirmed for Introjection.


$\beta=.13$, $p=.02$ — Introjected Motivation — $\beta=.28$, $p<.001$

CCA — Total effect: $\beta=.18$, $p<.001$ — PEB
Direct effect: $\beta=.14$, $p<.001$
Indirect effect: $\beta=.04$, 95% CI [.01, .08]
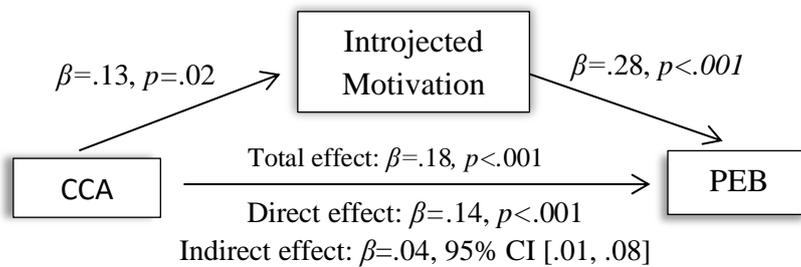
Figure 2. Model of the mediating role of Introjected Motivation, on the relationship between Climate Change Anxiety (CCA) and Pro-Environmental Behavior (PEB).

Finally, Hierarchical Regression Analysis was performed to test Hypothesis 4 while controlling for gender . The results showed that the two variables explain 18% of the variance CCA ($R^{2}=.18$, $F_{(2,95)=}10.43$. $p<.001$. GAD score appears to be a strong predictor for CCA ($\beta=.28$, $p=.01$), therefore Hypothesis 4 is confirmed.

4. DISCUSSION

The main goal of the present study was to explore the phenomenon of Climate Change Anxiety (CCA) according to the perspective of Self-Determination Theory. This phenomenon is becoming more common as climate change expands and seems to concern a part of the population who seeks help from mental health professionals. The main emphasis was given on the role of different types of autonomous and controlled motivation in the relationship between CCA and Pro-Environmental Behaviors. Based on theoretical background linking autonomous functioning to various indicators of adaptive functioning and controlled regulation to basic features of psychopathology (Ryan et al., 1997, 2016; Ryan & Deci, 2017), it was hypothesized that the different

types of motivation would present a mediation effect on the relationship between CCA and PEB.

As demonstrated at the section above, a strong positive connection was found between Climate Change Anxiety and Pro-Environmental Behavior. This result was in accordance to previous research findings that linked higher stress levels to more behavioral activation (Higginbotham et al., 2014, Homburg & Stolberg, 2006, Clayton & Karazsia, 2020).

There were positive correlations of autonomous types of motivation (intrinsic and integrated motivation) with CCA, something that was not expected. It is noteworthy that those correlations are even bigger than the positive correlation of CCA with introjected motivation, which was expected to have the strongest relationship with anxiety based on the literature review (Ryan et al., 2016). The expected general pattern of relationships, with the positive correlation between the most autonomous regulation (intrinsic motivation) and PEB being the highest, followed by gradually smaller correlations with the less autonomous types of motivations, was not met. The present results showed a much higher correlation of integrated motivation than intrinsic motivation. Moreover, Introjected motivation was more strongly related to PEB than Identification, which contradicted normal expectations.

The partial mediation effect of Integrated motivation on the relationship between CCA and PEB was quite expected. CCA was positively related to Integrated Motivation, which was also positively linked to PEB. This effect probably indicates that people with high integration see Pro-Environmental Behaviors as a way to achieve personal internalized goals, which may increase stress and anxiety levels, as a result of their need to achieve those goals. One possible interpretation of this phenomenon could be that when anxiety is dealt with openly, it is able to integrate these emotions into one's general psychological self-structures and turn them into adaptive behavior. Former research has shown similar findings regarding Integrated motivation. Menegassi et al. (2018), who studied a sample of soccer players, observed that Integration had a positive effect on Somatic Anxiety. The positive relation between integrated motivation and PEB is generally in accordance to the principles of self-determination theory, which links relative autonomy to behavioral pro-activation towards a problem (Ryan et al., 2016, Villacorta et al., 2003).

Moreover, Introjected motivation showed a partial mediation effect on the relationship between CCA and PEB, which was also expected. Since it is considered as a more controlled type of motivation, it had a smaller effect than Integration (Ryan et al., 2016). As predicted, Introjection was positively linked to CCA. This finding is compatible with previous research that related introjection to certain forms of anxiety (Ryan et al., 2016, Ryan& Deci, 2017). Introjected Motivation also had a positive effect on PEB. According to Ryan et al. (2016) introjected motives, whilst closely related to anxiety and depressive disorders, can be extremely powerful levers of behavioral activation in individuals.

In addition, we have attempted to detect the clinical elements of Climate Change Anxiety by exploring its relationship with features of Generalized Anxiety Disorder. The positive relation that emerged between them indicates a clinically dysfunctional aspect of worrying about climate change. These findings contradict previous research that has shown that worries about the planet were not associated with pathological manifestations of anxiety (Verplanken & Roy, 2013). This difference may be due to the fact that Verplanken and Roy (2013) measured pathological worrying with a different instrument, which distinguished samples that met the diagnostic criteria for GAD, something that was not attempted in the present study. Possible interpretations of the present findings could be that people with anxiety disorders are more prone to stress related to the environment and vice versa, that people who develop such strong environmental concerns may generalize them to other areas of their lives.

5. (CLINICAL) IMPLICATIONS

Therefore this exploration of Climate Change Anxiety is clinically relevant. Since the phenomenon is taking over humans' mental health, it is very likely that in the coming years people will arrive at the offices of their psychotherapist with concerns about the destruction of the environment. Researching the way Climate Anxiety interferes with psychology, contributes to the creation of appropriate healthcare interventions. It is important for mental health professionals to know how to separate anxiety associated with integrated regulation from introjected regulation. The integrated function implies an actual digestion of anxiety by the individual, an inner exploration of the importance of stress for the individual. This process could result to transforming the anxiety into a healthy, significant motivating force. Accordingly, when individuals seem overwhelmed

or paralyzed by stress, introjected regulation is indicated. In this case people experience conflicts between stress and behavior or other parts of the self. For instance, professionals could approach the environmental issues of their patient by providing an autonomy-supporting context, based on integrated regulation. In an autonomy support context, the therapist or counsellor would support their client's choices, and minimize pressure and control. Meanwhile a great focus would be given on strengthening the therapeutic alliance (Ryan et al., 2011).

Furthermore, other areas are likely to benefit from studying this phenomenon, such as education and ecology, while various autonomy-focused frameworks, could be useful for the encouragement of Pro-Environmental Behaviors.

6. LIMITATIONS

It is important to note the limitations of the research, one of which is the online conduct of the questionnaire. The online condition largely excludes the ideal laboratory environment that would be needed to reduce the exogenous factors that may affect participants' responses. Moreover, the cross sectional design of the research cannot result in causal relations or direction effects. Therefore, this research highlights the links between different variables but does not display directionality or cause-and-effect relationships.

In addition, the results are of limited generalizability, as the sample is not a random sample. More specifically, the sample consisted mostly of people originating from Greece, most of who were women. The diversity of the age was also limited, as the sample was mainly consisted of young adults. The data came from rather a convenience sample than a scientifically appropriate random sample.

7. DIRECTION FOR FUTURE RESEARCH

More research is needed in this area; especially experimental research that would be able to extract causal relationships. Autonomous motivation, which seems to play an important role in the relationship studied, meets one of the three basic needs according to the SDT, that of autonomy. A suggested direction for future research would be to study the relationship of this phenomenon with the Basic Needs Satisfaction and Frustration, as described in SDT. Furthermore, previous researchers have pointed

towards the need for research on climate change in the field of child psychology, as there is evidence that children are more vulnerable to climate change concerns than adults (Clayton, 2020).

8. **CONCLUSION**

In spite of the limitations, the present study contributes to existing literature about the phenomenon of Climate Change Anxiety, viewing it through the perspective Self-Determination Theory. In conclusion, the present research identified Climate Change Anxiety as a clinically relevant manifestation of the general concern about the phenomenon of Climate Change and demonstrated that the positive relationship between Climate Change Anxiety and Pro-Environmental Behavior was mediated by Integrated Motivation, as well as by Introjected Motivation, thus to a lesser extent. As a basic interpretation, Climate Change Anxiety seems to be regulating and transforming into a stable integrated regulation. Along with further research in this area, there could be an enhancement of clinical tools and reflexes in cases of climate change-related stress. It would be an important step to focus on interventions aimed at strengthening the autonomous motivation with the aim of improving the mental state of people suffering from this type of anxiety.

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APPENDICES

    A. Information Letter

Dear participants,

 Welcome to this survey.

As a matter of fact, people's practices of interfering with nature have had dire consequences for our planet. As the years go by, we see even more clearly the effects of climate change on our daily lives. Responding to climate change is supposed to be one of the biggest challenges we face this century, affecting both our physical and mental wellbeing.

 The present survey aims to explore the role of Motivation in the relationship of Climate Anxiety and Pro-environmental Behaviors.

Thank you in advance for your time. Your participation is valuable.

    B. Consent Form

Please read carefully!

During this survey you will be asked questions about demographical information, your performance of pro-environmental behaviors, your motivation behind your actions and your levels of anxiety.

You will need approximately 10 minutes to complete the whole questionnaire. You are not allowed to change your answers and each item on the list must be complete in order to continue. There are no wrong or right answers! This investigation cannot lead to coincidental findings and it does not use deception.

Participation is voluntary, which means that you are allowed to stop and leave the research whenever you feel like. The data are completely anonymous, they will be accessed only by the researchers and will be treated with confidentiality. Your data are protected by the Regulation (EU) 2016/679 of the European Parliament and of the Council.

This research is conducted for educational purposes in the context of MSc Clinical Psychology of Utrecht University.

For any further questions, feel free to contact s.papadopoulousgourou@students.uu.nl (researcher) or b.a.m.neyrinck@uu.nl (supervisor).

- I read the participation letter and my participation has been explained to my satisfaction. I am 18+ years old and I agree to take part in this study.
C. Questionnaire
   1) To which gender identity do you most identify?
   o   Male (1)
   o   Female (2)
   o   Other (3) _____

   2) Please write down your age (years old).

   _____
   3) What is the highest degree or level of education you have completed?

o   Less than high school (1)

o   High school graduate (2)

o   Bachelor's Degree (3)

o   Master's Degree (4)

o   Doctorate / PHD (5)

o   Other (Please Specify) (6)

_____

5) Where do you live? (Country)

_____

6) Please rate how often the following statements are true for you.

        Never (1)   Rarely (2)   Sometimes (3)   Often (4)   Almost
Always (5)

I wish I behaved more sustainably. (1)

I Recycle. (2)

I turn off lights. (3)

I try to reduce my behaviors that contribute to climate change. (4)

I feel guilty if I waste energy (5)

I believe I can do something to help address the problem of climate change. (6)

I follow a zero or low- waste lifestyle (7)

7) WHY ARE YOU DOING THINGS FOR THE ENVIRONMENT?

There are many things that one can do for the environment. For example, some people recycle old bottles, different types of containers, newspapers, papers, etc. Listed below are several statements concerning possible reasons why people might recycle.

Using a scale from 1-7 below, please indicate the degree to which the proposed reasons correspond to your reasons for recycling by selecting the appropriate number at the right of the item.

1= Does not correspond at all.

4= Corresponds Moderately.

7= Corresponds Exactly.

 Why are you doing things for the environment?

1. For the pleasure I experience while I am mastering new ways to help the environment. (1)

2. Honestly, I don't know; I truly have the impression that I am wasting my time doing things for the environment. (2)

3. For the pleasure I experience when I find new ways to improve the quality of the environment. (3)

4. Because it is a reasonable thing to do to help the environment. (4)

5. Because I like the feeling I got when I do things for the environment. (5)

6. I don't really know; I don't see what I am getting out of it. (6)

7. I think I'd regret not doing something for the environment. (7)

8. I wonder why I'm doing things for the environment; The situation is simply not improving. (8)

9. For the pleasure I get from contributing to the environment. (9)

10. Because it's a sensible thing to do in order to improve the environment. (10)

11. Because it's the way I've chosen to contribute to a better environment. (11)

12. Because other people will be upset If I don't. (12)

13. For the recognition I get from others. (13)

14. Because I would feel bad If I didn't do anything for the environment. (14)

15. Because taking care of the environment is an integral part of my life. (15)

16. Because my friends insist that I do it. (16)

17. Because it seems to me that taking care of myself and taking care of the environment are inseparable. (17)

18. Because I would feel guilty if I didn't. (18)

19. Because being environmentally-conscious has become a fundamental part of who I am. (19)

20. Because it's part of the way I've chosen to live my life. (20)

21. Because I would feel ashamed of myself if I was doing nothing to help the environment. (21)

22. Because I think it's a good idea to do something about the environment. (22)

23. To avoid being criticized. (23)

24. I don't know; I can't see how my efforts to be environmentally- conscious are helping the environmental situation. (24)

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

Never (1) Rarely (2) Sometimes (3)   Often (4) Almost Always (5)

1. Thinking about climate change makes it difficult for me to concentrate. (1)

2. Thinking about climate change makes it difficult for me to sleep. (2)

3. I have nightmares about climate change. (3)

4. I find myself crying because of climate change. (4)

5. I think "why can't I handle climate change better?" (5)

6. I go away by myself and think about why I feel this way about climate change. (6)

7. I write down my thoughts about climate change and analyze them. (7)

8. I think, "why do I react to climate change this way?" (8)

9. My concerns about climate change make it hard for me to have fun with my family or friends. (9)

10. I have problems balancing my concerns about sustainability with the needs of my family. (10)

11. My concerns about climate change interfere with my ability to get work or school assignments done. (11)

12. My concerns about climate change undermine my ability to work to my potential. (12)

13. My friends say I think about climate change too much. (13)

9) Over the last 2 weeks, how often have you been bothered by the following problems?

Not at all sure (1)Several days (2)Over half the days (3)Nearly every day (4)

1. Feeling nervous, anxious, or on edge (1)

2. Not being able to stop or control worrying (2)

3. Worrying too much about different things (3)

4. Trouble relaxing (4)

5. Being so restless that it's hard to sit still (5)

6. Becoming easily annoyed or irritable (6)

7. Feeling afraid as if something awful might happen (7)

8. If you checked off any problems, how difficult have these made it for you to do your work, take care of things at home, or get along with other people?
o   Not difficult at all (1)
o   Somewhat difficult (2)
o   Very difficult (3)
o   Extremely difficult (4)