UNIVERSITY OF TWENTE.

Bachelor Thesis

Too Worried To Act?

A Correlational Study on Climate Worry, Climate Anxiety and Pro-Environmental Behaviors among Young Adults

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SVENJA WITTROCK

Student ID: s2112914
First Supervisor: ROMÉE LAMMERS
Second Supervisor: PETER TEN KLOOSTER

University of Twente
Faculty of Behavioral, Management and Social Sciences
Department of Psychology

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Abstract

Climate change has far-reaching consequences for the future of young adults, causing great anxiety for many of them. As a result of this development, the concept of "climate anxiety" has gained major attention. Though, when talking about climate anxiety it is important to distinguish between worry and 'real' anxiety about climate change, as these reactions possibly have opposing effects on young adults' pro-environmental behaviors (PEB). This distinction may thus explain why current literature reports both constructive and unconstructive variations of climate 'anxiety', which either mobilize or inhibit young adults to behave pro-environmentally. Therefore, this research investigated the relation between climate worry/ anxiety and PEBs among young adults. In doing so, this study differentiated between private and public-sphere PEBs and additionally, examined mediation effects of perceived self and collective efficacy. A cross-sectional study design was applied and 247 young adults responded to an online survey. By conducting partial correlations, climate worry was found to be positively associated with private and public-sphere PEBs (r=.24 and r=.15, respectively*)*. Climate anxiety was positively associated with public-sphere PEBs (r=.29) and not associated with private-sphere PEBs. Moreover, separate mediation analyses with PROCESS showed that perceived self and collective efficacy did not mediate these associations. While keeping in mind various research limitations, the results imply that young adults likely cope with their climate worry and climate anxiety in constructive ways. Future research should study these associations more closely and particularly investigate how other factors, such as a green self-identity and positive eco-emotions, can account for a constructive response in worried/ anxious young adults.

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Introduction

I want you to panic. I want you to feel the fear I feel every day. And then I want you to act.

— Greta Thunberg, 2019

Climate change is an existential threat to planetary and human health and causes many young adults to be anxious of the uncertain future (American Psychological Association, 2020; Doherty & Clayton, 2011). In a 2019 survey, more than half of 18 to 29-year-old US adults mentioned being very worried about climate change (Parker, Morin, & Horowitz, 2019). Further, there is substantial evidence that, as global warming becomes more apparent, even more young adults will experience emotional distress due to their worries and anxious feelings (Clayton, Manning, Krygsman, & Speiser, 2017). These emotional responses to climate change are captured the increasingly popular term "climate anxiety" and have become the focus of environmental psychology (Pihkala, 2020).

However, research around the concept of climate anxiety is hampered due to the various meanings that have been associated with it. Typically, scholars depict 'climate anxiety' as an emotion closely related to worry but at times, 'climate anxiety' is used to describe an intense, panic fear of climate change (Pihkala, 2020). This strong climate anxiety differs from 'mere' worry, in that is causes symptoms similar to clinical anxiety, such as obsessive thinking, insomnia, appetite changes or panic attacks (Castelloe, 2018; Clayton & Karazsia, 2020; Doherty & Clayton, 2011; Pihkala, 2020). Consequently, the term 'climate anxiety', as it is used today, actually captures two conceptually different emotional reactions: one characterized by worry, and another characterized by strong anxiety that impinges on mental health and daily functioning. In order to distinguish between these emotional reactions, they are from here-on referred to as climate worry and climate anxiety.

The aforementioned distinction is also important to make due to different implications climate worry and climate anxiety may have for pro-environmental behaviors (PEB). Taking environmental action is essential to moving towards a green future and preventing the vast consequences of climate change (IPCC, 2019). In addition to the environmental benefits, behaving pro-environmentally has mental benefits for the actor because it helps building resilience and hope. It is therefore a recommended, constructive strategy for coping with fear of climate change (Clayton & Karazsia, 2020; de Moor, Uba, Wahlström, Wennerhag, & de Vydt, 2020).

Since most previous research mixed climate worry and climate anxiety up, findings on their relationship with PEBs are inconsistent. Generally, climate worry appears to empower young adults to engage in PEBs, and may therefore be a constructive emotion (Clayton & Karazsia, 2020; Doherty & Clayton, 2011; Pihkala, 2020). However, there are some accounts of 'unconstructive worry' in which individuals disengage from the threat and consequently, do not behave pro-environmentally or even deny climate change (Doherty & Clayton, 2011; Pihkala, 2020; Verplanken, Marks, & Dobromir, 2020). Presumably, this unconstructive state of paralysis results from climate anxiety, rather than worry.

According to literature, negative efficacy beliefs may explain why some young adults are paralyzed by their climate anxiety (Clayton, 2020; Clayton et al., 2017; Doherty & Clayton, 2011). Because of their negative coping appraisals, e.g. not feeling able to do anything about climate change, anxious individuals may not make attempts to protect the environment. In contrast, climate worry supposedly gives rise to positive efficacy beliefs and thereby empowers individuals to act pro-environmentally (Mah, Chapman, Markowitz, & Lickel, 2020). Hence, efficacy beliefs seem to play a vital role in the relationship between climate worry/ anxiety and PEBs.

This study aims at drawing attention to the difference between climate worry and climate anxiety and sets a starting point for untangling the discussion about their unconstructive or constructive nature. Consequently, it investigates the research question: "To what extent are climate worry and anxiety associated with PEBs in young adults?" The main research question is divided into three sub-research questions: 1) "To what extent is climate worry associated with PEBs in young adults?", 2) "To what extent is climate anxiety associated with PEBs in young adults?" and, to test for the effect of young adults' efficacy beliefs, 3) "To what extent does young adults' perceived efficacy mediate the association of climate worry/ anxiety and PEBs?"

Theoretical Framework

In order to arrive at testable hypotheses and a conceptual research model, this theoretical framework aims at conceptualizing the relevant constructs. Based on existing literature, the constructs of climate worry and anxiety, PEBs and perceived efficacy will be defined and discussed.

Climate Worry and Anxiety

In the past years, public and scholarly discourse has brought about various terms to capture the fearful feelings associated with climate change. 'Climate anxiety' and 'eco-anxiety' are the most popular terms and sometimes used interchangeably. However, many scholars argue that 'climate anxiety' is a narrower form of 'eco-anxiety', since it only refers to feelings about climate change rather than the entire ecological degradation (Clayton et al., 2017; Pihkala, 2020). Otherwise, the term 'climate anxiety' as it is used today has not been conceptualized yet and actually discusses two distinct affective reactions: worry and anxiety (Pihkala, 2020).

Most young adults experience climate worry, which manifests as worrying, fearful thoughts about the changing climate and the threat it poses to the planet, future generations or one's own life (Stewart, 2021). Those thoughts are affect-laden and frequently accompanied by feelings of grief, despair or anger (Pihkala, 2020; Verplanken et al., 2020). For some individuals, climate worry causes distress, tension or irritability (Stewart, 2021). Nevertheless, scholars view this worry as a healthy and normal response to the climate crisis which prepares for future threats (Doherty & Clayton, 2011; Pihkala, 2020; Verplanken & Roy, 2013).

Opposed to climate worry, climate anxiety is an intense emotional reaction, characterized by a generalised, uncontrollable anxiety that interferes with a person's ability to function in everyday life (Clayton & Karazsia, 2020; Stewart, 2021; Verplanken et al., 2020). Essentially, this anxiety is not only externally focused but also involves irrational self-beliefs, e.g. a fear of being punished. In addition, it can cause somatic symptoms, such as increased heart rate and sweating, occasionally resulting in panic attacks (Castelloe, 2018; Stewart, 2021). Even though these characteristics may be considered pathological (Pihkala, 2020), climate anxiety is not an official clinical diagnosis because it is still a seldom and unrecognized reaction to climate change in the population (Clayton & Karazsia, 2020; Usher, Durkin, & Bhullar, 2019; Verplanken & Roy, 2013).

The difference between climate worry and climate anxiety is further underpinned by their opposed effects on individuals' PEBs. Worry is widely considered a practical emotion, which initiates a cognitive re-appraisal of the threat and thereby assists a problem-solving response aimed at mitigating the threat (Doherty & Clayton, 2011; Mah et al., 2020; Pihkala, 2020). Results by Verplanken et al. (2020) support this view. In their study, habitual worry about global warming was associated with predictors of environmental action, i.e. past PEB, a pro-environmental worldview, pro-environmental values and a green identity. Overall, climate worry appears as an adaptive and constructive emotion which provokes PEBs.

On the contrary, climate anxiety likely results in unconstructive avoidant behavior rather than environmental engagement. Albrecht (2011) calls this condition "ecoparalysis", "the inability to meaningfully respond to the climatic and ecological challenges that face us" (p. 50), because of one's intense, uncontrollable emotions (Doherty & Clayton, 2011). Indeed, Clayton and Karazsia (2020) found no correlation between climate anxiety and behavioral engagement. Literature about fear appeals in environmental communication further suggests that there may even be a negative correlation. Namely, participants in a study by Chen (2015) who read the high-fear appeal text reported less pro-environmental behavioral intentions than did those who read the low-fear appeal text. Hence, climate anxiety seems to inhibit PEBs.

Pro-Environmental Behaviors

Pro-environmental behavior, i.e. "behavior that harms the environment as little as possible, or even benefits the environment" (Steg &Vlek, 2009, p. 309) has hardly been recognized as a multi-dimensional, complex construct (Ertz, Karakas, & Sarigöllü, 2016). However, research shows that different PEBs have different psychological mechanisms and outcomes (Reese, Rosenmann, & Cameron, 2019; Stern, 2000), and that even the same PEB can have different causes in different situations (Gao, Zhao, Wang, & Wang, 2020). These findings highlight the importance of distinguishing between various types of PEBs when investigating their psychological determinants. In particular, a relevant distinction can be made between private and public-sphere PEBs, two types of behaviors that differ primarily in their environmental impacts (Stern, 2000).

Private-sphere PEBs describe personal behaviors that have a direct, yet only small positive impact on the environment (Stern, 2000). For instance, green consumerism (e.g., following a vegetarian diet), waste disposal (e.g., recycling), as well as the use of environmentally significant goods or services (e.g., public transportation) are ways of directly

protecting the climate (Stern, 2000). In contrast, acting pro-environmentally in public-sphere has an indirect but large impact on the environment. Public-sphere PEBs can be activist (e.g., participating in protests) or non-activist (e.g., pro-environmental petitioning). These collective actions can influence policies and are therefore crucial for tackling climate change (Stern, 2000).

Even though most studies on climate worry and anxiety did not distinguish between different types of PEBs, their expected effects on PEB are likely to apply to the private and public-sphere. Namely, climate worry has been linked to a variety of private-sphere PEBs (Verplanken & Roy, 2013; Verplanken et al., 2020), as well as selected public-sphere PEBs, namely climate policy support and activism (Kleres & Wettergren, 2017; Smith & Leiserowitz, 2013). The experience of climate anxiety seems to cause a general paralysis in which individuals are unable to translate their concern in any PEB, neither in the private nor in the public-sphere (Albrecht, 2011).

Based on the literature on climate worry and climate anxiety and their associations with PEBs, the following hypotheses are established:

H1a: Young adults who experience higher levels of climate worry are more likely to act in pro-environmental ways in (A) private-sphere and (B) public-sphere than young adults who experience lower levels of climate worry.

H2a: Young adults who experience higher levels of climate anxiety are less likely to act in pro-environmental ways in (A) private-sphere and (B) public-sphere than young adults who experience lower levels of climate anxiety.

Perceived Efficacy

Whether climate worry or climate anxiety cause an (un)constructive behavioral response may depend on individuals' perceived capability of acting in pro-environmental ways, i.e. their perceived efficacy. In line with the theory of panned behavior (Ajzen, 1991), perceived efficacy has been established as an important determinant of PEBs (Li, 2014; Verplanken & Roy, 2013). That is why climate anxious individuals, who perceive not only their emotions but also the stressor as uncontrollable, are likely to give up their attempts of saving the climate (Albrecht, 2011; Doherty & Clayton, 2011; Mah et al., 2020). Unlike anxiety, worry is a rational emotion, causing a positive cognitive re-appraisal of the threat and thereby eventually PEBs (Mah et al., 2020).

More specifically, two types of efficacy beliefs are relevant in this context: self-efficacy and collective efficacy (Bandura, 1997). High perceived self-efficacy is characterized by a sense that one is personally capable of addressing climate change (Clayton et al., 2017). In a study by Li (2014), perceived self-efficacy predicted college students' pro-environmental behavioral intentions. In addition, several fear appeal studies have shown that fear messages of climate change should only be used if feasible coping responses are presented, in order to ensure positively perceived self-efficacy (Mah et al., 2020; O'Neill & Nicholson-Cole, 2009).

Some studies, however, do not support the effect of self-efficacy on PEBs (e.g., Chen, 2015; Homburg & Stolberg, 2006). Instead, they argue that perceived collective efficacy, which refers to "a group's shared belief in its conjoint capabilities […]" (Bandura, 1997, p. 477), is determining private and public-sphere pro-environmental action (Chen, 2015; Homburg & Stolberg, 2006; Van Zomeren, Spears & Leach, 2010). That is because the environmental crisis, a large-scale global problem, exceeds individual capacities (Clayton et al., 2017; Homburg & Stolberg, 2006).

The incongruent findings show that research in this subject area is still at an early stage. In fact, there is no study that integrated the previous findings in the context of climate worry/ anxiety and examined relations between these constructs. Nonetheless, it seems likely that anxious individuals lack a sense of self and collective efficacy, while worried individuals perceive both their self and collective efficacy positively. Therefore, this study hypothesizes the following:

H1b: The effect of climate worry on (A) private-sphere and (B) public-sphere PEBs is positively mediated by (C) perceived self-efficacy and (D) perceived collective efficacy.

H2b: The effect of climate anxiety on (A) private-sphere and (B) public-sphere PEBs is negatively mediated by (C) perceived self-efficacy and (D) perceived collective efficacy.

Conceptual Research Model

The established hypotheses are listed in Table 1 and result in a conceptual research model, visualized in Figure 1.

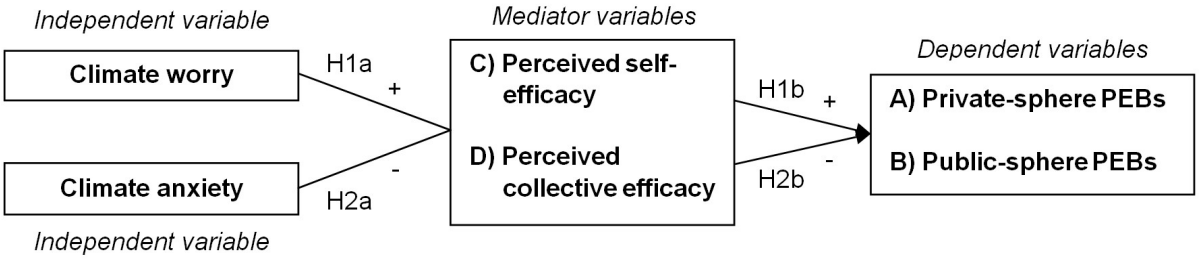
Table 1

Overview of the Tested Hypotheses

No	Hypothesis
H1a	Young adults who experience higher levels of climate worry are more likely to act in pro-environmental ways in (A) private-sphere and (B) public-sphere than young adults who experience lower levels of climate worry.
H1b	The effect of climate worry on (A) private-sphere and (B) public-sphere PEBs is positively mediated by (C) perceived self-efficacy and (D) perceived collective efficacy.
H2a	Young adults who experience higher levels of climate anxiety are less likely to act in pro-environmental ways in (A) private-sphere and (B) public-sphere than young adults who experience lower levels of climate anxiety.
H2b	The effect of climate anxiety on (A) private-sphere and (B) public-sphere PEBs is negatively mediated by (C) perceived self-efficacy and (D) perceived collective efficacy.

Figure 1

Conceptual Research Model



Methods

Research Design

To test the proposed hypotheses, this study used a quantitative, cross-sectional research design. There were two independent variables (IV; climate worry, climate anxiety) and two dependent variables (DV; private-sphere PEBs, public-sphere PEBs). In addition, two mediating variables (perceived self-efficacy, perceived collective efficacy) were tested. All variables in this study were measured on a continuous level. This study collected primary, cross-sectional data from young adults by means of an online survey.

Respondents

In total, data was collected from 247 young adults who responded to the online survey. Of the 247 respondents, 13 respondents did not complete the survey to the end and were therefore removed from the research sample. Furthermore, 11 respondents, who spent less than three minutes completing the survey and delivered insufficient responses, were removed. Lastly, a screening question filtered out five respondents who did not believe in or were unsure if anthropogenic climate change is happening. Their responses were removed because climate change deniers' worry/ anxiety likely have a different origin, e.g. distrust of climate change news, and therefore may have different implications for PEBs (Stanley et al., 2021). Finally, the research sample for analysis consisted of 218 respondents.

Table 2 displays the distribution of respondents' characteristics. The age ranged between 18 and 30 years, with the average being 22 years old (SD = 2.80). There were 153 females (70%), 64 males (29%) and one respondent who identified as non-binary (0.5%). The majority of the respondents were German (78%), 28 respondents had a Dutch nationality (13%), 13 respondents were from other EU-countries (6%) and six respondents were from countries outside the EU (3%). Concerning their educational level, 157 respondents indicated that high-school diploma is the highest level of education they have completed (72%). This group thus represented the majority in regard to the level of education. The second largest group was made up of 36 respondents who obtained a Bachelor's degree (17%), followed by 18 respondents who obtained a Master's degree (8%). Consequently, highly educated individuals were well represented in this sample of young adults and results should therefore be interpreted with caution.

Table 2

Distribution of Respondents' Characteristics (N=218)

Demographic	Characteristic	*n*	%
Age	18-19 years	35	16.1
	20-21 years	79	36.3
	22-23 years	53	24.3
	24-25 years	21	9.6
	26-27 years	18	8.2
	28-30 years	12	5.5
Gender	Female	153	70.2
	Male	64	29.4
	Non-binary	1	0.5
Nationality	German	171	78.4
	Dutch	28	12.8
	Other EU-country	13	6.0
	Country outside EU	6	2.8
Level of Education	Secondary education	4	1.8
	High-school degree	157	72.0
	Trade/technical/vocational training	3	1.4
	Bachelor's degree	36	16.5
	Master's degree	18	8.3

Measures

The online survey created for this research study aimed to test all variables from the conceptual model. Its items were derived from pre-existing scales (see Appendix A) which have proven good reliability in previous studies. The entire survey was administered in English. All items in this study were assessed on 5-point Likert scales. Most scales measured the frequency of occurrence of each statement, with response options ranging from never (1) to almost always (5). The scales for perceived self- and collective efficacy were an exception

to this and used different response scales. Namely, respondents could indicate their level of agreement with each statement from strongly disagree (1) to strongly agree (5).

Independent Variables

The extent of respondents' climate worry was assessed using eight items from the Climate Change Worry Scale (CCWS; Stewart, 2021). Respondents were asked to rate eight statements regarding their worries about climate change (e.g., "I worry about how climate change may affect the people I care about"). Stewart's (2021) items 6 and 7, which relate to the ability to cope, were excluded in this survey because this study tested efficacy beliefs separately as mediator variables. The CCWS has been validated and shown to be a reliable measurement (α = .95) (Stewart, 2021).

Respondents' level of climate anxiety was measured with the Climate Change Anxiety Scale (CCAS; Clayton & Karazsia, 2020). Specifically, respondents' cognitive-emotional impairment was assessed with eight items (e.g., "I find myself crying because of climate change") and their functional impairment was assessed with five items (e.g., "My concerns about climate change undermine my ability to work to my potential"). Together, the two subscales made up the total climate anxiety score. The subscales of the CCAS were reliable measurements, α = .96 and α = .93 respectively (Clayton & Karazsia, 2020).

Dependent Variables

To assess private-sphere PEBs, Verplanken and Roy's (2013) measurement of environmental engagement was adapted. Respondents were asked to rate how often they had performed 14 different personal activities (e.g., "buying organic products", "taking shorter showers") in the last year. This study excluded items 15 and 16 as they pertain to public-sphere PEBs. Cronbach's α in the original study was .84 (Verplanken & Roy, 2013).

Respondents' public-sphere PEB was assessed with a scale by Hansmann and Binder (2020). Its five items describe activities that have primarily socio-political goals and are both non-activist (e.g., "I have signed a petition for an environmental issue or cause") and activist (e.g., "I have participated in peaceful demonstrations for the environment"). Respondents rated non-activist behaviors relative to last year and activist behaviors relative to before Covid-19 because those were constrained by pandemic legislation. Hansmann and Binder's (2020) subscale was a valid and reliable measurement (α = .73).

Mediator Variables

To measure respondents' self-efficacy beliefs, a scale by Van Zomeren et al. (2010) was adopted. Their scale consists of five statements about individuals' perceived ability to address climate change (e.g., "I can change my daily routines to combat climate change"). The wording of the statements was slightly changed from "climate crisis" to "climate change", so that the items matched with the previous scales. In the study by Van Zomeren et al. (2010), the scale was a reliable measurement (α = .92).

Moreover, respondents were presented with three items about their perceived collective efficacy that derived from Van Zomeren et al. (2010). The items were adjusted to the self-efficacy scale by rephrasing them as statements and changing the wording again to "climate change" (e.g., "I think that people can jointly prevent the negative consequences of climate change"). Van Zomeren et al. (2010) found a Cronbach's α of .94 and thus proved excellent reliability.

Quality of Instruments

In order to assess the quality of the scales used in this study, their validity and reliability was tested. Specifically, the scales were validated by conducting six factor analyses on the items that made up each construct (see Table 3). Factors were extracted when the eigenvalue was greater than 1 and the minimum amount of variance that had to be explained by the extracted factors was set to 50%.

The scales for climate worry, perceived self-efficacy and perceived collective efficacy came up as valid measurements, with more than 50% of variance explained by one extracted factor. For climate anxiety and private-sphere PEB, multiple factors had to be extracted in order to have a minimum of 50% of variance explained. Hence, the items that made up these scales were measuring multiple underlying dimensions of complex constructs. For the public-sphere PEB scale, only 48% of variance could be explained when all items were taken into account. In order to improve its validity, the item "I have convinced others to behave in a more environmentally friendly manner", which showed the lowest factor loading of .58, was not retained. After removing the item, the amount of variance explained increased to 55%. Consequently, all scales showed an acceptable amount of validity. The downside of running individual factor analyses, however, was that it remained unclear if or to what extent the items might have measured other constructs.

Lastly, the reliability of the scales was assessed by calculating Cronbach's α. All scales showed a Cronbach's α between .72 and .89, and were therefore considered reliable measurements (see Table 3).

Table 3

Factor and Reliability Analyses per Construct

Construct	Number of items	Number of extracted factors	Percentage of variance explained (%)	α
Climate worry	8	1	53.52	.87
Climate anxiety	13	3	62.35	.89
Private-sphere PEBs	14	4	55.74	.79
Public-sphere PEBs	4	1	54.63	.72
Perceived self-efficacy	5	1	64.63	.86
Perceived collective efficacy	3	1	69.34	.77

Procedure

The study was approved by the ethics committee of the Faculty of Behavioral, Management and Social Sciences (BMS) of the University of Twente (date: 30.03.2021, request number: 210306). The survey was created and administered with the online survey software *Qualtrics*. The use of an online questionnaire was time and cost-saving and allowed the data collection from a large sample during the Covid-19 pandemic. It was therefore the favored data collection method.

Pre-Test

Before the actual data collection, a pre-test of the online survey was run. The pre-test aimed at identifying potential obstacles in order to improve practicability of the measurement instrument. Following this aim, the researcher asked ten acquaintances to respond to the survey and give feedback afterwards. Specifically, they were encouraged to ask questions, share their thoughts about unclear items or give suggestions.

After the feedback from all ten participants has been collected, the researcher adjusted the survey. The biggest adjustment concerned the standardization of the response scales, which initially included different 5 and 7-point scales. The pre-test showed, however, that it is more user-friendly to use the same scale consistently and the researcher thus decided for a 5-point Likert scale. Secondly, the researcher adjusted the consent form which, initially,

informed the respondent about the clear aim and hypothesis of this study. However, one participant noted that this could cause respondents to answer in a way that confirms this hypothesis, i.e. an experimenter demand effect. The researcher implemented this suggestion and changed the consent form so that the topic was only broadly introduced and the clear aim was stated at the end of the survey.

Research Procedure

After finalizing the survey based on the pre-test, respondents were recruited by the methods of convenience and snowball sampling. These non-probability sampling methods were convenient and affordable ways to reach many young adults during the Covid-19 pandemic. A large share of the respondents was recruited by the BMS test-subject pool *Sona Systems*. In exchange for their participation, students at the University of Twente received 0.25 *Sona Credits*. In addition, respondents were recruited from the researcher's private social network by sharing the survey through social media. Snowball sampling occurred as well because acquaintances shared the survey in their WhatsApp groups. Lastly, the researcher posted the survey in German Telegram groups of the Fridays for Future movement as well as international Facebook groups associated with climate change or climate anxiety. There was no compensation offered to those respondents. The requirements for all respondents were being aged between 18 and 30 years and having a sufficient level of English.

Once respondents opened the survey link, they were asked to give informed consent to participate voluntarily and anonymously in the survey (see Appendix B). After giving consent, respondents were presented with a screening question about their recognition of anthropogenic climate change. Respondents could indicate that they either believe, are unsure or do not believe that climate change is happening and/ or largely caused by humans. Only respondents who believed in anthropogenic climate change were forwarded to the questionnaires. Respondents were first presented with statements about their climate worry and climate anxiety, followed by a list of PEBs and finally, statements about their perceived self and collective efficacy. Their demographics were requested at the end of the questionnaire in order to minimize potential survey fatigue. The final page clarified the aim of this research study, namely investigating to what extent young adults' worries about climate change are connected to pro-environmental engagement.

Results

Descriptive Statistics

All statistical analyses were performed using *IBM SPSS Statistics 27*. In order to give an outline of the descriptive statistics, the means, standard deviations and intercorrelations of the study variables were calculated (see Table 4). In this sample, the level of climate worry was moderately high, while the level of climate anxiety was low. Respondents commonly behaved pro-environmentally in private-sphere but less often in public-sphere. The means of perceived self-efficacy and perceived collective efficacy were high, meaning that the respondents felt mostly able to address climate change individually and collectively.

Climate worry and climate anxiety were strongly correlated, indicating that there was a large overlap between the experience of worry and anxiety about climate change. Furthermore, there was a moderate positive correlation between the DVs of private and public-sphere PEBs, as well as between the mediating variables of perceived self and collective efficacy.

Table 4

Descriptive Statistics and Pearson Correlations for Study Variables

Variable	*M*	*SD*	1	2	3	4	5	6
1. Climate worry	3.40	.71	-					
2. Climate anxiety	1.57	.55	.61**	-				
3. Private-sphere PEBs	3.88	.50	.37**	.29**	-			
4. Public-sphere PEBs	1.89	.79	.41**	.49**	.37**	-		
5. Self-efficacy	3.94	.71	.15*	-.00	.15*	-.06	-	
6. Collective efficacy	4.16	.72	.12	.03	.06	-.05	.39**	-

Note. Measured on 5-point Likert scales. *$p < .05$. **$p < .001$.

Next, the distributions of the variables were explored by plotting histograms (see Appendix C) and calculating skewness and kurtosis values. Climate worry and private-sphere PEBs were fairly symmetrically distributed and the distributions of perceived self-efficacy and perceived collective efficacy were slightly left-skewed. The distribution of public-sphere PEBs, however, was asymmetric and leptokurtic, with a skewness value of 1.20 (SE = 0.17) and excess kurtosis value of 1.60 (SE = 0.33). Moreover, climate anxiety was non-normally

distributed, with substantial skewness of 2.07 (*SE* = 0.17) and extreme excess kurtosis of 7.77 (*SE* = 0.33). Since statistical analyses often assume the normal distribution of variables, a violation of this assumption impacts the ability to validly draw inferences about results.

The extreme excess kurtosis value for climate anxiety was reason to inspect the data for outliers. By examining box plots (see Appendix D) and scatter plots (see Appendix E), two respondents with unusually high climate anxiety scores of 3.8 and 5 were identified (see Figure D2). In order to increase statistical power, these two respondents were excluded from further analyses. Thereupon, climate anxiety had a skewness of 1.08 (*SE* = 0.17) and excess kurtosis of .75 (*SE* = 0.33) and thus approached a normal distribution. The mean value was 1.54 *(SD* = 0.47), with the highest score being 3.08.

Main Effects of Independent on Dependent Variables

Next, the main effects of climate worry and climate anxiety on the DVs of private and public-sphere PEBs were tested by calculating partial correlations (see Table 5). The variables showed approximately linear relationships in scatter plots (see Figures E1-E5) and were thus suitable for the analyses.

Table 5

Partial Correlations between Independent and Dependent Variables

	Private-sphere PEBs	Public-sphere PEBs
Climate worry	.24**	.15*
Climate anxiety	.08	.29**

*$p < .05$. **$p < .001$.

Climate Worry on Dependent Variables

Partial correlations were run to test the main effect of climate worry on the DVs, whilst controlling for the effect of climate anxiety. There was a weak positive correlation between climate worry and private-sphere PEBs [$r(213) = .24$, $p < .001$] and between climate worry and public-sphere PEBs [$r(213) = .15$, $p = .024$], whilst controlling for climate anxiety. These results suggest that young adults who experience higher levels of climate worry are more likely to behave pro-environmentally in private and public-sphere. Hence, hypotheses H1aA and H1aB could be supported.

Climate Anxiety on Dependent Variables

Next, partial correlations were run to test the main effect of climate anxiety on the DVs, whilst controlling for the effect of climate worry. Climate anxiety did not correlate with private-sphere PEBs, whilst controlling for climate worry. However, there was a weak positive correlation between climate anxiety and public-sphere PEBs, whilst controlling for climate worry, $r(213) = .29$, $p < .001$. These results suggest that young adults who experience higher levels of climate anxiety are more likely to act pro-environmentally in public-sphere but not in private-sphere. Hence, hypothesis H2aA could not be supported and the opposite of H2aB was supported.

Mediation Effects

The mediation effects of perceived self-efficacy and collective efficacy were tested by conducting mediation analyses with *PROCESS*, a macro that uses a bootstrapping method (Hayes, 2018). Because of the theoretical overlap between the mediators, independent simple mediation analyses with either perceived self-efficacy or perceived collective efficacy as mediating variable were performed. The IV was climate worry or climate anxiety, whilst controlling for the effect of the other IV. The DV was either private or public-sphere PEBs because the model only allowed a single DV. This resulted in four simple mediation models for each mediator. An exemplary mediation model is visualized in Figure 2. The mediation effect, i.e. the indirect effect (a*b), was deemed significant when the bootstrapped 95% confidence interval did not include zero. Table 6 displays the results of the mediation analyses.

Before conducting the analysis, the assumptions of homoscedasticity and linearity were tested. Since there were no clear patterns to the residuals plotted against the fitted values (see Appendix F), the data was said to be homoscedastic. Furthermore, the IVs and DVs were approximately linearly correlated, as shown before. No correlation between the mediating variables and the IVs or DVs was observed when inspecting scatter plots (see Figures E6-E13). However, Zhao, Lynch and Chen (2010) show that insignificant a and b-paths do not affect the interpretation of the indirect effect. Overall, the data was thus suitable for conducting mediation analyses.

Figure 2

Visualized Simple Mediation Model with Control Variable

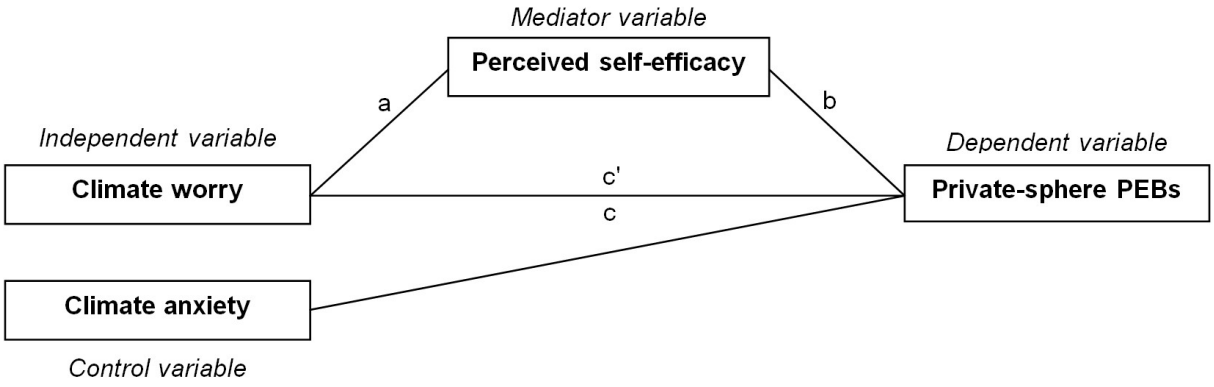


Table 6

Simple Mediation Analyses with Perceived Self or Collective Efficacy as Mediator

IV	DV	Mediator	Indirect effect	*SE*	95% CI	
					LL	UL
Climate worry	Private-sphere PEBs	Self-	0.02	0.01	-0.00	0.05
Climate worry	Public-sphere PEBs	efficacy	-0.02	0.02	-0.06	0.02
Climate anxiety	Private-sphere PEBs		0.00	0.01	-0.02	0.03
Climate anxiety	Public-sphere PEBs		0.00	0.01	-0.03	0.03
Climate worry	Private-sphere PEBs	Collective	0.00	0.01	-0.01	0.02
Climate worry	Public-sphere PEBs	efficacy	-0.01	0.01	-0.04	0.01
Climate anxiety	Private-sphere PEBs		0.00	0.01	-0.02	0.01
Climate anxiety	Public-sphere PEBs		-0.01	0.02	-0.04	0.02

Note. *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit.

Perceived Self-Efficacy as Mediator

Four independent simple mediation analyses with perceived self-efficacy as mediating variable were performed. Perceived self-efficacy had no significant mediation effect on the effect of climate worry on the DVs of private and public-sphere PEB. Furthermore, perceived self-efficacy did not have a significant mediation effect on the effect of climate anxiety on the DVs. Based on these results, hypotheses H1bC and H2bC could not be supported.

Perceived Collective Efficacy as Mediator

Four independent simple mediation analyses with perceived collective efficacy as mediating variable were performed. Perceived collective efficacy did not have a significant mediation effect on the effect of climate worry on the DVs of private and public-sphere PEB. Moreover, perceived collective efficacy had no significant mediation effect on the effect of climate anxiety on the two DVs. Hence, hypotheses H1bD and H2bD could not be supported.

Overview of the Results

Table 7 displays an overview of the results of the tested hypotheses. Furthermore, the proposed research model was adjusted (see Figure 3).

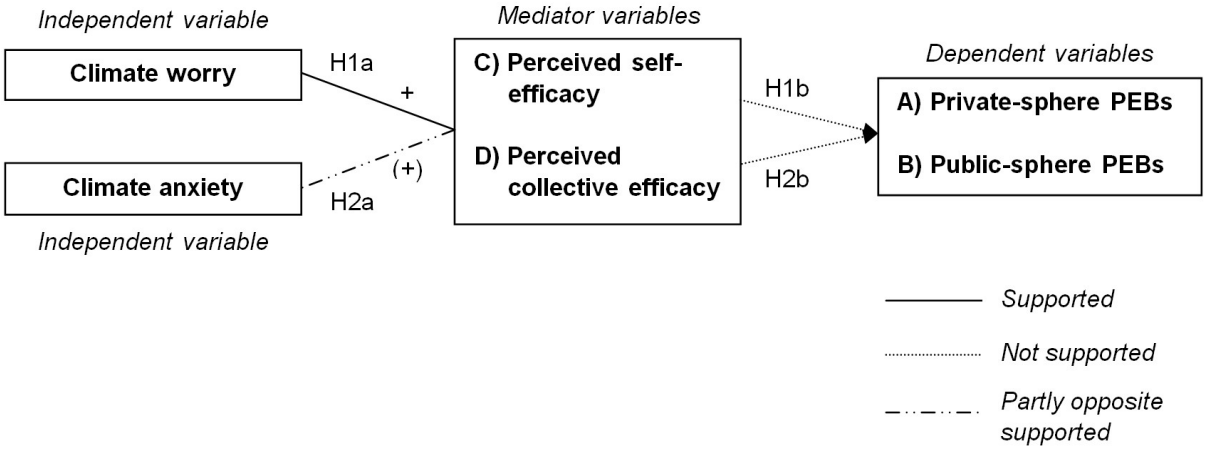
Table 7

Overview of the Results of the Tested Hypotheses

No	Hypothesis	Results
H1a	Young adults who experience higher levels of climate worry are more likely to act in pro-environmental ways in (A) private-sphere and (B) public-sphere than young adults who experience lower levels of climate worry.	Supported
H1b	The effect of climate worry on (A) private-sphere and (B) public-sphere PEBs is positively mediated by (C) perceived self-efficacy and (D) perceived collective efficacy.	Not supported
H2a	Young adults who experience higher levels of climate anxiety are less likely to act in pro-environmental ways in (A) private-sphere and (B) public-sphere than young adults who experience lower levels of climate anxiety.	H2aA not supported, Opposite of H2aB supported.
H2b	The effect of climate anxiety on (A) private-sphere and (B) public-sphere PEBs is negatively mediated by (C) perceived self-efficacy and (D) perceived collective efficacy.	Not supported

Figure 3

Adjusted Research Model



Discussion

The aim of this study was to investigate to what extent young adults' climate worry and climate anxiety are associated with PEBs in private and public-sphere. In order to get further insight into these relations, mediating effects of perceived self-efficacy and collective efficacy were examined. In this section, this study's results as well as its limitations will be discussed. Finally, implications for future research and practice will be deliberated.

Discussion of Results

Climate Worry and Pro-Environmental Behaviors

Firstly, it was hypothesized that young adults who experience higher levels of climate worry are more likely to act pro-environmentally in private and public-sphere than young adults who experience less climate worry. This hypothesis was based on a body of scientific reports, stating that worry about climate change is a constructive emotion which evokes a problem-focused coping approach, i.e. PEB (Doherty & Clayton, 2011; Mah et al., 2020; Pihkala, 2020). Indeed, various studies have demonstrated its positive relationship with various private and public-sphere PEBs (Kleres & Wettergren, 2017; Smith & Leiserowitz, 2013; Verplanken et al., 2020; Verplanken & Roy, 2013).

This study's results align with the existing literature and the assumption that worry is a constructive response, as climate worry was positively associated with private and public-sphere PEBs. An explanation for this relation may lie within the formation of a green identity as well as other activating emotions that co-occur with climate worry. Young adults likely integrate their worries and concerns about climate change into their identity and adopt a green self-image. As a result, they feel determined and empowered about acting pro-environmentally (Verplanken et al., 2020). Hence, despite being worried about climate change, young adults remain hopeful and are willing to find a solution (de Moor et al., 2020). Moreover, climate worry has been associated with anger about the climate crisis, which is also a motive force for personal and collective action (Stanley et al., 2021; Verplanken et al.,2020). Overall, complex dynamics between various psychological factors, particularly a green identity and feelings of hope or anger, may explain how PEBs evolve from climate worry.

Climate Anxiety and Pro-Environmental Behaviors

Furthermore, it was hypothesized that young adults who experience higher levels of climate anxiety are less likely to behave pro-environmentally in private and public-sphere than young adults who experience lower levels of climate anxiety. This expectation builds on the idea of 'ecoparalysis', a state in which individuals are unable to transform their anxious feelings into action (Albrecht, 2011). Though Clayton and Karazsia (2020) found no significant relation between climate anxiety and behavioral engagement, fear appeal studies suggest that there may be a negative relationship. Namely, they have shown that triggering strong fear of climate change decreases individuals' pro-environmental behavioral intentions (Chen, 2015; O'Neill & Nicholson-Cole, 2009).

This study's results, however, do not support the hypothesis but partially align with Clayton and Karaszia's (2020) results, as climate anxiety was not associated with private-sphere PEBs. Opposed to Clayton and Karaszia (2020) though, this study found a positive correlation with public-sphere PEBs, meaning that individuals who experience higher levels of climate anxiety are even more likely to be environmentally active in public-sphere.

Again, a green identity and positive and negative emotions may explain why young adults are not paralyzed by their climate anxiety. Instead of refraining from the climate crisis, they seem to embrace their anxious feelings as part of their identity and seek ways to cope with them. Becoming member of an environmental group is thus a way to overcome their negative feelings and find meaning in life (Barth, Masson, Fritsche, Fielding, & Smith, 2021; Binder & Blankenberg, 2017; Kleres & Wettergren, 2017). Specifically, acting collectively against climate change can create hope and a social identity that is valued by others (Masson & Fritsche, 2021; Wright, 2009). Personal action, in contrast, seems less promising to those who are climate anxious, presumably because it neither generates a sense of being valued, nor the positive feeling of effectively contributing to solving the crisis (Stern, 2000). Thus, the restorative effect that is anticipated for collective action but not for personal PEBs, may explain why climate anxious individuals are likely to engage pro-environmentally in public-sphere, while not changing their PEBs in private-sphere.

Effects of Perceived Efficacy

To test possible mediating effects of perceived self and collective efficacy, two hypotheses were established. Firstly, it was hypothesized that the effect of climate worry on PEBs is positively mediated by perceived self and collective efficacy. The second hypothesis

stated that the effect of climate anxiety on PEBs is negatively mediated by perceived self and collective efficacy.

The theory of planned behavior provided the groundwork for this hypothesis by establishing perceived efficacy as a direct predictor for behavioral intentions (Ajzen, 1991). Following this theory, environmental research has focused on two types of efficacy beliefs: perceived self-efficacy and collective efficacy. Despite sometimes incongruent findings, these two efficacy beliefs seem essential for young adults to behave pro-environmentally (e.g., Homburg & Stolberg, 2006; Li, 2014). In addition, fear appeal studies have shown that fear messages need to convey positively perceived efficacy in order to be effective in promoting PEBs, and thereby emphasized the significance of efficacy beliefs in the context of anxious emotions (Mah et al., 2020; O'Neill & Nicholson-Cole, 2009). Since climate worry appears to be linked to positive efficacy beliefs and climate anxiety to negative efficacy beliefs (e.g., Albrecht, 2011; Clayton; 2020; Mah et al., 2020), a mediating effect was hypothesized.

This study, however, did not match the expectation because perceived self and collective efficacy did not mediate the effect of climate worry or climate anxiety on PEBs. This result implies that worried and anxious young adults act independently of their perceived efficacy. The theory of planned behavior may provide an explanation for this finding as it recognizes two other crucial predictors of behavioral engagement: an individual's attitude and subjective norm (Ajzen, 1991). In the context of climate action, the theory thus implies that a pro-environmental attitude and the perceived norm to behave pro-environmentally are central forces of environmental engagement and predominate over positive or negative efficacy beliefs (Masson & Fritsche, 2021; Stern, 2000). For instance, young adults who are worried or anxious about climate change may not believe that their actions contribute to mitigating climate change, but still engage in them because it corresponds to their pro-environmental attitude and perceived norms. Here, a green self-identity and the anticipated restorative effect of action may have a mediating effect as well. Thus, the relation between climate worry or anxiety and PEBs cannot be reduced to a single motive but is a highly complex interplay of different forces.

Research Limitations

The results must be discussed in the light of the limitations of this study. Firstly, due to the convenience sampling method, the generalizability of the results to the population of young adults is limited. Specifically, the recruitment of respondents in the researcher's

private network, along with the snowball sampling method, led to a less representative research sample. Moreover, posting the survey in activist groups could have caused finding more respondents who are pro-environmentally active, and thereby has possibly contributed to finding positive associations with PEBs. In addition, the unequal distribution of demographic characteristics, particularly the high proportion of students and females, needs to be taken into account when making inferences from the results. Therefore, future studies should replicate the results in a random sample of young adults.

The research sample poses another limitation of this study as it does not include young adults who experience strong climate anxiety. In fact, this study removed two outliers with extreme scores of climate anxiety in order to increase the accuracy of the results. Anyway, data from these two respondents would have been insufficient for drawing accurate conclusions about whether climate anxiety causes (un)constructive behavior. Consequently, this study does not fully solve the knowledge gap if climate anxiety may be paralyzing, and future research must address this task.

Moreover, a limitation lies within the cross-sectional study design which does not allow drawing conclusions about a temporal or causal effect of climate worry or anxiety. In fact, it is likely that the effect is not one-directional but bi-directional in nature, meaning that worries or anxiety and sustained PEB continuously reinforce each other (Verplanken et al., 2020). Future research can bring clarity about the effect by conducting cross-lagged longitudinal analyses of young adults' climate worry and anxiety and their PEBs.

Lastly, the validity analysis of the survey scales poses a limitation to interpreting this study's results. Due to running separate factor analyses, it is unclear whether the scales were really discriminatory. Specifically, this limits the ability to draw correct conclusions about differences between climate worry and climate anxiety. Their respective scales indeed showed a strong correlation (r=.61), although still in an acceptable range. Hence, it can be concluded that the scales most likely measured distinct constructs. Nonetheless, future studies are advised to perform a single exploratory factor analysis among study scales in order to show their discriminant validity.

Implications for Research and Practice

Future studies can build up on the discussion of the results and address the research limitations in order to gain deeper understanding of the subject matter. First, considering that climate anxiety is still a fairly unexplored and uncommon reaction to climate change, it would be interesting to study the construct of climate anxiety in an exploratory qualitative

interview study. Interviews with anxious young adults are suited to explore what constitutes climate anxiety and to gain a better understanding of how it can affect young adults' lives and behavior. This understanding will be useful for making a clear-cut conceptualization and operationalization of climate anxiety, which is the basis for subsequent research.

Moreover, the relations with PEBs should be examined more closely in order to understand what other factors contribute to a constructive response in worried and anxious young adults. This knowledge is relevant for understanding why there are some accounts of paralyzing, unconstructive climate anxiety. Even though this study found that these emotions are, statistically speaking, likely to mobilize young adults, it by no means rules out the possibility that some are paralyzed by their fear. Therefore, it is important to research to what extent other constructs, such as positive eco-emotions, a green self-image or perceived environmental norms, account for climate action in worried and anxious individuals. Future studies can build on and expand this study's research model (see Figure 3).

Besides the implications for future research, this study has important practical implications for dealing with young adults' fear of climate change. In the light of the crisis that the earth is facing, worry can indeed be considered a constructive emotion. This study has strengthened this view by showing that climate worry is associated with PEBs. Even though climate anxiety is also likely to cause constructive behavior, namely public-sphere action, it should not be concluded that it is a constructive reaction. That is because climate anxiety clearly impinges on young adults' well-being and their daily lives. For this reason, it is of utmost importance to distinguish between climate worry and climate anxiety.

Further, this study's findings imply that clinical practice needs to respond to young adults' experiencing of climate change. In line with prior surveys (American Psychological Association, 2020; Parker et al., 2019) this study has shown that the majority of young adults are worried about the drastic consequences of climate change. Even though this is an adequate and constructive response, it can hold negative effects for their well-being nonetheless. Luckily, young adults in this sample and previous studies rarely experienced a strong climate anxiety (Clayton & Karazsia, 2020). Nevertheless, the fact that two respondents reported considerable levels of climate anxiety signals the importance of being attentive to these experiences and monitoring the psychological impacts of climate change. In practice, psychologists and therapists should be aware of the arising challenges and find ways to address climate change-related mental health problems in their clients. In this process, research and practice need to go hand in hand and inform each other.

Conclusion

Overall, this study aimed at answering the main research question: “To what extent are climate worry and climate anxiety associated with PEBs in young adults?”. In order to conclude with an answer to this main research question, the three sub-research questions must be answered first.

Firstly, this study investigated the sub-research question “To what extent is climate worry associated with PEBs in young adults?” Based on the results, it can be concluded that climate worry is positively associated with PEBs in private and public-sphere. This means that young adults who worry about climate change are more likely to behave pro-environmentally in private and public-sphere than those who do not worry about climate change.

Next, the second sub-research question can be answered: “To what extent is climate anxiety associated with PEBs in young adults?” Namely, it was found that climate anxiety is positively associated with PEBs in public-sphere but not associated with private-sphere PEBs. Hence, young adults who experience climate anxiety are more likely to behave pro-environmentally in public-sphere, but equally as much in private-sphere as young adults who are not anxious about climate change.

Lastly, a third sub-research question was investigated: “To what extent does young adults’ perceived efficacy mediate the association of climate worry/ anxiety and PEBs?” Specifically, this study looked at two types of efficacy beliefs, perceived self and collective efficacy. In this research, no mediating effects for perceived self and collective efficacy were found. Thus, the answer on this sub-question is that young adults’ perceived efficacy does not mediate the association of climate worry or anxiety and PEBs.

Based on the answers to the three sub-research questions, a concluding answer to the main research question can be given: “To what extent are climate worry and climate anxiety associated with PEBs in young adults?” While climate worry is positively associated with private and public-sphere PEBs, climate anxiety is positively associated with public-sphere PEBs but not associated with private-sphere PEBs. Finally, this study has shown that none of these associations are mediated by young adults’ perceived self-efficacy or perceived collective efficacy.

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Appendix A

Survey scales

Construct	Items	Source
Climate worry	Read each statement and indicate how frequently each statement applies to you. Respond in terms of how you generally feel. There are no right or wrong answers. 1) I worry about climate change more than other people. 2) Thoughts about climate change cause me to have worries about what the future may hold. 3) I tend to seek out information about climate change in the media (e.g., TV, newspapers, Internet). 4) I tend to worry when I hear about climate change, even when the effects of climate change may be some time away. 5) I worry that outbreaks of severe weather may be the result of a changing climate. 6) I notice that I have been worrying about climate change. 7) Once I begin to worry about climate change, I find it difficult to stop. 8) I worry about how climate change may affect the people I care about.	Stewart (2021)
Climate anxiety	Please rate how often the following statements are true of you. 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.	Clayton & Karazsia (2020)
Private-sphere PEBs	Please indicate how often you have performed each of the following behaviors in the last year. 1) Taking shorter showers 2) Switching off the water tap while brushing your teeth 3) Switching off electrical appliances instead of leaving them on standby 4) Taking a used or reusable shopping bag when shopping 5) Switching off lights when leaving a room 6) Disposing garbage in the proper recycling bins or bags 7) Buying organic products 8) Buying locally produced products 9) Buying a less polluting product when given the choice 10) Switching off the heating on time before going out or to sleep 11) Making sure to maintain a comfortable, but not higher than strictly	Verplanken & Roy (2013)

	necessary, temperature in room or house 12) Monitoring electricity and/or gas consumption 13) Making sure not to spoil gas or electricity while cooking.	
Public-sphere PEBs	Please indicate how often you have performed each of the following behaviors in the last year. 1) I have made a donation to an environmental organization or environmental project of request. 2) I have signed a petition for an environmental issue or cause. Please indicate how often you have performed each of the following behaviors before Covid-19**.** 3) I have participated in peaceful demonstrations for the environment. 4) I have worked or volunteered for an environmentally friendly organization. 5) (I have convinced others to behave in a more environmentally friendly manner.) [a]	Hansmann & Binder (2020)
Perceived self-efficacy	Please indicate to what extent you agree or disagree with each of the following statements. 1) There are simple things I can do that reduce the negative consequences of climate change. 2) I can change my daily routines to combat climate change. 3) There are things I can do that can make a difference in reducing the negative consequences of climate change. 4) My individual actions will contribute to a solution of climate change. 5) Changes in my daily routines will contribute to reducing the negative consequences of climate change.	Van Zomeren, Spears, & Leach (2010)
Perceived collective efficacy	Please indicate to what extent you agree or disagree with each of the following statements. 1) I think that people can jointly prevent the negative consequences of climate change. 2) I think that individuals can collectively stop the negative consequences of climate change. 3) I think that people can together, through joint effort, achieve the goal of preventing the negative consequences of climate change.	Van Zomeren, Spears, & Leach (2010)

[a] Item not retained.

Appendix B

Informed consent form

Welcome!

You are invited to participate in a **survey on young adults' experiences of climate change**. This research study is done by Svenja Wittrock from the Faculty of Behavioural, Management and Social Sciences at the University of Twente.

The survey will take you approximately **5-10 minutes** to complete. Your participation in this study is entirely **voluntary** and you can withdraw at any time.

The possible **risks** or discomforts of the study are minimal. You may find some of the survey questions to be sensitive. Be aware that you can exit the survey at any time without giving any reason.

The data will be used for the researcher's bachelor's thesis. Your answers in this study will remain **confidential**. We will minimize any risks by storing the data offline and on a USB stick and by deleting it after use. Nobody, except the researcher and the research supervisor, will have access to the data. Personal identifiable data will not be collected and you will remain **anonymous**.

Contact details for questions or further information:
Name of researcher: Svenja Wittrock
E-Mail: s.h.wittrock@student.utwente.nl

Please indicate below if you consent to participating in this study.
By clicking "I consent" you agree that

- You have read the information above
- You are aged between 18 and 30 years (because we're interested in young adults)
- You voluntarily agree to participate

○ I consent.
○ I do **not** consent.

Appendix C

Histograms for study variables

Figure C1

Histogram of Mean Scores for Climate Worry

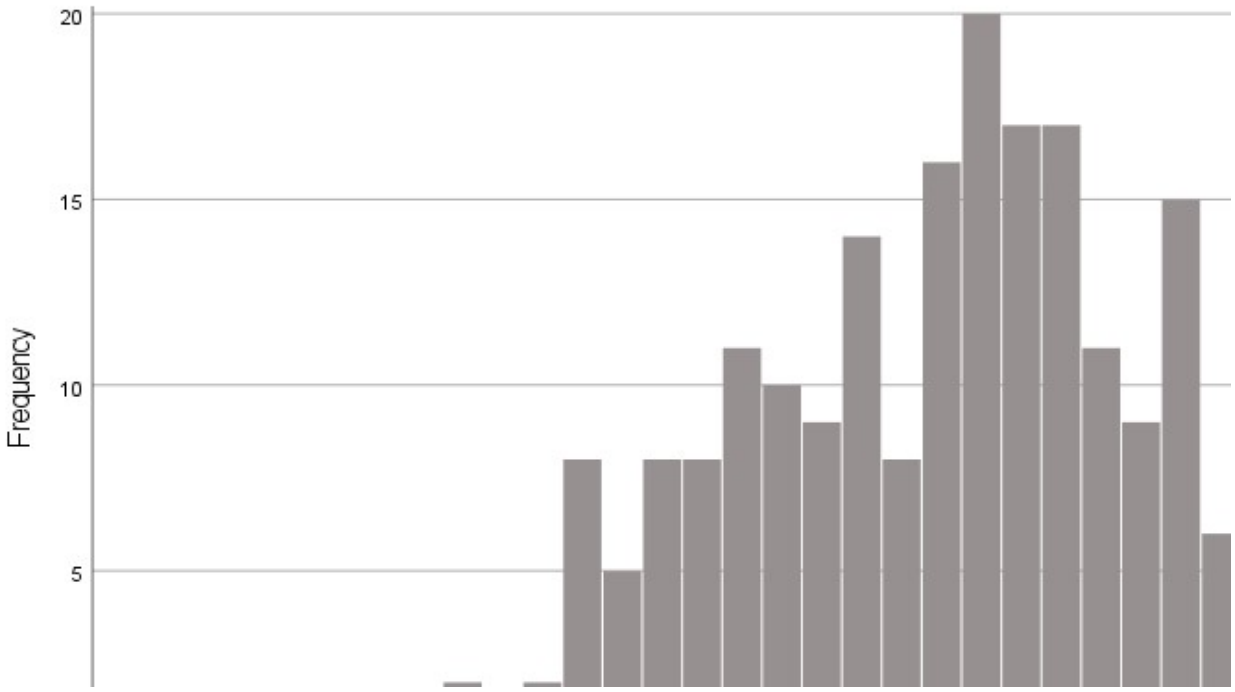


Figure C2

Histogram of Mean Scores for Climate Anxiety

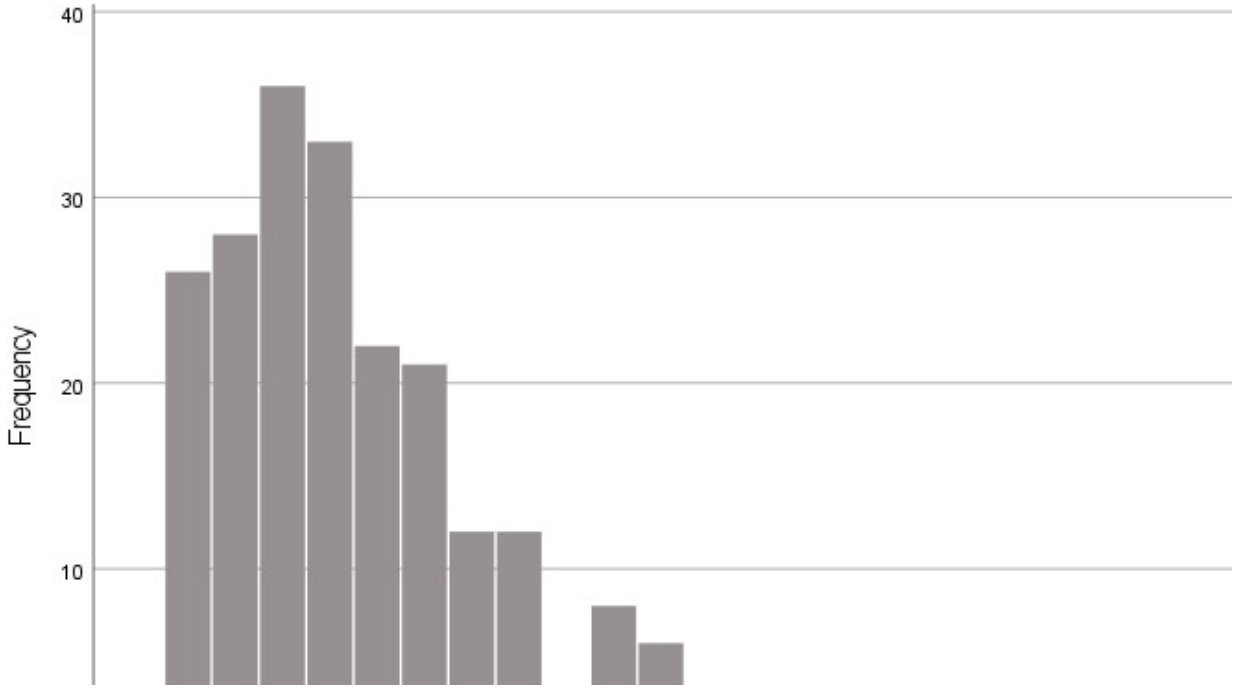


Figure C3

Histogram of Mean Scores for Private-Sphere PEBs

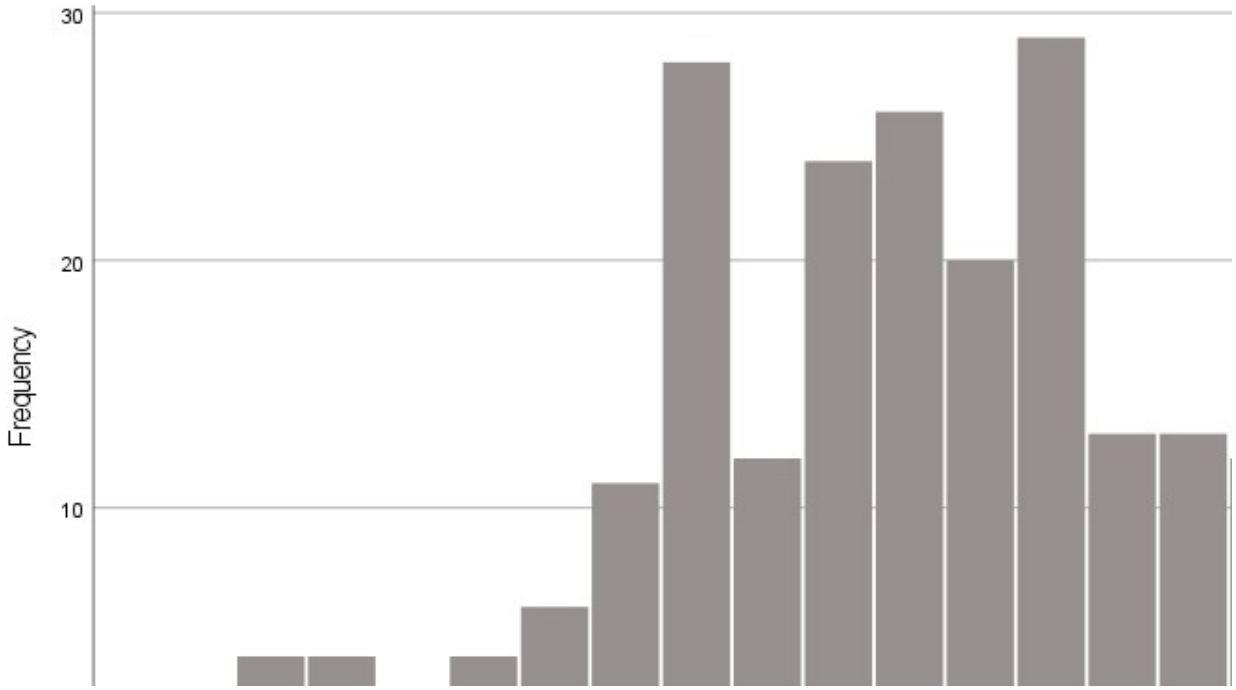


Figure C4

Histogram of Mean Scores for Public-Sphere PEBs

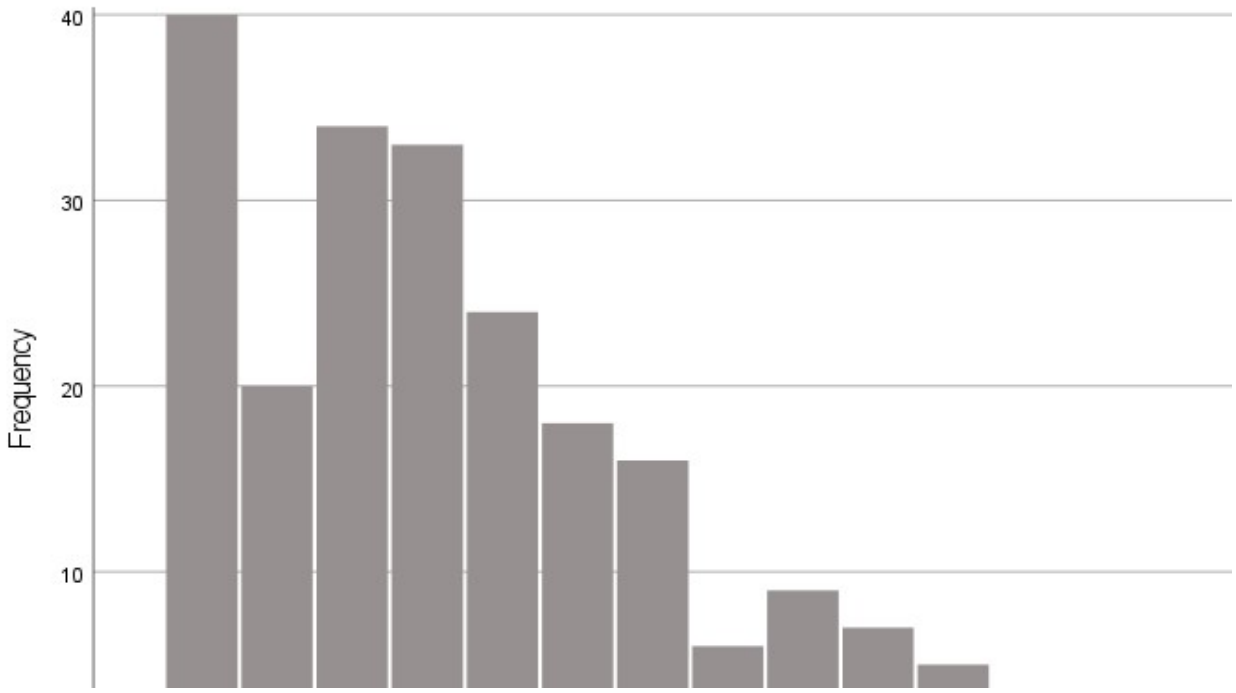


Figure C5

Histogram of Mean Scores for Perceived Self-Efficacy

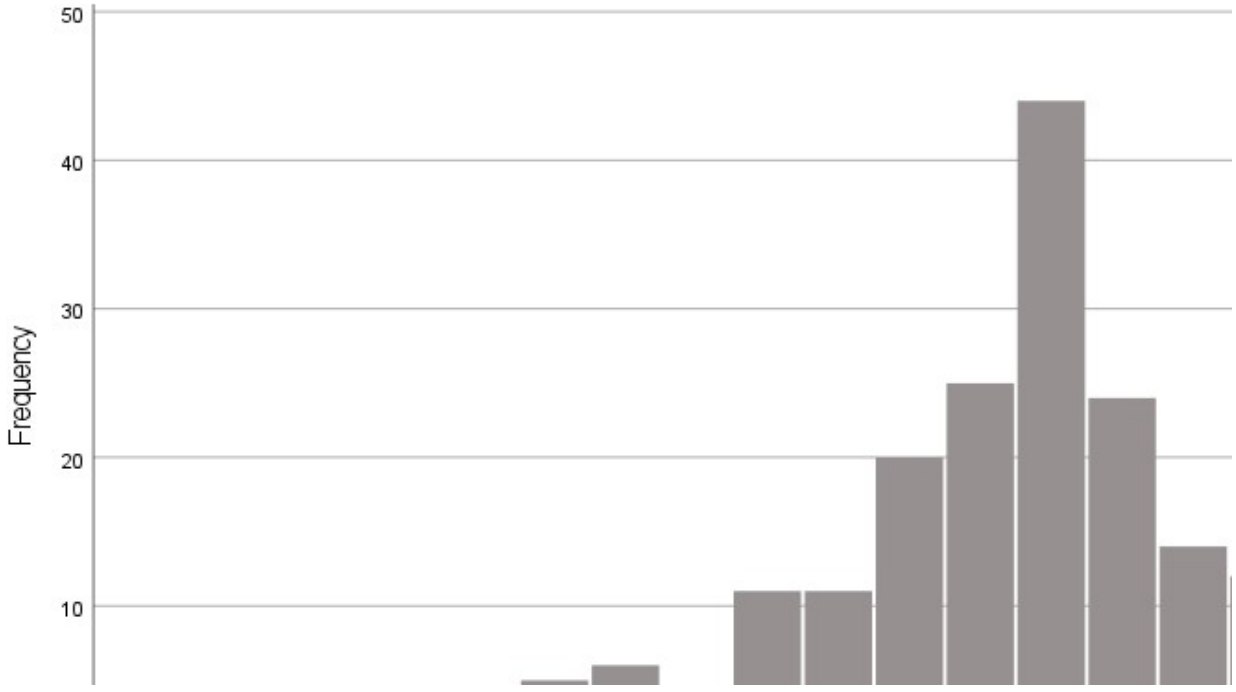
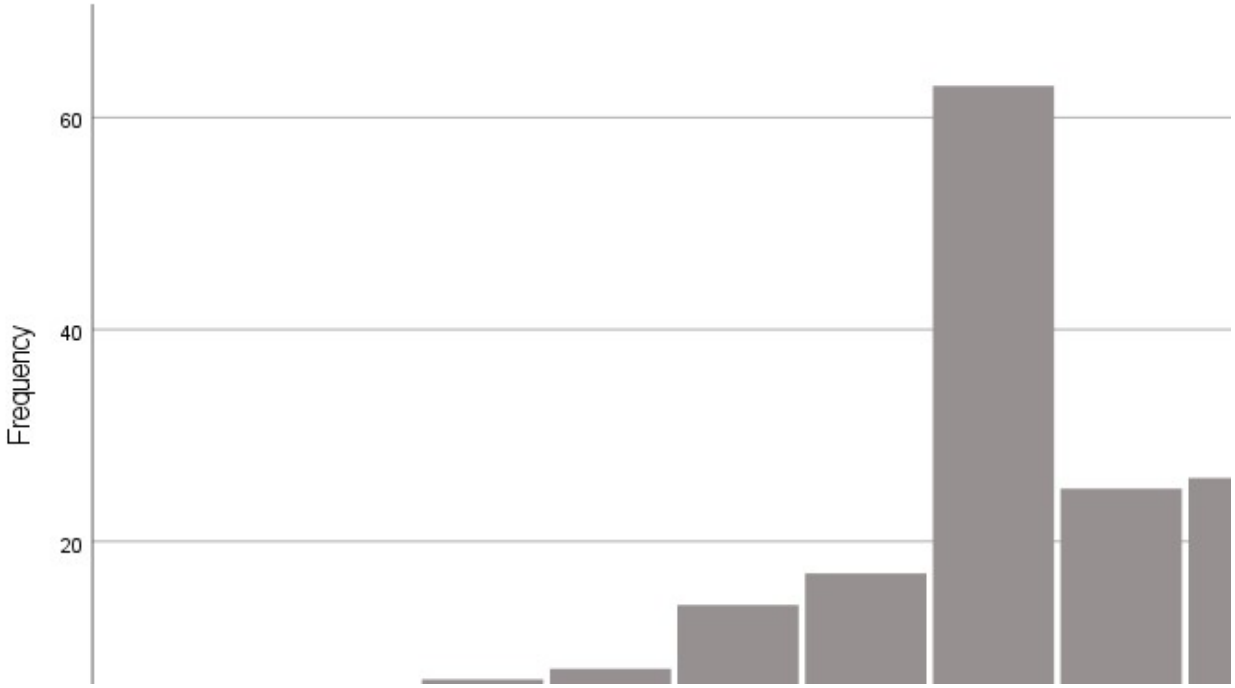


Figure C6

Histogram of Mean Scores for Perceived Collective Efficacy



Appendix D

Box plots for study variables

Figure D1

Box Plot for Climate Worry

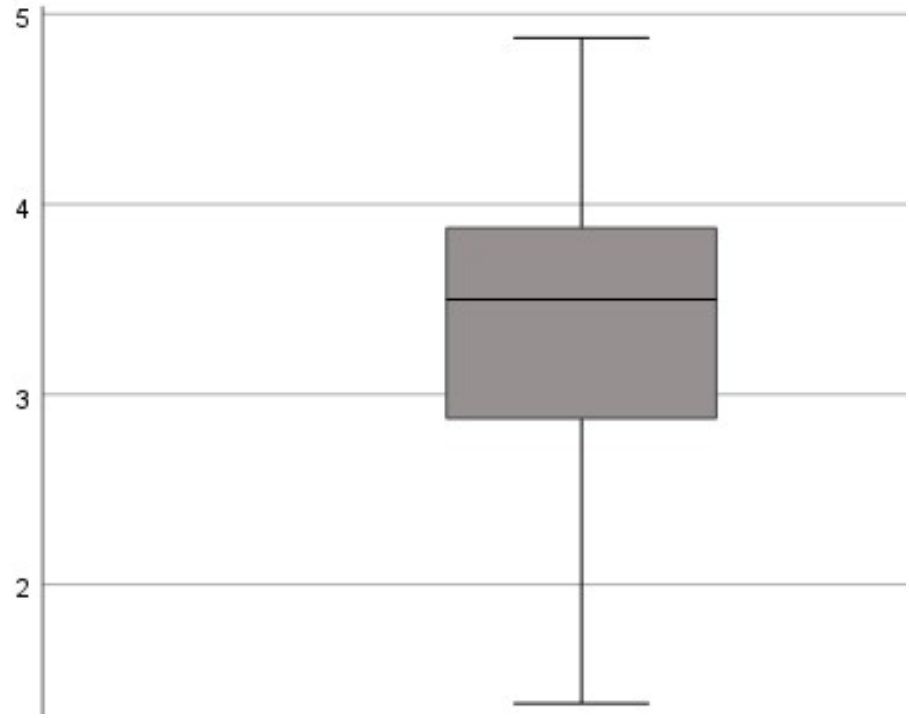


Figure D2

Box Plot for Climate Anxiety

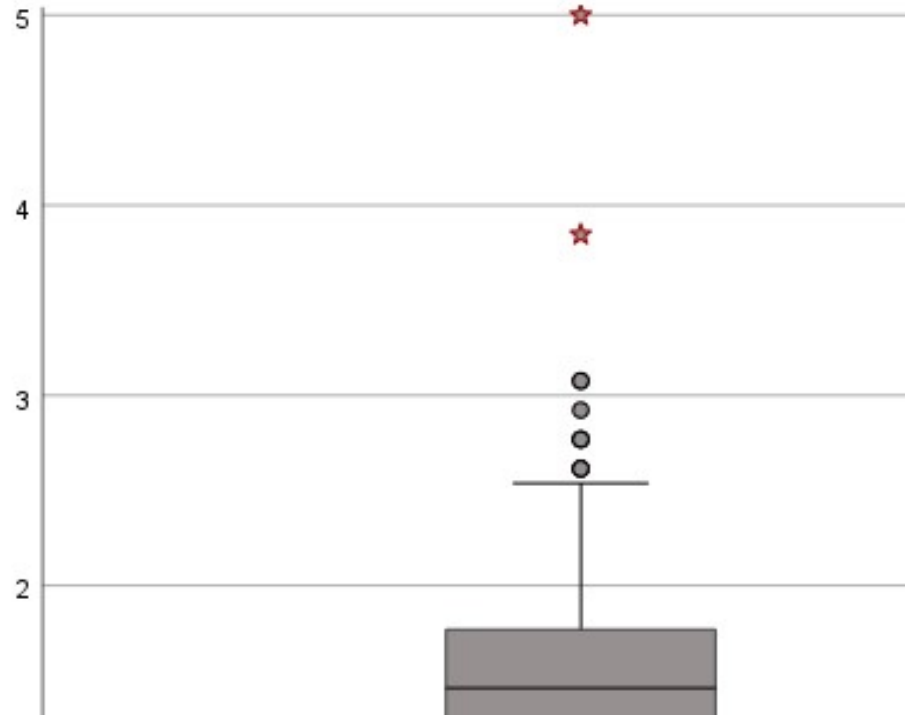


Figure D3

Box Plot for Private-Sphere PEBs

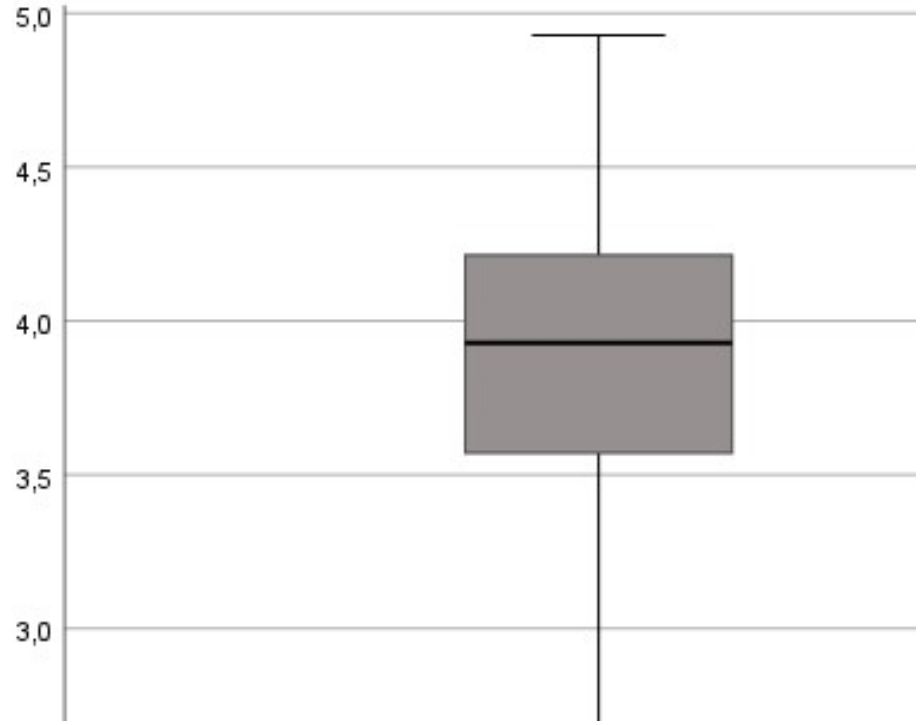


Figure D4

Box Plot for Public-Sphere PEBs

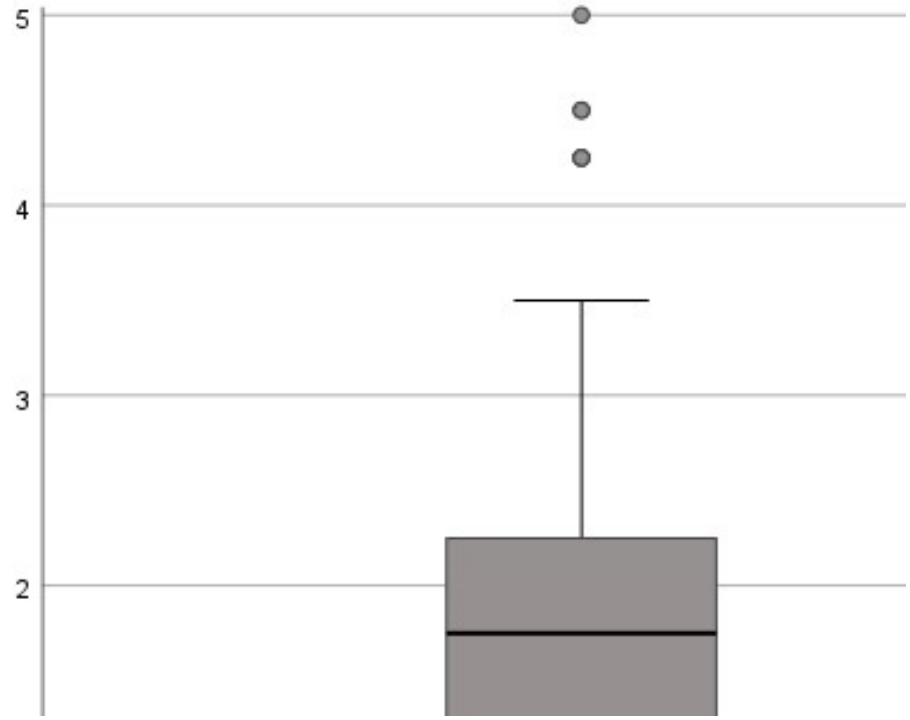


Figure D5

Box Plot for Perceived Self-Efficacy

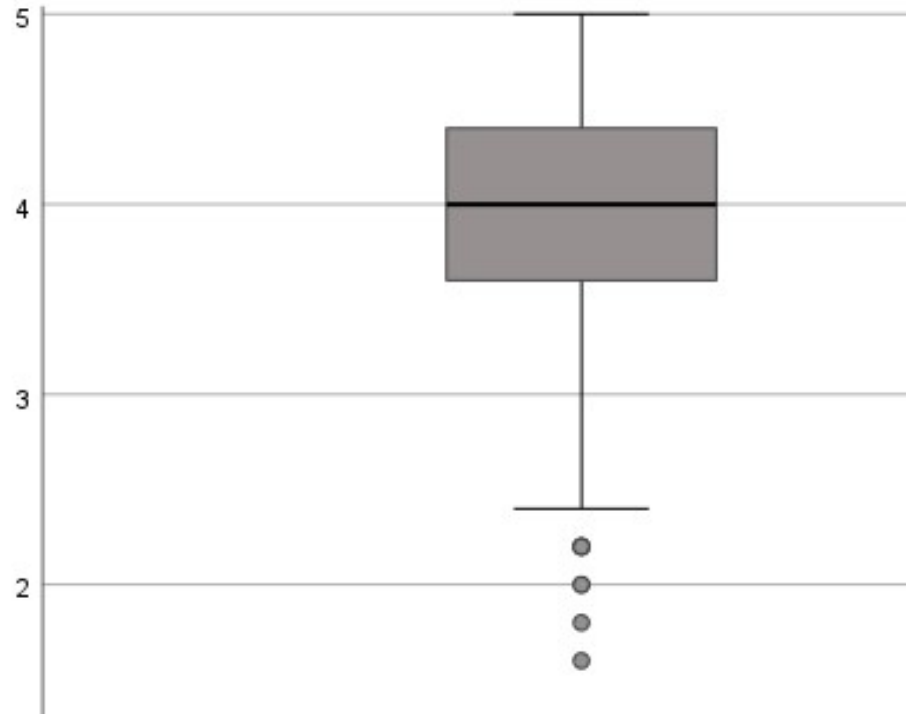
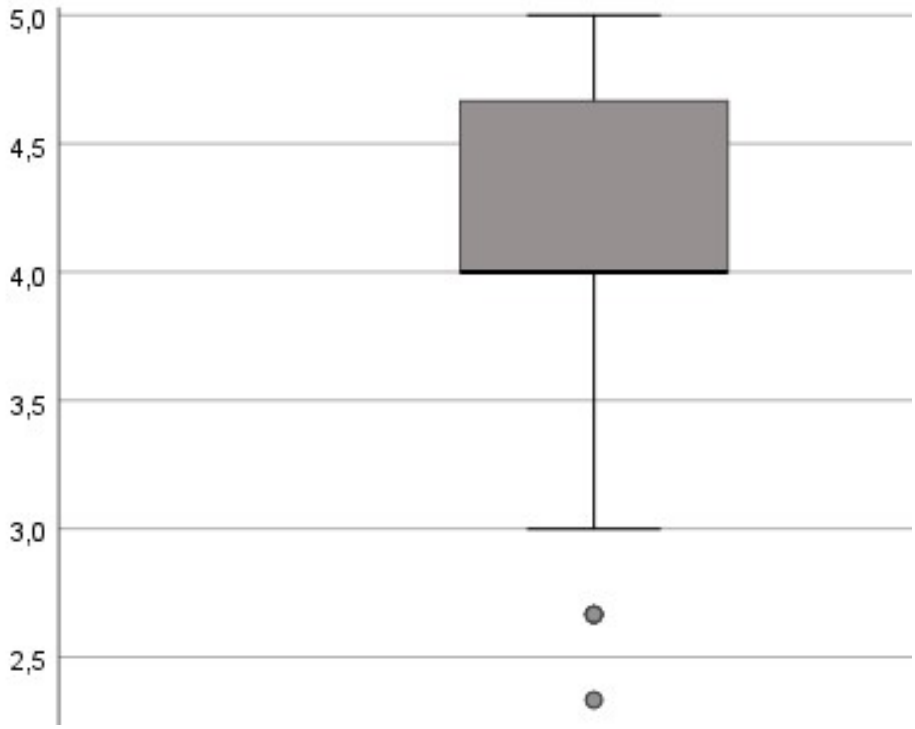


Figure D6

Box Plot for Perceived Collective Efficacy



Appendix E

Scatter plots for study variables

Figure E1

Scatter Plot for Climate Worry and Climate Anxiety

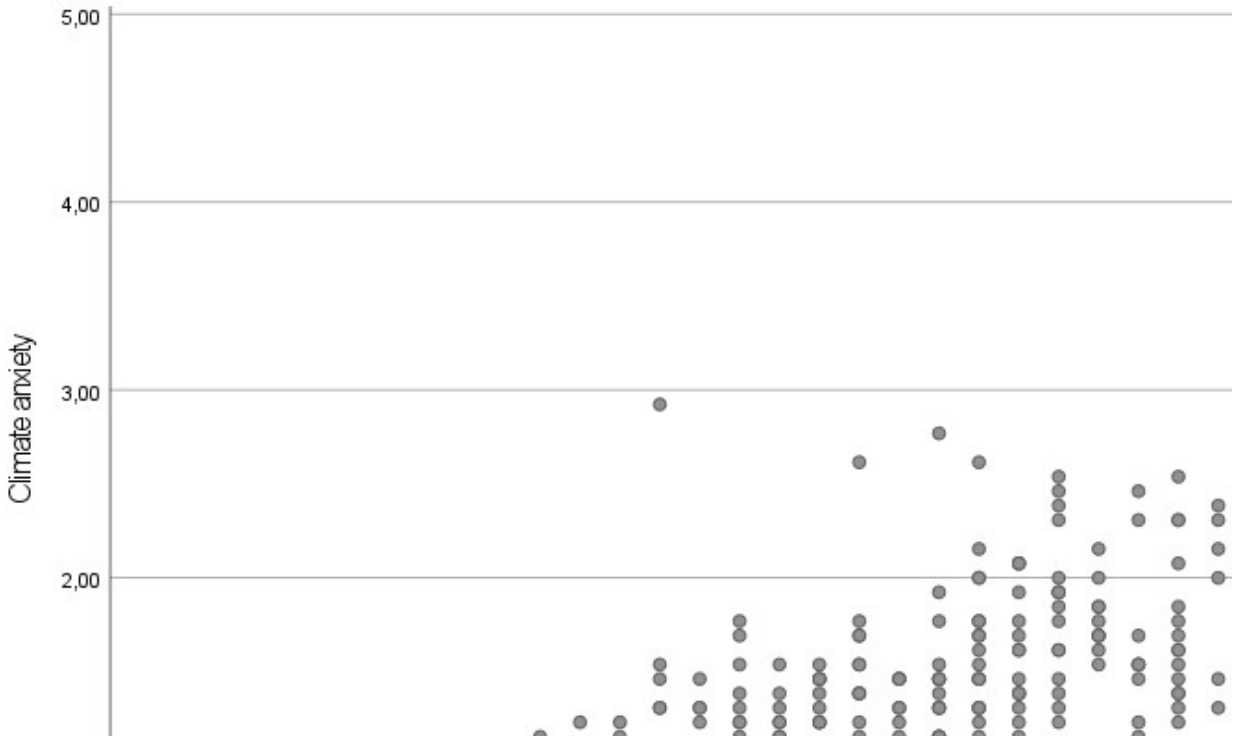


Figure E2

Scatter Plot for Climate Worry and Private-Sphere PEBs

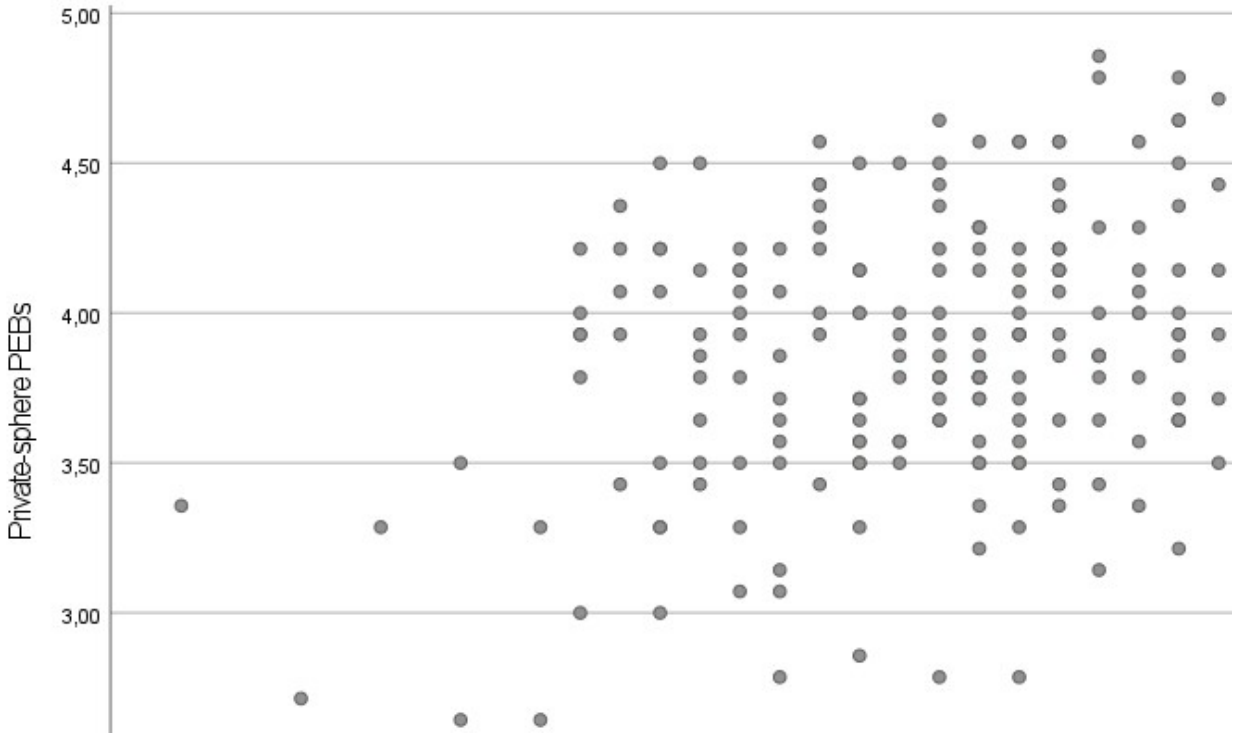


Figure E3

Scatter Plot for Climate Worry and Public-Sphere PEBs

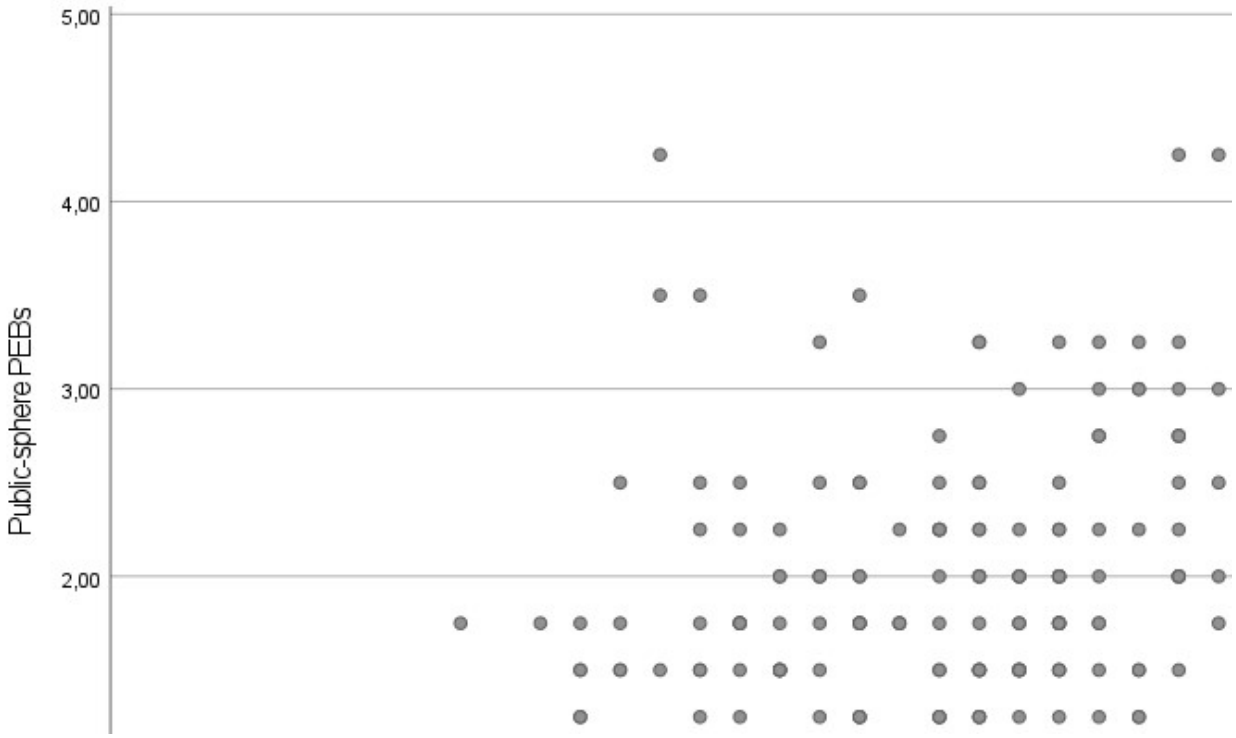


Figure E4

Scatter Plot for Climate Anxiety and Private-Sphere PEBs

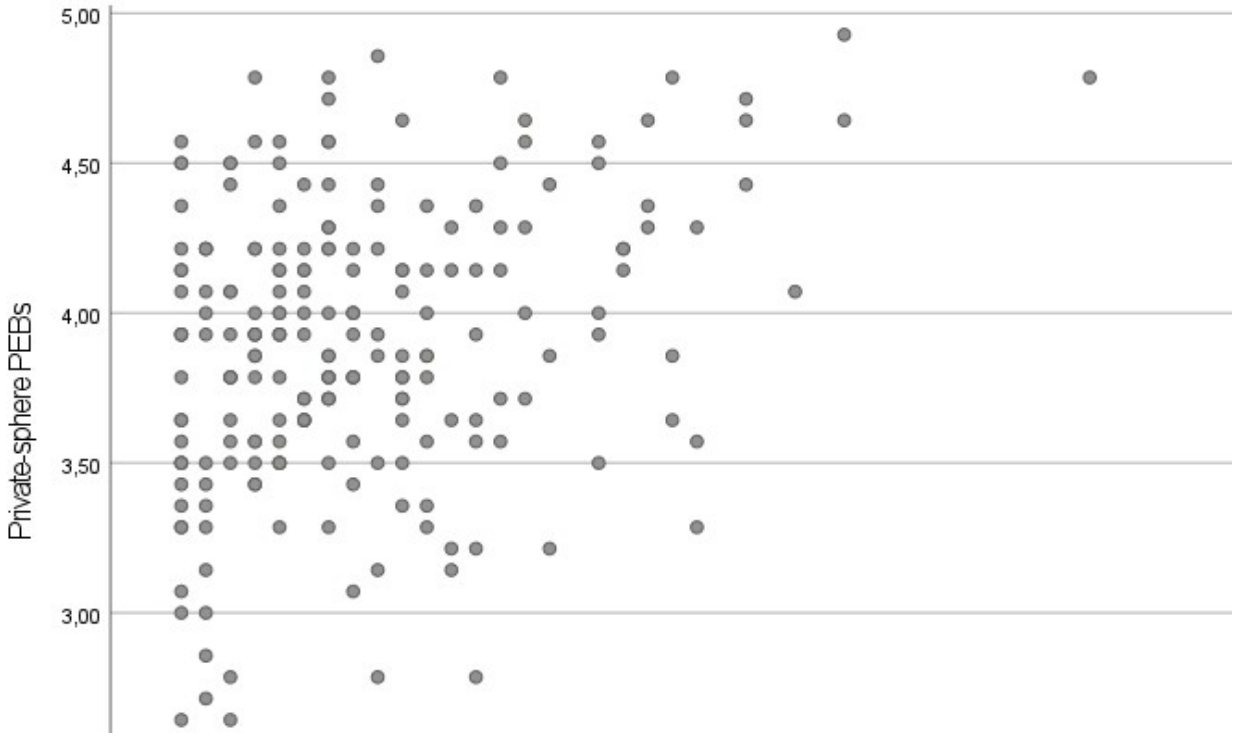


Figure E5

Scatter Plot for Climate Anxiety and Public-Sphere PEBs

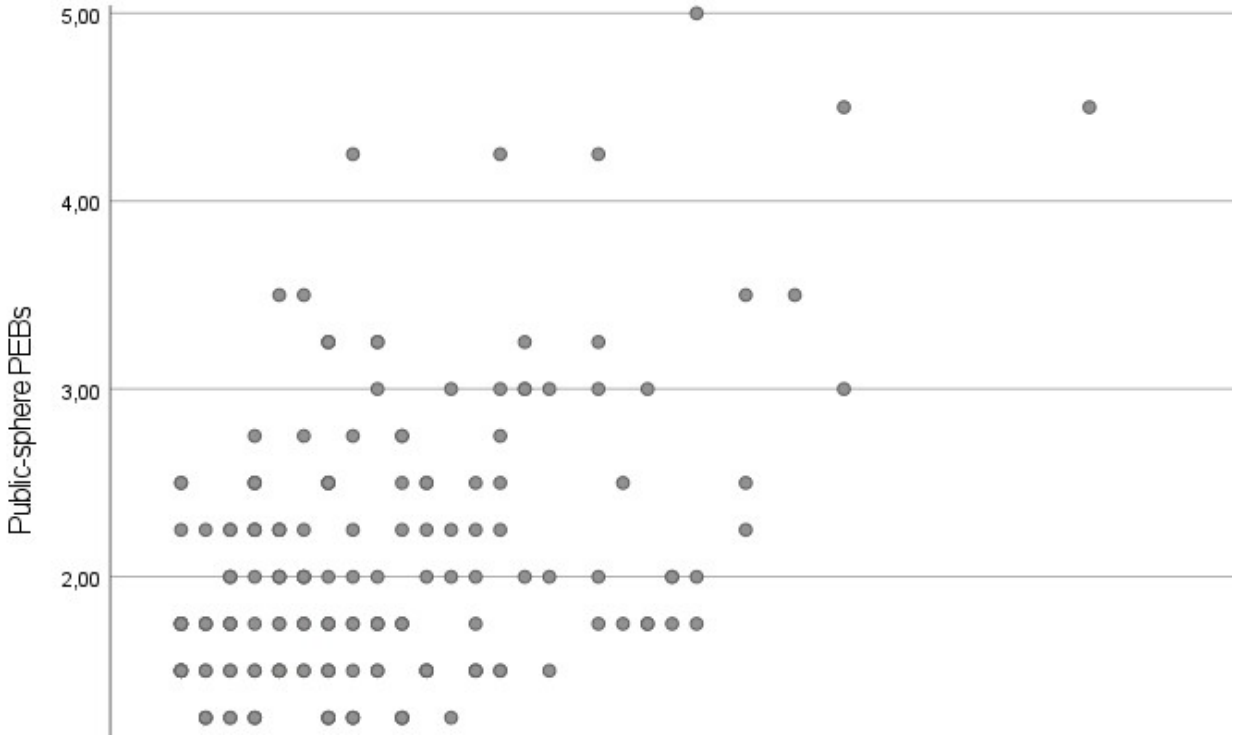


Figure E6

Scatter Plot for Climate Worry and Perceived Self-Efficacy

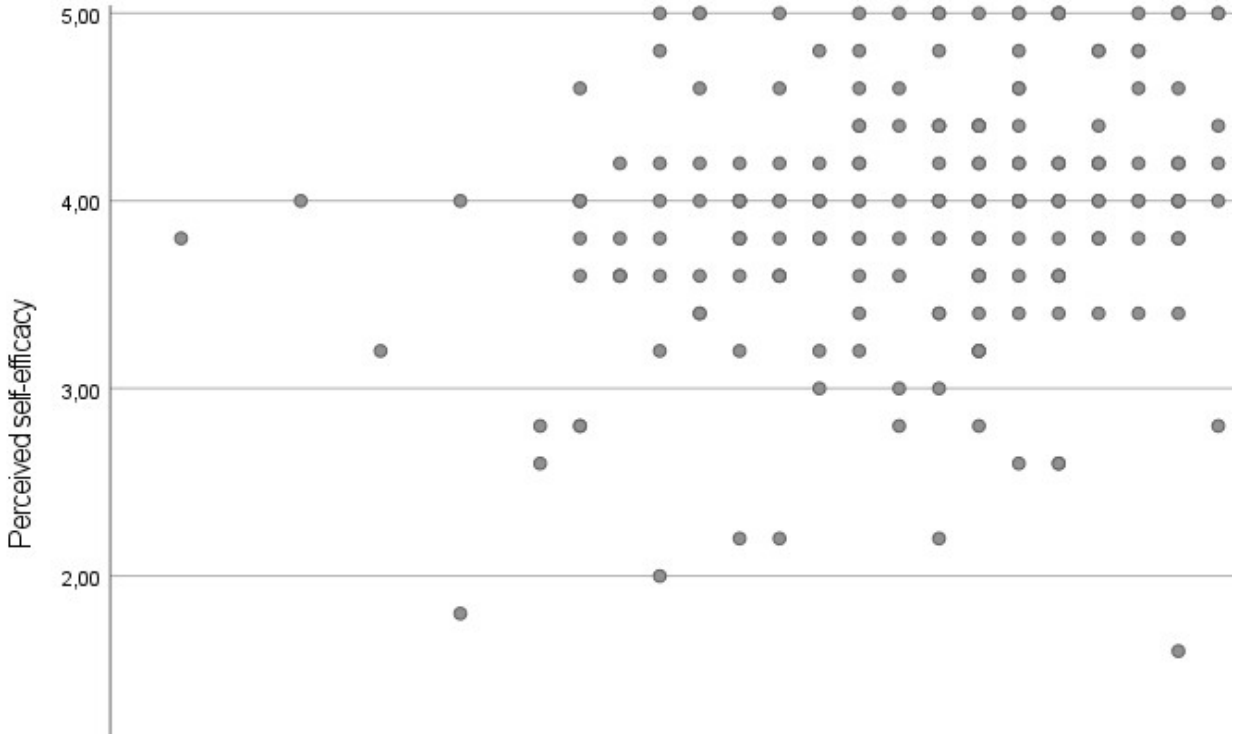


Figure E7

Scatter Plot for Climate Anxiety and Perceived Self-Efficacy

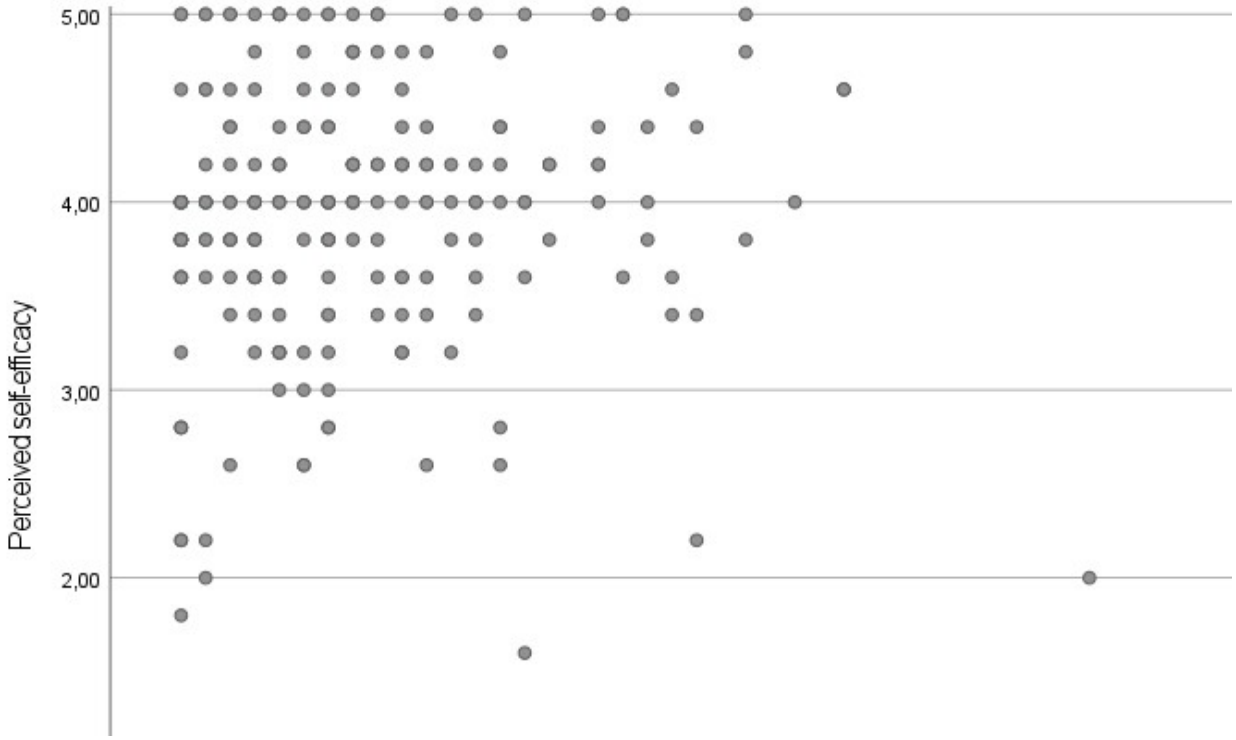


Figure E8

Scatter Plot for Climate Worry and Perceived Collective Efficacy

Figure E9

Scatter Plot for Climate Anxiety and Perceived Collective Efficacy

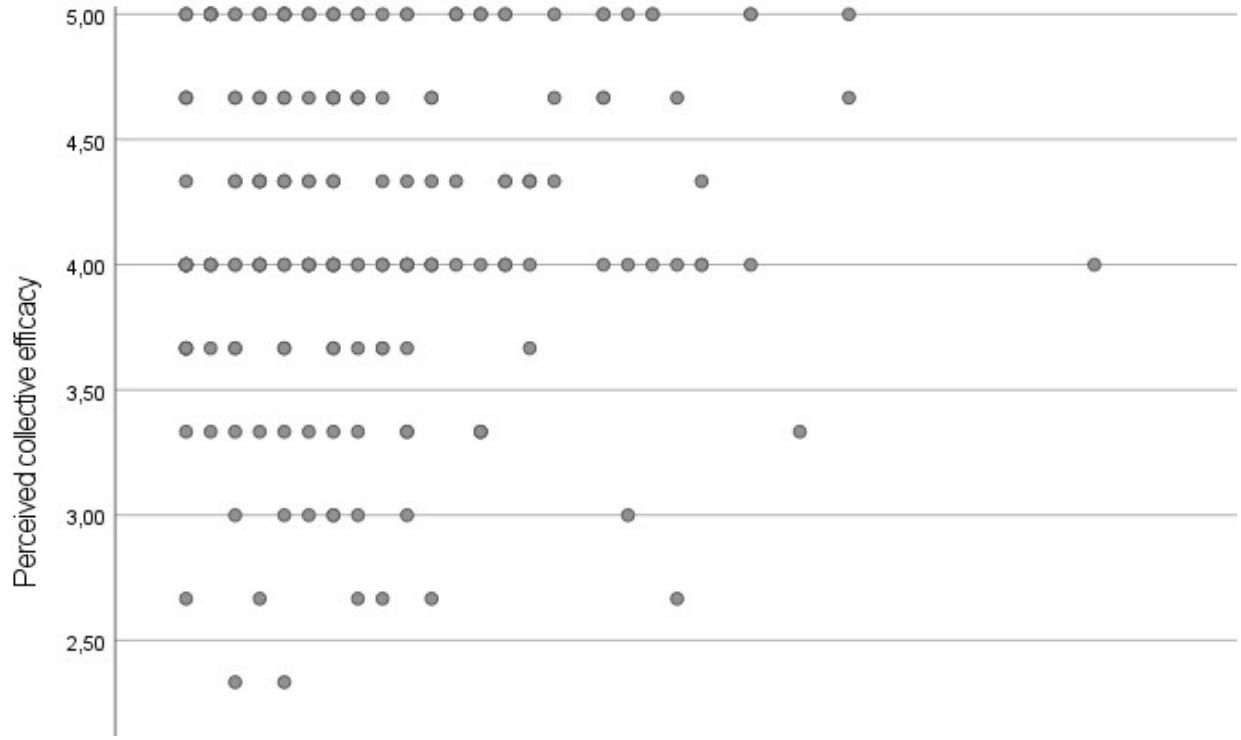


Figure E10

Scatter Plot for Private-Sphere PEBs and Perceived Self-Efficacy

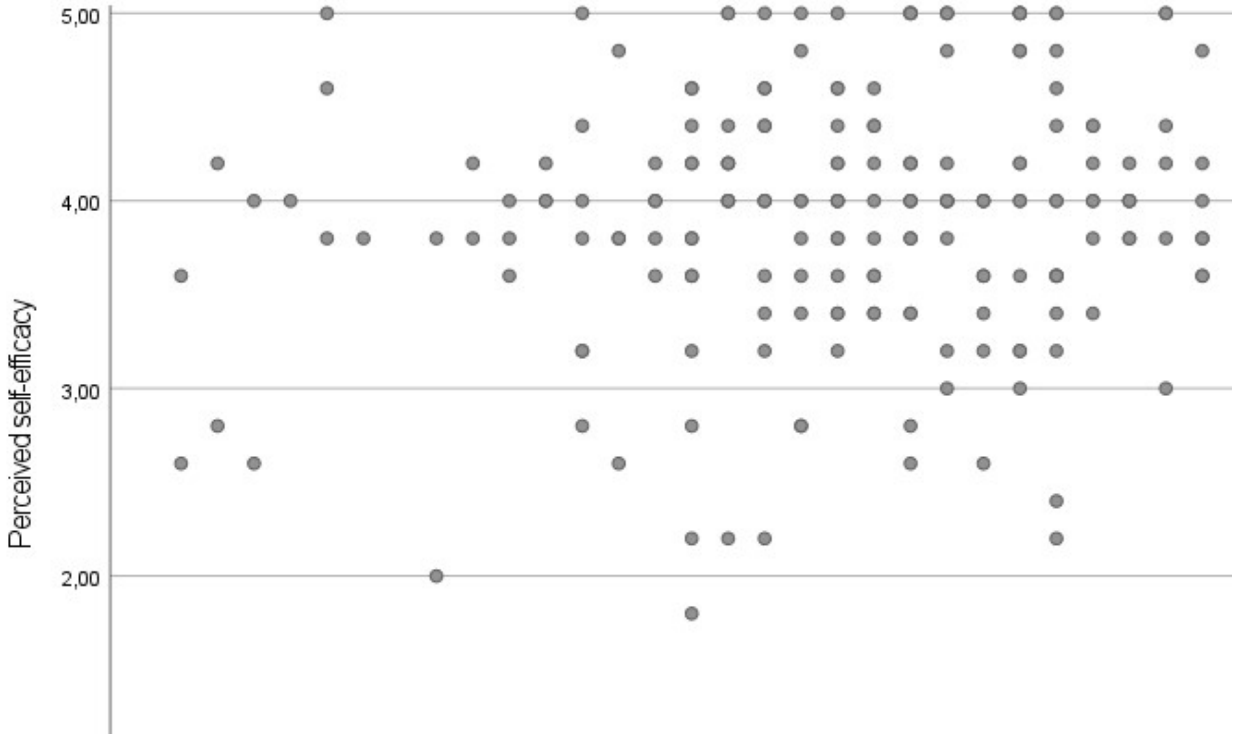


Figure E11

Scatter Plot for Private-Sphere PEBs and Perceived Collective Efficacy

Figure E12

Scatter Plot for Public-Sphere PEBs and Perceived Self-Efficacy

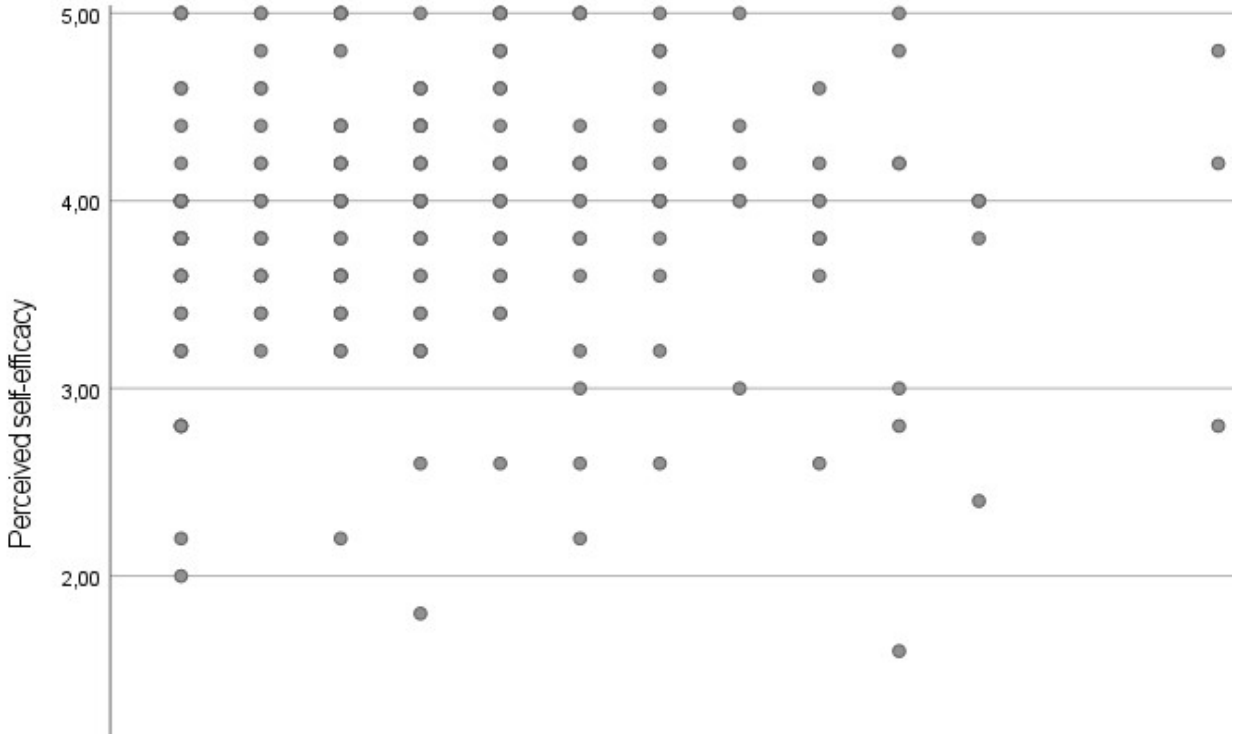
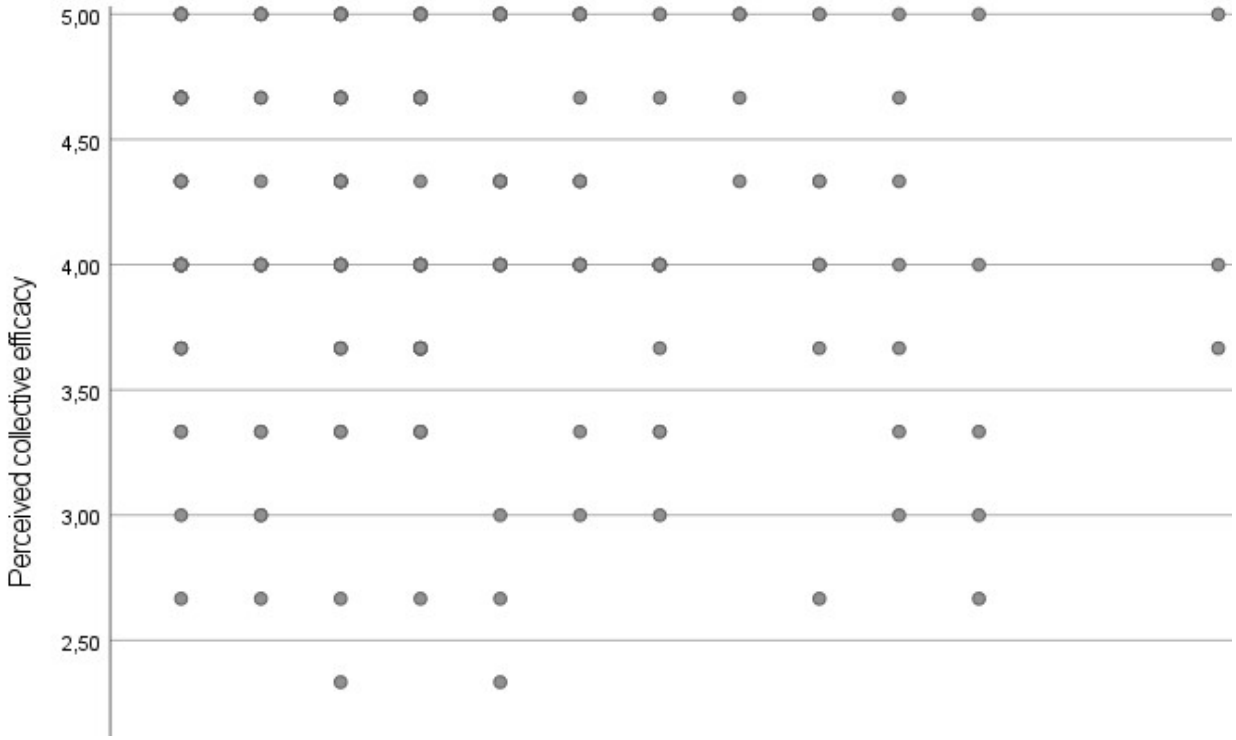


Figure E13

Scatter Plot for Public-Sphere PEBs and Perceived Collective Efficacy



Appendix F

Residual plots for study variables

Figure F1

Predicted Values for Private-Sphere PEBs (IV: Climate Worry) plotted against Residuals

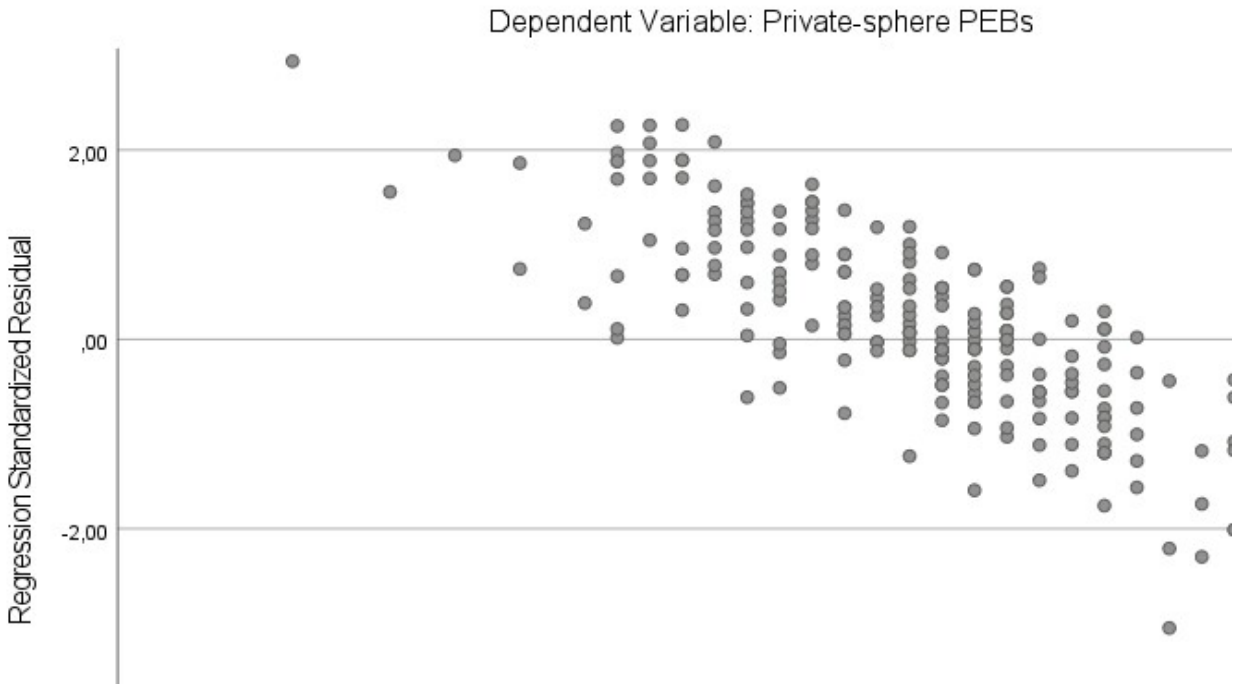


Figure F2

Predicted Values for Public-Sphere PEBs (IV: Climate Worry) plotted against Residuals

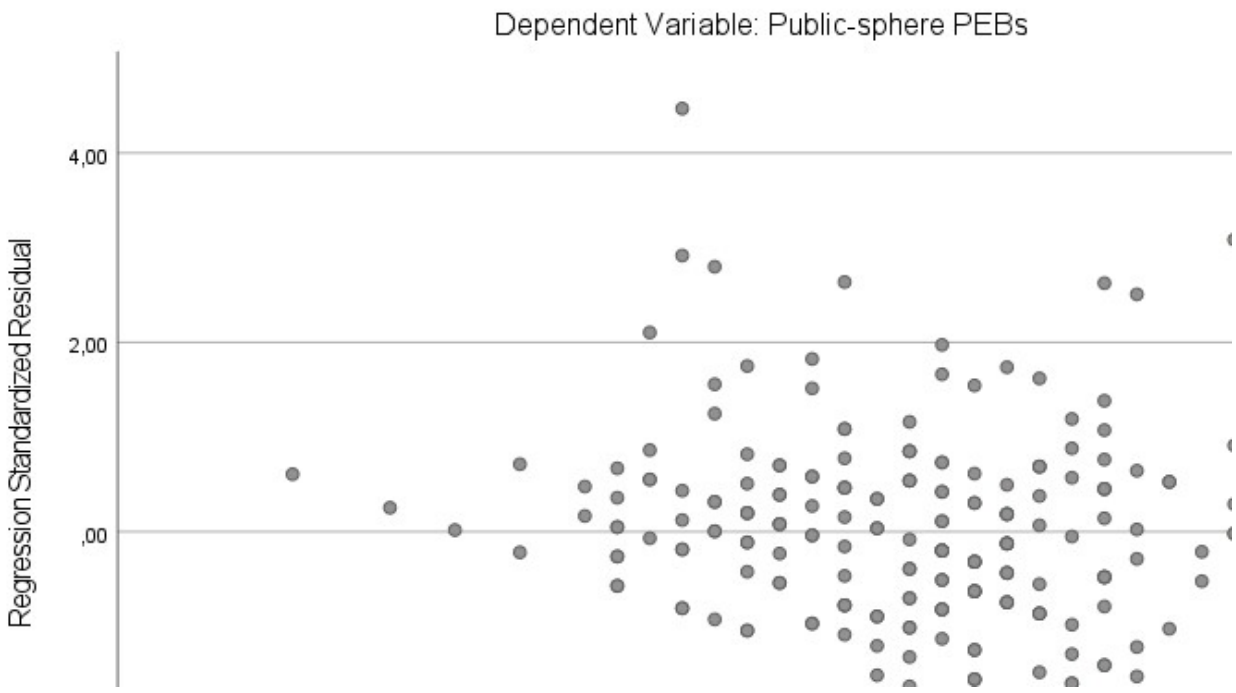


Figure F3

Predicted Values for Private-Sphere PEBs (IV: Climate Anxiety) plotted against Residuals

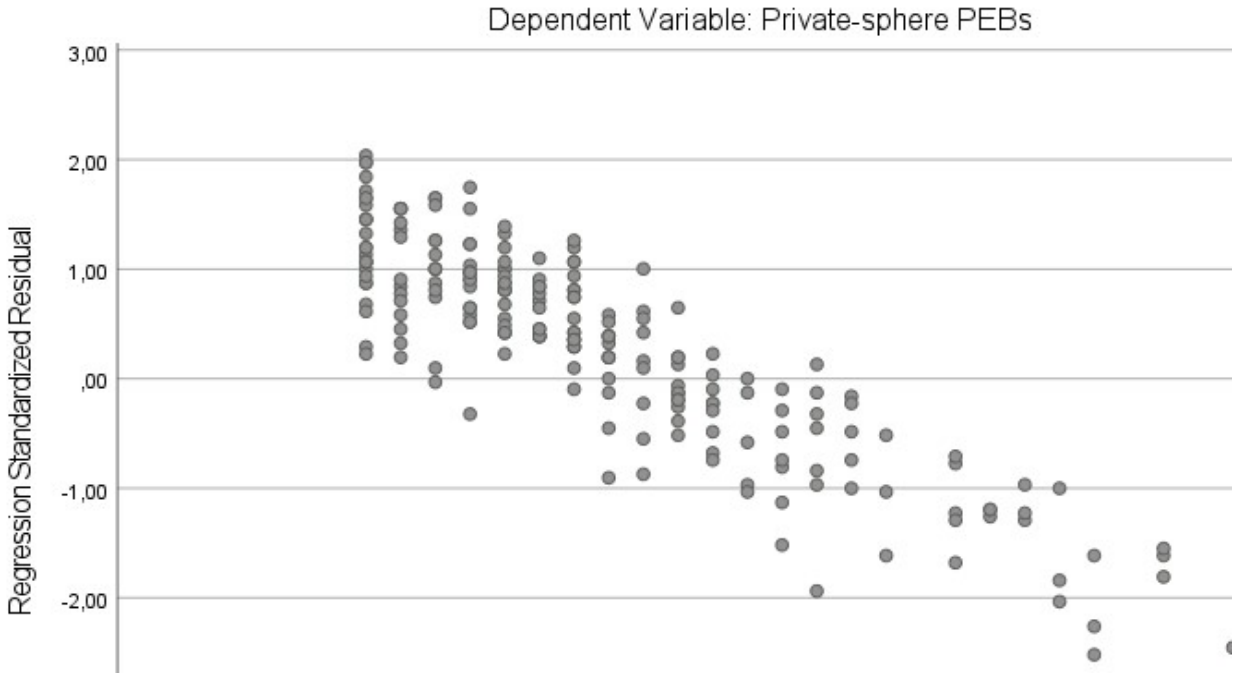


Figure F4

Predicted Values for Public-Sphere PEBs (IV: Climate Anxiety) plotted against Residuals

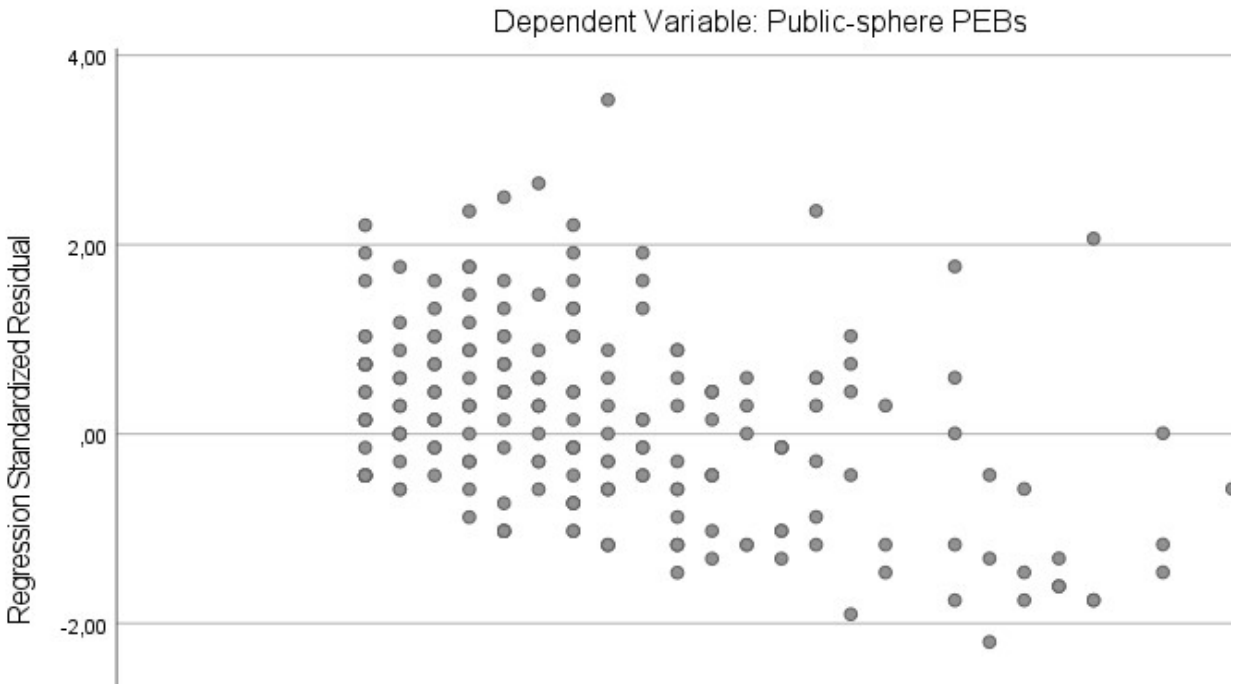


Figure F5

Predicted Values for Private-Sphere PEBs (IV: Self-Efficacy) plotted against Residuals

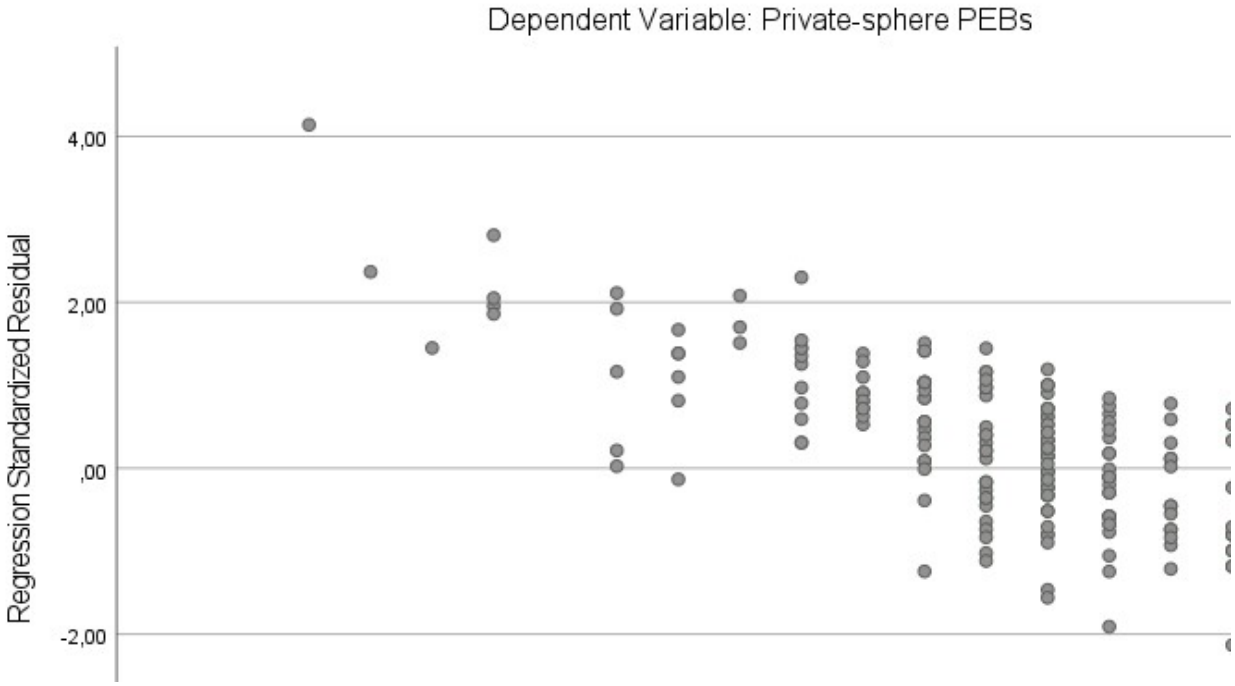


Figure F6

Predicted Values for Public-Sphere PEBs (IV: Self-Efficacy) plotted against Residuals

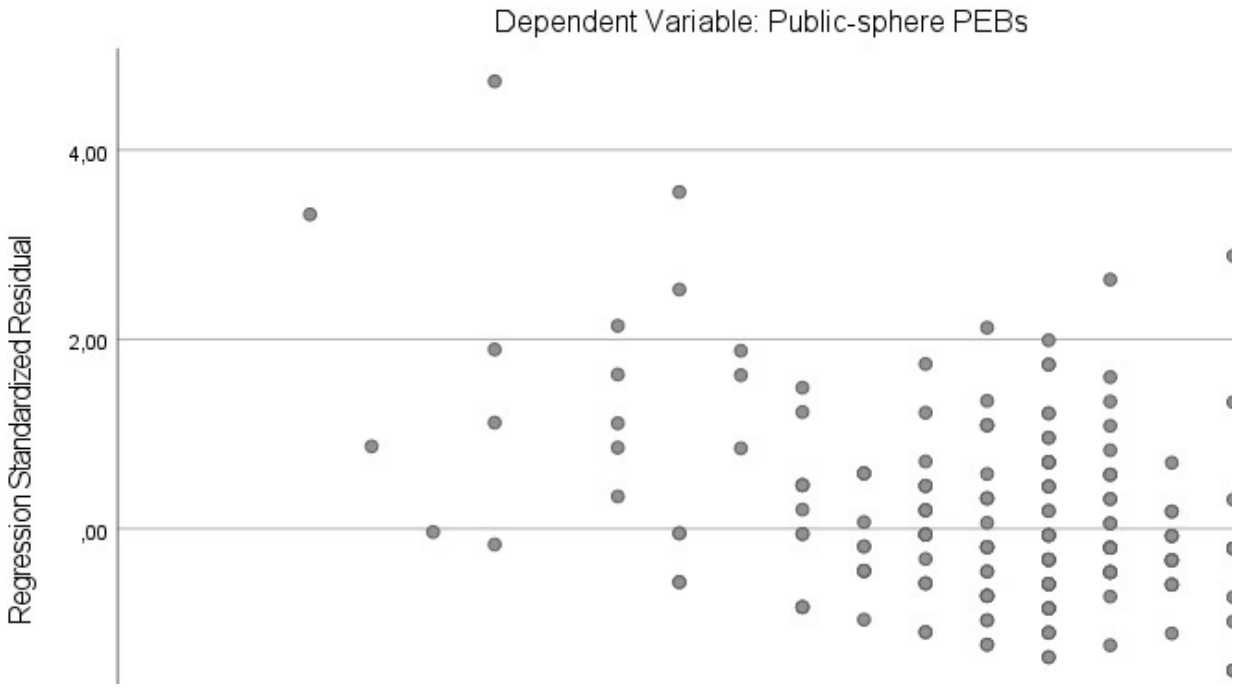


Figure F7

Predicted Values for Private-Sphere PEBs (IV: Collective Efficacy) plotted against Residuals

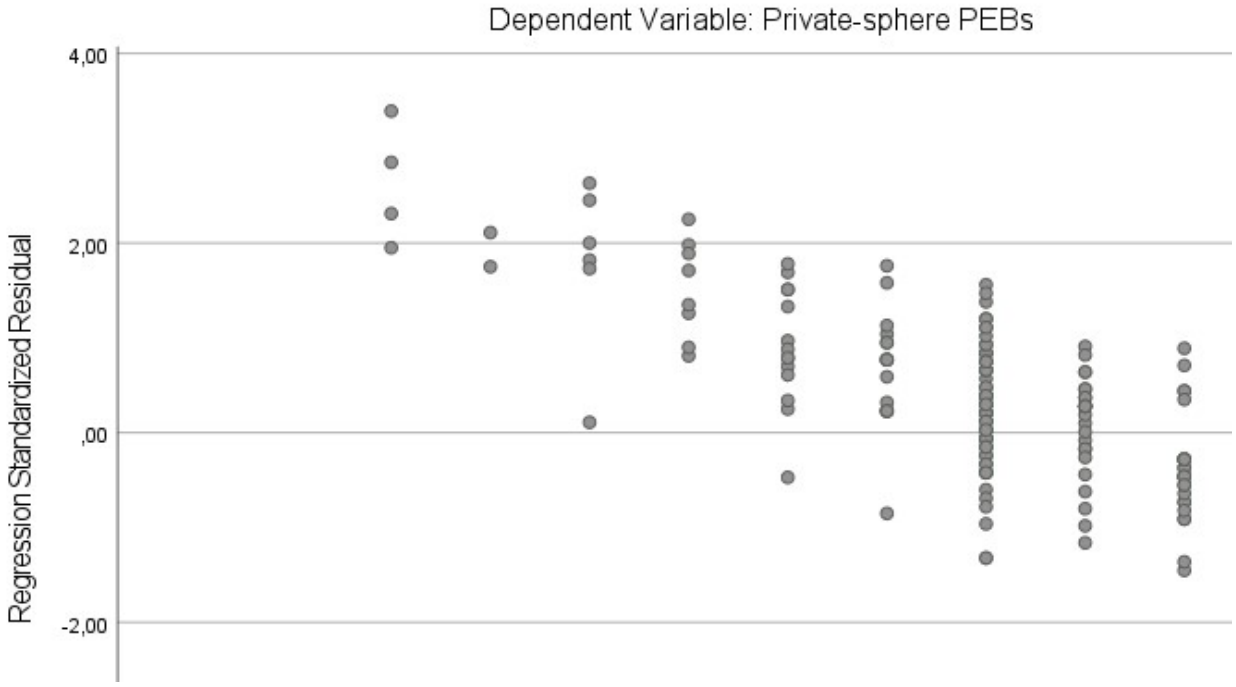


Figure F8

Predicted Values for Public-Sphere PEBs (IV: Collective Efficacy) plotted against Residuals

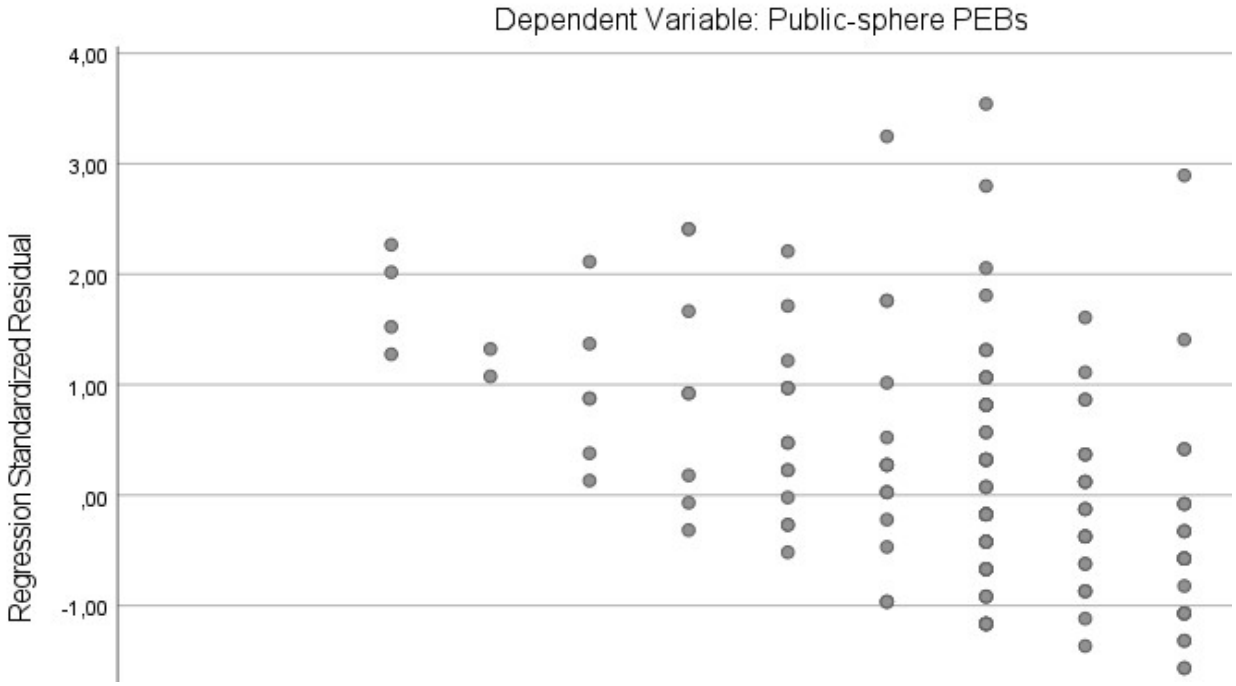


Figure F9

Predicted Values for Self-Efficacy (IV: Climate Worry) plotted against Residuals

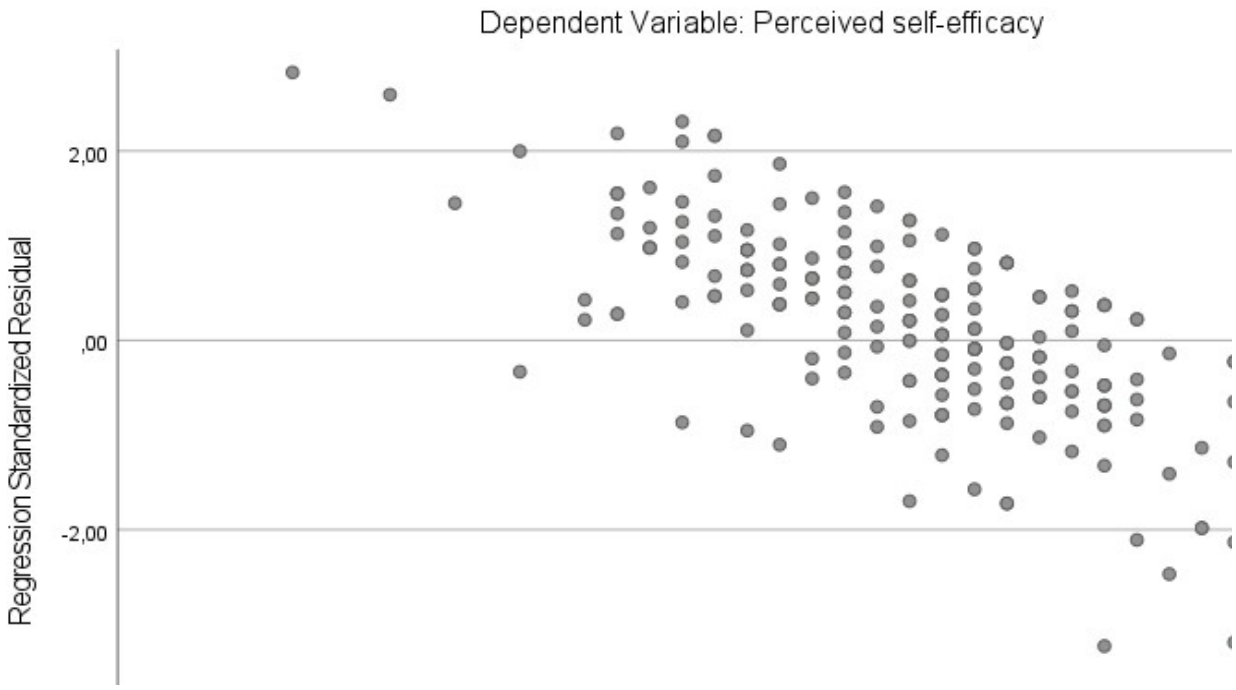


Figure F10

Predicted Values for Collective Efficacy (IV: Climate Worry) plotted against Residuals

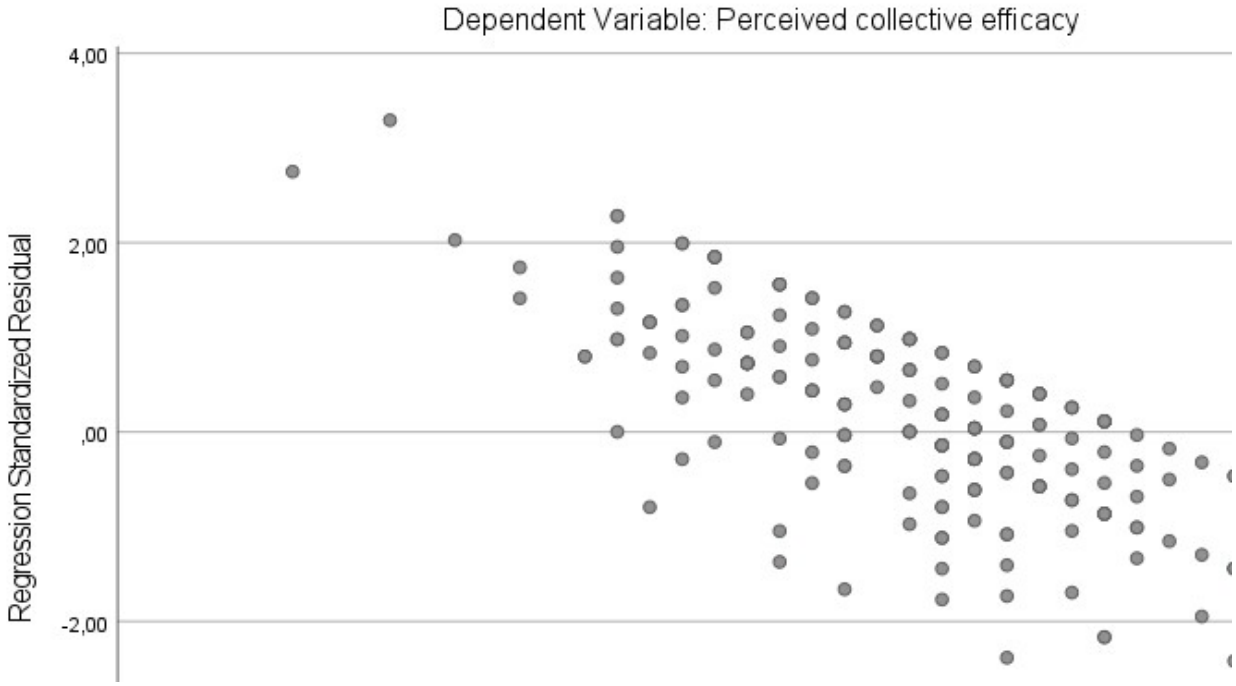


Figure F11

Predicted Values for Self-Efficacy (IV: Climate Anxiety) plotted against Residuals

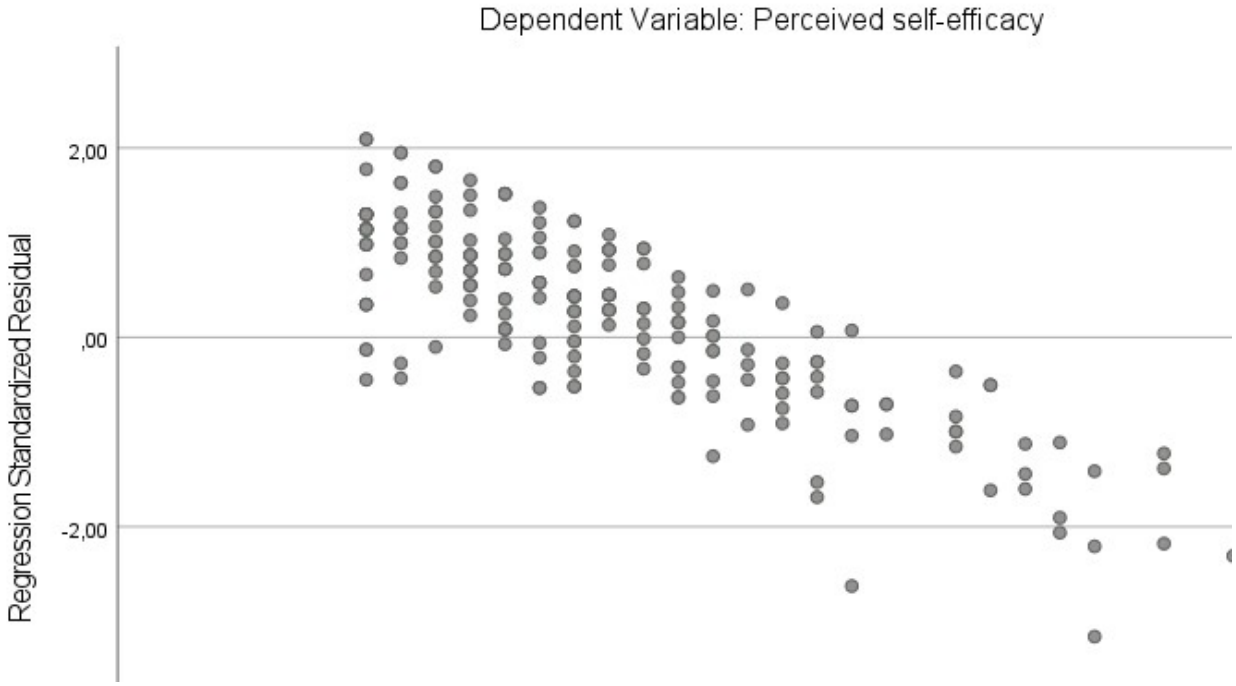


Figure F12

Predicted Values for Collective Efficacy (IV: Climate Anxiety) plotted against Residuals