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Predicting Pro-Environmental Behaviours with Locus of Control and Ecoanxiety

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Abstract

The climate crisis is not only affecting the physical world, but individuals' mental health. The concept of ecoanxiety has reached major attention in the public discourse and more individuals report psychological consequences as a result of climate change. The call for action is urgent, but what are individuals doing to prevent further harm to the planet? Does the experience of ecoanxiety leave them passive or active in their response to act constructively, i.e. engage in pro-environmental behaviours (PEBs)? Could personality factors, more specifically Locus of Control (LOC), affect individuals' behaviour? The current study investigated LOC and ecoanxiety as predictors for engagement in PEBs, while controlling for trait anxiety. 351 university students in Denmark and Sweden were conveniently sampled to participate and the data was collected through an online survey. The sample included 242 females, 106 males and 3 who had labeled their sex as other; their age ranged from 19-45. Several multiple regressions were conducted for the purpose of investigating the variables' effect on engagement in PEBs, where ecoanxiety was shown to be the only significant predictor ($beta = .616, p < .001$).

Keywords: climate change; locus of control; ecoanxiety; trait anxiety; pro-environmental behaviours.

Abstrakt

Klimatkrisen påverkar inte bara den fysiska världen, men också människors psykiska hälsa. Begreppet klimatångest har fått stor uppmärksamhet i diskursen och allt fler rapporterar psykologiska besvär till följd av klimatförändringar. Handlingskraft är nödvändigt, men vad gör individen för att förhindra ytterligare skada på planeten? Påverkar upplevelsen av klimatångest hen att bli passiv eller aktiv i att agera konstruktivt, dvs. engagera sig i miljömedvetna beteenden? Kan personlighetsfaktorer ha en inverkan? Föreliggande studie har undersökt om kontrollfokus och klimatångest kan predicera engagemang i miljömedvetna beteenden, medan trait anxiety (generell ångest) kontrolleras för. 351 universitetsstudenter från Danmark och Sverige rekryterades genom ett bekvämlighetsurval och datan samlades in med ett digitalt frågeformulär. Urvalet bestod av 242 kvinnor, 106 män och 3 som hade angett sitt kön som annat; åldersspannet var 19-45 år. Multipla regressionsanalyser genomfördes för att utvärdera den prediktiva effekten av studiens variabler, där klimatångest påvisades vara den enda signifikanta prediktorn ($beta = .616, p < .001$).

Nyckelord: klimatförändring; kontrollfokus; klimatångest; ångest; miljömedvetna beteenden

The climate change crisis

We are currently living through some of the most extreme weather conditions our planet has seen in modern times. Global warming causes natural disasters almost on a daily basis, including hurricanes, earthquakes, volcanic eruptions, floodings and droughts (IPCC, 2014). Scientists refer to climate change as a wicked problem due to the fact that it does not seem to have a single or simple solution (Clayton & Manning, 2018). United Nations Framework Convention on Climate Change (2014) make a distinction between climate change attributable to natural causes and human causes, when they define the phenomenon as: “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.” (p. 1760).

Scientists have called for political action since 1979, when a group of researchers came together at a climate conference in Geneva to raise the alarming news about climate change trends (Newsome & Ripple, 2019). Today, 40 years later, scientists from all over the world have co-signed a letter that calls for the immediate action necessary in the battle. Despite the straightforward facts, climate change still seem impossible for many individuals in today’s society to grasp, especially in countries that are not experiencing them upfront. According to Rudiak-Gould (2013) the term creates a psychological distance from the individual to the globe, which causes people to push the problem aside. In addition, many individuals still tend to be skeptical, or even in denial, about climate change and portray it as a distant threat when, in fact, it is something that they are right in the midst of.

No matter natural or human causes, temperatures are shifting dramatically: The ice is melting and sea levels are rising. Clayton & Manning (2018) state that heat records in the United States have been increasing annually since 2015, with 2017 being the second hottest year ever recorded in history. According to the Swedish Commission on Climate and Vulnerability and Klimarådet in Denmark (SCCV, 2007; Klimarådet, 2017; Fischer & Knutti, 2015) Scandinavian countries are also experiencing

more extreme weather conditions in both summer and winter. Storms, hurricanes and heavy rains are becoming more common, along with droughts and wildfires. In 2018 Denmark lost 4,1 billion DKK worth of harvest due to the extreme heatwave (“Forudsigelserne i landbruget”, 2019), which is also a negative trend seen globally (IPCC 2014). In July of 2018 alone Sweden was hit by more than sixty wildfires (Watts, 2018) and were forced to call in a big team of Polish fire men to help battle them (Zhuhan, 2018).

Whether individuals decide to recognize or turn a blind eye to the signs, climate change is noticeable everywhere and scientists tell us that it will not just have an impact on the environment and the economy, but also affect individuals’ mental health (Melillo, Richmond & Yohe, 2014). In the current study, we wish to investigate this aspect further. Our research does not aim to evaluate objective facts regarding climate change, but only individuals’ subjective experience of anxiety in relation to them. This is a specific type of anxiety referred to as ecoanxiety in literature. We will investigate if this variable could predict individuals’ engagement in environmentally friendly behaviors taken to minimize climate change, so called pro-environmental behaviours (PEBs).

In order to be able to differentiate between ecoanxiety and more general anxiety, we have chosen to include trait anxiety as a control variable in our study. We will thus measure individuals’ level of trait anxiety in order to evaluate their level of ecoanxiety. In this way we hope to be able to investigate if ecoanxiety is more likely to be an additive effect to an already existing anxiety, or if individuals could experience ecoanxiety even if they do not seem to be anxiety prone in general.

We furthermore want to evaluate if there could be something specific within individuals’ personality that make them more or less prone to engage in PEBs. We will apply Rotter’s (1966) theory of Locus of Control (LOC) in order to investigate if the internal or external attribution of control could also predict this engagement.

According to Clayton & Manning (2018), climate change and its succeeding effects have become

of increasing interest to researchers in the past 10-15 years (see Appendix A for graph). They argue that a psychological perspective highlights how individuals contribute to climate change, as well as how they respond to it emotionally and behaviourally. Since a main scientific goal within psychology is human well-being, continuous research within this field is relevant in relation to today’s rapid changing climate.

Swim, Stern, Doherty, Clayton, Reser & Weber (2011) further address human consequences of, and responses to, climate change and how it relates to motivation, cognition and affective processes. They present a model that illustrates how psychological research is relevant in this context (see Figure 1). It depicts a clear distinction between the so called climate system and the human system, which includes psychological responses. Individuals are presented as being in the center of this wicked problem, in which they are contributing to worsen it while simultaneously suffering from its consequences.

When individuals impact the climate through consumption, production, or the emission of fossil fuels, these actions stem from the human systems that are mitigated via psychological considerations, including motivation, affect and cognition (this is showed in the circle in the middle). When responding to the climate crisis the human response would be either to mitigate, i.e. limit the causes of, or to adapt to the physical changes in the environment by addressing psychological causes of climate change.

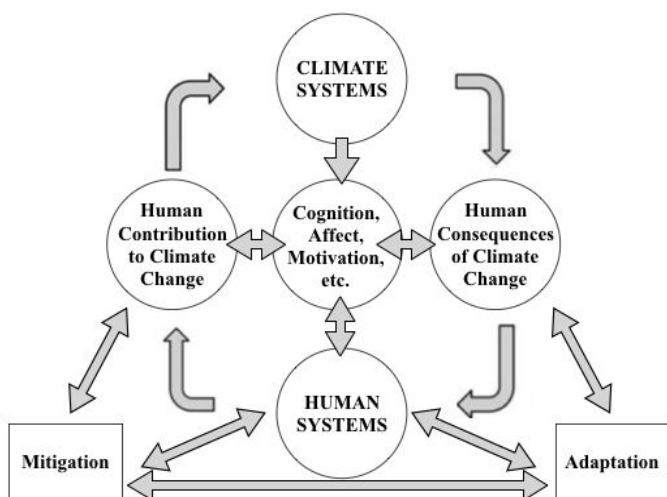


Figure 1. Human consequences of, and responses to, climate change.

Awareness about climate change is constantly rising (Mariegaard, 2019; Clayton & Manning, 2018) and in the past couple of years it seems like the distance that Rudiak-Gould (2013) discusses has decreased. Suddenly, climate change is a hot political topic almost everywhere. The Danish election in May of 2019 was called “a climate election” by prime minister Mette Frederiksen (Kallestrup & Eller, 2019) and when The United Nations held their exclusive Climate Action Summit in September of this year, only countries with actual solutions to the crisis were given time to speak (UN Climate Action Summit, 2019).

The reason for this political turn could partly have been induced by Swedish Greta Thunberg’s School strike for Climate, initiated in August 2018. Her protests have resulted in a new green movement that has grown strong globally, especially among the younger generations. She has raised awareness about the ongoing climate change and put pressure on societal sectors and governments to immediately act towards saving the planet (Thunberg, 2019a). During the Global Week For Future in September of 2019 millions of people from more than 185 countries took part in the demonstration, which now marks the biggest in history (Cereceda & Abellan-Matamoros, 2019).

Greta’s Friday protests have created a strong media momentum, which according to Milman & Smith (2019) has only increased the spread of her message that we need to listen to the scientists and act now, because there is no reason to educate oneself to a future that does not exist: “I don’t want you to be hopeful. I want you to panic. I want you to feel the fear I feel every day. And then I want you to act. I want you to act as you would in a crisis. I want you to act as if our house is on fire. Because it is.” (Thunberg, 2019b).

We wish to extend the discussion on how psychology is relevant in relation to the climate change debate by contributing with research regarding human behaviour. The main focus will be to evaluate ecoanxiety and LOC as predictor variables for the engagement in PEBs in university students in Denmark and Sweden. To gain a more elaborate understanding of these variables is relevant knowledge

for researchers, politicians and strategy makers in their efforts to find solutions to climate change, especially in the context of behavioural change.

Ecoanxiety

Neria & Shultz (2012) argue that individuals' feelings of inability to cope or act upon a climate related situation can cause stress, which could be accompanied by feelings of vulnerability, grief and despair. Higginbotham et al. (2006) have found a connection between the well-being of ecosystems and human well-being and Rubonis & Bickman (1991) have reported that general anxiety is the most common psychopathology post natural disasters. These findings provide further emphasis to the relevance to discuss psychological distress in this context.

Psychologists have only recently begun to discuss climate change in relation to mental health by referring specifically to the concept of ecoanxiety, which has reached major attention in the debate. Despite its newfound popularity, its frequency in media (see e.g. Ro, 2019, Christensen, 2019) and its adoption in psychological practices (Klimatpsykologerna, n.d; PJKP, n.d.), the current research field presents different ways of understanding and conceptualising mental consequences that arise from climate change (Albrecht, 2011).

Some researchers have called it solastalgia, explained as “the lived experience of the physical desolation of home” (Albrecht, 2005; Albrecht et al., 2007, p. 96). Others, like Välimäki & Lehtonen (2009), have suggested the concept environmental neurosis, rooted in an anxiety stemming from individuals' distant relation to nature and based on an illusion of human autonomy. Several scientists have instead referred to ecological grief (Cunsolo & Ellis, 2018; Cunsolo & Landman, 2017; Randall, 2009), while Lertzman (2015) has called it environmental melancholy. Randall (2013) introduced the term ecological debt to describe how individuals are intertwined with the world's ecology. He argued that when individuals come to terms with their indebtedness, they are not just left mourning, frightened or disorientated, but overwhelmed with sadness.

In literature, the distressing impacts of climate change are commonly categorized into two groups: direct and indirect (Clayton & Manning, 2018; Doherty & Clayton, 2011, USGCRP, 2016; Pihkala, 2018). Direct impacts include stress caused by experiencing a natural disaster, which can result in acute trauma, death and severe physical injuries. American Psychology Association (APA) argue that disasters, power breakdowns, broken water supplies, floodings, or disruptions of medical infrastructure can make it more difficult to access health care, which in turn can increase mental stress (2017).

Indirect impacts include stress caused or mediated by, e.g., media's representations of climate change (Doherty & Clayton, 2011), as well as an uncertainty regarding the future (Searle & Gow, 2010). Individuals are likely to experience psychological symptoms or be reminded about their vulnerability when listening to others talk about their personal fears and negative experiences (Greco & Roger, 2003; Stoknes, 2015). Similarly, individuals who feel that they are not doing enough to improve the current crisis could be affected by feelings of loss, helplessness and frustration (Moser, 2013). Further mental health consequences are addressed by APA (2017), such as depression, anti social behaviour, suicide, conflict avoidance, fatalism, fear, helplessness and resignation. Findings by Searle and Gow (2010) also confirm these.

In the current study, we choose to understand the concept of ecoanxiety as originally defined by Glenn Albrecht (2011), who portrays individuals as deeply dependent on regularity and the health of their home environments. His definition includes mental consequences caused by indirect impacts, e.g. individuals being exposed to high scale negative information about climate change in a variety of ways. Characteristics of ecoanxiety further include perceiving climate change as an important and nearby threat in time, which causes individuals to feel stressed or anxious, e.g. in relation to feeling uncertain about the future or having negative thoughts about human impacts on the climate. Since most individuals daily are exposed to information about climate change portrayed as a problem that they are facing right now, they might perceive the urgent crisis as too complex to handle. They might also experience

negative thoughts and feelings about possible future consequences as a result, e.g. regarding friends, family and their own lives.

According to Albrecht, ecoanxiety stems from a deep interest in protecting the environment, but it does not necessarily numb individuals' ability to act in a pro-environmental manner. Verplanken & Roy (2013) confirm this: Individuals with ecoanxiety seem to deal with worry in a constructive way, e.g. by engaging in PEBs and their everyday functionality is not affected negatively by ecoanxiety, as it often is in individuals who experience general anxiety. However, APA (2017) argue that negative psychological responses do in fact affect individuals' ability to deal with the changing climate in a constructive manner, i.e. an idea contrary to what Albrecht and Verplanken & Roy propose.

The rise of ecoanxiety is undoubtedly warranted on a global scale. A survey distributed in France, Germany, Norway and the United Kingdom (Steenjtes et al. (2017) indicated that between 20% (United Kingdom) and 41% (France) describe themselves as very or extremely worried about climate change. Skarum & Kristensen (2019), Christophersen (2018) and Weston (2019) agree with this increasing trend. Greta could perhaps also have played a big part in making individuals more aware of the concept: Her movement has had a huge impact on global politics in general and individuals in particular. She has not only made individuals become more aware of the crisis, but influenced them in making behavioural changes, i.e. engage in more PEBs. One could perhaps also argue that many individuals have taken on her climate related fear and, as a result, started to experience ecoanxiety, which is supported by the current research.

In the past few years, psychologists have reported that more individuals, the majority of which are children and adolescents, experience psychological effects as a result of climate change. Searle and Gow (2010) have found that younger age groups (18-25 years and 26-36 years) have the highest mean rating of climate change distress. Other researchers, e.g. Mizes and Crawford (1986) and Susulowskan (1985) have found indicators of age related differences when examining climate change fears: They report that

the intensity of various fears tend to peak in high-school- and college aged groups. Furthermore, Klimatpsykologerna in Sweden and Psykologerne Johansen & Kristoffersen (PJK) in Denmark have even targeted their work specifically towards patients who are suffering from ecoanxiety. Thomas Doherty, an American psychologist, recounts the following from his therapy sessions:

I have counseled many people experiencing varying crises of meaning and responsibility about climate change: a scientist who has sailed in the 'Pacific garbage patch', distressed by neighbors' consumer habits; an environmental engineer who has 'run the numbers' and doesn't see a way to effectively address carbon emissions; a ranger in Glacier National Park, trying to remain positive while educating visitors about these receding landmarks; and a person shocked by a news story about the dire consequences of rising ocean temperatures (APA, 2017, p. 28).

Pro-Environmental Behaviours

PEBs are defined as: "behaviours that intentionally seek to minimize the negative impact of one's actions on the natural and built world" (Derckx, 2015). PEBs include everything from avoiding leaving the water running when taking a shower to carpooling, line-drying laundry, buying locally produced groceries, composting food waste, flying less, using less electricity, voting for green parties and participating in climate related demonstrations. In the current study we will be looking at engagement in PEBs on an individual level and our understanding of them will be as pro-environmental actions that are common in everyday life for university students in Denmark and Sweden.

PEBs are not only manifold, but have also been studied from various perspectives, especially in aspects of categorization. Derckx (2015) has formed seven types of categories, all of which include different kinds of behaviour. These are water, transportation, electricity, food, materials, waste and biodiversity, where e.g. "watering the garden only when it has not rained in days" and "taking a short shower" are behaviours included in the category water, while "turning off the lights in rooms that are

not in use” fall under the category of electricity etc. (p. 4). Gillis (2016) has categorized PEBs differently, but the behaviours included in each of her categories are similar.

According to Karlin, Davis, Sanguinetti, Gamble, Kirkby, & Stokols (2012) and Nair, Gustavsson, & Mahapatra (2010) PEBs also differ in aspects of variables that predict them. Kirkels (2012) has argued that personal responsibility act as a predictor for engagement, while Verplanken & Roy (2013) have found that individuals who systematically worry about climate change engage more in them. They further showed that habitual ecological worry positively correlated with engagement in PEBs and that there was no correlation between being worried about climate change and pathological worry or other mental instabilities. They thus reached the conclusion that individuals who habitually worry about the climate seem to be constructively adapting to the crisis and are not showing manifestations of “comorbidity of anxiety-related conditions” (Verplanken & Roy, 2013, p. 1).

Stern et al. (2000) introduced a theoretical and conceptual framework to alter PEBs, the so called value-belief-norm theory of environmentalism (VBN). The VBN have proposed various predictors for engagement, such as personal values (e.g. altruistic and egocentric), beliefs about ecological worldviews, perceived ability to reduce threat, consequences for valued objects and perceived obligation or personal norms that individuals possess to take pro-environmental action, i.e engage in PEBs. They proposed a causal relationship between these components and PEBs, where personal values were mediated by individuals’ beliefs. In addition, they presented a finding on personal norms and how they were influenced by both scientific and non-scientific information, such as news reports or opinions expressed by political or public commentators. This implied the possibility that environmental concern and PEBs are social constructions. The VBN variables have been found to be better predictors of ‘non-activist’ PEBs than other theories, which indicate that individuals’ moral and personal norms act as main predictors.

Despite the extreme focus and attention that the climate change crisis has been given in media, classrooms, streets and in the political discourse, far from everyone is handling it in an equally constructive manner, i.e. doing what they can in terms of engaging in PEBs. This is, as mentioned, one of many negative psychological responses that individuals experience as a result of climate change, reported by the APA (2017). It is evident that individuals together on an international, national and individual level are not doing enough to reach climate goals, e.g. the ones set up in the Paris Agreement from 2016 (Oberhaus, 2019).

“Combating climate change requires responsible policy-making in the long term.” (Mäki, 2019). Scientists have for long provided us with the facts and with them it is up to politicians, policy makers and industries to behave correspondingly and set a good example for every single citizen to do what they can in terms of engaging in PEBs.

On the individual level we have Greta at one end of the spectrum, who might be an extreme example of someone who is taking an active stand in the crisis. She has listened to scientists’ information about the urgent need for action and taken on extreme measures, both in terms of raising awareness and putting pressure on people in power, but also in doing everything she can to minimize her impact on the climate. On the other end we have single, ordinary citizens, who have all the information, tools and possibilities, but perhaps do not use them. Maybe they do not engage in enough PEBs in their everyday lives, e.g. recycle properly or compost food waste; maybe they fly on a regular basis instead of taking the train or leave the water running when taking a shower.

If not everyone, then who is handling the current climate crisis in a constructive manner? What type of individual is consciously behaving in a way to fight the crisis, i.e. engaging in PEBs? Do some individuals feel more in control of their ability to change environmental conditions and turning the crisis around?

Hines, Hungerford & Tomera (1987) developed a model on behaviors defined similarly to PEBs, so called responsible environmental behaviours (REB), which included variables that determined individuals' REB and made them more prone to engage in them. These included, e.g., the intention to act, the desire to act and prior knowledge of the problem at hand. They further argued that individuals' desire to act upon an intention was influenced by personality variables, e.g. LOC and environmental attitudes, but also more situationally based variables such as gender, age and level of education.

Hwang, Kim & Jeng (2000) decided to test Hines et. al.'s model and found that attitudes and LOC had the most effect on the intention to act. Haywayrd (1990) further elaborated on this and found that personal responsibility, worry, age and knowledge of action strategies acted as direct predictors of REB. Other variables, e.g. perception of skills, social support and collective control, only predicted REB indirectly. Stoknes (2014) further argued that the problems of climate change create a feeling of helplessness, which stems from the fact that solutions are far from individuals' locus of control (p. 162). As Stoknes and other researchers argue, could there then be specific personality aspects that make individuals more or less prone to engage in PEBs?

Locus of Control

Julian B. Rotter (1916-2014) was an American psychologist who first introduced the theory of LOC in 1954, which has come to play an essential part in laying the foundation for research in behaviour and personality (Strickland, 2014). LOC refers to how individuals interpret and locate the responsibility for life events; individuals are believed to have a tendency to locate the control of these either under, or outside of, themselves (Rotter, 1966). He thus claims that LOC serves to describe individuals' ability to attribute an outcome of a behaviour and to what extent they feel that they have control over life events. LOC is, according to Rotter, believed to be relatively stable across different conditions and is divided into two types: internal and external.

Individuals who tend to attribute the outcomes of life events internally (under their self-control behaviour), as a result of feeling like they are in control of their own lives are believed to have a strong sense of internal LOC (Rotter, 1954; Di Fabio & Saklofske, 2019). These individuals also tend to believe that the outcomes of actions result from their individual efforts, i.e. are accomplished through their own achievements (April, Dharani & Peters, 2012). In addition, individuals with internal LOC assign blame or praise to their individual ability more often and are thus more prone to believing that outcomes of life events derive from their self-control (Jacobs-Lawson, Waddell & Webb, 2011; Carlson et al, 2009).

Individuals with external LOC, however, tend to attribute the outcomes of life events externally, i.e. to outside factors in the environment, such as luck or fate (Hines, Hungerford & Tomera, 1987; Rotter, 1954). They thus hold the belief that factors that are uncontrollable to them determine the outcomes of life events. As a result of this, individuals who possess a stronger external LOC tend to be unable to implement changes that are based on their own efforts and they assign blame or praise to external factors (Peyton & Miller, 1980; Jacobs-Lawson, Waddell, Webb, 2011).

Asghar & Nazneen (2016) show that different personality aspects, including LOC, could predict engagement in PEBs. They found that moderate LOC acted as a significant predictor for attitudes towards environmental cleanliness and behaviour towards wildlife, while subjects with external LOC had significantly different attitudes towards energy resources. Pavalache-Iliea and Unianua (2012) have also examined the relationship between LOC and pro-environmental attitudes and found a significant association between what they call “internality with ecocentric concern and support for interventionist conservation policies” (p. 1), i.e. internal LOC and pro-environmental attitudes.

McCarty & Shrum (2001) have described psycho social predictors of PEBs, for instance internal attribution. They further proposed that individuals with internal LOC are the easiest to influence in order to develop a so called protective behaviour in the area of environment. These findings have also been

confirmed by Fielding and Head (2011), who investigated predictors of pro-environmental intentions and PEBs. Their results showed that a higher level of internal LOC, in relation to the environment, correlated with more engagement in PEBs and stronger pro-environmental intentions, along with less environmentally harmful behaviour.

Peyton and Miller (1980) proposed that LOC play different roles in predicting PEBs. Even if knowledge, attitudes and beliefs about environmental issues could be predictors, they argued that individuals would not engage in PEBs if they were unable to implement behavioural change. LOC was thus critical for engagement: Individuals with internal LOC tend to believe that their effort and skills affect the outcomes of life events, rather than what pure luck or opportunity do and they are thus more prone to put effort into achieving desired outcomes. These individuals therefore also had a higher tendency to take responsibility for them, an argument similar to what Kirkels (2012) and Hayward (1990) have proposed. Ahlström, Weimer, Lisspers & Lipsanen (2017) have found other indications regarding the relationship between LOC and PEBs, which showed that LOC did not have a significant correlation with neither the intention to engage, nor actual engagement, in PEBs.

In sum, various predictors for engagement in PEBs have already been tested for in previous studies. However, findings are inconsistent and we thus wish to further investigate this field of research. Many studies have indicated that LOC acts as a dominant predictor, more specifically internal LOC, but there seems to be an inconsistency regarding the predictive effect of this variable, especially between findings by Peyton & Miller (1980) and Ahlström et al. (2017). Therefore, we find it interesting to evaluate the specific effect of LOC as a predictor for engagement in PEBs.

Albrecht (2011) and Verplanken & Roy (2013) propose that the experience of ecoanxiety does not make individuals numb or passive in their response to acting pro-environmentally and engaging in PEBs, i.e. in a constructive manner. However, APA (2017) state that ecoanxiety in fact does affect individuals in responding constructively to climate change, i.e. could leave them passive in their

engagement. This also brings up a disagreement in the current research field that will be further investigated in this study.

In addition, we wish to extend the current research field by evaluating if LOC could act as a predictor of PEBs when it is mediated by individuals' level of ecoanxiety, while simultaneously controlling for trait anxiety (see Figure 2). This has, to our knowledge, not yet been researched. In line with the objectives presented above, we hypothesise that:

Individuals with higher levels of both internal LOC and ecoanxiety will have a higher engagement in PEBs.

Method

In order to evaluate LOC and ecoanxiety as predictor variables for engagement in PEBs, an online survey was conducted (see Appendix B for full version).

Participants

The final sample consisted of 351 individuals, all of whom were current university students in Denmark and Sweden. 242 out of the total respondents were female, 106 were male and 3 had labeled their sex as other. The respondents' age ranged from 19-45 with a mean of 25 years ($SD = 3.4$, $n = 348$). Respondents' ethnicities included Danish, Swedish, Nicaraguan, German, Norwegian, Spanish and Brazilian, only to name a few. Respondents' levels of education included bachelor's level, master's level and Ph.d. level, with educational areas within both the natural and social sciences, including e.g. psychology, economics, design, IT, political science, veterinary medicine, business administration, engineering, architecture and law.

The respondents in the study were conveniently sampled and since our study targeted current university students in Denmark and Sweden, the sample consisted of individuals representative of this population. The reason for why we decided to target current university students was because we believed

that they had a higher sense of autonomy in aspects such as independent living situations, economy etc. in comparison to younger individuals, e.g. high school students. For instance, a high school student living at home might not be as responsible for composting food waste, buying groceries or do laundry, as a university student who makes these kinds of decisions on a daily basis. Another reason was because recent literature show that climate change fears peak in populations below 35 years of age (Searle & Gow 2010). The main reason for why we decided to include both Danish and Swedish students was because we believed that this would make us able to statistically generalize (to a greater extent) beyond our sample and thus extend the external validity of our study.

Instruments

Firstly, LOC was measured using Rotter's (1966) standardized index, which included 13 items in total. For each item, the respondents were given statements presented in pairs relating to everyday situations. Scores in the LOC index ranged from 0-13, where a low score indicated internal LOC and a high score indicated external LOC.

Secondly, trait anxiety was measured using the standardized State-Trait Anxiety Inventory (STAI) measures (Julian, 2011; Spielberger, 1983). As mentioned, this was done in order to be able to differentiate between types of anxiety, i.e we measured the respondents' level of trait anxiety in order to evaluate their level of ecoanxiety. We wanted to see if ecoanxiety was more likely to be an additive effect to an already existing anxiety, or if individuals could experience a high level of ecoanxiety even if they did not seem to be anxiety prone in general.

The full version of the STAI included forty items, but only the twenty items measuring trait anxiety were included in the survey. This decision was based on the fact that trait anxiety refers to individuals' personality, while state anxiety is situational and refers to a psychological reaction within the individual in specific moments (Julian, 2011). Since LOC is a theory of human personality, we argue that it was more relevant to measure trait anxiety for the purpose of our study.

We then self constructed two indexes, one for ecoanxiety and one for PEBs, since these measured constructs without already existing standardized measures.

Since we investigated university students in Denmark and Sweden, who most likely perceive climate change as a distant threat (Lorenzoni & Pidgeon, 2006; Pidgeon, 2012), we chose to deal with the indirect causes of stress. We therefore operationalized the construct of ecoanxiety according to Albrecht’s (2011) definition. In addition, we also understood ecoanxiety as being on a spectrum ranging from *low* to *high*, meaning that individuals could experience different levels of it.

For the PEBs, we extracted specific behaviours from the categories developed by Derckx (2015) and Gillis (2016) that we found most relevant and relatable to everyday life for the population. We chose not to highlight any PEBs that included more activist behaviours, e.g. voting for a green party, donating money to climate-related organizations or participating in demonstrations, because we considered that these were more likely to be based on values and ideologies.

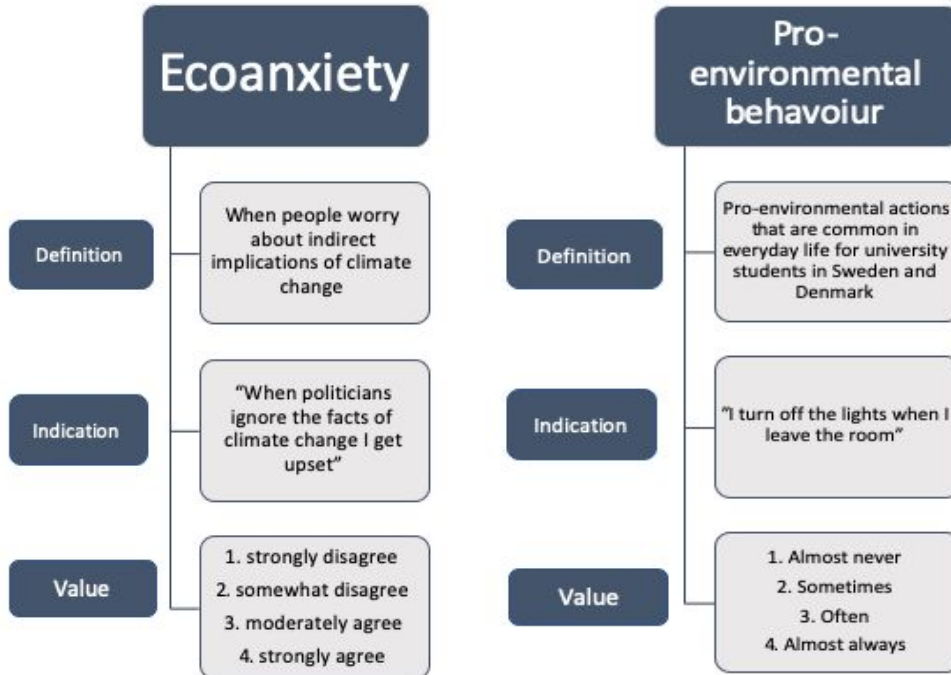


Figure 3. Operationalization of ecoanxiety and PEBs.

Before the final survey was conducted we found it useful to evaluate how the respondents would perceive and interpret the questions for these two remaining variables. We thus conducted a pilot study in order to test the items beforehand, to be able to identify potential misunderstandings or problems with them. A total of eighteen respondents participated in the pilot study; out of these, fourteen were of Swedish origin, two of Danish and one of Czech. The respondents' educational levels ranged from bachelor's level to Ph.d. level and their areas of education included e.g. economics, law, psychology and communication.

In the pilot study, the items in the ecoanxiety index involved 17 questions regarding feelings such as stress, worry and hopefulness in relation to actual and hypothetical scenarios about climate change, e.g.: "If sea levels rise in Sweden, I would feel stressed" and "When politicians ignore the facts of climate change I get upset.". The respondents gave feedback regarding what they thought was unclear, which led us to remove some of the items to increase validity. This also led us to change some of the reversed items, since these were easily misunderstood. Examples of items that we removed were: "I worry about my future when I hear scientists say that we only have 10-12 years left to limit climate change catastrophe" and "I feel helpless when I think about the threats of climate change". We ran tests for the items' internal consistency in SPSS, which resulted in that we kept nine out of the seventeen items (see Appendix C for full overview of items). These had the highest internal consistency coefficient out of all ecoanxiety combinations with a *Cronbach's alpha* of .75, which is considered acceptable (Pallant, 2010). A four point Likert scale was used for the ecoanxiety index, as for the STAI index, but it now ranged from strongly disagree to strongly agree. The possible score ranged from 9 to 36; the higher the final score, the higher level of ecoanxiety.

The PEBs index consisted of 42 items in total. The behaviours included were based on our operationalization of the construct and thus related specifically to behaviours carried out in university students' everyday lives. Feedback from respondents led us to remove or rephrase items that were too

similar in nature or caused misunderstandings due to the fact that they were, e.g., hard to relate to or difficult to answer because they were reversed. These items included e.g. "I wait until the dishwasher is full before running it" and "I don't leave the water running when I brush my teeth."

We ran tests for internal consistency in SPSS, which resulted in that we kept 25 out of the 42 items (see Appendix C). These items had the highest internal consistency coefficient out of all combinations, with a *Cronbach's alpha* of .71 and were thus included in the final survey. The four-point Likert scale now included almost never, sometimes, often and almost always. The possible score ranged from 25 to 100, where almost never had a value of 1 and almost always had a value of 4, i.e. the higher the final score, the higher engagement in PEBs. The items that had been reversed in the survey were transformed, e.g. if a respondent had a value of 1 on a reversed item this was transformed into a 4.

The final survey instrument consisted of six different parts. The first part informed the respondents that the survey was anonymous and that no information would be used for other purposes. The second part contained questions regarding information such as age, nationality, gender and educational level. In the following sections there were 13 items on LOC, 20 items on trait anxiety and 9 items on ecoanxiety. Lastly, there were 25 items measuring engagement in PEBs. We used a hyperlink as our distributional instrument, which led the respondents directly to the Google survey.

Treatment of data

Firstly, each question in the data set was assigned a numeric value. The LOC questions had two possible values on each item and were therefore turned into an ordinal scale with the value of either '0.00' or '1.00'. Each item was transformed into a new variable, e.g. LOCa, LOCb etc. The STAI, ecoanxiety and PEBs variables had four possible answers presented on a Likert scale and each item was thus turned into a nominal scale with the value '1.00', '2.00', '3.00' or '4.00' (see Appendix C). Since the multiple regression is sensitive to outliers, as these could affect the results in one direction, we screened the data for extreme cases, but did not find any (see Appendix D).

The four variables (LOC, ecoanxiety, PEBs & trait anxiety) were changed into four new individual-score-indexes. With LOC every value of '1.00' was counted on each respondent's answer on the 13 items and the new index was labeled 'TotalLOC'. If a respondent's score on the index was high, this indicated high external LOC, while a low score indicated high internal LOC. The remaining three variables trait anxiety (20 items), ecoanxiety (9 items) and PEBs (25 items) were all transformed into new individual-score-indexes via the calculation function, e.g. the calculation for ecoanxiety was: $(ECO1 + ECO2 + ECO3 + ECO4 + ECO5 + ECO6 + ECO7 + ECO8 + ECO9) / 9 = TotalECO$. To make the results more comparable we chose to keep the new variable scores on the original scale from 1-4 instead of the actual scale width from 1-20, 1-9 and 1-25.

As the variables 'TotalPEB' and 'TotalECO' looked skewed in their histograms (see Appendix F) we did a log-transformation in SPSS to avoid any possible bias in the results. The new variables were named 'Log10TotalPEB' and 'Log10TotalECO' (see Appendix F for new histograms).

We performed a standard multiple regression using the SPSS functions 'analyze/regression/linear'. We selected 'Log10TotalPEB' as the dependent variable and 'Log10TotalECO' and 'TotalLOC' as the independent variables. We made sure to follow the SPSS guide when clicking off the relevant boxes (Pallant, 2010, p. 154). We then performed a hierarchical multiple regression to control for trait anxiety. We used the SPSS functions 'analyze/regression/linear' once again, but selected 'Log10TotalPEB' as the dependent variable and 'Log10TotalECO' and 'TotalLOC' as the first section of independent variables and then 'TotalANX' as the second section of independent variables.

Procedure

The current study was advertised using word of mouth and through spreading the online survey link using digital tools such as Facebook and email, but not via any other media. The respondents did not receive any type of incentive to participate, but took part in our study simply because they had access to the internet and could come across the survey.

We actively shared the link from November 1st through the 17th and it was distributed via both of our private Facebook profiles. Apart from sharing it on our walls we also shared the link in relevant Facebook groups for university students at the University of Copenhagen, such as two groups for psychology students (1995 and 336 members), political science students (4991 members) and economy students (2403 members). It was further re-distributed by friends, e.g. in a group at Copenhagen Business School and in the Facebook group for a Danish dorm called Egmont (3079 members). In Sweden the link was distributed in two groups for psychology students at Lund University (53 and 6 members) and Uppsala University (1162 members) and a reminder was sent out on two occasions. The link was further re-distributed by friends, e.g. in different dorm groups.

It took approximately 5-10 minutes to answer the survey and the respondents were able to edit their answers, but once the respondents had submitted their answers, they could not re-submit them. The data was subsequently downloaded from Google Analysis to SPSS for further analysis. 393 respondents initially completed the survey: After deleting outliers the final data set consisted of 351 respondents.

Design

The design of the study was cross-sectional: Data was collected quantitatively from a sample of the population during one point in time. The independent variables were LOC and ecoanxiety, while PEBs was the dependent variable and trait anxiety the control variable (see Figure 2).

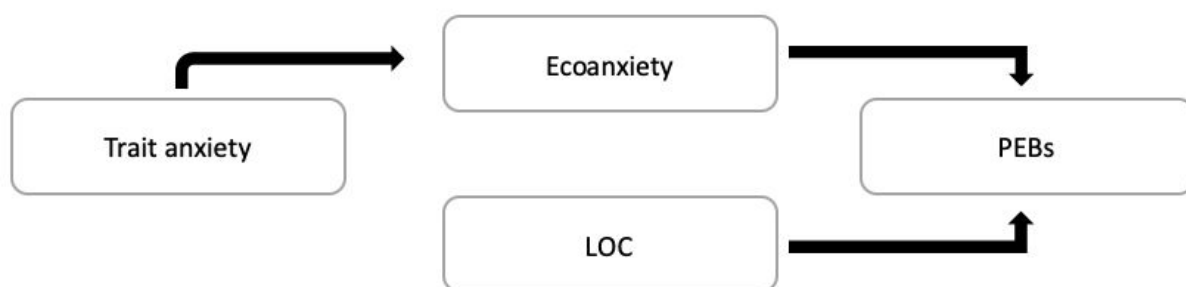


Figure 2. Variables in the current study.

Ethics

Before the respondents started the survey we provided them with information that their participation was voluntary and completely anonymous. Secondly, we informed them that they, at any time, had the right to discontinue their participation if they wished to do so and that any information given by them would be used solely for the purpose of the study. If they, for some reason, would experience any discomfort they had the possibility to discontinue their participation without having to argue for it. Lastly, the respondents were provided with information about how to reach us or our supervisor if they had any questions regarding the study or their participation in it. In this way we assured that the four basic ethical principles set up by the APA were met (American Psychology Association, 2018).

Additionally, together with our research supervisor we signed an ethics declaration prior to carrying out the survey, which assured that we would carry out our research according to the ethical principles stated in the EPN law. We also promised to collect informed consent from all the respondents and inform them about their confidentiality, as well as the purpose of the study before they continued their participation. Lastly, in accordance with Personuppgiftslagen, we assured that we would not collect or include any sensitive information about the respondents, e.g. regarding ethnicity or political views, that could be traced back to a specific individual. We declared that we would not study biological material, use methods that included physical procedures, aimed to have a physical or psychological impact on participants, or that could put them at risk for physical or psychological injury.

Results

Descriptive statistics

We ran descriptives for the new indexes: We found an acceptable range of scores and skewness of our distribution and no outliers. Preliminary analysis was then conducted to ensure that there were no violations of the assumptions of normality, linearity, multicollinearity and homoscedasticity.

The descriptives (see Table 1) showed a normal distribution of scores on the LOC variable. Scores on trait anxiety were overall low and the distribution was skewed to the right, with the average respondent being only a little prone to trait anxiety. On the contrary, the sample showed a high level of ecoanxiety, with the distribution skewed to the left and a similar high engagement in PEBs, also with the distribution skewed to the left (see Appendix E for full overview of descriptive statistics and see Appendix F for histograms). We consistently used the alpha level of 5% for significance and 95% for confidence intervals.

Table 1

Descriptives of independent, dependent and control variables

n = 351	Mean	SD	<i>Cronbach's α</i>
<i>LOC</i>	6.6	2.4	
<i>Trait anxiety</i>	2.1	0.5	.92
<i>Ecoanxiety</i>	0.5	0.1	.83
<i>PEBs</i>	0.5	0.1	.81

Note. Cronbach's α is not provided for LOC since it is a standardized measure.

Multiple regression

A standard multiple regression was conducted to test if LOC and ecoanxiety significantly predicted respondents' engagement in PEBs. The results first showed a large significant correlation between ecoanxiety and PEBs and a small significant correlation between LOC and PEBs (see Table 3),

which indicates that higher external LOC is associated with higher scores on PEBs. The variance explained by model 1 was 39.7%, $F(2, 348) = 114.423, p < .001$ (see Appendix G for regression outputs).

An hierarchical multiple regression was then conducted to test our results when controlling for the trait anxiety variable. The variables trait anxiety and ecoanxiety showed a small and non-significant correlation, while trait anxiety and LOC showed a large significant correlation. The variance explained by model 2 as a whole was now 39.8%, $F(3,347) = 76.591, p < .001$, i.e. the variable did not change the results.

In sum, the results (see Table 2) showed that ecoanxiety had a significant contribution to explaining the engagement in PEBs, while trait anxiety and LOC did not significantly contribute in this model.

Table 2

Sample regression table

Variable	<i>F</i>	β	<i>P</i>	<i>CI 95%</i>
Model 1	114.423			
<i>LOC</i>		.057	.183	[-.001, .003]
<i>Ecoanxiety</i>		.617	.001	[.408, .536]
Model 2	76.591			
<i>Trait anxiety</i>		-.043	.329	[-.016, .005]
<i>LOC</i>		.070	.116	[.000, .004]
<i>Ecoanxiety</i>		.616	.001	[.408, .535]

Notes. *CI* = confidence interval. $n = 351$. $R^2 = .397$ for model 1 and .398 for model 2.

Table 3

Correlation table

Variable	LOC	Trait anxiety	Ecoanxiety	PEBs
<i>LOC</i>	-			
<i>Trait anxiety</i>	.317**	-		
<i>Ecoanxiety</i>	.181**	.037	-	
<i>PEBs</i>	.168**	.002	.627**	-

Notes. *indicates $p < .05$, ** indicates $p < .01$.

Model 2

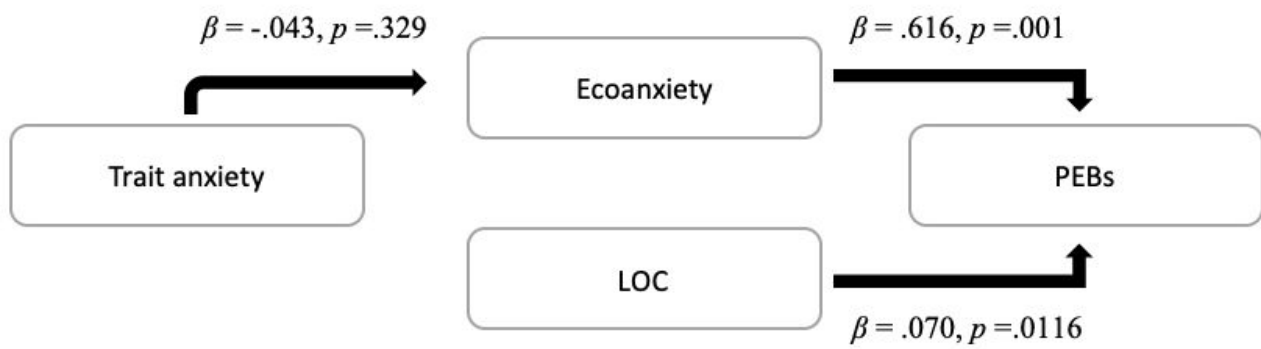


Figure 3. Variables in the current study with results.

Discussion

The results show that ecoanxiety can predict individuals' engagement in PEBs. It thus seems like the more individuals worry about the state of the environment (the more ecoanxiety they have), the more they will do in their personal lives to prevent further harm to the climate (engage in more PEBs). This is in line with what we hypothesized.

However, our results show that LOC does not act as a significant predictor in this model, i.e. where individuals attribute control for outcomes in life events does not uniquely contribute to the engagement in PEBs in our study. We find these results surprising and they are not in line with what we originally hypothesized. These findings are also paradox to previous research by Fielding & Head (2011) and Peyton & Miller (1980), who found that LOC was a dominant variable in predicting engagement in PEBs. They do however confirm findings by Ahlström et al. (2017), who found that LOC did not have a significant correlation with neither the intention to carry out PEBs, nor actual engagement in them.

Furthermore, even if one could be concerned that respondents with high scores on ecoanxiety could be mentally unhealthy individuals with high scores on trait anxiety, this is not the case. We find the same relation between ecoanxiety and PEBs when controlling for trait anxiety, which means that there is no significant correlation between these variables. This is a finding that confirms the results found by Verplanken & Roy (2013).

McCarty & Shrum (2001) have suggested that individuals with internal LOC are the easiest to influence in order to develop a protective behaviour in relation to the environment. Our research, however, suggests that it is more relevant to talk about ecoanxiety in the context of PEBs, rather than LOC, meaning that individuals who worry about the climate and experience high levels of ecoanxiety actually manage to transform their despair into action.

Our results could also confirm the findings by Stern et al. (2000), who discussed the possibility of environmental concern and PEBs being social constructions. Since it is evident that LOC is not a dominant predictor of PEBs in our study, it is reasonable to assume that external factors play a crucial role in affecting human behaviour. These include, e.g., increased media attention and political emphasis on climate change and ecoanxiety. Even though studies indicate that personal morals, norms, attitudes and beliefs are predictors of PEBs, it is worth noting that they too perhaps could be affected by external forces of behaviour, e.g. ecoanxiety.

It is theoretically reasonable to assume that internal LOC would be a dominant variable in predicting PEBs, like Asghar & Nazneen (2016) and Pavalache-Iliea & Unianua (2012) have suggested, but we find that individuals with external LOC are more prone to engagement than individuals with internal LOC. Even if these results are not significant, they are opposite of what we hypothesized. This leaves us with the following questions: did our measuring instruments fail to catch the actual relation between LOC and PEBs? If not, is ecoanxiety one of the main predictors?

Another interesting result on this topic, regarding the correlational analysis, is that our results show the strongest correlation between external LOC and trait anxiety (see Table 3). Even if we did not find an indication that this affected individuals' engagement in PEBs in the current study, it would be interesting to further look into this specific stratum of our population. Because how could these individuals be affected by experiencing a higher level of trait anxiety while also having a more external LOC? Could this in turn result in that they feel more ecoanxiety as well, but as a result of "possessing" all of these components become passive in the response to acting in a pro-environmental manner? This could, in addition, be applied theoretically and be an interesting aspect to investigate in relation to, for instance, learned helplessness.

Sources of error

In light of our unexpected results regarding LOC as a predictor variable, we will discuss some implications of using the LOC index as an instrument. We received criticism by respondents in Denmark, who pointed out that the questions in this index restricted them from participating in the survey. Some reported that the questions were too black and white, e.g. “Many of the unhappy things in people's lives are partly due to bad luck” vs. “People's misfortunes result from the mistakes they make”. However, a reason for why they perceived it like this might be because they are used to holding a critical perspective as university students. Even when they were told not to take the LOC questions too straightforwardly, but to pick the one that they agreed with the most, their frustration led some of them to not participate in the study at all or, if they did chose to participate, some felt that they could not give fully honest answers. Despite this criticism, our results showed a normal distribution of LOC (as one could expect since it is a standardized measure) and we therefore concluded that it was not due to any flaw in our choice of using the LOC index. Secondly, there could be a potential concern regarding the validity of our self constructed PEBs index. For some people it is not possible to buy certain products, e.g. with less packaging or that are locally produced, even if they wanted to. This is simply because they are not available in the supermarket and as a result these individuals’ engagement in PEBs might therefore not have been captured in our index.

It could also be a relevant implication to discuss the potential inflexibility of the survey as an instrument, which could be another reason for why we did not completely confirm our hypothesis. One possible implication could be the title of the survey, which could have interested only certain types of individuals, e.g. people who felt that they experience ecoanxiety or were interested in PEBs. They could, for instance, have been more interested in participating in comparison to their counterparts, which could potentially have left our sample consisting of a non-representative homogeneous group. However, respondents from a variety of sciences were represented, which would have evened out this potential bias. Another implication could have been that we did not give the respondents an additional option

when they answered the survey, e.g. I don't know or No opinion. This could have given us a more complex picture of our sample. We did not either have the possibility to change a potentially bad question in the survey when it had already been distributed. However, by conducting a pilot study, we aimed to avoid this weakness.

In addition, even though we wanted to minimize the potential risk of respondents getting bored while completing the survey by minimizing the PEBs items and only including 20 of the total 40 STAI items, this might still have resulted in mechanical answers in the postceding questions of the survey, which could have left our data potentially inaccurate or irrepresentative. However, the survey method is generally considered as a reliable instrument. When using the already standardized indexes like LOC and STAI we avoided several errors, e.g. low validity and reliability. Besides, the best way to test the validity of the new indexes for ecoanxiety and PEBs was through a survey. Another strength is the possibility to get a representative understanding of both attitudes, behaviours and inner feelings in an anonymous and safe way. The method was also chosen since it is cost-efficient and enables easy collection of a large amount of data, which is a good fit for us as university students. We were, in addition, able to conduct the research with zero cost by using Google tools, all free of charge and accessible online. Another strength is that respondents are presented with the exact same questions.

However, flaws could, e.g., include questions that were phrased in a potentially confusing way. We did however remove these items after receiving feedback in the pilot study and thus tried to avoid this problem. Even though many researchers use surveys to investigate PEBs, there is further valid criticism of using a self reported measure of behaviour, e.g. the problem of response bias. First of all, it is not always easy to remember one's actual behaviour and there might be a tendency among respondents to report the behaviour obtained from on top of their heads or the better behaviour, i.e. the one that is more socially desirable, rather than their actual behaviour. This weakness could have been

solved by adding natural observation to our research, but due to time limits, high costs and ethical implications this was not chosen as a methodological supplement.

The potential problem of response bias could also be explained by the concept of climate shame (Nielsen, 2019). Engagement in PEBs symbolize political awareness, consciousness and sympathy with Greta's green movement, which in today's society makes it an attractive label of identity. This is confirmed by the findings in our study, since individuals with high levels of ecoanxiety also had a high engagement in PEBs.

Since the ecoanxiety index was not standardized, this could also have created problems with the study's validity. We did however get acceptable *Cronbach's alpha* values for both indexes in both the pilot study and in the final results; we therefore conclude that there is no need to look further into the implications of the indexes. To further strengthen the validity we took several steps to make sure that the new questions measured what we intended them to. We firstly read through the existing literature on concepts similar to ecoanxiety and PEBs and hand picked the definitions we found suitable, while discriminating the ones that did not fit our understanding of the concepts. We then tested the internal validity of the items in our pilot study to make sure they correlated. To further increase the validity, we followed the rules on executing a valid questionnaire, e.g. through making sure to include positively and negatively phrased items, e.g. "I get my electronics repaired instead of buying new" and "I allow myself to buy new stuff". We also used these repeated questions to test the consistency of respondents' answers.

With practical implications in mind, it is still relevant to discuss why our sample was highly engaged in PEBs and experienced ecoanxiety. One possibility could be that university students today are well educated on the topic of climate change and are aware of how they need to behave accordingly. In today's society it is perhaps easier to engage in PEBs, e.g. using public transportation and recycling, because it is accessible and affordable to most people. In addition, Greta's movement could have created a new normal among the younger generation, that now share a consensus that it is good to act in a

pro-environmental manner, while it is bad not to. To engage in PEBs is not necessarily considered hippie in today's society, but now rather the norm in Scandinavian countries like Denmark and Sweden, which could be an explanation for why our results indicated a high engagement in PEBs. To live in a more sustainable manner has also become a more popular way of living (seen in both magazines and television) in the last decade and could certainly be seen as a trend, which could also further explain the high engagement.

Conclusion

In sum, our results show a positive relation between ecoanxiety and PEBs, meaning that individuals' level of ecoanxiety can predict engagement in PEBs. At the same time, we have found that ecoanxiety is not an additive effect of trait anxiety, but that these variables act independently of each other. This means that individuals can experience ecoanxiety without experiencing trait anxiety, i.e. more general anxiety. Lastly, LOC does not uniquely contribute to predict the engagement in PEBs in our study.

Our results, however, call for further research. We suggest that additional variables could be of interest to investigate as predictors of PEBs, e.g. political views. It would also be interesting to look into the concept of so called self-efficacy, included in Albert Bandura's Social Cognitive Theory (1994), and evaluate if this could be a better predictor for engagement in PEBs than LOC. Further investigation should preferably also include interviews, since this would provide the possibility to explain the complexity of individual behaviour that is hard to capture in a survey. Lastly, it would be interesting to evaluate a younger population, e.g. a sample consisting of middle school students, since they have grown up in the midst of, what one could call, a green era. They might therefore have different reasons for engaging in PEBs than the population investigated in this study.

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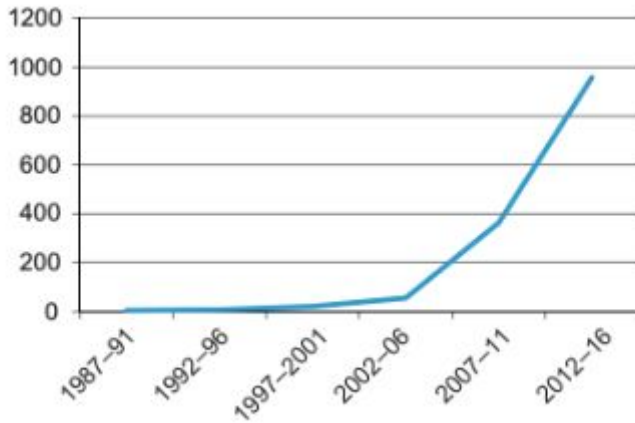
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Appendices

Appendix A

Increasing interest of climate change in the field of psychology



Number of entries in PsycInfo with global warming or climate change as keywords, in 5-year increments (Clayton & Manning, 2018).

Appendix B

Full survey: Climate Anxiety and Pro Environmental Behaviour

Climate Anxiety and Pro Environmental Behaviour

Thank you for helping us with your answers. You will answer questions regarding your feelings and behaviour concerning climate change. Please answer as close to your actual feelings and behaviour as possible.

Your participation

When submitting the survey you agree to the following terms:

Participation in the questionnaire is voluntary. Your answers will be treated anonymously in our data. Any information given by you will only be used for the purpose of this study and nothing else. If you wish, you have the right to discontinue your participation at any time.

If you have any questions regarding this study or your participation, feel free to contact us or our supervisor at any time.

Emilie Refsgaard Hansen: em8024ha-s@student.lu.se

Filippa Sjöstrand: filippasjostrand@hotmail.com

Mats Dahl: mats.dahl@psy.lu.se

Climate Anxiety and Pro Environmental Behaviour

Personal information

Gender

Female

Male

Other

Age

Dit svar _____

Nationality

Swedish

Danish

Norwegian

Andet: _____

What is your current level of education?

High school level (gymnasium)

Bachelor's level

Master's level

Ph.d. level

Area of education

Dit svar _____

Locus of Control

Part 1 - Please chose 1 statement in each of the following questions

Choose the one statement that best describes how you feel

1. Many of the unhappy things in people's lives are partly due to bad luck
2. People's misfortunes result from the mistakes they make

Choose the one statement that best describes how you feel

1. One of the major reasons why we have wars is because people don't take enough interest in politics
2. There will always be wars, no matter how hard people try to prevent them

Choose the one statement that best describes how you feel

1. In the long run, people get the respect they deserve in this world
2. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries

Choose the one statement that best describes how you feel

1. The idea that teachers are unfair to students is nonsense
2. Most students don't realize the extent to which their grades are influenced by accidental happenings

Choose the one statement that best describes how you feel

1. Without the right breaks, one cannot be an effective leader
2. Capable people who fail to become leaders have not taken advantage of their opportunities

Choose the one statement that best describes how you feel

1. No matter how hard you try, some people just don't like you
2. People who can't get others to like them don't understand how to get along with others

Choose the one statement that best describes how you feel

1. I have often found that what is going to happen will happen
2. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action

Choose the one statement that best describes how you feel

1. In the case of the well prepared student, there is rarely, if ever, such a thing as an unfair test
2. Many times exam questions tend to be so unrelated to course work that studying is really useless

Choose the one statement that best describes how you feel

1. Becoming a success is a matter of hard work; luck has little or nothing to do with it
2. Getting a good job depends mainly on being in the right place at the right time

Choose the one statement that best describes how you feel

1. The average citizen can have an influence in government decisions
2. This world is run by the few people in power, and there is not much the little guy can do about it

Choose the one statement that best describes how you feel

1. When I make plans, I am almost certain that I can make them work
2. It is not always wise to plan too far ahead because many things turn out to be a matter of luck anyway

Choose the one statement that best describes how you feel

1. In my case, getting what I want has little or nothing to do with luck
2. Many times we might just as well decide what to do by flipping a coin

Choose the one statement that best describes how you feel

1. What happens to me is my own doing
2. Sometimes I feel that I don't have enough control over the direction my life is taking

Climate Anxiety and Pro Environmental Behaviour

Anxiety

Part 2 - A number of statements which people have used to describe themselves are given below. Indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

I feel pleasant

- Almost never
- Sometimes
- Often
- Almost always

I feel nervous and restless

- Almost never
- Sometimes
- Often
- Almost always

I feel satisfied with myself

- Almost never
- Sometimes
- Often
- Almost always

I wish I could be as happy as others seem to be

- Almost never
- Sometimes
- Often
- Almost always

I feel like a failure

- Almost never
- Sometimes
- Often
- Almost always

I feel rested

- Almost never
- Sometimes
- Often
- Almost always

I am "calm, cool and collected"

- Almost never
- Sometimes
- Often
- Almost always

I feel that difficulties are piling up so that I cannot overcome them

- Almost never
- Sometimes
- Often
- Almost always

I worry too much over something that really doesn't matter

- Almost never
- Sometimes
- Often
- Almost always

I am happy

- Almost never
- Sometimes
- Often
- Almost always

I have disturbing thoughts

- Almost never
- Sometimes
- Often
- Almost always

I lack self-confidence

- Almost never
- Sometimes
- Often
- Almost always

I feel secure

- Almost never
- Sometimes
- Often
- Almost always

I make decisions easily

- Almost never
- Sometimes
- Often
- Almost always

I feel inadequate

- Almost never
- Sometimes
- Often
- Almost always

I am content

- Almost never
- Sometimes
- Often
- Almost always

Some unimportant thought runs through my mind and bothers me

- Almost never
- Sometimes
- Often
- Almost always

I take disappointments so keenly that I can't put them out of my mind

- Almost never
- Sometimes
- Often
- Almost always

I am a steady person

- Almost never
- Sometimes
- Often
- Almost always

I get in a state of tension or turmoil as I think over my recent concerns and interests

- Almost never
- Sometimes
- Often
- Almost always

TILBAGE

NÆSTE

Climate Anxiety and Pro Environmental Behaviour

Climate Anxiety

Part 3

If sea levels rise in Sweden, I would feel stressed

- Strongly disagree
- Somewhat disagree
- Moderately agree
- Strongly agree

I don't think my choice of transportation has an impact on climate change

- Strongly disagree
- Somewhat disagree
- Moderately agree
- Strongly agree

The Swedish forest fires in the summer of 2018 made me worried about the effects of increasing temperatures

- Strongly disagree
- Somewhat disagree
- Moderately agree
- Strongly agree

When it comes to public spending I think the environment should be less prioritized than e.g. health care, education or tax cuts

- Strongly disagree
- Somewhat disagree
- Moderately agree
- Strongly agree

I think today's climate activism is unnecessary

- Strongly disagree
- Somewhat disagree
- Moderately agree
- Strongly agree

When politicians ignore the facts of climate change I get upset

- Strongly disagree
- Somewhat disagree
- Moderately agree
- Strongly agree

Higher temperatures in Sweden make me feel hopeful for new ways of growing crops

- Strongly disagree
- Somewhat disagree
- Moderately agree
- Strongly agree

Fridays for future is a good example of raising awareness of the urgency of climate change

- Strongly disagree
- Somewhat disagree
- Moderately agree
- Strongly agree

I don't think my choice of diet has an impact on climate change

- Strongly disagree
- Somewhat disagree
- Moderately agree
- Strongly agree

TILBAGE

NÆSTE

Climate Anxiety and Pro Environmental Behaviour

Behaviour

Part 4

When I go shopping, I bring my own bag

- Almost never
- Sometimes
- Often
- Almost always

I leave my phone charger in the plug

- Almost never
- Sometimes
- Often
- Almost always

When I buy vegetables I buy those grown locally (e.g. in Sweden), instead of abroad (e.g. Spain)

- Almost never
- Sometimes
- Often
- Almost always

I recycle everything that I can

- Almost never
- Sometimes
- Often
- Almost always

I buy plastic bags

- Almost never
- Sometimes
- Often
- Almost always

I turn off the lights when I leave the room

- Almost never
- Sometimes
- Often
- Almost always

I go by train instead of flying

- Almost never
- Sometimes
- Often
- Almost always

I leave the shower running when I'm shampooing my hair

- Almost never
- Sometimes
- Often
- Almost always

If I have the option, I buy 2nd hand

- Almost never
- Sometimes
- Often
- Almost always

I use aluminium foil

- Almost never
- Sometimes
- Often
- Almost always

I try to keep my showers short

- Almost never
- Sometimes
- Often
- Almost always

I have meat free days every week

- Almost never
- Sometimes
- Often
- Almost always

I allow myself to buy new stuff

- Almost never
- Sometimes
- Often
- Almost always

I wait to do laundry until I have enough to fill a full machine

- Almost never
- Sometimes
- Often
- Almost always

I only charge my computer when it's run out of battery

- Almost never
- Sometimes
- Often
- Almost always

I leave the water running when I brush my teeth

- Almost never
- Sometimes
- Often
- Almost always

I buy products with less packaging

- Almost never
- Sometimes
- Often
- Almost always

I buy non-local products

- Almost never
- Sometimes
- Often
- Almost always

I compost food waste

- Almost never
- Sometimes
- Often
- Almost always

I get my electronics repaired instead of buying new

- Almost never
- Sometimes
- Often
- Almost always

I leave the lights on when leaving a room

- Almost never
- Sometimes
- Often
- Almost always

I have energy-efficient light bulbs

- Almost never
- Sometimes
- Often
- Almost always

I use flying as transportation

- Almost never
- Sometimes
- Often
- Almost always

I reuse plastic bags

- Almost never
- Sometimes
- Often
- Almost always

I throw away food if I make too much

- Almost never
- Sometimes
- Often
- Almost always

TILBAGE

NÆSTE

Climate Anxiety and Pro Environmental Behaviour

Thank you for participating

All the best,
Filippa and Emilie

Indsend aldrig adgangskoder via Google Analytics.

Appendix C

Full overview of items in each variable index

LOC

1. Many of the unhappy things in people's lives are partly due to bad luck = 1
People's misfortunes result from the mistakes they make = 0
2. There will always be wars, no matter how hard people try to prevent them = 1
One of the major reasons why we have wars is because people don't take enough interest in politics = 0
3. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries = 1
In the long run, people get the respect they deserve in this world = 0
4. Most students don't realize the extent to which their grades are influenced by accidental happenings = 1
The idea that teachers are unfair to students is nonsense = 0
5. Without the right breaks, one cannot be an effective leader = 1
Capable people who fail to become leaders have not taken advantage of their opportunities = 0
6. No matter how hard you try, some people just don't like you = 1
People who can't get others to like them don't understand how to get along with others = 0
7. I have often found that what is going to happen will happen = 1
Trusting to fate has never turned out as well for me as making a decision to take a definite course of action = 0
8. Many times exam questions tend to be so unrelated to course work that studying is really useless = 1
In the case of the well prepared student, there is rarely, if ever, such a thing as an unfair test = 0
9. Getting a good job depends mainly on being in the right place at the right time = 1

Becoming a success is a matter of hard work; luck has little or nothing to do with it = 0

10. This world is run by the few people in power, and there is not much the little guy can do about it
= 1

The average citizen can have an influence in government decisions = 0

11. It is not always wise to plan too far ahead because many things turn out to be a matter of luck
anyway = 1

When I make plans, I am almost certain that I can make them work = 0

12. Many times we might just as well decide what to do by flipping a coin = 1

In my case, getting what I want has little or nothing to do with luck = 0

13. Many times we might just as well decide what to do by flipping a coin = 1

What happens to me is my own doing = 0

STAI

1. I feel pleasant: almost never (4), sometimes (3), often (2), almost always (1)
2. I feel nervous and restless: almost never (1), sometimes (2), often (3), almost always (4)
3. I feel satisfied with myself: almost never (4), sometimes (3), often (2), almost always (1)
4. I wish I could be as happy as others seem to be: almost never (1), sometimes (2), often (3),
almost always (4)
5. I feel like a failure: almost never (1), sometimes (2), often (3), almost always (4)
6. I feel rested: almost never (4), sometimes (3), often (2), almost always (1)
7. I am "calm, cool and collected": almost never (4), sometimes (3), often (2), almost always (1)
8. I feel that difficulties are piling up so that I cannot overcome them: almost never (1), sometimes
(2), often (3), almost always (4)
9. I worry too much over something that really doesn't matter: almost never (1), sometimes (2),

often (3), almost always (4)

10. I am happy: almost never (4), sometimes (3), often (2), almost always (1)
11. I have disturbing thoughts: almost never (1), sometimes (2), often (3), almost always (4)
12. I lack self-confidence: almost never (1), sometimes (2), often (3), almost always (4)
13. I feel secure: almost never (4), sometimes (3), often (2), almost always (1)
14. I make decisions easily: almost never (4), sometimes (3), often (2), almost always (1)
15. I feel inadequate: almost never (1), sometimes (2), often (3), almost always (4)
16. I am content: almost never (4), sometimes (3), often (2), almost always (1)
17. Some unimportant thought runs through my mind and bothers me: almost never (1), sometimes (2), often (3), almost always (4)
18. I take disappointments so keenly that I can't put them out of my mind: almost never (1), sometimes (2), often (3), almost always (4)
19. I am a steady person: almost never (4), sometimes (3), often (2), almost always (1)
20. I get in a state of tension or turmoil as I think over my recent concerns and interests: almost never (1), sometimes (2), often (3), almost always (4)

Ecoanxiety

1. If sea levels rise in Sweden, I would feel stressed: Strongly disagree (1), Somewhat disagree (2), Moderately agree (3), Strongly agree (4)
2. I don't think my choice of transportation has an impact on climate change: Strongly disagree (4), Somewhat disagree (3), Moderately agree (2), Strongly agree (1)
3. The Swedish forest fires in the summer of 2018 made me worried about the effects of increasing temperatures: Strongly disagree (1), Somewhat disagree (2), Moderately agree (3), Strongly agree (4)

4. When it comes to public spending I think the environment should be less prioritized than e.g. health care, education or tax cuts: Strongly disagree (4), Somewhat disagree (3), Moderately agree (2), Strongly agree (1)
5. I think today's climate activism is unnecessary: Strongly disagree (4), Somewhat disagree (3), Moderately agree (2), Strongly agree (1)
6. When politicians ignore the facts of climate change I get upset: Strongly disagree (1), Somewhat disagree (2), Moderately agree (3), Strongly agree (4)
7. Higher temperatures in Sweden make me feel hopeful for new ways of growing crops: Strongly disagree (4), Somewhat disagree (3), Moderately agree (2), Strongly agree (1)
8. Fridays for future is a good example of raising awareness of the urgency of climate change: Strongly disagree (1), Somewhat disagree (2), Moderately agree (3), Strongly agree (4)
9. I don't think my choice of diet has an impact on climate change: Strongly disagree (4), Somewhat disagree (3), Moderately agree (2), Strongly agree (1)

PEBs

1. When I go shopping, I bring my own bag: Almost never (1), Sometimes (2), Often (3), Almost always (4).
2. I leave my phone charger in the plug: Almost never (4), Sometimes (3), Often (2), Almost always (1).
3. When I buy vegetables I buy those grown locally (e.g. in Sweden), instead of abroad (e.g. Spain): Almost never (1), Sometimes (2), Often (3), Almost always (4).
4. I recycle everything that I can: Almost never (1), Sometimes (2), Often (3), Almost always (4).

5. I buy plastic bags: Almost never (4), Sometimes (3), Often (2), Almost always (1).
6. I turn off the lights when I leave the room: Almost never (1), Sometimes (2), Often (3), Almost always (4).
7. I go by train instead of flying: Almost never (1), Sometimes (2), Often (3), Almost always (4).
8. I leave the shower running when I'm shampooing my hair: Almost never (4), Sometimes (3), Often (2), Almost always (1).
9. If I have the option, I buy 2nd hand: Almost never (1), Sometimes (2), Often (3), Almost always (4).
10. I use aluminium foil: Almost never (4), Sometimes (3), Often (2), Almost always (1).
11. I try to keep my showers short: Almost never (1), Sometimes (2), Often (3), Almost always (4).
12. I have meat free days every week: Almost never (1), Sometimes (2), Often (3), Almost always (4).
13. I allow myself to buy new stuff: Almost never (4), Sometimes (3), Often (2), Almost always (1).
14. I wait to do laundry until I have enough to fill a full machine: Almost never (1), Sometimes (2), Often (3), Almost always (4).
15. I only charge my computer when it's run out of battery: Almost never (1), Sometimes (2), Often (3), Almost always (4).
16. I leave the water running when I brush my teeth: Almost never (4), Sometimes (3), Often (2), Almost always (1).
17. I buy products with less packaging: Almost never (1), Sometimes (2), Often (3), Almost always (4).
18. I buy non-local products: Almost never (4), Sometimes (3), Often (2), Almost always (1).
19. I compost food waste: Almost never (1), Sometimes (2), Often (3), Almost always (4).

20. I get my electronics repaired instead of buying new: Almost never (1), Sometimes (2), Often (3), Almost always (4).
21. I leave the lights on when leaving a room: Almost never (4), Sometimes (3), Often (2), Almost always (1).
22. I have energy-efficient light bulbs: Almost never (1), Sometimes (2), Often (3), Almost always (4).
23. I use flying as transportation: Almost never (4), Sometimes (3), Often (2), Almost always (1).
24. I reuse plastic bags: Almost never (1), Sometimes (2), Often (3), Almost always (4).
25. I throw away food if I make too much: Almost never (4), Sometimes (3), Often (2), Almost always (1).

Appendix D

Extreme values

Extreme Values

		Case Number	Age	Value	
TotalLOC	Highest	1	33	24	12.00
		2	167	23	12.00
		3	186	27	12.00
		4	187	27	12.00
		5	213	26	12.00
	Lowest	1	346	19	1.00
		2	264	21	1.00
		3	251	20	1.00
		4	208	.	1.00
		5	97	23	1.00 ^a
TotalANX	Highest	1	137	26	3.55
		2	138	26	3.50
		3	188	28	3.30
		4	235	23	3.30
		5	47	27	3.25 ^b
	Lowest	1	244	23	1.05
		2	344	26	1.10
		3	314	24	1.10
		4	232	22	1.10
		5	275	29	1.20 ^c
TotalECO	Highest	1	53	32	4.00
		2	56	29	4.00
		3	58	27	4.00
		4	74	27	4.00
		5	77	27	4.00 ^d
	Lowest	1	164	35	1.33
		2	38	28	1.33
		3	255	22	1.44
		4	233	28	1.67
		5	128	24	1.67 ^e
TotalPEB	Highest	1	97	23	3.92
		2	292	26	3.72
		3	49	25	3.64
	Lowest	4	52	24	3.64
		5	149	26	3.64 ^f
		1	255	22	1.08
		2	86	27	1.72
		3	183	25	1.76
		4	153	25	1.96
		5	83	22	2.00

Appendix E

Descriptives of the sample

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	242	68.9	68.9	68.9
	Male	106	30.2	30.2	99.1
	Other	3	.9	.9	100.0
	Total	351	100.0	100.0	

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	19	6	1.7	1.7	1.7
	20	4	1.1	1.1	2.9
	21	22	6.3	6.3	9.2
	22	43	12.3	12.4	21.6
	23	52	14.8	14.9	36.5
	24	56	16.0	16.1	52.6
	25	50	14.2	14.4	67.0
	26	27	7.7	7.8	74.7
	27	30	8.5	8.6	83.3
	28	23	6.6	6.6	89.9
	29	12	3.4	3.4	93.4
	30	6	1.7	1.7	95.1
	31	2	.6	.6	95.7
	32	5	1.4	1.4	97.1
	33	1	.3	.3	97.4
	34	3	.9	.9	98.3
	35	3	.9	.9	99.1
	43	1	.3	.3	99.4
	44	1	.3	.3	99.7
	45	1	.3	.3	100.0
	Total	348	99.1	100.0	
Missing	System	3	.9		
Total		351	100.0		

Nationality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2	.6	.6	.6
	argentinean	1	.3	.3	.9
	Brazilian	1	.3	.3	1.1
	British	1	.3	.3	1.4
	Danish	246	70.1	70.1	71.5
	Dobbeltstatsborgerskab (dansk og luxembourgsk)	1	.3	.3	71.8
	Double citizenship; German and Danish	1	.3	.3	72.1
	Dutch	1	.3	.3	72.4
	Faroese	1	.3	.3	72.6
	French	1	.3	.3	72.9
	German	2	.6	.6	73.5
	Islandic	1	.3	.3	73.8
	Nicaraguan	1	.3	.3	74.1
	Norwegian	6	1.7	1.7	75.8
	Spanish	1	.3	.3	76.1
	Swedish	83	23.6	23.6	99.7
	Swiss and German	1	.3	.3	100.0
	Total	351	100.0	100.0	

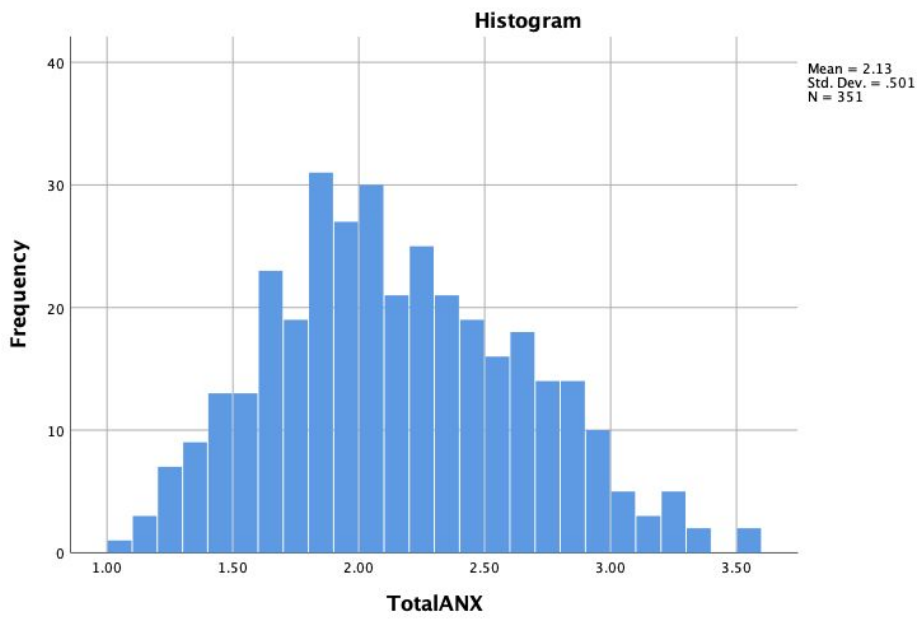
What is your current level of education?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor's level	195	55.6	55.6	55.6
	High school level (gymnasium)	33	9.4	9.4	65.0
	Master's level	123	35.0	35.0	100.0
	Total	351	100.0	100.0	

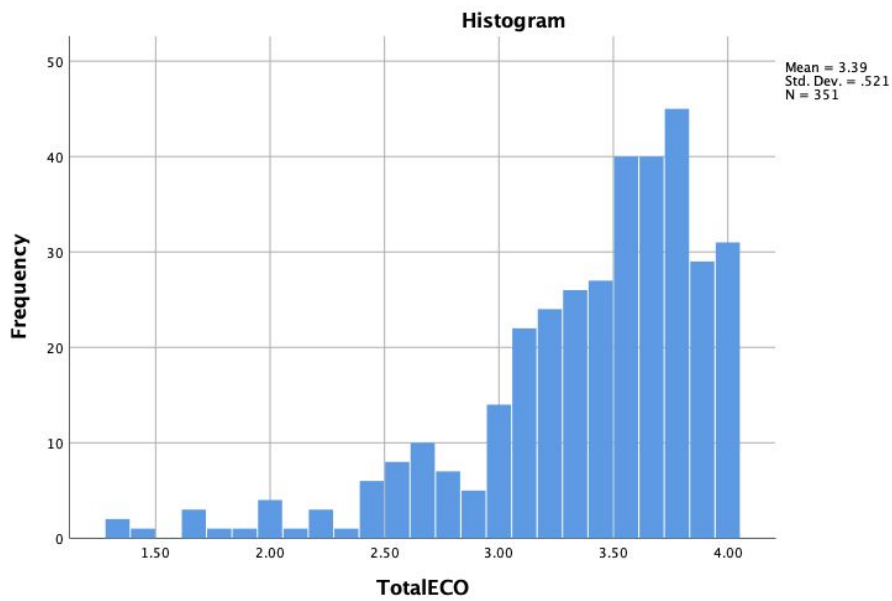
Appendix F

Histogram for each variable's distribution of scores

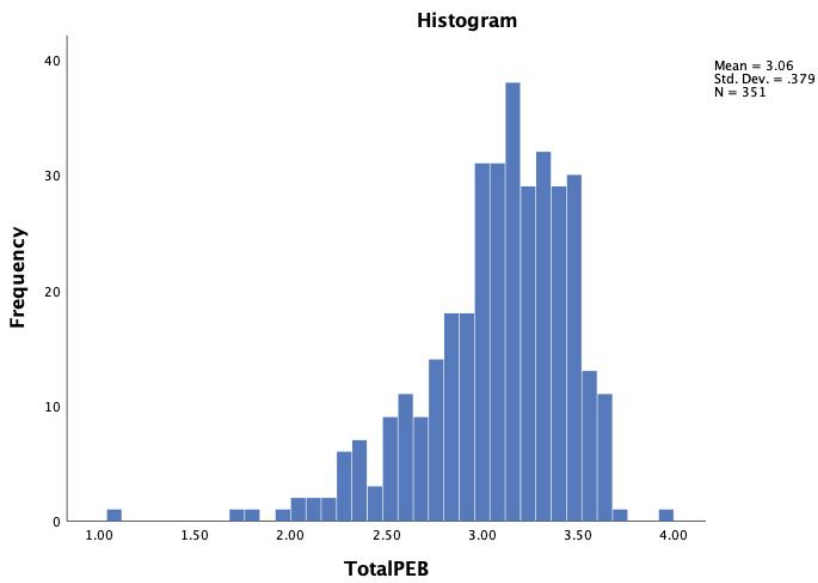
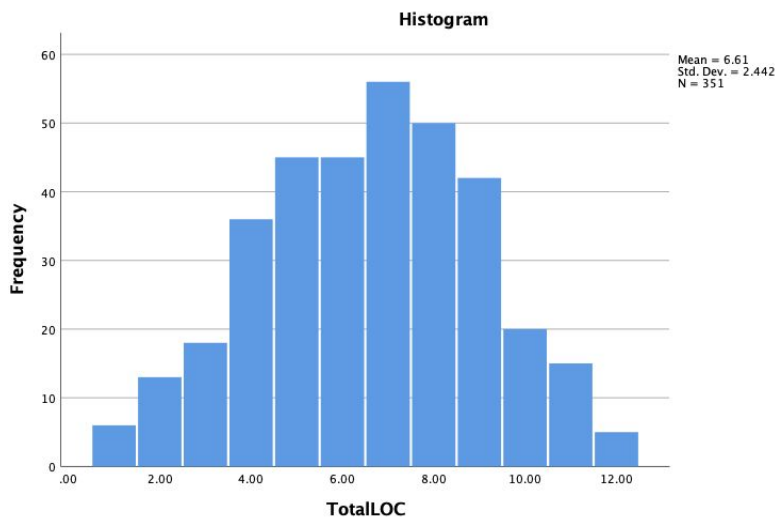
TotalANX

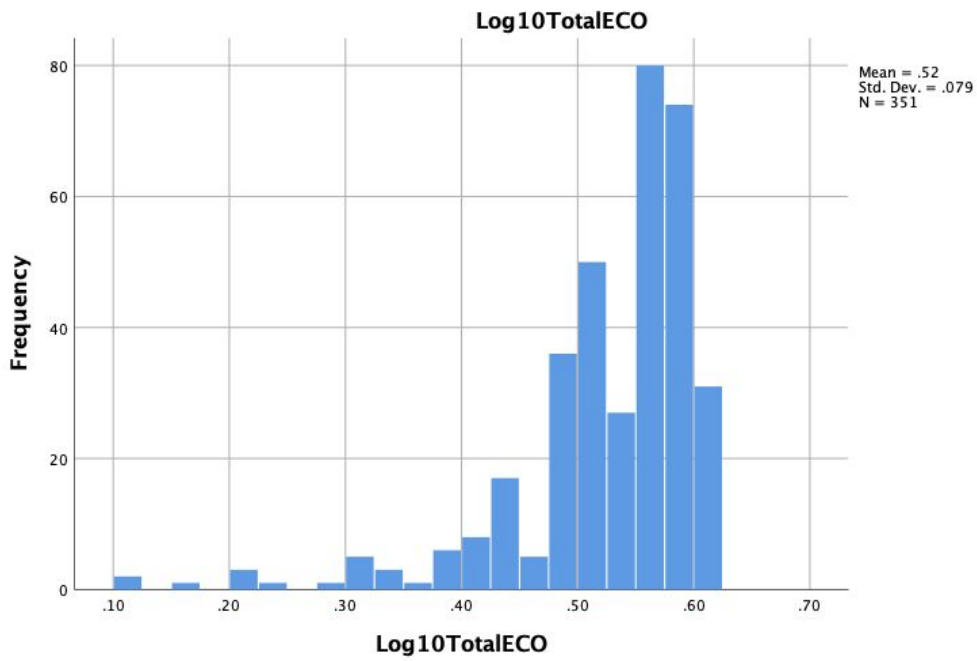
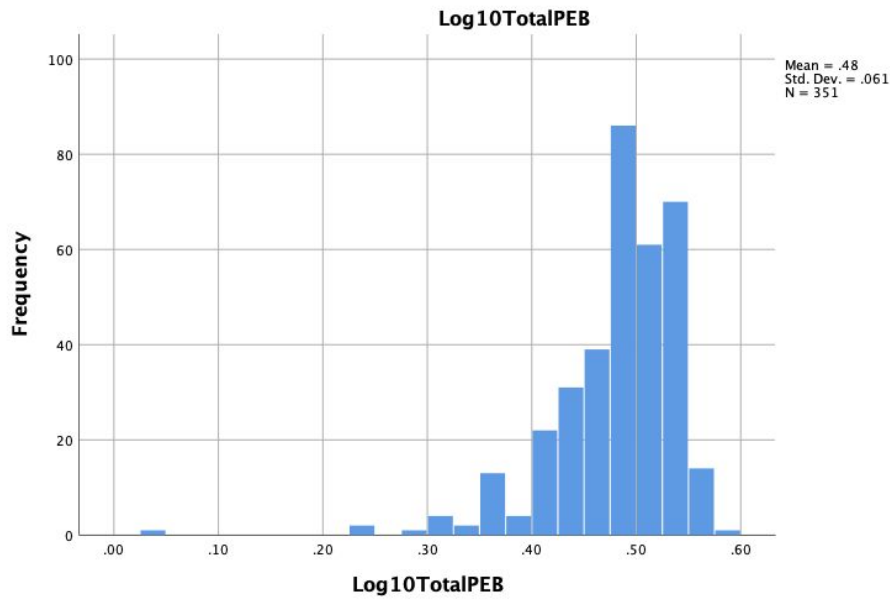


TotalECO



TotalLOC





Appendix G

Regression outputs

Descriptive Statistics

	Mean	Std. Deviation	N
Log10TotalPEB	.4816	.06063	351
TotalLOC	6.6097	2.44220	351
Log10TotalECO	.5241	.07925	351
TotalANX	2.1256	.50075	351

Correlations

		Log10TotalPEB	TotalLOC	Log10TotalECO	TotalANX
Pearson Correlation	Log10TotalPEB	1.000	.168	.627	.002
	TotalLOC	.168	1.000	.181	.317
	Log10TotalECO	.627	.181	1.000	.037
	TotalANX	.002	.317	.037	1.000
Sig. (1-tailed)	Log10TotalPEB	.	.001	.000	.484
	TotalLOC	.001	.	.000	.000
	Log10TotalECO	.000	.000	.	.245
	TotalANX	.484	.000	.245	.
N	Log10TotalPEB	351	351	351	351
	TotalLOC	351	351	351	351
	Log10TotalECO	351	351	351	351
	TotalANX	351	351	351	351

Model Summary^d

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change
						F Change	df1	df2	
1	.168 ^a	.028	.025	.05985	.028	10.129	1	349	.002
2	.630 ^b	.397	.393	.04723	.369	212.575	1	348	.000
3	.631 ^c	.398	.393	.04723	.002	.955	1	347	.329

a. Predictors: (Constant), TotalLOC

b. Predictors: (Constant), TotalLOC, Log10TotalECO

c. Predictors: (Constant), TotalLOC, Log10TotalECO, TotalANX

d. Dependent Variable: Log10TotalPEB

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.036	1	.036	10.129	.002 ^b
	Residual	1.250	349	.004		
	Total	1.287	350			
2	Regression	.510	2	.255	114.423	.000 ^c
	Residual	.776	348	.002		
	Total	1.287	350			
3	Regression	.513	3	.171	76.591	.000 ^d
	Residual	.774	347	.002		
	Total	1.287	350			

a. Dependent Variable: Log10TotalPEB

b. Predictors: (Constant), TotalLOC

c. Predictors: (Constant), TotalLOC, Log10TotalECO

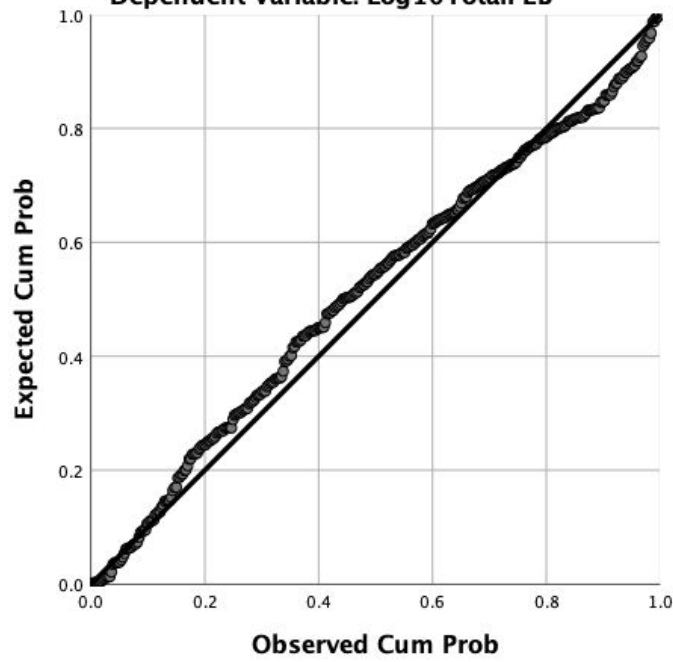
d. Predictors: (Constant), TotalLOC, Log10TotalECO, TotalANX

Coefficients^a

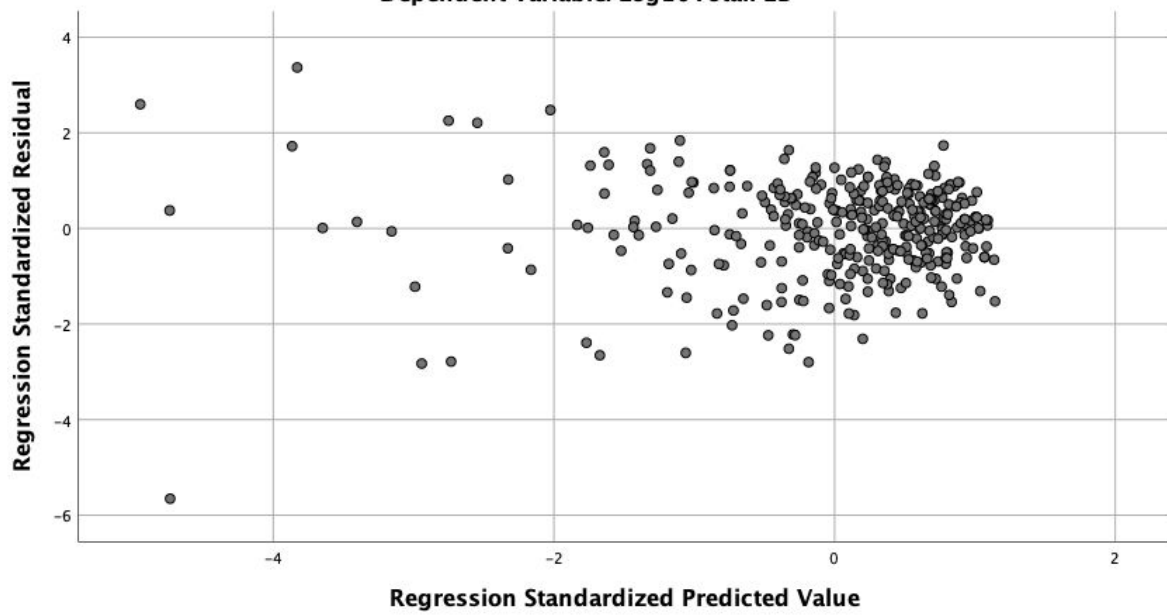
Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error				Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.454	.009		49.199	.000	.436	.472					
	TotalLOC	.004	.001	.168	3.183	.002	.002	.007	.168	.168	.168	1.000	1.000
2	(Constant)	.225	.017		12.979	.000	.191	.259					
	TotalLOC	.001	.001	.057	1.335	.183	-.001	.003	.168	.071	.056	.967	1.034
	Log10TotalECO	.472	.032	.617	14.580	.000	.408	.536	.627	.616	.607	.967	1.034
3	(Constant)	.234	.020		11.884	.000	.195	.273					
	TotalLOC	.002	.001	.070	1.576	.116	.000	.004	.168	.084	.066	.871	1.148
	Log10TotalECO	.472	.032	.616	14.554	.000	.408	.535	.627	.616	.606	.967	1.034
	TotalANX	-.005	.005	-.043	-.977	.329	-.016	.005	.002	-.052	-.041	.899	1.112

a. Dependent Variable: Log10TotalPEB

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Log10TotalPEB



Scatterplot
Dependent Variable: Log10TotalPEB



Correlations

		Log10TotalP EB	TotalANX	Log10TotalE CO	TotalLOC
Pearson Correlation	Log10TotalPEB	1.000	.002	.627	.168
	TotalANX	.002	1.000	.037	.317
	Log10TotalECO	.627	.037	1.000	.181
	TotalLOC	.168	.317	.181	1.000
Sig. (1-tailed)	Log10TotalPEB	.	.484	.000	.001
	TotalANX	.484	.	.245	.000
	Log10TotalECO	.000	.245	.	.000
	TotalLOC	.001	.000	.000	.
N	Log10TotalPEB	351	351	351	351
	TotalANX	351	351	351	351
	Log10TotalECO	351	351	351	351
	TotalLOC	351	351	351	351