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Eco-anxiety in adolescents: an explorative study

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INTRODUCTION

In recent years the urgency of the worldwide conversation about the climate has never been higher. Climate change and the consequent habitat destructions, biodiversity loss, and environmental challenges such as extreme weather events, have led to environmental concerns in the front line of public consciousness. While this awareness is a fundamental step towards addressing the imminent ecological crisis, it has also given rise to a new psychological phenomenon, that in recent years has been increasingly recognized and documented: eco-anxiety.

This phenomenon is not restricted to youth, but it has attracted significant attention in the context of adolescents, who appear to be the demographic most influenced by environmental issues.

Adolescence is a critical period for human development, characterized by heightened sensitivity towards social and environmental issues, making them the most concerned about climate change. It is during this time that individuals undergo profound neurobiological, psychological, and emotional changes, as they grapple with identity formation, peer pressure, and the impending responsibility of adulthood. The interaction between these developmental factors combined with the awareness of climate change, has generated unique challenges for this generation, which not only has to deal with age-related difficulties but also must come to terms with an ecological crisis that is threatening their future.

Eco-anxiety among adolescents is a very complex and multi-faceted emotional response, and it includes a range of emotions from fear and despair to anger and frustration, all derived from the perceived threat that climate change represents toward the natural world and their future lives. These emotions have the potential to influence their well-being but also their attitudes, behaviors, and future choices as global citizens. Moreover, this ecological concern has a lot of elements in common with existential anxiety. Climate change can give rise to profound existential questions about the future, purpose, and meaning of life, causing emotions such as grief and guilt challenging the idea we always had about the world and the future. This existential dimension adds another layer of complexity to their emotional and psychological experience.

Young people's activism underscores the significance of this issue. The Fridays for Future movement, initiated by Swedish activist Greta Thunberg in August 2018, gained significant importance across Europe. Tens of thousands of young people in various European cities

participated in climate strikes, demanding more concrete climate action. Moreover, in some European countries, adolescents took legal action against their governments, alleging insufficient sustainable measures. This unprecedented level of involvement reflects the growing concern among adolescents about the climate crisis and the urgent need for carbon reduction strategies.

This thesis aims to better understand the phenomenon of eco-anxiety in adolescents, and comprehend its impact, causes, and potential interventions, while also acknowledging pro-environmental behaviors and the existential questions climate change raises.

The first chapter conducts an analysis of the psychological consequences of climate change in young people. We explore the direct and indirect effects and how they manifest, with a focus on eco-anxiety as a form of existential anxiety. Moreover, the terminologies used to describe various forms of ecological distress are also presented. Chapter two shifts the focus to interventions and examines mitigation and adaptation strategies to help adolescents cope and adapt to climate change.

Finally, the third and fourth chapters present our research methodology and the most important findings. The final chapter synthesizes these findings, contextualizing them within the recent literature acknowledging limitations, and suggesting potential areas for future research.

This thesis aspires to contribute to the growing body of knowledge on the intersection of mental health, environmental concerns, pro-environmental behaviors, self-efficacy, and youth development. In doing so, my hope is that this research may inform strategies for addressing eco-anxiety and fostering eco-resilience and eco-empathy among adolescents, helping them to navigate towards ecological challenges and build inner and collective resilience.

CHAPTER 1

ECO-ANXIETY: ANALYSIS OF THE PHENOMENON

“Men argue. Nature acts.” (Voltaire)

The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as a change in the climate attributed directly or indirectly to human activity on earth, that alters the composition of the global atmosphere. In April 2023, The Intergovernmental Panel on Climate Change (IPCC) released the Sixth Assessment Report, a scientific review of literature on climate change made by the world’s leading climate experts. This report shows that greenhouse gases have caused a temperature rise of +1.2°C above the preindustrial average temperature (1850-1900), and it will likely reach +4°C in 2100. Consequently, the last seven years have been the hottest in human history, reaching temperatures never experienced before; oceans are heating up and glaciers are melting, increasing sea levels by 20cm, double compared to the last century (IPCC, 2023). To put this data into context, we need to consider that a sea level increase of +1 m will cause a near-complete submersion of Venice. We know with certainty that this temperature rise is caused by anthropic activity on the hearth and that humans dramatically changed our world. If we do not take urgent action, the consequences will be devastating for mankind (IPCC, 2014).

1.1 Psychological effect of climate change on youths

1.1.1 The direct effect

We are used to thinking that climate change affects only bears (Clayton, 2022), but it is now obvious that human well-being has also been (and will be) implicated. Physical health will be threatened by the increasing heat, spread of water-borne diseases, malnutrition, and an increasing number of Extreme Weather Events (EWEs) such as wildfires, floodings, and heat waves. In addition, insidious changes such as prolonged drought and lack of livability in some areas will cause an increase in diseases spreading, food insecurity (and malnutrition), need for migration, inter-group conflicts, and economic disparities, coinciding with decreased access to clean water (IPCC, 2014, 2023; UNICEF, 2014). While the physical consequences of climate change have been well documented, psychological impacts have been less studied, especially in young people. It is important to fill this gap since the children (and the fetus) are particularly vulnerable to long-

term cumulative risks of climate change and fuel-related air pollution. Physical and psychological susceptibility in youth can manifest as cognitive impairment or chronic diseases. These stressors may include malnutrition, infectious diseases, traumas from an EWE experience, heat stress, and cancer caused by pollutants (UNICEF, 2014).

UNICEF (2014) predicts that EWEs will likely affect 175 million children per year, and unfortunately, they are more prone than adults to experience Post-Traumatic Stress Disorder (PTSD), depression, and sleep disorders after an EWE (Clayton, 2020). The increased risk faced by children amidst EWEs is due to their greater dependence on their caregivers and social support networks (that can be disrupted by these events), and to the long-term effects of early experiences of traumatic events (Clayton, 2020). EWEs will also increase the need for migration, which can become very stressful for young people, especially when they need to enter other countries “illegally” and cross borders (Clayton, 2020), exposing themselves to all the risks of this long travel. Additionally, the process of adjustment into a new “home” is challenging, especially when residents do not welcome them, exposing migrants to the risk of developing mental health problems (Clayton, 2020). Another factor we need to consider is that malnutrition is associated with a reduction in learning capacities and educational activities (Clayton, 2020; UNICEF, 2014), affecting both individual and societal development. The increase in the price of food and water will affect many households, and numerous people will not be able to afford basic food supplies (UNICEF, 2014). With an increase in the cost of living, a lot of children (especially in the “developing world”) will be forced to start working at a young age, losing the opportunity and right to go to school and get an education. This will be true especially for young females since usually, they are the first ones to be put out of school rather than male children. Other than migration, competition for food will additionally increase social conflict, another factor that directly threatens mental health (Clayton, 2020).

Sometimes the link between climate change, undernutrition, poverty, migration, conflicts, and mental health might not be evident, but experts all over the world are starting to recognize that climate change will amplify existing risks and create new risks to humans, increasing the threats and challenges that disadvantaged communities already have. Thus, psychology is slowly starting to acknowledge climate change as an international justice problem and a “peace issue” (Sanson & Burke, 2020) that will affect more children and young people, especially the ones in the poorest countries. However, its effects are becoming more tangible both in Europe and the rest of the

world, with an increasing frequency of EWEs that will cause more people to experience symptoms of depression, PTSD, and anxiety (Clayton, 2022).

1.1.2 The Indirect Effects

Climate change is affecting the mental health of not only people who directly experienced EWEs, but also the ones who are worried about the big threat represented by climate change.

So far, we only discussed the direct psychological effect of climate change, but nowadays there is increasing attention in the literature and on social media to the possibility of the more indirect effects of climate change, such as climate anxiety (Clayton, 2020). According to the bio-psychosocial model (Engel, 1977), health and illness are a result of the interaction between biological factors (biochemistry and genetics), psychological factors (personality, mood, behavior), and social factors (cultural, familial, socio-economical). If behavior, thoughts, and feelings can influence the psychophysical aspects, when we think about the effect of climate change on human health and psyche, we also must consider the indirect effects (Innocenti, 2022).

Global problems such as climate change are frequently related to emotions such as worry, despair, anger, guilt, and helplessness (Noorgard, 2006; APA 2017), even if there has not been a direct experience of climate-related events as the ones described before. Thus, more people in “developed countries” are starting to experience fear, sadness, anger, and powerlessness in reaction to the impact of climate change on their lives (Ojala, 2015; UNICEF UK, 2013), and, furthermore, of these study cohorts, young people experience are perceived to experience more anxiety than adults (APA, 2017) because young people seem to be more conscious about climate change and its effects.

In an earlier survey, investigating 11 to 16-year-old British adolescents’ perception of climate change, 74% of the participants were worried about its impact on their future, and 63% were concerned about how it would affect children and families in developing countries (UNICEF UK, 2013). A 2020 YouGov poll commissioned by Friends of the Earth, reported that 70% of 18 to 24-year-olds are more worried about climate change than they were a year ago.

In a very large study by Marks et al. (2021), which has been defined by “The Guardian” as the widest study about young people and climate anxiety, 10,000 young people from 16 to 25 years old in 10 different countries were interviewed. The results showed that 59% were “extremely worried” about climate change and 84% were at least moderately worried, while half of the sample

(45%) declared that climate anxiety affects them in their functioning and everyday life during moments such as playing, eating, studying, and sleeping. Interestingly, the majority evaluated the government's responses to climate change negatively and expressed feelings of betrayal. In this study, correlations suggested that the anxiety for climate change is significantly related to the perception of the inadequate response of the government to this phenomenon. Furthermore, 65% of the participants said that they think that governments are failing young people, 64% thought they are lying about the impact of the action taken, and 58% stated that governments are betraying young people (Marks et al., 2021). The uncertainty and lack of clarity in communication about the climate crisis from the governments, negatively impact young people; if problems are presented without a solution, reassurance, or instructions on what young people can do to solve it, negative emotions may develop. Confirming these results, Hickman (2020) in her psychotherapist practice with children, found out that children are often scared of seeing the "adult world" failing to take urgent action against this threat. Youths are left out of decisional processes about climate change mitigation policies, despite being the ones who will face the consequences of the climate crisis. The threat posed against the future of humankind in combination with the uncertainty that surrounds our natural environment, the timing in which climate change effects are manifesting, and the frustration derived from the feelings that we are not doing enough, gives rise to a complex mixture of deep emotions such as grief, anxiety, rage and a sense of guilt. This response to the climate crisis depends on personality, experience, and social support, but also vulnerability (Clayton, 2022), as well as psychological and neurobiological characteristics of young people's brains that put them in a more volatile state of emotional vulnerability.

One crucial factor that determines the level of concern one might experience and establishes why young people experience more climate-related distress than adults, is the psychological distance that people interpose between the threat. As pointed out by Xie et al. (2019), sometimes it seems that climate change happens only to other people, in another place, and in another future. Thus, young people may experience the worst mental health impacts because they feel "closer" to the consequences of climate change, since they are predicted to occur during their lifetimes. Adolescents and young people may think about the future more than adults (Ojala, 2012) given that this is the period youths start to make plans for their adult life, and they are beginning to take responsibility for their own lives and houses, becoming aware of how difficult it is to live up to

their values in everyday life (Ojala, 2018-19). This is a very critical period, and understandably it is not children, but adolescents and late adolescents who are the more pessimistic and disempowered regarding the future. Hickman (2020) reported that many young people believe that what is happening to the planet feels personal as it was being done to them:

'I think it's different for young people, for us the destruction of the planet is personal, it's happening to me, you are doing this to me'.

Many young people reported that adults around them are failing to understand their worries about the climate crisis and how this affects them daily. As a result many youths gave up talking to their parents about these feelings because adults often argued that they were “worrying too much” or that “there is nothing to worry about” (Hickman, 2020).

“What I don't get is why everyone isn't running around the streets screaming in fear, that's what they should be doing if they knew how bad it was going to get, how bad it already is in some places in the world. Instead I'm told by grown-up's to stop worrying and go back to school. All they have to do is look at what's going on, I don't get it, why can't they see it?! They say I'm the one with the problem because I'm scared; but I'm even more scared because they are not scared.

They should be. I'm living in the twilight zone! Help me!” (14 year old; Hickman, 2020).

Norgaard (2011), found that in a studied community, the social dissonance and pressures in relation to climate change were so contradictory and strong that people resorted to “socially constructed silence”, which ultimately increased anxiety. This experiment illustrated how anxiety can be caused by not only geophysical changes, but also by pressures in the social world. Consequently, those who report experiencing eco-anxiety frequently express a need for greater understanding from the social groups and societies around them; they believe that the “socially constructed silence” and social disputes made their anxiety worse (Pihkala, 2020).

Through cross-analysis of this data and interview responses, young people seem to be more affected by the climate crisis because this is a period of their lives where they are building their personalities and aspirations. Since climate change is so overwhelming and unpredictable, it is perceived as something very close to them and a significant threat that will affect their future lives. Young people seem to pose less psychological distance between themselves and climate change because the threats associated are relevant to their future, and we can hypothesize that this closeness makes their anxiety greater than the adults' ones. This is in line with Rollo May's Theory of Anxiety, which postulates that anxiety can be caused by a perceived threat that is relevant to a

person or social group's values (Barlow, 2004). At the same time, they are angry and feel betrayed by adults and politicians because they do not seem to understand why they are scared, and that they need to act now to secure a better future for youths. They do not feel understood, and this "social silence" around climate anxiety can make it worse. Additionally, they do not have the political power to do what they believe must be done, leading to a feeling of powerlessness (Pihkala, 2020; Skovdal & Benwell 2021). So, it is fundamental, on the one hand, to reduce the psychological distance between individuals and climate change (for people to acknowledge climate change as a big threat), but on the other hand, we know that a reduction leads to an increase in the emotional component (Innocenti, 2022), as it is happening to youths.

Fear for the future is another important aspect that is often reported in literature discussing young people's feelings about the climate crisis. An Australian study (Tucci, Mitchell, and Goddard 2007) found that among a group of 10–14-year-olds, 27% of them believed that the world may end during their lifetime due to climate change and other global threats. Consequently, an increasing number of young people are considering not having kids (Clayton, 2020) because they don't want to expose them to the consequences of climate change, or because they think the world might end soon:

'It wouldn't be fair to have a child knowing what I know about the climate crisis, I would feel guilty' (Hickman, 2020).

Namely, 39% of the young people interviewed in the study by Marks et al. (2021) stated that they were not sure they wanted to have children. These considerations may also be made to prevent their child from seeing the disruption of the planet, or because the best action to reduce the individual's carbon footprint is to decide to not have children (Passmore et al, 2023).

These findings are extremely important but concerning since young people need to use this period of their lives to build their personality, dreams, projects, and future aspirations, so if this period is not characterized by the essential hope for the future, it can have serious consequences in their future development (Innocenti, 2022). Adolescents can better understand the complexities of world problems than children, and this can lead to feelings of powerlessness. At the same time, their cognitive system is more sophisticated and can help them cope with climate change threats in better ways (Ojala, 2012). Therefore, it is important for specialists in mental health to understand

this growing phenomenon to provide young people with strategies to help them cope with climate-related emotions and to include them in political decisions.

1.2 Terminology: the difference between climate-related emotions

Social media is abundant with stories about the so-called “eco-anxiety”, so much that *Grist* magazine described this phenomenon as the “biggest pop-culture trend of the year” (McGinn, 2019). The terms “eco-anxiety” and “climate anxiety” have been widely used in newspaper articles, interviews, documentaries, and blogs (Pikhala, 2020), and even Greta Thunberg openly spoke about her eco-anxiety. Recently the topic arrived in Italy, with a viral video showing a young lady who, during a public speech, told the minister of the environment Pichetto Fratin that she has been suffering from eco-anxiety and that she is scared for the future¹.

Today, we do not have a recognized diagnosis of eco-anxiety, but professionals use the term to describe the emotional response of anxiety and worry caused by the climate crisis. Albrecht (2011), who is one of the leading exponents of eco-existentialism, was the first one to coin the term, while the American Psychological Association in 2017 defined it as the “chronic fear of environmental doom” (APA, 2017). In fact, anxiety seems to be the most reported reaction in literature, but eco-anxiety became an “umbrella term” to describe all the emotions caused by the indirect experience of climate change we discussed before (worry, despair, anger, guilt, and helplessness), even though this feeling has specific characteristics that differentiate it from other reactions. The term seems quite suitable since a lot of forms of feeling regarding climate change have some characteristics of anxiety, which is potentially why the term has become so popular (Pihkala, 2020). In this section, we will describe all the terms used to report emotional reactions to climate change that have been used both in scientific literature and on social media.

Discussing and researching eco-anxiety is very difficult; first, because there is a lack of studies about all the forms in which eco-anxiety can display, and its relationship to other forms of “ecological distress” that we are going to present later; second, not all scholars agree on a definition of eco-anxiety. Other than the definition by the American Psychological Association presented before, Albrecht (2011) defines it as the “generalized sense that the ecological foundations of

¹ <https://www.youtube.com/watch?v=p35CGNS8mu0>

existence are in the process of collapse”. Typical symptoms of eco-anxiety are associated with worry and can escalate to higher levels of anxiety (Pihkala, 2020); Even though scholars are against the pathologization of this popular phenomenon, which must be considered a natural reaction to a serious societal problem, eco-anxiety is in fact, the constant worry that there is something terrible and irremediable that is threatening the ecological integrity of our planet (Clayton, 2020). It is a form of worry for our environment, nature, and the anthropic activities that are destroying it. Consequently, eco-anxiety is directed against the causes of anthropization, and it leads to questioning the system we are living in. On the contrary, “climate anxiety” can be described as an emotion: it is a fear against climate change and EWEs, and the anxiety is directed to the effects of anthropization. It is relevant for psychologists and sociologists who are researching this topic to know that eco-anxiety and climate anxiety have become the standard terms in literature (Pihkala, 2020), but they are indeed different.

A recent meta-analysis by Coffey et al. (2021) analyzed the vocabulary used to describe emotions related to eco-anxiety (**Figure 1**). They stated that there are inconsistencies in the use of the term between scholars, but that, in general, emotions associated with eco-anxiety are linked to general anxiety: negative emotions together with physical symptoms, future-oriented apprehension, and concerns for climate change. Some people reported psychosomatic symptoms such as gastrointestinal tract discomfort or headaches (Innocenti, 2022), and studies have also highlighted negative physical behaviors such as panic attacks, irritability, weakness, depression, sadness, sleeplessness, helplessness, numbness, hopelessness, guilt, anger, feeling uncertain or angry (Coffey et al., 2021). It is not surprising that there is a great confusion among researchers, since this feeling is characterized by several different characteristics and symptoms, although anxiety seems particularly significant in capturing the sense of concern and worry. It is plausible that the negative threat of climate change, among all the other emotions, can cause anxiety and worry, since anxiety is linked to a sensitivity to negative outcomes and to the anticipation of goal conflict, and this can lead to the inhibition of conflictual behaviors (Clayton, 2020).

taking action (Clayton, 2020). Anxiety can be paralyzing, and so eco-anxiety can cause helplessness, loss of hope, depression, loss of motivation, and nullification of the sense of efficacy. Eco-paralysis is used to describe the realization that we are unable to take effective action to mitigate the damage of climate change. It is when people think the world is dying and they cannot do anything to save it (Innocenti, 2022).

- Terrafurie (Albrecht, 2011): experience of furious anger generated in response to the changes in the climate, directed against those economic and political institutions that obstruct the reforms for mitigation. This particular emotion can be observed in climate activists and during climate demonstrations, from the most pacific to the most violent ones (Innocenti, 2022).
- Ecological grief (Comtesse et al., 2021, as cited in Innocenti, 2022): experience of loss in relationship to changes in the natural environment, that manifests as a state of sadness and disorientation. There are three types: a) grief for the disappearance or extinction of various animal forms and ecosystems; b) loss of our identity and culture that was linked to that environment (this feels more personal); c) grief for the future loss of species, landscapes, lifestyles, and livelihoods methods for the self and entire populations.

From what we can infer, eco-anxiety and all the other climate-related emotions are “existential anxieties” for one's identity, meaning, freedom, death, and isolation. People's happiness might be affected by the reduced opportunity to experience our eco-system, and so their sense of connectedness with nature and with their identity (and so the meaning of life and how we know it) decreases together with the landscapes and eco-system we are attached to (Passmore et al., 2023).

It is understandable that the relationships between eco-anxiety, climate anxiety, and the other terms discussed are very strong, and that they seem quite interchangeable. However, we need to consider that these emotions have not been sufficiently described, and that we are discussing a very novel topic that is extremely complex and multi-faceted. With an increase in this phenomenon, it is important for experts who work with mental health to have an operational definition of all climate-related emotions and to better understand these existential feelings. Moreover, it is fundamental to name emotions related to climate change not only to legitimize their existence but also to legitimize climate change itself (Innocenti, 2022).

1.1 Eco anxiety: an existential and practical anxiety

As already pointed out, the term eco-anxiety appears to be extremely significant in portraying the sense of worry and concern a lot of young people experience. Thus, it is necessary to investigate the nature of this anxiety and to understand why anxiety seems to be the most common feeling. Moreover, eco-anxiety has many elements of “existential anxiety”, but it often manifests as a “practical anxiety”, leading to action (Pihkala, 2020). We will discuss both elements in this section and the next chapter.

First, we need to analyze the characteristic of the threat: climate change.

In terms of the ecological model of child development by Bronfenbrenner and Morris (2006, as cited in Sanson & Bruke, 2020) climate change is a phenomenon that can be classified as a macro-system one (that includes national, cultural, and global factors), but people can see its impacts in every level, from meso- and exo-system (including social influences such as school) to micro (child’s family context).

Furthermore, climate change, as a stressor, has very distinct characteristics (Clayton, 2020):

- It is a real threat: scientists already agreed that climate change is real, that its effects are already happening, and that it will cause more challenges in the future. So, it is rational to experience worry.
- It is developing and ongoing, so is not completely possible to adapt to the changes that it will cause.
- It is uncertain, and so anxiety (which is usually linked to uncertainty) is the most plausible response rather than fear (which is usually linked to a concrete threat; Pihkala, 2020)
- It is globally shared, so people can use others’ responses to regulate theirs.

We need to acknowledge that social media and cell phones lead to constant media exposure and overstimulation about climate change disturbing information (Pihkala, 2020). Similarly to behaviors and attitudes expressed in the social context, social media are crucial in determining people's perception of the risk (Norgaard, 2006).

The lack of understanding and the feeling of uncertainty and uncontrollability are some of the most important aspects of the climate crisis: no one knows with certainty the impact that can have and when and where we will see its effects (Clayton, 2020). Unpredictability relates to uncertainty, and these factors are further linked with the geophysical consequences of climate change and

environmental politics. Uncontrollability can give rise to powerlessness and helplessness, and consequently to a decreased “locus of control” (control beliefs) and sense of efficacy (Pihkala, 2020).

A general vision of “anxiety” is a future-oriented worry about a threat in which there is some significant uncertainty. Feelings of unpredictability, uncertainty, and uncontrollability (caused by climate change), are all classic “ingredients” of the broader term “anxiety” (Pihkala, 2020). The definitions of eco-anxiety in literature are congruent with the research about anxiety, which sees it as strongly related to fear and worry but still as a distinct construct. In standard definition, fear is usually related to a concrete threat, whereas anxiety is linked to uncertain situations. The splintering of conventional norms and meaning sources, combined with rapid societal changes caused by climate change brings individuals into constant uncertainty (Pihkala, 2020). Young people, who need to think about their future, can experience it to a greater extent since it is difficult to create aspirations if you have no idea of how the world is going to look like when you grow up. It is clear that, for them, the future is something uncertain:

‘No, you just don’t get it. You grew up in a world where you expected Polar Bears to be there forever, I’m growing up knowing that they will be extinct soon, it’s different for us, you need to understand that.’ (Hickman, 2020).

As a result of this uncertainty that seems to characterize eco-anxiety, several authors classified climate change as an “existential threat”, since it threatens the core understanding of our social system, and life itself (Clayton, 2020; Passmore et al., 2023; Pihkala 2020). Overall, there is a pull towards existentialism in relation to eco-anxiety (Pihkala, 2020). Norgaard (2006) described it as a “potential loss of ontological security” since our knowledge and the system of understanding we rely upon seem to be no longer true. This is particularly relevant if we think about the statement presented before in which a young person tried to tell the adult (the therapist Caroline Hickman) that is not obvious to today’s children that polar bears will be part of the existing ecosystem as it was for earlier generations. Climate change has been changing the perception of the world we had for centuries. Consequently, the climate crisis can raise feelings of ontological security, leading to anxiety, depression, or defensive reactions (Pihkala, 2020). As Flanders (2007) stated: “Even the simple pleasure of losing ourselves while gazing at the stars is a freedom that is being lost. Light and air pollution are serious obstacles to viewing the stars and night sky in urban centers and

surrounding areas, yet driving fossil-fueled vehicles to darker more remote areas to enjoy this taste of freedom is yet another trigger for eco-anxiety”.

Existential anxiety is defined by philosophers and psychologists as a “mental state related to being human and wrestling with fundamental questions in life”. Existentialism is often characterized by questions of living as a human being, and usually, they are related to mortality, meaninglessness, and feelings of grief and guilt (Pihakala, 2020), which we already know often characterize the experience of young people. It seems that eco-anxiety can be linked to existential questions.

Psychology researchers already know that guilt (and so “eco-guilt” or “eco-shame”) can be displayed as anxiety; while anxiety is generally implied in grief, unresolved grief can manifest in anxiety (Pihkala, 2020). The link between guilt, grief, and anxiety is thus very profound.

Climate change threatens the existence of our species (and so is linked to death), encouraging us to contemplate our identity not only as beings, but also as nonbeings (Passmore et al., 2023). The existential philosopher Paul Tillich (1952, as cited in Passmore et al., 2023; Pihkala, 2020) posited that the contemplation of our nonbeing can lead to three types of anxiety, and two of them are guilt and condemnation. In relation to this, Ojala (2017-18) defines eco-anxiety as a “worry mixed up with guilt”; this guilt (or existential eco-guilt) “infects” our identity as virtuous humans when we think about our life choices, as well as our collective identity as intelligent beings (Passmore et al., 2023). This is particularly true for indigenous groups, whose identity is strongly linked to their land and natural environment (Clayton 2020; Clayton & Karazsia, 2020; Passmore et al., 2023). Furthermore, we can also speculate that this is true for teens whose identities are forming in this period. Every time we hear about the death of coral reefs, forest fires, or the melting of glaciers, we subconsciously accept that we will never be able to see them in our lives. Something adults took for granted in the past is no longer given to today’s children. We must emphasize with young people who are limited to bystanders to the destruction of their planet before having the possibility to find their place on the earth, thus struggling to imagine a future for themselves and new generations (Hickman, 2020). This population has limited political power compared to adults, so guilt is often expressed by children and adolescents as a perceived lack of action, in the consciousness that adults are not doing enough (Skovdal & Benwell 2021).

Other than guilt, grief, and condemnation, eco-anxiety is linked to freedom, which in the “existential” sense is the individual responsibility to make choices in life that lead to the realization of a world in which one wishes to live (Yalom, 1980, as cited in Passmore et al., 2023). It is overwhelming to think about all the personal choices (and Pro-Environmental Behaviors) we need to make to live sustainably, and since many require mitigation actions beyond people’s individual control, the sense of individual powerlessness is a fundamental part of eco-anxiety (Pihkala, 2020). Again, given that youths are not involved in political decisions, powerlessness is indeed a part of their experience of climate change (Budziszewska & Johnsson, 2021).

At the beginning of this section, it was argued that other than an “existential anxiety”, climate change is also reported to be a “practical anxiety”. It is very misleading to think about eco-anxiety mostly as an anxiety disorder as it is a moral emotion (Pihkala, 2020) based on the recognition of the severity of the threat we are facing; it is a “practical anxiety”.

Pihkala (2020) talks about “practical eco-anxiety” in terms of a type of anxiety that can lead people to search for better information, re-evaluate the situation, make changes in their lifestyles, and engage in collective behavior. Clayton and Karazsia (2020) talk about the possibility of this anxiety being functional in preparing people to deal with the climate change threat. There is, in fact, a link between eco-anxiety and pro-environmental behaviors (Higginbotham et al., 2014), since individuals who experience anxiety concerning climate change usually have more awareness and might adopt behaviors to reduce their impact on the world. Moreover, pro-environmental behavior predictors include environmental attitudes and connection to nature (Menardo et al., 2018), and many authors also pointed out that people who feel more connected to nature usually feel more eco-anxiety (Clayton, 2020; Clayton & Karazsia, 2020). Innocenti et al., (2021; 2023) found a positive correlation between eco-anxiety and pro-environmental behaviors in an Italian adult sample: engaging in collective and individual action can help manage anxiety while helping mitigate climate change (Sanson & Burke, 2017), creating a virtuous circle. Climate change anxiety can turn into self-protection and problem-solving strategies. This connection, however, depends on the ability of the person to cope with it, a concept called self-efficacy (or climate self-efficacy; Clayton, 2020). Innocenti et al., (2023) showed that self-efficacy is a mediator between pro-environmental behaviors because it can help people reduce their worry, but since climate

change impact people's self-efficacy it can trigger negative feelings, hopelessness, and helplessness.

Caroline Hickman (2020) argues that eco-anxiety is more than just an emotional reaction from an experience of an environmental crisis; It is an intrinsic part of it is the relationship between the emotional response and the cognitive knowledge that we both caused and are failing to respond to it. Eco-anxiety can be a rational response to a very urgent and serious threat. The emotions evoked by the autonomic nervous system are biologically programmed to warn us when a situation needs attention, they help us to survive. In this case, eco-anxiety can indicate to us that we need to repair our relationship with nature (Passmore et al., 2023).

Eco-anxiety has many elements of existential anxiety (such as grief and guilt), but it can also be displayed as a practical anxiety, leading to pro-environmental behaviors and self-efficacy. However, in some people eco-anxiety can turn into eco-paralysis leading to distress, helplessness, and hopelessness, inhibiting our self-efficacy and our ability to act. It is important for future research to investigate the link between these four constructs, especially in young people, to comprehend the phenomenon of eco-anxiety and create new interventions.

Considering climate change as an existential threat can be useful because: a) can help uncover the underlying mechanism that contributes to children and teens' negative emotions; b) it acknowledges climate change as a threat and validates its impact on children and teens; c) it can help to create targeted mental health support by drawing from evidence-based practices of existential therapies and theories (Budziszewska & Johnsson, 2021). We need more research on existential themes in youths, and future works must focus on adapting existing existential therapies to children and adolescents to help them create a new idea of themselves as hearth dwellers.

Furthermore, eco-anxiety as a practical anxiety merits more attention. Therapeutic approaches should focus on helping people develop coping strategies and self-efficacy to avoid eco-paralysis and to help engage in pro-environmental behaviors that can, in turn, stimulate self and collective efficacy. We will discuss coping strategies and how to transform eco-anxiety into action in the next chapter.

CHAPTER 2

INTERVENTIONS

“[...] Adults have got to tell children the truth about the climate crisis, because if you don’t tell me the truth, then that means you are lying to me, and if you lie to me I won’t be able to trust you, and if I can’t trust you then I can’t talk with you about things that worry me. So, tell children the truth, but don’t tell them all the bad things all at once, talk about a bad thing and then a good thing, then a bad thing then a good thing”
(12 year old; Hickman, 2020)

This chapter is dedicated to interventions for eco-anxiety and other forms of climate distress. The first section describes ways to assess eco-anxiety in youths, useful for mental health professionals to recognize severe symptoms that might require intervention. There are described some recently developed questionnaires to measure climate change anxiety, as well as other classifications of symptoms. Moreover, the important topic of the de-pathologization of this emotion is presented and discussed.

The second and third sections are dedicated to coping strategies and therapeutic approaches that mental health professionals can use to support adolescents and children. It must be acknowledged that these interventions are tested for individuals who experience indirect distress and eco-anxiety. These interventions are not tested for youth in the “global south” who more than others directly experience climate change effects. Also, very little research has been made on interventions for eco-anxiety in children and adolescents, so this section will present interventions tested for adults that need more attention in literature because of their potential for youth.

2.1 Climate anxiety: a pathology or a congruent response?

When we think about the word “anxiety” usually we think about pathological anxiety or an anxiety disorder. Some researchers are cautious about using terms such as climate change anxiety and eco-anxiety (Pikhala, 2020). Eco-anxiety is more complex than an anxiety disorder and has very peculiar characteristics that distinguish it from other mental health disorders, even though “anxiety” (and in particular “existential anxiety”) seems to better capture its nature than other terms. Eco-anxiety can be defined as a distinct construct (Clayton & Karazsia, 2020). In fact, it is

not defined as an official disorder, even though strong symptoms of eco-anxiety require a mental health intervention (Clayton, 2020; Clayton & Karazsia, 2020; Pikhala, 2020).

Currently, there is no instrument to test eco-anxiety or other climate-related emotions in youth, but Clayton and Karazsia in 2020 developed the “Climate Change Anxiety Scale” (CCAS) in an adult American sample. This scale measures two aspects of the response to anxiety: cognitive impairment and functional impairment (see **section 4.2**), which are positively correlated with general measures of anxiety and depression. In their research, in accordance with the German validation of the CCAS (Wullenkord et al., 2021), only a few people experienced a strong emotional response in relation to climate change. The majority of the sample obtained low scores, with young people scoring higher than older people. It seems that even though eco-anxiety is a common emotion for some populations, only a few people really experience it in a severe way that impacts their daily functioning.

Caroline Hickman (2020) in her psychotherapist practice with children, young people, and adults made a categorization of the emotional response (including anxiety) to climate change that goes from mild to severe:

- Mild: feelings of upset that respond to reassurance (“it will all be okay”), and anxiety can be reduced with a focus on individual and local actions (recycling or eating less meat). There is an attachment to trust and optimism, there is a belief that “others” (such as scientists) will find a solution. There is a tendency to avoid painful feelings. Disruption in thinking/cognition.
- Medium: feelings of upset are more frequent, and there are more doubts in “others” solutions, but they still believe that a solution will be found. Less efficient psychological defenses that allow feelings of discomfort. They made some changes in their lifestyle, but they are minimum significant changes. They can still be reassured. Some disruption in thinking/cognition, but no preoccupation with the crisis.
- Significant: feelings of upset appear daily, and awareness that they are increasing, with minimal defense against fear, grief, and guilt. Anxiety can be harder to mitigate with reassurance. Very little faith that “others” will find a solution. Much more significant impact on life choices, such as not having children or stopping flying. Signs of disruption in thinking and cognition, especially guilt for children and grandchildren.

- Severe: serious thinking/cognition disruption, that manifests in intrusive thought, sleeping difficulties, and preoccupation that can lead to the inability to enjoy daily life. No defense against terror. A belief that there will be a social collapse and extinction of human beings. No believe that “others” will find a solution. There is difficulty in managing the emotional responses, which can lead to spontaneous angry outbursts or crying a lot. There might be thoughts about suicide or having to kill their children to save them from social collapse or starvation.

This classification can help us better understand Clayton and Wullenkord's (2020; 2021) results, since it makes clear that people can experience eco-anxiety in different forms, from the mildest to the most severe. This classification is important since it can help professionals to discriminate between people whose eco-anxiety is a “functional anxiety”, and the ones who need a mental health intervention. In fact, ecological emotions, as well as the “classic” ones, can be measured based on their intensity (how strong and visible they are) and the value we give them, which can be positive or negative (Innocenti, 2022).

Almost everyone can be affected by eco-anxiety no matter their personal vulnerability or safety (Clayton, 2020). Eco-anxiety is a feeling that can be “practical” (Pikhala, 2020), and it is experienced by many people who do not have underlying mental issues or have pre-existing anxiety sensitivity (Hyry, 2019), even though it is clear that an existing mental issue (in particular anxiety) can contribute to the severity of it (Clayton, 2020; Clayton & Karazsia; Pikhala, 2020). Although eco-anxiety is positively correlated with general anxiety, it is a distinct construct (Clayton & Karazsia, 2020). Through a diagnostic lens, people who have anxiety might not experience climate change anxiety, but people who experience climate change anxiety in a severe way might also have anxiety. The response has some mediators such as media representation and moderators including access to coping resources and social vulnerability (Doherty and Clayton, 2011).

Anxiety can be functional, and concerns about climate change are appropriate since they reflect a valid threat perception. The resulting anxiety can help to motivate people to act, but there is an important difference between being worried and very worried about it (Clayton & Karazsia, 2020; Pikhala, 2020). When the sensitivity to potential problems (differences between what one expects and what is encountered) surpasses a threshold, this anxiety can reverse its effectiveness for survival and instead become maladaptive; too much anxiety can trigger responses such as

rumination, impairing anxiety resolution. Fear and anxiety are normal if they do not interfere with work, school, or social relationships (Clayton & Karazsia, 2020). For some people, this emotional negative reaction can be severe enough to cause mental illness problems, and suicidal thoughts, as reported by Hickman (2020). Moreover, eco-anxiety can become chronic, and detached from a certain cause, as it happens in General Anxiety Disorder (Clayton, 2020). Severe forms of eco-anxiety have already been described with the term “solastalgia” (Albrecht, 2003, as cited in Innocenti, 2022) and “eco-paralysis” (Albrecht, 2011), whereby the emotional state is characterized by helplessness, loss, and inability to act (Innocenti, 2022).

The classification described may risk leading to pathologizing and labeling eco-anxiety, which is in contrast with the vision that eco-anxiety is congruent and sometimes practical. This response can be part of our adaptation to this phenomenon, and this worry has an adaptive nature (Clayton & Karazsia, 2020). It is very important to de-pathologize this phenomenon, given its social media attention, but we also need to address that there might be people who suffer more than others.

Hickman (2020) talks about eco-anxiety as a form of “eco-empathy” (or “eco-compassion” and eco-caring”), emphasizing that people wouldn’t feel this way if they didn’t feel connected to people or other animal species. In fact, people who feel more connected to nature (such as indigenous people) suffer more from eco-anxiety (Clayton, 2020; Clayton & Karazsia 2021; Passmore, 2023). It is important to think about eco-anxiety inside an attachment view, so we can finally start to talk about connection and relationships, moving forward from the mental illness framework (Hickman, 2020).

Validating and supporting young people must be done without labeling or pathologizing (Hickman, 2020). Parents, teachers, and mental health professionals need to listen to how children feel without labeling their feelings as mental illness. The dichotomy of validating children’s mental health while avoiding the risks of labeling involves complexities, but this approach will help remove labels and discriminate between eco-anxiety and other forms of struggle (Hickman, 2020). Climate change as a threat gives mental health professionals new challenges as we have no “map” to help navigate since is something new we have never witnessed, thus it can create a new type of distress in people we have never seen. Labels can help proper research into the phenomenon, but it is also important to create approaches that prioritize increasing collective and self-efficacy, finding sources of meaning, building connections with nature, and most importantly, developing empathy.

2.2 cope with eco-anxiety: mitigation strategies

Strategies to fight climate change can be divided into two broad categories: mitigation and adaptation. Mitigation refers to efforts to try to reduce or slow down climate change, mainly by reducing carbon emissions and absorbing the carbon dioxide already in the atmosphere. Mental health professionals use this term to refer to interventions that focus on coping strategies for climate-related emotions.

A scoping review of interventions for eco-anxiety by Baudon and Jachens (2021) examined all the interventions available in literature regarding age and found five major themes: fostering client's inner resilience (cognitive interventions, meaning-focused and existential interventions, emotion-focus intervention, self-care intervention), helping find social connection and emotional support by joining groups, encouraging take action (individual action and collective action), practitioner's inner work and education (grief awareness).

2.2.1 How to talk to young people about climate change

Before exposing all mitigation strategies, it is important to point out that young people are afraid to talk with adults about the climate crisis because they fear being judged (for example for being unreasonable) or not understood. Hickman (2020) noticed that a lot of young people don't know whom they can safely talk to about this issue, and some reported being belittled and dismissed by adults (such as teachers or parents). Moreover, adults' responses can trigger a sense of powerlessness and helplessness in them (Hickman, 2020).

Adults need to create a safe and comfortable space to let youth express their emotions and fear, utilizing active listening, and answering their questions in a very honest way (Ojala, 2016).

Sometimes climate change questions can quickly become serious, such as the situation described by the therapist Anouchka Grose in her book "A Guide to Eco-anxiety: How to Protect the Planet and Your Mental Health" (2020). She talks about a conversation her friend had with her six years old, that asked her "Will lots of animals dye?" that then transformed into "Will lot of people dye?" and eventually "Will *we* dye?", a question that created panic to both mother and son. It is important to stay calm when children ask this kind of question, emphasizing that there are people who can do something about it and that scientists are working on a solution. Children's knowledge of the world can not be controlled, thus there is no need to lie to them, they are going to find out the truth themselves. What parents and professionals can do is be thoughtful about how to present them

with painful truths (Grose, 2020). It is important that adults resist the urge to move away from negative feelings (“Don’t worry, everything is going to be fine”) but instead validate them (“I get why you are worried, it is a big problem”) and help them find action to do. The first step is to talk about these emotions and to identify how they are dealing with them. The second step is to evaluate their own self-talk and try to understand together with them if this is the only way we can think about this issue. The final step is to help to generate alternative thoughts and to challenge their catastrophic thinking (Ojala, 2012a). As Hickman (2020) said, we need to find creative, caring, and playful ways to have this conversation with children and youth.

2.2.2 Fostering Inner Resilience: cognitive interventions, meaning-focus coping, and existential interventions

Fostering inner resilience means fostering the ability to reframe people's distress, addressing different levels (cognitive existential, emotional, creative), and creating a scaffolding around their inner experience to make them access, feel, and express their emotions in a safe way (Baudon & Jachens, 2021).

2.2.2.1 Cognitive interventions

These types of interventions focus on finding and reframing beliefs, thoughts, and attitudes about eco-anxiety (Baudon & Jachens, 2021). It can be done by re-prioritizing, for example, by asking “What’s most urgent? Are there any true emergencies? What are your skills?” (Dockett, 2019), helping them to create their environmental identity by encouraging thoughts about things that can be done now, and thinking about skills they have that can be used to mitigate climate change. In this way, a sense of self-efficacy can also be created. Another re-prioritizing intervention can be done through a thought experiment that consists of asking to imagine if they “could travel to any other era in history. What would be the great moral or ethical challenge of that era?” and “Would they change then for now?” and help them understand that every era has its challenges (Baudon & Jachens, 2021) and that them has been exceeded. Hopelessness must be replaced with thoughts such as: “The big problems in history have been overcome, like apartheid or women’s voting rights”, “scientist think we still have time”, “There are a lot of people (scientists) who are working to mitigate climate change” and “changes take time”.

What can also be done is encourage them to search for alternative stories about the future, which can be discussed together in a critical and creative way (Ojala, 2012b). Re-framing can help to

mitigate engagement negative effects, perfectionistic concerns, and self-blame (Stoeber & Janssen, 2011, as cited in Ojala 2012a).

Another cognitive intervention can focus on shifting from a catastrophizing view to a less black-and-white picture, embracing nuance (Baudon & Jackens, 2021). Pikhala (2018) describes this phenomenon as “binocular vision”, and we can change it helping clients to accept that good things and bad things can happen at the same time. Black-and-white thinking is when someone thinks in terms of all-or-nothing such as “driving cars is completely bad for the environment” (Australian Psychological Association, n.d.). Cognitive strategies aim to make people think about the problem in a more realistic and empowering way for example, “climate change is happening, but we still have a window of opportunity to limit greenhouse gas emissions” (Australian Psychological Association, n.d.).

2.2.2.2 Meaning-focus coping and existential interventions: the importance of hope

Ojala (2017-18) argued that sometimes hope can be displayed in denying the gravity of climate change. Some people try to escape from anxiety through denial since it is difficult to accept that there is an ecological crisis going on now. It is difficult because it implies accepting that there is a serious threat that can change the lives of people and communities. However, the internal conflict and dissonance still remain, and so this denial can turn into more (repressed) anxiety (Pihkala, 2020). Some people avoid talking about their anxiety and worry about the environment to protect other people from these disturbing emotions, to prevent possible ridicule (and this happens often to youths), or because of denial (Norgaard, 2011). Eco-anxiety can inhibit people from expressing their feelings, causing individuals to feel isolated from society, and damaging the social connections that are a vital source of resilience (Clayton, 2020). A good source of hope can come from meaning-focused coping strategies (Ojala 2017-18). Ojala (2012a; 2012b; 2013) explored the benefit of meaning-focus coping for children and adolescents regarding the climate crisis. This form of coping’s goal is to draw upon the existential understanding of meaning, linked to people’s morals and values. These interventions focus on exploring eco-anxiety’s existential concerns such as people’s values and identity, the activity they found hope in and that are meaningful to them, and their sense of place (Baudon & Jachens, 2021). Climate change as an existential threat can lead to questions about meaning and mortality, therefore existential questions are a central theme in eco-anxiety and need to be addressed with a realistic and empathetic approach.

Meaning-focus coping is important for those situations (such as climate change) in which the problem cannot be solved, but it still requires active involvement (Ojala, 2012a). However, Ojala (2012a) in her research with adolescents, found that this strategy was less used compared to others such as problem-focus coping and emotion-focus coping (respectively 12%, 33%, and 35%). Moreover, many participants (17%) stated that they usually don't do anything special to cope with climate-related distress.

A part of meaning-focus coping interventions is based on positive appraisal, encouraging youths to look at the situations from more points of view (Ojala 2017-18). It means acknowledging the problem, but also reframing the situation thus it can be seen in a positive way. This can be done by putting climate change into a historical perspective such as empathizing that climate change awareness has increased recently or that when negative consequences (such as extreme weather events) are more observable, people finally start to act (Ojala, 2012a).

Another important part of meaning-focus coping and existential intervention is the focus on fostering optimism and hope (Baudon & Jachens, 2021). In the literature, hope has been found to mitigate worry and promote pro-environmental behaviors (Ojala, 2012a). The first chapter pointed out that young people do not have hope toward adults and governments (Marks et al., 2021), thus what needs to be promoted is trust in societal actors such as scientists, environmental organizations, and sometimes politicians (Ojala, 2017-18). Hope can also be fostered through collective processes where adults (parents, teachers, or therapists) help youths create a story about the future, concentrating on hope. Furthermore, it is important to encourage agency and help them understand that everyone's effort is important and that they need to celebrate small successes (Ojala, 2012b). It is understandable why Greta Thunberg does not want hope: "I don't want your hope, I don't want you to be hopeful, I want you to panic and act as if the house was on fire". The risk with hope is that it can sound passive (Grose, 2020); But is also important to bear uncertainty. This led us back to where we started: anxiety. Is it possible to face uncertainty with hope? Someone might think that is not possible to save the world by being hopeful, but if we stop hoping, we are inviting catastrophe. The point is to make hope active and to use it as an engine of change (Grose, 2020). It is difficult even for adults to acknowledge that things that are serious also contain elements of progress. People who can manage such complexity can start a dialectical process able to drive climatic engagement (Ojala, 2017-18).

2.2.3 Emotion-focus intervention

These interventions focus on giving the space to process and express emotions related to climate change concerns and help develop skills to regulate them (Baudon & Jachens, 2021).

Half of the emotion-focus strategies in the literature focus on supporting the grief process inherent in eco-anxiety (Baudon & Jachens, 2021). Other sub-themes in emotion-focused interventions are self-care (practicing healthy routines, mindfulness, self-compassion, and gratitude) and creative expression through art. More research about how to apply these interventions to youth is needed since emotional coping strategies are fundamental to not burnout.

A way to help young people regulate their emotions can be validating their feelings, letting them know that is normal to feel this way given this big threat, and that they are not the only ones who feel this way. Practicing self-compassion is another way, helping them to treat themselves and others with compassion, understanding that these feelings are a congruent response (Australian Psychological Association, n.d.) and that they wouldn't feel this way if they didn't care about the planet (Hickman, 2020). This leads again to the need to address eco-anxiety as a dysregulated form of eco-empathy (Hickman, 2020).

2.2.4 Encouraging taking action: increasing self-efficacy and pro-environmental behaviors

These interventions focus on guiding towards lifestyle changes that help people meet their environmental values (for example eating less meat and/or animal products), or towards groups that engage in collective action (Baudon & Jachens, 2021).

Increasing self-efficacy is necessary for people who are convinced that they cannot do anything for the environment, helping them to understand that there are some ways in which the climate catastrophe can be avoided. Education is fundamental: if people are instructed in what do to and which kind of behaviors they can make, we can substitute helplessness with hope (Innocenti, 2022). We already pointed out the relationship between eco-anxiety, self-efficacy, and pro-environmental behaviors: self-efficacy can stimulate pro-environmental behaviors because it increases the perception that we can do something, meanwhile engaging in individual and collective action can stimulate the sense of self-efficacy (Innocenti, 2022; 2023). Hickman (2020) in her classification of eco-anxiety symptoms, describes how pro-environmental behaviors can reduce anxiety in people who have mild and medium symptoms. Action can give the occasion to practice a behavioral response to people's preoccupations, soothing negative environmental

emotions (Innocenti, 2022). Furthermore, self-efficacy can improve self-esteem, reduce stress, and prevent psychological vulnerability, other than generating collective efficacy and help people accomplish their goals (Innocenti et al., 2023) engaging in sustainable behaviors.

Talking about collective engagement, literature shows that a group can become an emotional container and a safe space that induces action (Doherty & Clayton, 2011). And, as Pikhala (2020) said: “The antidote to anxiety is action”. Groups seem to act as powerful emotional containers for the existential distress that characterizes eco-anxiety (Baudon & Jachens, 2021). Collective engagement regarding environmental issues is correlated to well-being and hope, probably because when you are involved in a community, people can support one another creating a sense of efficacy (Ojala, 2017-18).

Additionally, a concrete way to find hope is through prefigurative politics, where groups of people try to bring societal changes by practicing locally instead of confronting structures of power directly. In this way, groups can be role models for others, other than trying to prefigure a more sustainable world (Ojala 2017-18).

2.2.5 Connection with nature

These interventions help find in nature a space of resourcing, inspiration, and reflection. They can take place in the therapy space by including nature-oriented questions, suggesting clients to interact more with nature, or even offering the possibility of holding the session in an outdoor space (Baudon & Jachens, 2021). Interestingly, the scoping review by Baudon and Jachens pointed out that a quarter (26%) of the paper about eco-anxiety interventions focuses solely on connecting with nature, finding in nature a great source of healing from climate change distress.

A new branch of ecology called “Affective ecology” posits that human beings have an innate tendency to focus on life and life-like forms to affiliate with them emotionally (The *Biophilia hypothesis*; Wilson 2002, as cited in Barbiero, 2011), and that our feeling of all being “children” of mother heart (Gaia) is an instinct and it’s present in every culture, even the more technologically advanced (The *Gaia Hypothesis*; Lovelock 1979, as cited in Barbiero, 2011).

However, our society has become distant from the natural world, risking to not stimulate our innate biophilic tendencies and develop a naturalistic intelligence² (Barbiero, 2011).

Passmore et al., (2023) argued that our emotions usually warn us when a situation needs attention (they help us survive), so eco-anxiety can indicate that we need to repair our relationship with nature. Immersions in nature can help cultivate our innate biophilic tendencies, soothing positive existential anxieties like the ones outlined by Yalom (1980, as cited in Passmore et al., 2023) of meaning, isolation, freedom, and death. Only within the interconnected framework of our interaction with nature as a whole humans can live and grow, thus it is important to recognize the bi-directional relationship between nature and humans (Passmore et al., 2023). Various environmental psychologists argue that rediscovering a genuine relationship with nature may be the key to curing the damaging psychological effects of climate change, leading to new solutions for an eco-sustainable restart (Innocenti, 2022). Everything that makes us reconnect and rediscover nature it's healthy and healing: nature walks, growing a garden, buying a plant, visiting a farm, or doing a sport that stimulates contact with nature (Innocenti, 2022). This is very important for young people, especially the ones who live in big cities who do not have the same contact with nature that their parents had, and even if they have it, nature in the cities is not "natural" but is a cemented and anthropized nature, made for humans. A study (Clements, 2004) conducted on mothers born between 1960 and 1980, showed that 76% spent most of their time outside from Monday to Sunday when they were kids, whereas their children spent just 26% of their time in nature. The impoverishment of people's relationship with the environment is becoming difficult due to the decrease in rural green areas, especially in major urban centers (Innocenti, 2022). In Italy for instance, the cement rate is increasing more than the population one, and Italy is among the first European countries in terms of cementing rate (19 hectares of land, about 26.5 soccer fields, are wrested from nature every day; wwf.it, 2023). This confirms that the psychological consequences of climate change are a community problem (Innocenti, 2022). We need to build more green spaces

² Naturalistic intelligence: eight manifestations of intelligence according to Gardner's "multiple Intelligence Theory". Is the ability to connect profoundly with non-human beings and to appreciate the effect of this relationship on us and the external world. It requires the sensory ability to sense living beings, logical reasoning capacity that allows us to differentiate and classify living organisms based on certain logical standards, and a specific emotive sensitivity to everything "natural" (Gardner, 1999)

in cities, but there is also a need to experience nature untainted by human influences. Seeing how beautiful and lush nature is, can give the strength to fight even harder to preserve it (Clayton, inside Innocenti, 2022). Children need direct experience of nature; Aquariums, zoos, or city farms are interesting, but they need to see creatures in their native habitat (Grose, 2020). Once the kid has an idea of how the planet is formed, and which kinds of creatures live in it, it will become easier to involve them in pro-environmental behaviors from an early age, whether picking up trash from the woods or the beaches, or preserving home energy (Clayton, inside Innocenti, 2022). If children are not allowed to develop a relationship with the natural environment, biophilia is not stimulated and naturalist intelligence can atrophy, causing damages to the psychological development defined as “nature deficit disorder”, a range of behavioral problems due to deprivation of interaction with the environment (Louv, 2005).

To summarize, eco-anxiety mitigation treatments could adopt a holistic strategy based on two factors: first, addressing all the elements and layers of the youth's inner experience, and second, creating a connection with mental health professionals, groups, and nature (Baudon & Jachens, 2021). A lot of papers contained the message that healing our world and humans involves shifting from human-centeredness to spreading our attention between individuals, communities, and nature (Baudon & Jachens, 2021).

2.3 Prevent eco-anxiety: Adaptation strategies

Adaptation refers to strategies to deal with the future and current effects of climate change, and in our case, strategies to help youths prepare for future changes, to prevent eco-anxiety and other forms of climate distress.

Since the climate crisis is already happening right now, even with serious mitigation strategies the situation will inevitably get worse, so effective adaptation strategies become necessary. When the world converts to a zero-emissions economy there will be a need for radical changes in one's lifestyle, including working, consuming, and traveling (Sanson et al., 2019). New challenges include the experience of extreme weather events, increasing numbers of climate refugees, and the conflicts these events may bring (UNICEF, 2013). New generations will therefore need to be highly adaptive and resilient, developing skills such as problem-solving and conflict resolution, as well as learning to live in a world that will be increasingly interconnected and multicultural.

Additionally, they will need skills such as empathy and compassion, tolerance and acceptance, cooperation, equality, justice, protection environment, a sense of community and commitment (Sanson et al., 2018; Sanson et al., 2019). Developmental psychology will need to help children prepare for future changes.

In recent years, several authors have proposed models of “positive development” for children and adolescents, that can provide guidance on how to foster in them the skills needed to respond effectively to the climate crisis as individuals, community members, and citizens. The many existing models of positive development emphasize skills (a) at the individual attitude level; (b) in the personal sphere, reflecting healthy relationships with parents, peers, and others, and the ability to cooperate and negotiate with others; and (c) at a community/social level, encompassing civic actions, commitment, trust, and tolerance (Sanson et al., 2018). Generally, these models propose functional capacities for resilience and adaptation in the face of change through self-regulation; relationships positive and supportive with parents, peers, and teachers; connection at the school level, and contribution to the community through volunteering and political awareness (Sanson et al, 2018). Research on resilience and positive development has identified the three characteristics that new generations will need to have: (a) competencies and skills individuals, which include self-regulation (e.g., through meaning-focus and existential coping), values such as empathy, social justice, adaptability, and creativity; (b) interpersonal and interpersonal skills, which include negotiation, ability to conflict resolution, cooperation and knowing how to work with others; and (c) engagement social and civic, which is important for living in a climate-altered world, including volunteering, participation in community groups and active citizenship (Sanson et al., 2018; Sanson et al, 2019). The characteristics described are very similar to those of the positive development model; This may indicate that these are the skills important to possess in the context of the climate crisis, that psychologists, researchers, therapists, educators, and parents need to promote in children and adolescents.

CHAPTER 3

THE RESEARCH

3.1 Aim of the study

The aim of this explorative study is to investigate eco-anxiety in a healthy sample of Italian adolescents (13-19 years-old), pioneering research in Italy to explore this emerging phenomenon.

We aim to understand the nature of eco-anxiety and its potential impact on mental health.

Additionally, we seek to establish correlations between eco-anxiety and clinical measures of depression, anxiety, stress and general distress, to understand the connection between eco-anxiety and psychological variables.

Furthermore, we will examine the levels of engagement in pro-environmental behaviors, to understand how eco-anxiety may influence the motivation to take sustainable actions. Lastly, we will assess perceived self-efficacy to test whether it can serve as a mediator between eco-anxiety and pro-environmental behaviors.

3.2 Hypothesis

Previous research showed higher levels of eco-anxiety in women (Clayton & Karazsia, 2020; Wullenkord et al., 2021) and young people (APA, 2017; Clayton & Karazsia). So, we hypothesized a higher level of eco-anxiety in females in our sample of adolescents (**Hypothesis 1**).

Furthermore, there seems to be a link between eco-anxiety and Pro-Environmental Behaviors (Higginbotham et al., 2006; Higginbotham et al., 2014), and young people seem to engage more in PEBs than adults (Ballman, 2020). Innocenti et al., (2021) showed a positive correlation between eco-anxiety (measured with the Climate Change Anxiety Scale, CCAS; Clayton, 2020) and PEBs (measured with the Pro-Environmental Behavior Scale; PEBS; Markle, 2013) in an Italian adult sample. Consequently, we expected a positive correlation between engagement in PEBs in individual who reports more eco-anxiety (**Hypothesis 2**). Given the mediator role of self-efficacy in determining PEBs (Innocenti et al., 2023), we also expected higher levels of self-efficacy in people who report more eco-anxiety and engage frequently in PEBs (**Hypothesis 3**).

Finally, both the American, Italian, and German validation of the CCAS (Clayton & Karazsia, 2020; Innocenti et al., 2021; Wullenkord et al., 2021) showed positive correlations between eco-anxiety and clinical measures of Depression and anxiety. We expected a positive correlation between eco-anxiety and symptoms of Depression, Anxiety, Stress, and general distress (**Hypothesis 4**).

3.3 Method

3.3.1 Participants

The original sample was composed of 136 subjects. We excluded all the subjects who did not complete the questionnaire and the subjects who did not pass the attention item (“If you can read correctly this sentence, click 7”), specifically included to verify the reliability of the responses. This resulted in a final sample of 131 participants from 13 to 19 years of age ($M = 15.85$, $SD = 1.65$, $Mdn = 15$). The majority part of the sample was composed of people assigned “female” at birth ($n = 88$, 67.2%), while the rest of the sample was “male” assigned ($n = 43$, 32.8%). Regarding gender identity, 42 people (32.1%) identified themselves as male, 85 (64.9%) identified themselves as female, 2 (1.5%) as non-binary, and 2 (1.5%) chose the option “I would rather not answer the question”. The overwhelming majority of the sample had an Italian nationality ($n = 120$, 91.6%), while the rest were not Italian or mixed. All participants lived in the region “Emilia Romagna”, 83 of them (63.4%) lived in an urban area, and 48 (36.6%) in a rural area. Regarding the family composition, most of the participants reported living with a mother and a father ($n = 99$, 75.6%). Parent’s education level for every family structure was also assessed (excluding the participants who responded “monoparental” and “other”; see **Table 2**), showing that almost half of the parents had an upper secondary education ($n_{MOTHER} = 50$, 40.7%; $n_{FATHER} = 53$, 43.1%). Regarding the socio-economic status, the scores obtained in the Family Affluence Scale III were mostly high ($M = 8.80$, $Mdn = 9$, $SD = 1.94$) indicating a medium-high socio-economic status among our sample. **Table 1** summarizes our sample’s main sociodemographic characteristics.

Table 1*Sociodemographic Characteristics of participants*

	n	%		n	%
Biological sex			Ethnicity		
Male	43	32.8	White	124	95
Female	88	67.2	Balkanian	1	0.8
Gender identity			Black	1	0.8
Male	42	32.1	Mixed/others	5	3.8
Female	85	64.9	Family composition		
Non-binary	2	1.5	Heteroparental	99	75.6
I'd rather not answer	2	1.5	Homoparental	-	-
Sexuality			Heteroparental but divorced	24	18.3
Heterosexual	117	89.3	Homoparental but divorced	-	-
Homosexual	1	0.8	Monoparental	6	4.6
Bisexual	7	5.3	Other	2	1.5
Pansexual	1	0.8	GPA		
I'd rather not answer	5	3.8	Poor	1	1.5
Nationality			Satisfactory	30	22.9
Italian	120	91.6	Good	66	50.4
Moldavian	3	2.4	Excellent	33	25.2
Romanian	2	1.6	Physical/psychological problems		
Ukrainian	1	0.8	Yes	19	14.5
Ivorian	1	0.8	No	104	79.4
Mixed	4	3.2	I'd rather not answer	8	6.1
Home area					
Rural	48	36.6			
Urban	83	63.4			

Note. n = 131

Table 2*Absolute and Percentage frequency of the participants parents' level of education*

	Mother		Father	
	n	%	n	%
Primary school	-	-	1	0.8
Lower secondary school	5	4.1	18	14.6
Upper secondary education	50	40.7	53	43.1
Bachelor's degree	13	10.6	5	4.1
Master's degree	22	17.9	12	9.8
Single-cycle degree (medicine, law, etc)	13	10.6	13	10.6
First-level master's degree/specialization	10	8.1	9	7.3
PhD	2	1.6	2	1.6
I don't know	8	6.5	10	8.1

Note. $n = 123$; 8 participants (monoparental family and “other” type of family) were excluded. Percentage and absolute frequencies refer to the people who responded “Heteroparental” and “Heteroparental but divorced” ($n = 123$)

3.3.2 Procedure

The study took place in a High School located in Ferrara (Italy). The project received ethics approval from the ethical committee of the University of Padua (Area 17 - Protocol n.: 5062 of 09/01/2023). After the approval, we contacted via email the principal of the school, with a formal request to participate in the study. We informed them about the aim of the project and the questionnaires we wanted to use, as well as the data treatment policy and the informed consent collection procedure for students and parents. After the principal agreed to participate, we contacted via email and by phone the reference teacher for the project, whom we sent the informed consent to hand out to the students. The informed consent was signed by the parent if the student was a minor, or by the student if at least 18 years old. The data were collected from March to May 2023, in collective sessions (one classroom at a time) of 30 minutes. The link was sent by the teacher to the student using the school's platform. Participants were instructed about the aim of the study and their rights, emphasizing that the data were anonymous and that they were free to

withdraw at any time. In addition, the first screen of the questionnaire was an explanation of the aim of the study and the personal data processing policy.

3.3.3 Materials

We decided to use the Climate Change anxiety scale (Clayton & Karazsia, 2020; Italian version by Innocenti et al., 2021) to measure the participants' self-perception of eco-anxiety. The scales used to assess the validity of CCAS in Clayton and Karazsia's (2020) original version were not validated in Italian, while the scales used in the Italian version of CCAS (Innocenti et al., 2021) were not validated for teens. Therefore, we choose to use a different set of scales. Given the positive correlation between the CCAS and clinical measures of anxiety and depression, the Depression, Anxiety and Stress Scale (DASS-21; Lovibond & Lovibond, 1995; Italian version by Bottesi et al., 2015) was used. Moreover, to assess the engagement in PEBs we used an adapted version of the Pro-environmental Behavior Scale (PEBS; Markle, 2013; Italian version by Bottesi et al., 2019). Finally, a scale for Perceived Social Self-Efficacy in youth (PSSE; Bandura, 1993; Italian version by Caprara et al., 2001) was used to investigate the link between self-efficacy, eco-anxiety, and PEBs. Descriptive statistics of study variables can be found in **Section 4.1 in Chapter 4**, as well as frequency variables for every instrument.

We used the software “Qualtrics” to create the survey, and the participants used their personal phones to complete it.

3.3.3.1 Sociodemographic

The following demographic and socio-economic data were collected: age, nationality, ethnicity, residence, biological sex, sexuality, gender identity, family composition, mother's and father's occupation and education, GPA for the current academic year, class attended, presence of any physical or psychological illnesses, region of residence. The Socio-Economic Status was assessed using the Family Affluence Scale III (FAS III; Torsheim et al., 2016), a 6-item questionnaire for adolescents with an “asset” approach, in which participants need to rate household “assets” (number of cars, bedrooms, computers, bathrooms, dishwasher or and recent travels). The total score is calculated with the sum of the responses and ranges from 0 to 13, with a higher score indicating higher family income.

3.3.3.2 Climate Change Anxiety Scale (CCAS)

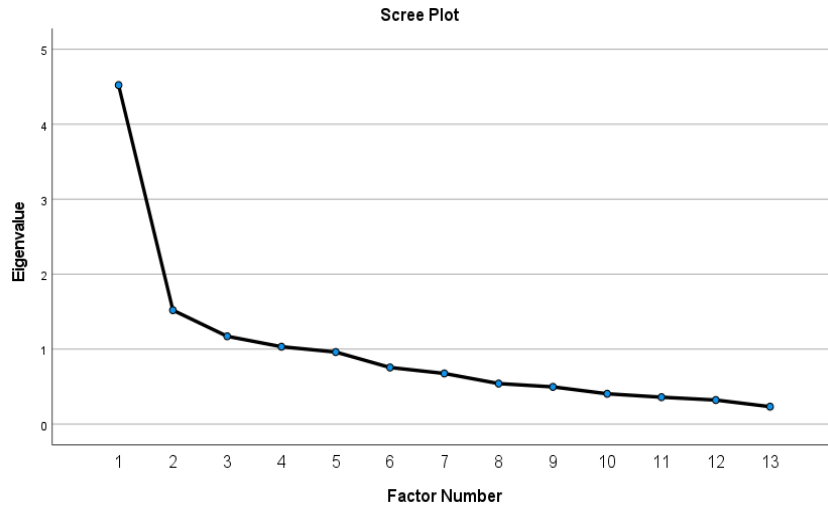
We used the Italian version of the Climate Change Anxiety Scale (Innocenti et al., 2021), originally validated by Clayton and Karazsia (2020) in an American adult sample. This scale is a self-report questionnaire that measures the perception of the individual of their anxiety in relation to climate change. Clayton's original version consisted of 22 items divided into 4 factors, however, they observed that the first 13 items (and two factors) were the most relevant to definite eco-anxiety. Therefore, a 13-items with two factors were used in the Italian validation study. The Italian version consists of 13 items, divided into two subscales: items 1-8 compose the "cognitive impairment scale", while items 9-13 the "functional impairment scale".

The first factor refers to having trouble learning new things, remembering or learning, making decisions, or other factors that affect daily life ("thinking about climate change makes it difficult for me to concentrate"). The second factor is an indicator of behavioral engagement and so it reflects limitations one can have ("my concerns about climate change make it hard for me to have fun with my family or friends"). Participants needed to evaluate the frequency with which they experienced the situation described by the item along a Likert scale from 1 to 5 (1 = Never; 2 = Rarely; 3 = Sometimes; 4 = Often; 5 = Almost always). The psychometric properties and internal consistency of both Clayton and Innocenti scales were good. Clayton and Karazsia (2020) stated that the questionnaire is comprehensible to children from age 12, therefore, after reading the items in the Italian version, we decided to not make any changes. Regarding reliability, we calculate Cronbach's alpha for the total score of the questionnaires and the subscales. Cronbach's alpha for the total items of CCAS was good ($\alpha_{TOT} = .816$), while for the subscales of Cognitive Impairment and Functional Impairment, the alpha was acceptable ($\alpha_{CI} = .712$; $\alpha_{FI} = .747$).

We decided to carry out the Exploratory Factor Analysis (EFA) to evaluate the possibility of an alternative factor structure than the one in the Italian validation for adults. We conducted a Kaiser-Meyer-Olkin (KMO) test to assess whether our sample showed adequacy for the EFA. We obtained an overall KMO value of .803, confirming our data suitability for further analyses. After inspection of the scree plot (**Figure 2**) with an elbow point after two factors, we enforced both a single-factor model and a two-factor model since the difference between the two models was marginal.

Figure 2

Scree test used for the EFA of the Climate Change Anxiety Scale



Note. $n = 131$

3.3.3.2.1 Single factor model

The single-factor structure explains 34.78% of the total variance. All items correlate positively with the single factor. We excluded two items (item 3 and item 7) that had low loadings (.244, .23; Cut-off for inclusion: $\geq .40$), resulting in an 11-item single-factor scale. Communalities and factor loadings are shown in **Table 3**. Cronbach's alpha was good ($\alpha = .81$).

Table 3

Communalities and factor loadings for the CCAS single-factor model

	communality	Factor loading
Item 1	.355	.595
Item 2	.379	.616
Item 3	.060	.244
Item 4	.161	.402
Item 5	.269	.519
Item 6	.142	.377
Item 7	.053	.23

Item 8	.408	.638
Item 9	.565	.752
Item 10	.200	.447
Item 11	.508	.713
Item 12	.560	.748
Item 13	.256	.506

Note. $n = 131$; cut-off for inclusion $\geq .40$

3.3.3.2.2 Two-factor model

The two-factor model explains 46.48% of the total variance. We couldn't confirm the two-factor structure of previous studies: items 5, 7 and 8 had a high factor loading ($\geq .40$) with the first factor (respectively .40, .617, and .727) while items 5 and 11 had higher loadings ($\geq .30$) on both factors. The result was a two-factor scale with 13 items. Items 5-7-8-9-10-12-13 constitute the first factor, while items 1-2-3-4-6 constitute the second factor. Communalities and factor loadings are shown in **Table 4**. Cronbach's alpha for the first and second factors was good ($\alpha_{F1} = .773$; $\alpha_{F2} = .661$). We interpret it as evidence that the subscales of Cognitive Impairment and Functional Impairment do not fit our adolescent Italian sample. However, considering the low numerosity of our sample, we decided to carry out further hypotheses considering the single-factor model and two-factor model of the American and Italian validation. Using this model eases the interpretability of the results.

Table 4

Communalities and factor loadings for the CCAS two-factor model

	communality	Factor 1	Factor 2
Item 1	.542	.181	.668
Item 2	.502	.275	.585
Item 3	.332	-.185	.596
Item 4	.247	.173	.423
Item 5	.339	.40	.333
Item 6	.519	-.139	.744

Item 7	.385	.617	-.333
Item 8	.576	.727	.098
Item 9	.593	.553*	.41*
Item 10	.384	.628	-.034
Item 11	.548	.494*	0.437*
Item 12	.606	.628	.325
Item 13	.471	.694	-.031

Note. $n = 131$; cut-off for inclusion $\geq .40$; * items with high loadings on both factors

3.3.3.3 Pro-Environmental-Behaviours Scale (PEBS)

The Pro-environmental Behaviors Scale (PEBS) was originally validated by Markle (2013) in an adult American sample. In this study, we used the Italian version validated by Menardo, Brondino, and Pasini (2019). The Italian version maintained 15 of the original 19 items. Psychometrical properties were good or better.

The scale consists of 15 items that investigate different types of pro-environmental (ecological) behaviors that people can do. The questionnaire is composed of four factors: conservation, environmental citizenship, food, and transportation. Examples of items for every factor are respectively: “How often do you limit your time in the shower in order to conserve water?”, “how often do you talk to others about their environmental behaviors?”, “during the past year have you decreased the amount of beef you consume?”, and “During the past year how often have you used public transportation?”.

This is the only scale that is based on empirical evidence and an impact-oriented approach that covers the three categories of Environmental behaviors (EBs) originally proposed by Stern (2000, as cited in Menardo et al., 2019). The first three dimensions of the scale measure the human activities that influence climate change: household consumption, transportation, and food. The fourth dimension refers to environmental activism and nonactivist behaviors in the social sphere. Since the Italian version was validated in an adult sample, we decided together with the authors of the version to modify some items to make them fit for an adolescent population. Consequently, our final version consists of a 14-item scale divided into four factors: conservation (items 1-3), environmental citizenship (items 4-7), food (items 8-11), and transportation (items 12-15).

The following changes were made:

- The item “How often do you wait until you have a full load to use the washing machine or dishwasher?” was excluded.
- Items 5 and 6 (“Are you currently a member of any environmental, conservation, or wildlife protection group?” and “During the past year have you contributed money to an environmental, conservation, or wildlife protection group?”) became: “Are you currently a member of an environmental group or do you define yourself as an activist (for instance, do you engage regularly in pro-environmental behaviors such as picking up plastic from the beaches or informing your friends about environmental problems?)” and “during the past year did you participate or contribute in activities in support of the environmental cause?”.
- The item “Please answer the following question based on the vehicle you drive most often: approximately how many kilometers per liter does the vehicle get?” was excluded considering that most high school students do not have a driver’s license or a car. Instead, we added the item “In the last year, how often have you had people driving you where you needed to go?”.
- “During the past year how often have you walked or rode a bike instead of driving?” became “During the past year how often have you walked or rode a bike?”

Response options are categorical (during the scoring numerical values are assigned to the response) and they vary depending on the item. In our version there are five possible responses: a) “never”(1), “rarely”(2), “sometimes”(3), “usually”(4), “always”(5); b) “no” (1), “yes” (5); c) “never”(1), “rarely”(2), “sometimes”(3), “often”(4), “constantly” (5); d) “no”(1), “yes”(5), “I do not eat beef/pork/poultry”(5); “never”(1), “occasionally”(3), “frequently”(5). The scores for each dimension are calculated with the mean of the items in that dimension, while the total score is obtained with the mean of the scores of every dimension.

Reliability was questionable for the total score of PEBS ($\alpha = .614$) and the subscales: conservation ($\alpha = .51$), environmental citizenship ($\alpha = .40$), food ($\alpha = .619$), and transportation ($\alpha = .092$). Reliability for the dimension transportation was unacceptable, thus, we excluded it from the analysis.

3.3.3.4 DASS 21

The Depression Anxiety Stress Scale (Lovibond & Lovibond, 1995) is a short version of a questionnaire originally developed to discriminate between symptoms of depression and anxiety, and a third factor “stress” that emerged during the research. The short version has seven items for each scale and maintained 21 of the original 42 items. “Depression” (items 3, 5, 10, 13, 16, 17, 21) assesses low self-esteem, lack of incentive, and dysphoria; “Anxiety” (items: 2, 4, 7, 9, 15, 19, 20) assesses somatic and subjective symptoms of anxiety and acute fear; “Stress” (items 1, 6, 8, 11, 12, 14, 18) measures tension, irritability, difficulty in relaxing, and agitation. Respondents need to evaluate how often in the last week the sentences applied to them were: 0 = “Did not apply to me at all”, 1 = “Applied to me to some degree, or some of the time”, 2 = “Applied to me a considerable degree, or a good part of the time”, and 3 = Applied to me very much, or most of the time. DASS-21 is a good measure of a general dimension of distress and additional independent dimensions of depression, anxiety, and stress. It is a versatile questionnaire since it is an efficient and economical way to assess four dimensions at the same time. The Italian version (Bottesi et al., 2015) reported good alpha values ($\geq .80$) for the total scale and the subscale, and proved to be efficient in assessing anxiety, depression, and stress in an efficient and meaningful way, both in a clinical and a community sample. The same research group (Innattone et al., 2023) is currently validating the questionnaire for Italian adolescents (14-18 years), using the same structure and items. Therefore, we choose to use the same version. Cronbach’s alpha in our sample was good for the total scale ($\alpha_{TOT} = .94$) and the subscales ($\alpha_{DEPR} = .917$; $\alpha_{ANXIETY} = .804$; $\alpha_{STRESS} = .863$). DASS-21 scores were calculated by summing of the values of the 7 items that compose every subscale (range for each subscale: 0 - 21), and a general distress score was calculated by summing the values of all three subscales (range: 0 - 63).

3.3.3.5 Perceived Social Self-Efficacy (PSSE)

The Perceived Social Self-Efficacy Scale (PSSE) is a questionnaire originally developed by Bandura (1993), later adapted for children and adolescents in Italian by Caprara et al. (2001; Scala di Autoefficacia Sociale Percepita versione Giovani, ASP/G). It measures children’s beliefs about their ability to establish and maintain social relationships, as well as to assert their opinions and rights. It is a self-report measure composed of 13 items along a 5-point Likert scale ranging from 1 = no confidence at all to 5 = complete confidence. Examples of the items are “participate during

classroom discussions” or “express your opinion when you are discussing with your friends”. The Italian version (Caprara et al., 2001) proved to have “good” ($\alpha \geq .80$) psychometric properties. The total score is the sum of the score obtained in every item, and it can go from 0 to 65 where a lower score indicates a lower perceived self-efficacy, while a higher score indicates that the adolescent has a high self-efficacy. Finally, Cronbach’s alpha for the PSSE was good ($\alpha = .806$).

CHAPTER 4

DATA ANALYSIS AND RESULTS

In this chapter, we will report the main results of the study and the statistical analysis tools we used to reach them.

First and foremost, we computed descriptive statistics for all instruments and summarized the results in order to get a clearer picture of our sample. We then tested our four research hypotheses following the order in which they are presented in **Chapter 3**. The chapter is therefore organized into five sections according to this division. Data analysis procedures are described in detail in each section. Data were analyzed using IBM SPSS Statistics (Version 28).

4.1 Descriptive Statistics

4.1.1 Eco-anxiety

We proceed by exploring participants' answers to the CCAS questionnaire. Descriptive statistics are reported in **Table 5**. While mean, standard deviation, and item-total correlation for every item are shown in **Table 6**.

A Shapiro-Wilk test indicated non-normality of the distribution of the CCAS total score and of its Cognitive Impairment and Functional Impairment subscales ($W_{CCAS-TOT} = .832, p < 0.001$; $W_{CI} = .911, p < 0.001$; $W_{FI} = .63, p < 0.001$), all of which were positively skewed. **Figure 3**, **Figure 4**, and **Figure 5** illustrate the distribution of the CCAS total score and the subscales Cognitive Impairment and Functional Impairment in our sample.

Table 5

Descriptive statistics for the Climate Change Anxiety Scale (CCAS) and the subscales cognitive impairment (CI) and Functional Impairment (FI)

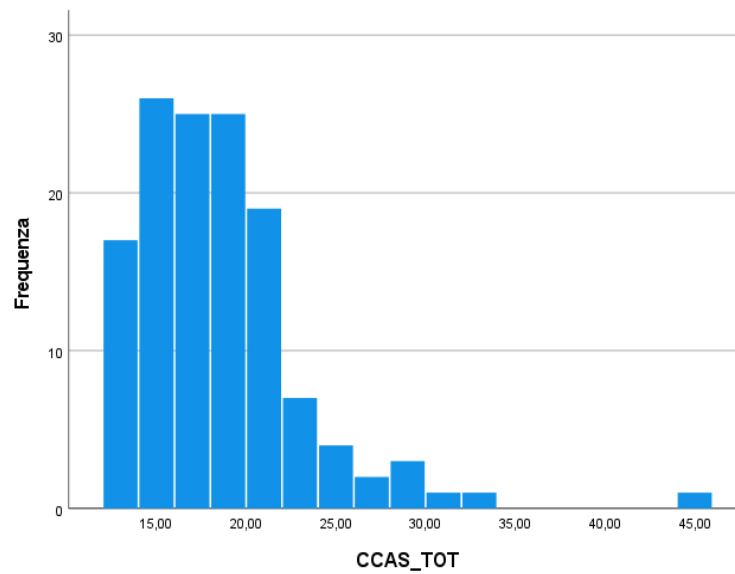
	Mean	SD	Mdn	Min	Max	Skewness	Kurtosis	95% CI	
								LL	UL
CCAS_TOT	18.05	4.64	17	13	45	2.14	8.47	17.2	18.8
CI	11.8	3.13	11	8	26	1.12	2.44	11.3	12.3
FI	6.20	2	5	5	19	3.22	14.70	5.85	6.55

Note. $n = 131$

Table 6*Mean, standard deviation, and item-total correlation for each item of the CCAS*

	Mean	SD	Item-total correlation		Mean	SD	Item-total correlation
1	1.79	.8	0.562	9	1.20	0.518	0.628
2	1.26	.52	0.567	10	1.60	0.829	0.412
3	1.2	.471	0.208	11	1.13	0.471	0.603
4	1.11	.405	0.364	12	1.21	0.591	0.628
5	2.35	1.03	0.525	13	1.07	0.309	0.444
6	1.37	.598	0.372	-			
7	1.11	.377	0.232	-			
8	1.66	.971	0.589	-			

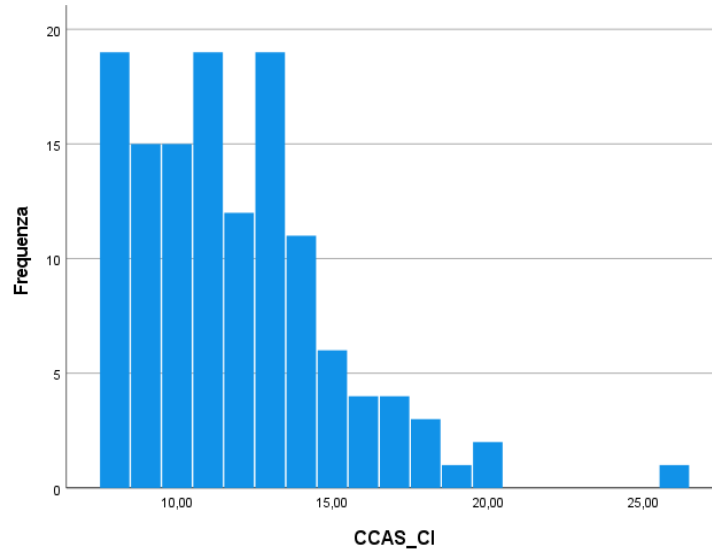
Note. $n = 131$. CI = cognitive impairment, FI = functional impairment.

Figure 3*Histogram of the Climate Change Anxiety Scale – Total Score (CCAS-TOT) variable.*

Note. $n = 131$; $M = 18.05$, $SD = 4.64$, $Mdn = 17$

Figure 4

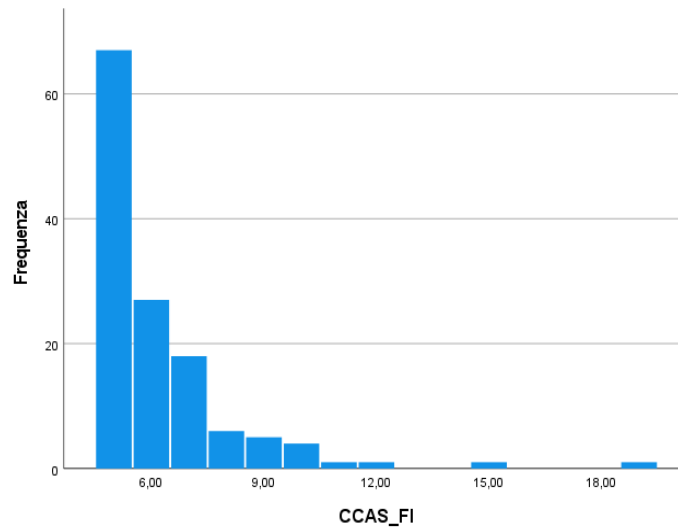
Histogram of the Climate Change Anxiety Scale – Cognitive Impairment (CCAS-CI) variable.



Note. $n = 131$; $M = 11.8$, $SD = 3.13$, $Mdn = 11$

Figure 5

Histogram of the Climate Change Anxiety Scale – Functional Impairment (CCAS-FI) variable.



Note. $n = 131$; $M = 6.20$; $DS = 2$; $Mdn = 5$

Eco-anxiety levels were interpreted by dividing the raw scores obtained in the Climate Change Anxiety Scale (CCAS) into five theoretical categories, where a lower score indicates the absence of symptoms of eco-anxiety and a higher score indicates clinical levels of eco-anxiety. As we can see in **Table 7**, the levels of self-perceived eco-anxiety in our sample were mainly low ($n = 107$, 81.7 %), with just six 6 people (4.6%) reporting having medium-low levels of eco-anxiety and 1 person (0.8%) reporting having a medium-high level of eco-anxiety. Moreover, 13 people (17%) didn't report having any symptoms.

Table 7

Absolute and percentage frequency of the theoretical levels of eco-anxiety

Level of Eco-anxiety	Range	n	%
absent	13	17	13
Low	14-26	107	81.7
Medium-low	27-39	6	4.6
Medium-high	40-52	1	0.8
High	53-65	0	0

Note. $n = 131$

4.1.1.1. Correlation between Eco-anxiety, Parental Education and Socio-Economic Status

Person's correlation coefficient indicated no linear association between parental education and children's eco-anxiety levels ($r_{CCAS-TOT} = .030, p = .774; r_{CI} = .030, p = .739; r_{FI} = .044, p = .631$). Moreover, eco-anxiety did not appear to be correlated to Socio-Economic Status ($r_{CCAS-TOT} = .162, p = .064; r_{CI} = .127, p = .148; r_{FI} = .158, p = .071$).

4.1.2. Pro-environmental Behaviors

Descriptive statistics of the Pro-Environmental Behavior Scale (PEBS) are shown in **Table 8**, while **Figure 5** illustrates the positive skew in the distribution of the PEBS total score in our sample.

Table 8

Descriptive statistics of the Pro-Environmental-Behavior Scale (PEBS)

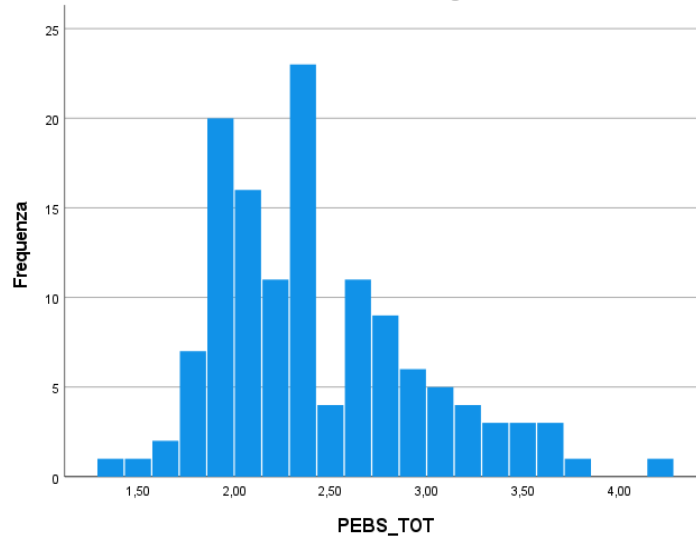
	Mean	SD	Mdn	Min	Max	Skewness	Kurtosis	95% CI	
								LL	UL
PEBS_TOT	2.39	.53	2.28	1.36	4.21	0.829	0.48	2.3	2.48
Conservation	2.92	3	.84	1.33	5	0.23	-.121	2.78	3.07
Environmental citizenship	1.58	.62	1.5	1	3.5	1.35	1.11	1.48	1.69
Food	2.08	1.13	2	1	5	1.13	0.57	1.88	2.27

Note. n = 131

Figure 6, Figure 7, Figure 8 and Figure 9 illustrates the positive skew in the distribution of the PEBS total score its subscales Conservation, Environmental citizenship and Food in our sample.

Figure 6

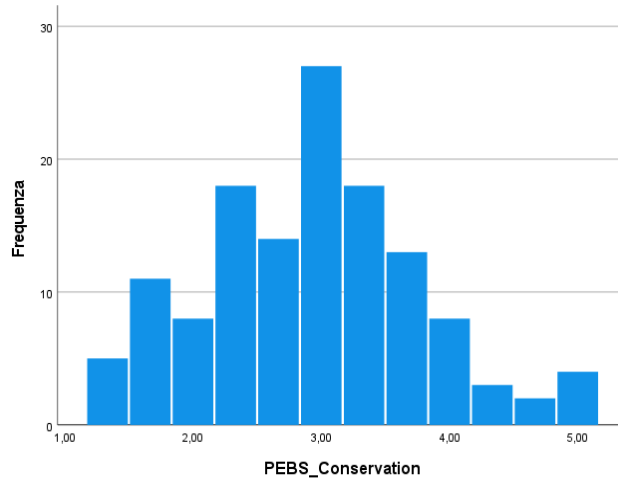
Histogram of the Pro-Environmental Behavior Scale – total score (PEBS_TOT) variable



Note. n = 131; M = 2.39, SD = .53, Mdn = 2.28

Figure 7

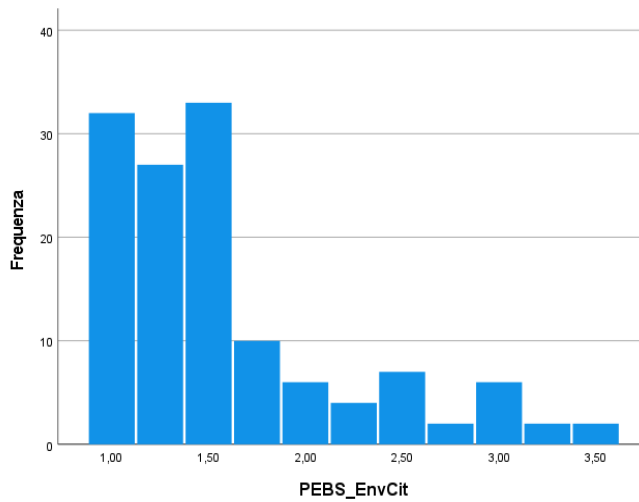
Histogram of the Pro-Environmental Behavior Scale –Conservation (PEBS_conservation) variable



Note. n = 131; M = 2.92; SD = 3; Mdn = .84

Figure 8

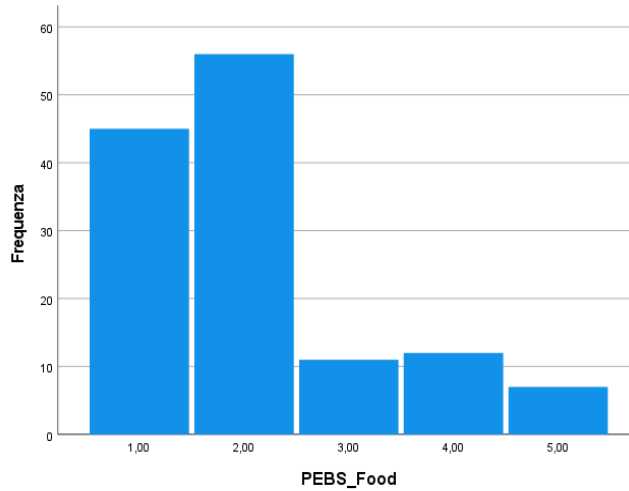
Histogram of the Pro-Environmental Behavior Scale – Environmental Citizenship (PEBS_EnvCit) variable



Note. n = 131; M = 1.58; SD = .62; Mdn = 1.5

Figure 9

Histogram of the Pro-Environmental Behavior Scale – Food (PEBS_Food) variable



Note. $n = 131$; $M = 2.08$, $SD = 1.13$; $Mdn = 2$

Adopting a similar procedure to that used for the interpretation of CCAS scores, the raw scores of the PEBS were divided into five theoretical categories, with lower scores indicating no or very infrequent engagement in Pro-Environmental Behaviors, and higher scores indicating frequent engagement in Pro-Environmental Behaviors. The majority of our sample ($n = 83$, 63.4%) reported engaging in PEBs with a medium-low frequency (see **Table 9** for full results). Only 5 people (3.8%) reported engaging with a medium-high frequency, while no one reported engaging with a high frequency.

Table 9

Absolute and percentage frequency of the theoretical levels of engagement in pro-environmental behaviors

	range	n	%
Low frequency	1 – 1.5	2	1.5
Medium-low frequency	1.51 – 2.5	83	63.4
Medium frequency	2.51 – 3.5	41	31.3
Medium-high frequency	3.51 – 4.5	5	3.8
High frequency	4.51 - 5	-	-

Note. $n = 131$

4.1.3 Depression, Anxiety, Stress, and General Distress

Descriptive statistics of the Depression, Anxiety, and Stress Scale (DASS-21) are reported in **Table 10**, while **Figure 10** illustrates the distribution of the DASS-21 total score in our sample.

Table 10

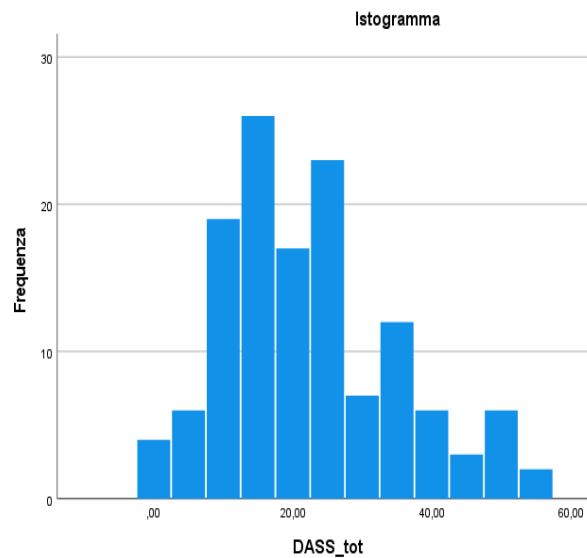
Descriptive statistics of the Depression, Anxiety, and Stress Scale (DASS21)

	Mean	SD	Mdn	Min	Max	Skewness	Kurtosis	95% CI	
								LL	UL
DASS21_TOT	22.4	12.7	21	0	56	.679	.009	20.1	24.6
Depression	6.92	5.34	6	0	21	.969	.33	6	7.84
Anxiety	5.86	4.03	4	0	16	.741	-.308	5.16	6.56
Stress	9.61	4.76	10	0	21	.214	-.33	8.79	10.4

Note. $n = 131$

Figure 10

Histogram of the DASS-21 – General Distress (DASS_tot) variable



Note. $n = 131$, $M = 22.4$, $SD = 12.7$, $Mdn = 21$

To interpret DASS-21 scores, we created a severity rank based on recommended cut-off ranges for the single scales (Lovibond & Lovibond, 1995) so that 0 – 15 = “normal”, 16 – 22 = “mild”,

23 – 31 = “moderate”, 32 – 40 = “severe”, and 41+ = “extremely severe”. A little over a third of the participants ($n = 47$, 35.9%) reported a normal level of distress, while 25 people (19.1%) reported mild levels and 29 (22.1%) moderate levels. 18 participants (13.7%) reported severe symptoms and 12 (9.2%) extremely severe symptoms.

We choose to focus on single labels conducting our analysis to evaluate if eco-anxiety is more similar to Anxiety, Depression, and Stress, or is more a measure of general distress since the relation between these variables is not clear. However, the objectives of our work were not clinical, and the administration of this instrument alone in a group setting might not be appropriate for a diagnosis.

4.1.4 Perceived Social Self-Efficacy

Descriptive statistics of the Perceived Social Self-Efficacy Scale (PSSE) are shown in **Table 11**. **Figure 11** illustrates the negative skew in the distribution of PSSE scores within our sample.

Table 11

Descriptive statistics for PSSE total score.

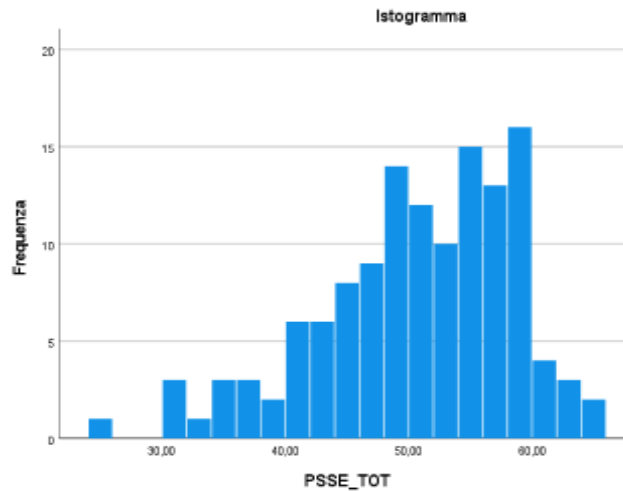
	Mean	SD	Mdn	Min	Max	Skewness	Kurtosis	95% CI	
								LL	UL
PSSE_TOT	50.07	7.98	51	25	64	-.714	.173	48.6	51.4

Note. $n = 131$

Once again, to facilitate interpretation, we divided PSSE raw scores into five theoretical categories, such that 13 = “low”, 14 – 26 = “medium-low”, 27 – 39 = “medium”, 40 – 52 = “medium-high”, and 53 – 65 = “high”), where higher scores indicate higher perceived social self-efficacy. Most of our sample reported high ($n = 59$, 45%) and medium-high levels of self-efficacy ($n = 59$, 45%), 12 people (9.2%) reported medium levels, and just 1 participant (0.8%) reported medium-low levels. No one reported experiencing low self-efficacy.

Figure 11

Histogram of perceived Social Self Efficacy Scale (PSSE) scores



Note. $n = 131$; $M = 50.07$, $SD = 7.98$, $Mdn = 51$

4.2 Hypothesis 1: Differences in Eco-Anxiety Levels Between Males and Females

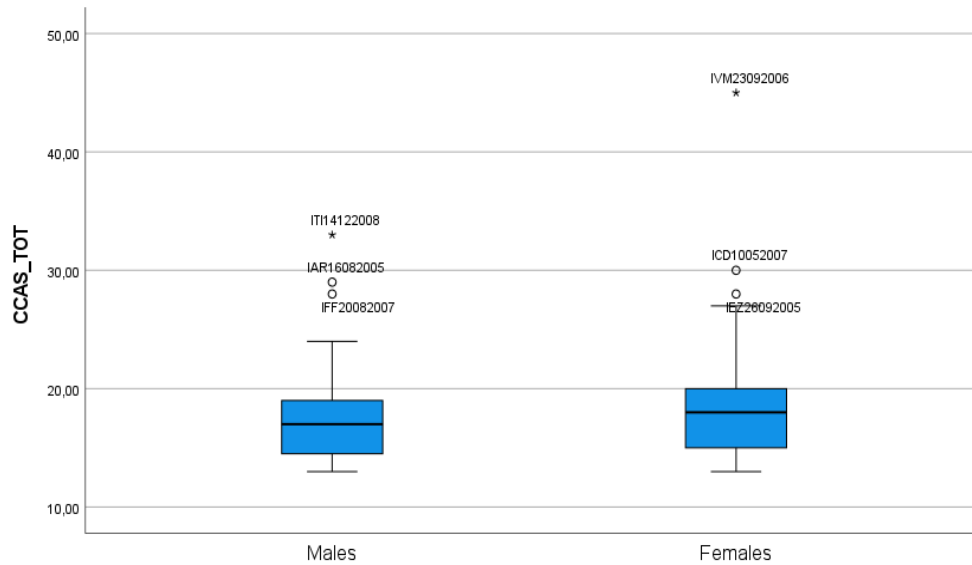
4.2 Hypothesis 1: Differences in Eco-anxiety Levels Between Males and Females

To test our first hypothesis we decided to compare the two groups by splitting the sample by biological sex. Since only a few people identified as non-binary and no one reported being transgender, gender identity-based grouping would have yielded highly unbalanced sample sizes. This choice was also dictated by the uncertainty surrounding gender self-identification in the scientific literature.

A Shapiro-Wilk test confirmed the non-normality of the distribution of the CCAS total scores for both male and female participants ($W_{CCAS-TOT M} = .823$, $p < 0.001$; $W_{CCAS-TOT F} = .819$, $p < 0.001$), as shown also by the boxplot (**Figure 12**), and by the skewness and kurtosis indexes (for males, skewness = 1.75, kurtosis = 3.6; for females, skewness = 2.35, kurtosis = 10.56), indicating a positive skew in the distribution of both variables.

Figure 12

Boxplot with frequencies in CCAS responses in males and females



Note. $n_{TOTAL} = 131$ ($n_{MALE} = 43$, $n_{FEMALE} = 88$)

Levene's test indicated equality of variances for all CCAS scales ($F_{CCAS-TOT}(1, 129) = .145$, $p = .704$; $F_{CI}(1, 129) = .055$, $p = .815$; $F_{FI}(1, 129) = .595$, $p = .422$). So, an independent t-test was conducted to compare the means of the two groups for all CCAS scales. The t-test revealed no statistically significant difference between the means of the groups. This result was further confirmed by a Mann-Whitney U test ($U_{CCAS-TOT} = 1554.5$, $p = .096$; $U_{CI} = 1619.5$, $p = .179$; $U_{FI} = 1656.5$, $p = .212$). Cohen's d indicated a small effect of biological sex on all CCAS scales. The results of the t-tests, Cohen's d , and descriptive statistics are reported in **Table 12**. Contrary to **H1**, we fail to reject the null hypothesis, and conclude that the two groups did not differ in a statistically significant way on any CCAS measure.

Table 12

Descriptive statistics and results of the group comparisons for males' and females' CCAS total scores and subscales Cognitive Impairment and Functional Impairment

		Mean	SD	t	df	p	Cohens'd
CCAS_TOT	Males	17.37	4.44	-1.175	129	.242	-.226
	Females	18.3	4.73				
CCAS_FI	Males	11.3	3	-1.215	129	.226	-.226
	Females	12.07	3.18				
CCAS_CI	Males	6	1.93	-.821	129	.413	-.153
	Females	6.30	2.04				

Note. $n_{TOTAL} = 131$ ($n_{MALE} = 43$, $n_{FEMALE} = 8$)

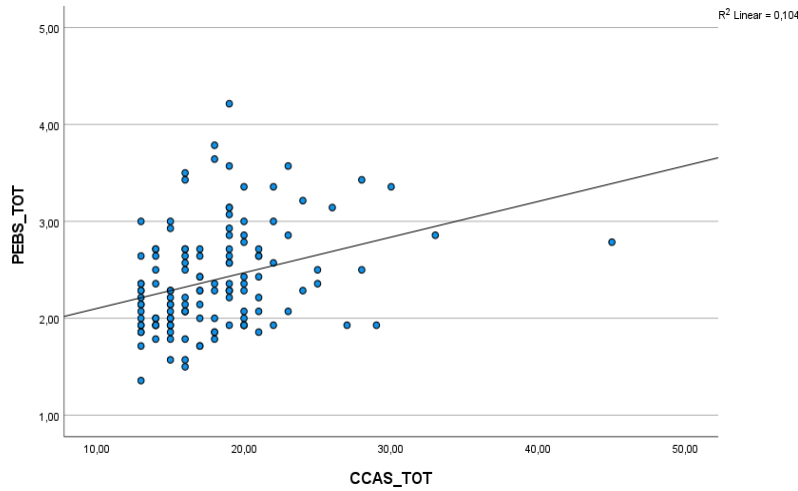
4.3 Hypothesis 2: Correlation Between Eco-anxiety and Pro-Environmental Behaviors

To test our second hypothesis, we computed three linear correlation analyses using Pearson's correlation coefficient between the PEBS total score and the three CCAS scores.

In line with **H2**, Pearson's correlation coefficient showed moderate positive linear correlations between the total score of the PEBS and the total score of the CCAS ($r = .322$, $p < 0.001$) and CI subscale ($r = .323$, $p = .006$), and a small positive correlation with the FI subscale ($r = .241$, $p < 0.001$). The correlation between the PEBS general score and the CCAS total score is illustrated in **Figure 13**. These results were also confirmed by Spearman's rho correlation between PEBS and CCAS total score ($r_s = .353$, $p < 0.001$), CI subscale ($r_s = .330$, $p < 0.001$), and FI subscale ($r_s = .252$, $p = .004$).

Figure 13

Scatterplot of the correlation between PEBS total score and CCAS total score



Note. n = 131

4.4. Hypothesis 3: Perceived Social Self-Efficacy as a Mediator Between Eco-anxiety and Pro-Environmental Behaviors

To test if self-efficacy can act as a mediator between symptoms of eco-anxiety and engagement in pro-environmental behaviors, we began by computing Pearson's and Spearman's correlation coefficients between PSSE and all three CCAS scales, and between the PEBS total score and PSSE.

Contrary to **H3**, we did not find statistically significant correlations between PSSE and any of the CCAS scores ($r_{CCAS-TOT} = .08, p = .367$; $r_{CI} = .084, p = .338$; $r_{FI} = .052, p = .367$, also confirmed by Spearman's rho correlation: $r_{SCCAS-TOT} = .048, p = .586$; $r_{SCI} = .064, p = .471$; $r_{SFI} = .04, p = .650$), nor between the PEBS total score and PSSE ($r = .036, p = .685$, again confirmed by Spearman's rho: $r_{SPEBS} = .026, p = .772$). These results may be due to low variability in PSSE scores since the vast majority of the sample reported medium-high to high levels of self-efficacy. Given these results, we decided to not carry out further moderation analyses.

4.5 Hypothesis 4: Correlation Between Eco-anxiety and Depression, Anxiety, Stress, and General Distress

To test our fourth hypothesis, we computed correlations between all CCAS scales and all DASS-21 scales (including General Distress) using both Pearson's and Spearman's correlation coefficients.

In line with **H4**, the correlations computed using Pearson's correlation coefficient highlighted moderate positive correlations between the total score of the CCAS and the total score of the DASS-21 ($r = .296, p = .001$; illustrated in **Figure 14**). The correlations between CCAS' subscales and DASS-21's subscales were also positive (see **Table 12** for full results), however, the strongest correlation was between the CCAS total score and the DASS-21's Depression subscale ($r = .319, p < 0.001$; illustrated in **Figure 15**). These results were also confirmed by Spearman's rho correlation coefficient (see **Table 14** for full results).

Table 12

Pearson's correlation for the CCAS general score, functional impairment subscale, cognitive impairment subscale, and DASS-21 total score and subscales Depression, Anxiety, and Stress

Variable	CCAS total score	Cognitive Impairment	Functional Impairment
DASS total score	.296 ($p = .001$)**	.253 ($p = .004$)**	.289 ($p = .001$)**
Depression	.319 ($p < .001$)***	.274 ($p = .002$)**	.310 ($p < .001$)***
Anxiety	.172 ($p = .05$)	.132 ($p = .133$)	.192 ($p = .02$)*
Stress	.288 ($p = .001$)**	.258 ($p = .003$)**	.264 ($p = .002$)**

Note. * Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed); *** Correlation is significant at the 0.01 level (2-tailed)

Table 13

Spearman's correlation for the CCAS general score, functional impairment subscale, cognitive impairment subscale, and DASS-21 total score and subscales Depression, Anxiety, and Stress

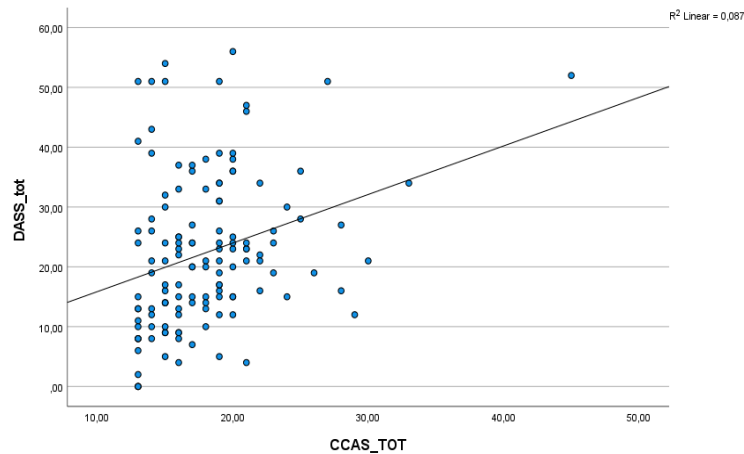
Variable	CCAS total score	Cognitive Impairment	Functional Impairment
DASS total score	.327 ($p < .001$)***	.280 ($p = .001$)**	.269 ($p = .002$)**
Depression	.363 ($p < .001$)***	.325 ($p < .001$)***	.295 ($p = .001$)**
Anxiety	.181 ($p = .03$)*	.143 ($p = .103$)	.165 ($p = .06$)

Stress .283 ($p = .001$)** .233 ($p = .007$)** .233 ($p = .007$)**

Note. * Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed); *** Correlation is significant at the 0.01 level (2-tailed)

Figure 14

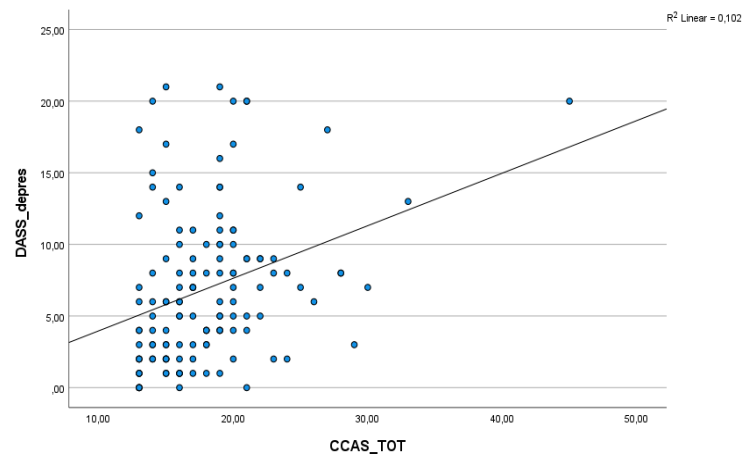
Scatter plot showing the linear correlation between the CCAS total score and DASS-21 “General Distress” score



Note. $n = 131$

Figure 15

Scatterplot showing the linear correlation between the CCAS total score and the DASS-21 “Depression” subscale



Note. $n = 131$

CHAPTER 5

DISCUSSION AND CONCLUSIONS

5.1 Discussion

Both national and international literature have consistently shown that young people express more significant concerns about climate change and its effects compared to adults (APA, 2017, Clayton 2020; Innocenti et al., 2021; Innocenti, 2022; Ojala, 2012a; 2012b; 2015). However, this is to best of our knowledge the first study in the Italian context to explore eco-anxiety in adolescents.

We will proceed step by step, discussing our results by researching Hypotheses, analyzing them in light of the most recent findings, and giving some personal consideration taking into account our experience of administering these questionnaires in schools. The limits of this study and prospects for future research are also presented.

Regarding the psychometric properties of the CCAS, internal consistency proved to be good in our sample for the original total score of CCAS and its two subscales. However, the single-factor model and the two-factor model of the previous validations (Clayton & Karazsia, 2020, Innocenti et al., 2021; Wullenkord et al., 2021) didn't fit our sample. We enforced both a single-factor and two-factor model. In the single-factor model, we excluded two items (3 and 7) that had low loadings, resulting in an 11-item scale. In the two-factor model, items 4, 7, and 8 showed higher factor loadings with the first factor, and items 9 and 11 had higher loadings on both factors. The result was a two-factor scale with 13 items: items 5-7-8-9-10-11-12-12 constitute the first factor, while items 1-2-3-4-6 constitute the second factor. Both models showed good internal consistency. Given the small size and the characteristics of our sample, we were cautious in interpreting these results, and further analyses were computed using the original single-factor model and two-factor model of Clayton and Karazsia (2020) validation. More research is needed to test whether the original CCAS structure can be applied to adolescents, given that a different factor structure could provide a better fit for this population who might have a different emotional response to climate change than adults.

Children and adolescents are a particularly important group to assess (Clayton, 2020), given the importance of eco-anxiety in social media, and given that this is a crucial period to build personality, aspirations, and plans for the future. Climate change can be a big threat that has the

potential to affect their lives and their ability to see the future as something to look forward to. Attempts at quantifying climate change anxiety are therefore necessary to further our understanding of how young people are being affected by this uncertainty and unpredictability. To this end, we might clarify that eco-anxiety is not a clinical diagnosis, and the CCAS is not designed to be a clinical assessment tool (Clayton, 2020). Nevertheless, it may be useful in research settings in assessing the prevalence of climate-related distress among some vulnerable populations such as young people, climate scientists, activists, people connected to nature, indigenous populations or people who recently experienced an EWE.

Our first hypothesis, namely that females would report higher eco-anxiety than males, as different studies suggest (Clayton & Karazsia, 2020; Innocenti et al., 2021; Wullenkord et al., 2021), was not confirmed: the birth-assigned “male” and “female” did not differ in a statically significant way on any CCAS measure. Moreover, eco-anxiety was not correlated to socioeconomic status or to parent’s education level. As for nationality, the potential association and impact of this variable on eco-anxiety were not tested due high sample size imbalance. Future studies should focus on assessing climate-related emotion amongst different populations, to better understand how it can be displayed in different nationalities.

As our second hypothesis, we were expecting to observe a positive correlation between eco-anxiety and Pro-environmental behaviors (Clayton & Karazsia, 2020; Innocenti et al., 2021). The results indeed showed that the CCAS total score and both its subscales were positively linearly correlated with pro-environmental behaviors, even though our sample showed low levels of engagement in PEBs. Innocenti et al. (2023) suggest that such relationship may be mediated by global self-efficacy. The belief in one’s own ability to make a positive difference for the planet may help lessen feelings of worry about the environment. The authors also suggest, however, that eco-anxiety may have a negative impact on self-efficacy, leading to negative thoughts, feelings of helplessness and hopelessness, and, ultimately, eco-paralysis. Following their approach, we decided to test the mediating role of self-efficacy.

In contrast with Innocenti et al.’s (2023) results, our third hypothesis was not confirmed: perceived self-efficacy was not correlated with eco-anxiety, nor with PEBs frequency. Self-efficacy did not therefore act as a mediator between eco-anxiety and PEBs in our sample. These results may in part

be due to the low variability in self-efficacy scores, as most of our sample reported medium-high to high levels of perceived social self-efficacy.

To summarize, in our study participants who reported more eco-anxiety also engaged more frequently in sustainable behaviors, but their engagement was still low, even the ones who had severe symptoms. Moreover, self-efficacy did not mediate behavioral engagement.

Ojala (2018) reports young people's lifestyle choices as not being more sustainable than those of adults. More recent studies however note (Clayton & Karazsia 2020; Innocenti et al., 2021) that young adults seem to engage in PEBs more frequently than adults. Balunde et al., (2020) found PEBs to decrease from childhood to adolescence and to increase during adulthood, probably because personal norms to act sustainably are not stable in this period, and so they might feel less obligation than younger to act pro-environmentally. So, we can hypothesize that PEBs decrease during childhood and adolescence but then increase during young adulthood.

Another hypothesis for the low frequency of PEBs in adolescence is that teenagers might not have control over some sustainable behaviors simply because of their monetary cost (e.g., buying organic fruit/vegetables), or because they are usually decided by their parents (e.g., what type of car to drive, what food to buy, or how to power their house). Indeed, most of the questions in the "Pro-Environmental Behaviors Scale" (Marks, 2013; Italian version by Menardo et al., 2019) that we used in our research ask about food consumption (organic fruit/vegetables and meat), means of transportation, and conservation (water consumed during a shower; the use of stand-by mode for electronic devices). However, adolescents might not have control over their means of transportation since some people can go to school by bike or foot because they live nearby and the routes are bike-friendly, while others need to take the bus or go by car because there is no bus that goes from their home to the school. The same can be applied to the consumption of meat, since most of the time is the parents who cook the meals and so, a change in the diet (such as vegetarianism or veganism) sometimes must pass through the parent's approval. Consequently, perceived behavioral control (thinking that I have the means and resources to execute a certain behavior) can be one of the most important factors in explaining the low levels of engagement in PEBs (Balunde et al., 2020). Consequently, perceived behavioral control (thinking that one has the means and resources to execute a certain behavior) can be one of the most important factors in explaining why adolescents do not engage in PEBs so much (Balunde et al., 2020).

Social norms can also play a crucial role, especially among peers. They might not drink tap water and refill their reusable bottle if drinking bottled water is the norm among their group (Balunde et al., 2020). Indeed, around 14 years of age, adolescents have a peak of sensibility towards the quintessential social stimulus, their peers, and this sensibility gradually decreases in young adulthood (Gardner & Stemberg, 2005, as cited in Albiero, 2011).

Moreover, adolescents appear to have an increased propensity for risk-taking as a result of the immature judgment of possible consequences, which is itself a behavioral response of the high excitability of the affective node and the poor self-control of the cognitive-regulator node (Poletti, 2011). Adolescents also are more sensible to rewards (*reward salience*), and external reinforcements gain particular motivational strength over internal ones. This means that they are more motivated to behave in a certain way if there is an external reward, especially among peers (Montagnana, Matricardi & Albiero, 2011). We must therefore consider behaviors that are less influenced by behavioral control and social norms if we truly want to understand how adolescents engage in PEBs, and a measure of engagement in pro-environmental action for adolescents should consider all these elements. For example, in evaluating PEBs frequency in children and adolescents, it might be better to assess the family's or the school's sustainable engagement in addition to the individual's actions, given the lack of control they have over some aspects of their lives.

On this topic, Balunde et al. (2020) report that Biospheric values, environmental self-identity, and individual factors (such as personal norms) are predictors of PEBs, and biospheric values and environmental self-identity can be influenced by environmental education (Balunde et al., 2020) that is usually given by the parents or the social environment (in this case school and peers). Therefore, we can hypothesize that if the family or the school does not give an education about sustainability, the youth will be less motivated to act sustainably. However, there is no evidence of the influence of this factor on PEBs in adolescents, because this topic has been studied just in adults, and since in adolescence there is a development of identity and values, we need to question if these values can influence their environmental behaviors (Balunde et al., 2020). An additional reason for exploring these elements further is early intervention: if environmental education can promote PEBs in adolescence when complex environmental considerations start to emerge, programs aimed at strengthening biospheric values have the potential to be maximally effective during this period. With such interventions, adolescents could develop a stronger instinct to act

sustainably, decreasing the need for interventions based on disincentives (such as laws and regulations; Balunde et al., 2020). Furthermore, adolescents' environmental considerations can work as a gateway to a more sustainable way of living, helping to change people's eating, traveling, and consuming habits (IPCC, 2018; Balunde et al., 2020).

Regarding self-efficacy, Innocenti et al., (2023) showed that it is a mediator between pro-environmental behaviors and eco-anxiety because it can help people reduce their worry and stimulate PEBs, but since climate change impacts people's self-efficacy it can trigger negative feelings, hopelessness, and helplessness, and reduce PEBs. However, the factors that influence self-efficacy in adolescence are different than those that contribute to it in adulthood. Teens' self-efficacy is highly correlated to their perception of the attention of significant others (family and peers) toward them (Palmonari & Crocetti, 1993). Combining this information with data indicating an increased sensibility to external rewards rather than internal ones, especially amongst peers, during adolescence (Montagnana, Matricardi & Albiero, 2011), we could hypothesize that self-efficacy might not be the mediator that stimulates adolescents to act pro-environmentally. Future research should focus on assessing if self-efficacy could be a mediator between eco-anxiety and pro-environmental behaviors in adolescents, or if another construct, such as peer reward, could play this role in youths.

Finally, just one person reported medium-high levels of eco-anxiety while the rest of the sample scored low. This result is in line with previous studies on adults showing generally low scores of eco-anxiety with just a few people having strong symptoms (Clayton & Karazsia, 2020; Wullenkord 2021). In line with our fourth hypothesis, our results indicated that the participants who reported higher eco-anxiety also reported more clinical symptoms of anxiety, depression, stress, and general distress, showing a linear correlation between the two CCAS scales and the three DASS-21 scales. In particular, the strongest correlation was found between the CCAS total score and the subscale "Depression". This correlation may be explained by the fact that many CCAS items are based on a measure of rumination, which is typical of depression (Clayton & Karazsia, 2020). Regarding the CCAS's discriminant validity, the authors of the German validation voiced their skepticism about the CCAS really being able to capture the emotional core of eco-anxiety, that differentiates it from other emotions. As I argue in **Chapter 1**, this may be because

eco-anxiety has not yet been extensively defined: several authors gave different definitions of this construct, furthermore, its relationship with general anxiety, depression, and stress is not clear. For instance, Clayton pointed out that eco-anxiety appears more similar to a measure of anxiety and stress as an effective response to environmental circumstances, but in some ways is also similar to depression (even though depression is not clearly associated with a specific cause as in anxiety). As with other forms of anxiety, the relationship between eco-anxiety and other outcomes might not be linear (Wullenkord et al., 2021), especially in different groups. Future research should focus more on Depression and stress since stress is linked to psychological and physical wellbeing, and so is an important measure to assess, since it could be involved in eco-anxiety (Clayton, 2020).

In addition, since the CCAS focuses a lot on “rumination”, it might not be able to capture one of the central elements of eco-anxiety: existential anxiety (Pikhala, 2023). Eco-anxiety as an existential anxiety is getting more attention in climate-related distress research. A lot of authors see climate change as an existential threat because it changes the perception of the world we always had, leading to a loss of our ontological security and to feelings of uncertainty, guilt, and grief (Norgaard, 2006; Pikhala, 2023). Eco-anxiety can stimulate existential questions about human beings, mortality, and meaninglessness, which often are reported in qualitative studies about climate distress in youths (as in Caroline Hickmore's work, 2020).

Seeing eco-anxiety as an existential anxiety can be very useful to better understand children and adolescents. They are, more than adults, experiencing changes at a great speed, seeing the world shift in front of them without having the political power to make some changes. What we need to imagine is what it feels like for them to bystander the destruction of the planet before having the possibility to find their place on the earth, and so struggling to see a future for themselves and new generations (Hickman, 2020). We argue that a measure of climate anxiety or eco-anxiety for children and adolescents needs to include existential questions in order to capture better their experiences.

Some final qualitative considerations on our experience are in order.

During our research, we found out that a lot of participants didn't have any basic knowledge about climate change, environment, or sustainability. During the administration of the questionnaire, some students asked us questions such as “What does biological food mean?”, “What are extreme

weather events?” or “What is involved in climate change?”. These questions were surprising first because scholars pointed out that adolescents seem to have a better knowledge about climate change than adults, and second because we were aware that Italy recently implemented mandatory environmental education in schools. In fact, in 2019, education Minister Lorenzo Fioramonti announced that starting from the academic year 2020/21, climate change and global warming would be taught in school. The news immediately spread around the world and even the front page of newspapers such as “The New York Times” and “The Guardian” reported that Italy had become the first country to make environmental education mandatory from primary school to high school, making Italy the “good example” to follow. The law 92/2019 that reformed civic education required 33 hours per year (1 hour a week) of climate change education, stating that “a share of 4 million euros per year starting from the year 2020 is intended for training of teachers on issues relating to transversal teaching civic education” (law 92/2019, article 6.1; UNESCO, n.d). All Italian students aged 6 to 19 needed, as a part of their curriculum, to actively participate in school projects that promote “knowledge, skills, understanding, and values for protecting the environment and the planet”. Given the lack of basic knowledge about environmental issues we have seen, what we as a research group asked ourselves was whether these programs were carried out in schools and whether our students received the education that the decree talks about. Actually, no research has been done on the current state of environmental education in schools, or the implementation at the practical level of these programs that have made us famous all over the world. To this end, I want to stress the importance of consciousness and knowledge about climate change in young people. The culture in which the person is embedded has a great influence on beliefs and behaviors, and for children and adolescents, schools, family and peers play a key role in environmental education. Schools must play a crucial role in teaching about climate change if we want young people to be more conscious about the world. We think that future research must focus on the current state of environmental education in Italy, and before assessing questionnaires about eco-anxiety, the level of consciousness and knowledge about climate change needs to be tested. We can speculate that the low levels of eco-anxiety in our sample could also be attributed to the low level of consciousness about climate change. Clayton and Karazsia (2020) pointed out that people who are more aware of climate change (such as climate scientists) also have higher levels of climate change distress. It is plausible that if people do not have enough information about climate

change, it will affect them less. However, this consideration remains just speculation since we didn't assess this aspect in our study.

5.2 Strengths and Limitations

While this exploratory study provides valuable insights into eco-anxiety in Italian adolescents and its potential connections with mental health, pro-environmental behaviors, and self-efficacy, it is essential to acknowledge several limitations that should be considered when interpreting the results.

The most apparent strength of this study may be that it is the first study about eco-anxiety in youth in Italy and the first study to administer the Climate Change Anxiety Scale to adolescents. Our research confirmed the results in the literature showing that eco-anxiety can be experienced in a severe way, and that eco-anxiety is related to pro-environmental behaviors and to anxiety, depression, stress, and distress. We investigated the same elements (anxiety and depression, pro-environmental behaviors, and self-efficacy) that in the literature had a connection with eco-anxiety in adults, however, we concluded that some of the questionnaires used might not be suitable for adolescents, that might differ from adults in the emotional response to climate change and how this guides sustainable actions.

As a matter of fact, one of the most significant limitations of this research is related to the questionnaire utilized in data collection. The questionnaire used to assess eco-anxiety and pro-environmental behaviors was not specifically validated for use with adolescents.

Regarding eco-anxiety, Susan Clayton and Karazsia (2020) validated the Climate Change Anxiety Scale, while Innocenti et al. (2021) translated and validated the CCAS in Italian. The authors of the scale (Clayton & Karazsia, 2020) stated that it was comprehensible to children from age 12. However, no research has been done to validate it for children and/or teens. Given the lack of validation of the CCAS for young people, our study originally aimed to verify the psychometric proprieties of the Italian version of the CCAS in a healthy sample of adolescents. Our a priori targeted sample size was at least 300 participants, but it was not met due to recruitment difficulties. Since we did not meet our intended sample size, the validation for this population was not possible, so we decided to use an explorative approach to analyze eco-anxiety and its correlates.

In fact, another important limitation regards the challenges encountered during the recruitment of schools. Despite our efforts to involve a diverse range of educational institutions all over Italy (we

contacted a total of 8 schools), we faced difficulties in securing their participation, even after some professors expressed their interest in the topic and the research. Several schools did either not respond to our outreach efforts or provided negative responses, resulting in a limited sample size.

Furthermore, regarding pro-environmental behavior engagements, we also used a questionnaire that was not validated for an adolescent population. This choice was made because this is the only scale that is based on empirical evidence and an impact-oriented approach that covers the three categories of Environmental behaviors (EBs) originally proposed by Stern (2000, as cited in Menardo et al., 2019). We decided together with the authors of the version (Menardo et al.) to modify some items to make them fit for an adolescent population. However, as we already argued previously, we believe that a measure of pro-environmental behaviors for adolescents should also assess the family's or the school's sustainable engagement in addition to the individual's actions, given the lack of control adolescents have over some aspects of their lives.

Moreover, the standardization of the instrument we used to measure adolescents' self-efficacy (Perceived Social Self-efficacy Scale, Italian edition by Caprara et al., 2001) is over 20 years old, so it may no longer possess the psychometric properties to detect the construct of interest: over the course of more than two decades, the definition of self-efficacy experienced by adolescents may have changed. The low variability in self-efficacy in our sample (most of the participant showed high perceived self-efficacy) could also be due to this aspect.

It is important to note that the sample used in this research may not be fully representative of the entire adolescent population in Italy, since all the data were collected only in one school located in Ferrara (north Italy). Furthermore, the majority part of the sample consisted of females (which could introduce gender-related biases in the results) and just a few people reported a non-Italian nationality. In this case, the findings should be cautiously applied to the broader population of Italian adolescents due to potential sample bias.

Finally, the entire questionnaire was a self-report measure, so students may not have provided answers that were completely truthful or reflective of reality. In fact, taking into consideration the developmental age within which the sample under consideration is located, teens may have been strongly influenced in their responses by social desirability and peer pressure. These aspects may

also have been further reinforced by the type of administration. Because it was done collectively, it may have generated explicit comparisons among peers and thus emphasized the processes described above.

5.3 Future recommendations

One important aspect to consider for future studies is the experience of Extreme weather events (EWEs). In our research, the data were collected in March and May 2023, right before we reached the hottest temperature ever registered in Italy. During the Summer of 2023, Italy has also seen a succession of devastating EWEs such as the cloudbursts in the region Lombardia, the floods in Emilia Romagna, and the heat waves in central and southern areas. It would have been interesting to assess eco-anxiety before and after the experience (direct or indirect for example through social media) of these events in Italy and see if eco-anxiety symptoms can become stronger after an EWE, and/or if this experience can change the perception of climate change as a threat. As reported in the last IPCC report (IPCC, 2023), these events are rapidly becoming normal to experience. IPCC predicts that a person born in 2020 (that will be 70 years old in 2090) will have more probability of experiencing this kind of climate event compared to their grandparents, born in the '50 and '60. So, it is important to assess how mental health will be threatened by EWEs to develop effective strategies.

Furthermore, what we suggest is that collective qualitative data could be more useful than quantitative data to capture the complexity of eco-anxiety symptoms. One of the approaches could be to create protected spaces in which people can fully express their climate-related emotions in some kind of support group, or combine interviews with self-report measures, especially for the ones who scored higher on the Climate Change Anxiety Scale.

5.4 Conclusions

In summary, this thesis represents a novel study about eco-anxiety within the context of Italian adolescents, trying to unravel the intricate relationship between eco-anxiety, self-efficacy, and pro-environmental behaviors. It is noteworthy that in this study, only a single participant reported medium-high levels of eco-anxiety, while most of the sample scored low, in line with findings from previous research on adults. Our results also confirmed the relationship between eco-anxiety

and clinical measures of distress, indicating that people who have strong symptoms of eco-anxiety might need clinical attention. Moreover, even though eco-anxiety was related to engagement in pro-environmental behaviors, participants in our sample didn't engage enough, and self-efficacy did not mediate in this relationship as it was observed in adults. We speculated that peer and family influence might be more relevant than self-efficacy during this period, underscoring the importance of age-specific evaluation tools to assess sustainable behaviors in adolescence.

The research also brings to light the critical role of climate knowledge among the youth and hints at a possible connection between extreme weather events and eco-anxiety. It introduces the novel perspective of eco-anxiety as a form of existential anxiety, thereby advocating for a new assessment approach. Despite this research strength, the main limitations are linked to the instrument used and the reliance on self-reported data. Future studies should investigate the impact of extreme weather events, understand the role of self-efficacy as a mediating factor, and incorporate qualitative and quantitative data sources. Furthermore, evaluating the current state of environmental education in Italy is essential to place climate awareness into an appropriate context.

In history, we don't have any stories of people surviving a climate catastrophe as the one we are facing now, so it is difficult not to be terrified or on the contrary deniers. Sometimes it feels like there is repeating traumatic news that follows day after day, at such a speed that we don't have time to recover from the news we heard yesterday, that a new story appears. This posits new challenges for mental health and for mental health professionals.

We need to create more spaces where together with youths we can discuss in an empathetic, creative but also critical way about which world we want to live in, and which kind of lives we want to create. We need to give the children the chance to be active citizens to help them feel more hopeful, in control, and resilient. As the Convention on the Rights of the Child (United Nations General Assembly, 1989) stated: children have the right to participate in and influence decision-making processes that are relevant to their lives. So, it is our right to treat them as protagonists of change, rather than just victims.

What mental health professionals need to do is stimulate clients who experience environmental distress to "think about" eco-anxiety. Frame something as rational can help to avoid feeling overwhelmed or deniers, entering into a relationship with them, and tolerating the existential terror

that seems to characterize this emotion (Hickman, 2020). We discuss through this work how eco-anxiety could be perceived as a dis-regulated form of eco-empathy, stating that if people didn't care about the world, human and animal species, they would not feel that way (Hickman, 2020). Emotions usually tell us when something needs our attention, and eco-anxiety might say that we need to fix our relationship with nature (Passmore et al., 2023). We can then find intergenerational healing transforming eco-anxiety into eco-awareness, eco-community, eco-agency, eco-aliveness, eco-empathy, eco-compassion, eco-care, and eco-awakening while the world learns how to live on and together with a suffering planet (Hickman, 2020). I invite everyone who's reading this work who is worried for the future, to think about eco-anxiety and to embrace their fear because they are normal. I invite everyone to stop blaming someone and to start loving because we cannot change what has been done, but we have the right and the duty to change the future. Because there are people who care and are doing their best to give back to new generations a better world than the one they were left with.

REFERENCES

- American Psychological Association & EcoAmerica (2017). Mental health and our changing climate: impacts, implications, and guidance.
- Ballman, C. J. (2020). *Emotions and actions: eco-anxiety and pro-environmental behaviours*. Ourspace.uregina.ca. <https://ourspace.uregina.ca/items/54fce414-33df-4fa3-b0b4-1a2f8389a9b8>
- Balundė, A., Perlaviciute, G., & Truskauskaitė-Kunevičienė, I. (2020). Sustainability in Youth: Environmental Considerations in Adolescence and Their Relationship to Pro-environmental Behavior. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.582920>
- Bandura, A. Self-efficacy conception of anxiety. *Anxiety Res.* 1988, 1, 77–98.
- Barbiero, G. (2011). *Biophilia and Gaia: Two Hypotheses for an Affective Ecology*.
- Barlow, D.H. *Anxiety and Its Disorders: The nature and Treatment of Anxiety and Panic*, 2nd ed.; Guilford Press: New York, NY, USA, 2004.
- Baudon, P., & Jachens, L. (2021). A scoping review of interventions for the treatment of eco-anxiety. In *International Journal of Environmental Research and Public Health*. 18 (9636). <https://doi.org/10.3390/ijerph18189636>
- Bottesi, G., Ghisi, M., Altoè, G., Conforti, E., Melli, G. & Sica, C. The Italian version of the Depression Anxiety Stress Scales-21: Factor structure and psychometric properties on community and clinical samples. *Comprehensive Psychiatry*. 2015; 60:170-181. <https://doi.org/10.1016/j.comppsy.2015.04.005>.
- Budziszewska, M., & Jonsson, S. E. (2021). From climate anxiety to climate action: An existential perspective on climate change concerns within psychotherapy. *Journal of Humanistic Psychology*, 0022167821993243.

- Clayton, S. (2020). Climate anxiety: Psychological responses to climate change. *Journal of Anxiety Disorders*, 74. <https://doi.org/10.1016/j.janxdis.2020.102263>
- Clayton, S. (2022). Prefazione. In Innocenti, M., *Ecoansia* (pp. 9-11). Edizioni Centro Studio Erikson.
- Coffey, Y., Bhullar, N., Durkin, J., Islam, M. S., & Usher, K. (2021). Understanding Eco-anxiety: A Systematic Scoping Review of Current Literature and Identified Knowledge Gaps. In *Journal of Climate Change and Health* (Vol. 3). Elsevier Masson s.r.l. <https://doi.org/10.1016/j.joclim.2021.100047>
- Dockett, L. The rise of eco-anxiety. *Psychother. Netw. Mag.* 2019, 43, 11–14.
- Doherty, T., & Clayton, S. (2011). The psychological impacts of global climate change. *American Psychologist*, 66, 265–276.
- Engel, G.L. (1977) The need for a new medical model: A challenge for biomedicine. *Science*, 196(4286), 129-136.
- Grose, A. (2020). A guide to Eco-anxiety: *How to Protect the Planet and Your Mental Health*. Watkins Media Limited.
- Hickman, C. (2020). We need to (find a way to) talk about ... Eco-anxiety. *Journal of Social Work Practice*, 34(4), 411–424. <https://doi.org/10.1080/02650533.2020.1844166>
- Higginbotham, N., Connor, L., Albrecht, G., Freeman, S., & Agho, K. (2006). Validation of an environmental distress scale. *EcoHealth*, 3, 245-254.
- Higginbotham N, Connor LH, Baker F. (2014). Subregional differences in Australian climate risk perceptions: coastal versus agricultural areas of the Hunter Valley, NSW. *Reg Environ Chang*;14(2):699–712.
- Homburg, A. & Stolberg, A. (2006). Explaining pro-environmental behavior with a cognitive theory of stress. *J Environ Psychol.* 26(1). 1–14.

- Hyry, J. (2019) Kansalaiskysely Ilmastomuutoksesta ja Tunteista [National Survey on Climate Change and Emotions]. Sitra The Finnish Innovation Fund Website. Available online: <https://media.sitra.fi/2019/08/21153439/ilmastotunteet-2019-kyselytutkimuksen-tulokset.pdf>
- Iannattone, S., Mignemi, G., Pivetta, E., Gatta, M., Sica, C., Cardi, V., Canale, N., Spoto, A., & Bottesi, G. (submitted). Are anxiety, depression, and stress distinguishable in Italian adolescents? An examination through the Depression Anxiety Stress Scales-21. *Current Psychology*.
- Innocenti, M. (2022). *Ecoansia*. Edizioni Centro Studio Erikson.
- Innocenti, M., Santarelli, G., Lombardi, G. S., Ciabini, L., Zjalic, D., Di Russo, M., & Cadeddu, C. (2023). How Can Climate Change Anxiety Induce Both Pro-Environmental Behaviours and Eco-Paralysis? The Mediating Role of General Self-Efficacy. *International Journal of Environmental Research and Public Health*, 20(4). <https://doi.org/10.3390/ijerph20043085>
- IPCC, 2017: *Meeting Report of the Intergovernmental Panel on Climate Change Expert Meeting on Mitigation, Sustainability and Climate Stabilization Scenarios* [Shukla, P.R. J. Skea, R. van Diemen, K. Calvin, Ø. Christophersen, F. Creutzig, J. Fuglestvedt, E. Huntley, F. Lecocq, M. Pathak, J. Portugal-Pereira, J. Rogelj, J. Roy, J. Scull, R. Schaeffer, R. Slade, D. Ürge-Vorsatz, D. van Vuuren.]. IPCC Working Group III Technical Support Unit, Imperial College London, London, the United Kingdom.
- IPCC, 2023: *Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, 1-34, <https://doi.org/10.59327/IPCC/AR6-9789291691647>
- Louv, R. (2005). Nature deficit. *Orion*, 70, 71.
- Lovibond, P.F., Lovibond, S.H. The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety

- Inventories, *Behaviour Research and Therapy*. 1995; 33(3): 335-343.
[https://doi.org/10.1016/0005-7967\(94\)00075-U](https://doi.org/10.1016/0005-7967(94)00075-U).
- Marks, E., Hickman, C., Pihkala, P., Clayton, S., Lewandowski, E. R., Mayall, E. E., ... & van Susteren, L. (2021). Young people's voices on climate anxiety, government betrayal and moral injury: A global phenomenon. *Government betrayal and moral injury: A global phenomenon*.
- Menardo, E., Brondino, M. & Pasini, M. Adaptation and psychometric properties of the Italian version of the Pro-Environmental Behaviours Scale (PEBS). *Environ Dev Sustain* 22, 6907–6930 (2020). <https://doi.org/10.1007/s10668-019-00520-3>
- Montagnana, A., Matricardi G., & Albiero, P. (2011). In Risk taking e adolescenza: la prospettiva delle neuroscienze sociali. In Albiero, P., *Il benessere psicosociale in adolescenza: prospettive multidisciplinari* (pp. 281-300). Carocci.
- Norgaard, K. M. (2006). “People want to protect themselves a little bit”: Emotions, denial, and social movement nonparticipation. *Sociological Inquiry*, 76(3), 372–396
- Norgaard, K. M. (2011). *Living in denial: Climate change, emotions, and everyday life*. mit Press.
- Ojala, M. (2012a). Regulating worry, promoting hope: How do children, adolescents, and young adults cope with climate change? *International Journal of Environmental & Science Education*, 7(4), 537–561. <https://doi.org.ezproxy1.bath.ac.uk/10.1080/13504622.2011.637157>
- Ojala, M. (2012b). Hope and climate change: The importance of hope for environmental engagement among young people. *Environmental Education Research*, 18(5), 625–642. <https://doi.org/10.1080/13504622.2011.637157>
- Ojala M. (2013) Coping with climate change among adolescents: implications for subjective well-being and environmental engagement. *Sustainability*;5(5):2191–209.
- Ojala, M. (2015). Young people and global climate change: Emotions, coping, and engagement in everyday life. In N. Ansell et al. (Eds.), *Geographies of global issues: Change and threat*. Singapore: Springer. doi:10.1007/978-981-4585-54-5_35

- Ojala, M. *ECO-ANXIETY*. (2018-19). *RSA Journal*, 164, 4 (5576), 10-15.
<https://doi.org/10.2307/26798430>
- Palmonari, A. & Crocetti, E. (1993). Identità a concetto di sé. In Palmonari, A., *Psicologia dell'adolescenza* (3rd ed., pp. 67-90). Il mulino
- Passmore, H. A., Lutz, P. K., & Howell, A. J. (2023). Eco-Anxiety: A Cascade of Fundamental Existential Anxieties. *Journal of Constructivist Psychology*, 36(2), 138–153.
<https://doi.org/10.1080/10720537.2022.2068706>
- Pihkala, P. (2020). Anxiety and the ecological crisis: An analysis of eco-anxiety and climate anxiety. *Sustainability (Switzerland)*, 12(19). <https://doi.org/10.3390/SU12197836>
- Poletti, M. (2011). Sviluppo cerebrale e funzioni esecutive in adolescenza. In Albiero, P., *Il benessere psicosociale in adolescenza: prospettive multidisciplinari* (pp. 35-60). Carocci.
- Sanson, A. V, Wachs, T. D., Koller, S. H., Salmela-Aro, K., Sanson, A. V, Theodore Wachs, E. D., Koller, S., & Salmela-Aro, K. (2018). Developmental Science and Sustainable Development Goals for Children and Youth. In *Social Indicators Research Series* (Vol. 74). Springer.
- Sanson, A. V., & Burke S. E. L. (2020). Climate Change and Children: An Issue of Intergenerational Justice. In Balvin, N. & Christie, D. J. (Ed.). *Children and Peace, Peace Psychology Book Series* (pp. 343-362). doi:10.1007/978-3-030-22176-8_21
- Sanson, A. V., Van Hoorn, J., & Burke, S. E. L. (2019). Responding to the Impacts of the Climate Crisis on Children and Youth. *Child Development Perspectives*, 13(4), 201–207.
<https://doi.org/10.1111/cdep.12342>
- Skovdal M, Benwell MC. (2021) Young people’s everyday climate crisis activism: new terrains for research, analysis and action. *Child Geogr.* 2021;19(3):259–66.

Torsheim, T., Cavallo, F., Levin, K. A., Schnohr, C., Mazur, J., Niclasen, B., ... & FAS Development Study Group. (2016). Psychometric validation of the revised family affluence scale: a latent variable approach. *Child indicators research*, 9, 771-784.

UNICEF Office of Research (2014). *The Challenges of Climate Change: Children on the Front Line*. Innocenti Insight, Florence: UNICEF Office of Research.

UNICEF UK (2013). Climate change: Children's challenge. <https://downloads.unicef.org.uk/wp-content/uploads/2013/09/unicef-climatechange-report-2013.pdf>

Xie, B., Brewer, M. B., Hayes, B. K., McDonald, R. I., & Newell, B. R. (2019). Predicting climate change risk perception and willingness to act. *Journal of Environmental Psychology*, 65, 101331. <https://doi.org/10.1016/j.jenvp.2019.101331>

WEBSITE REFERENCES

- Australian Psychological Society (n.d.). Coping with climate change distress. https://psychology.org.au/getmedia/cf076d33-4470-415d-8acc-75f375adf2f3/coping_with_climate_change.pdf.pdf
- Flanders, T. (2007). Pollution and stargazing. Sky & Telescope: The essential guide to astronomy. <https://skyandtelescope.org/astronomy-blogs/pollution-and-stargazing/>
- McGinn, M. (2019). 2019's biggest pop-culture trend was climate anxiety. Grist. <https://grist.org/politics/2019s-biggest-pop-culture-trend-was-climate-anxiety/>.
- UNESCO (n.d.). Climate Change Communication and Education. <https://education-profiles.org/europe-and-northern-america/italy/~climate-change-communication-and-education#Climate%20change%20education%20and%20training%20in%20the%20country>
- YouGov Poll (2020). Over two-thirds of young people experience eco-anxiety as Friends of the Earth launch campaign to turn anxiety into action. <https://friendsoftheearth.uk/climate/over-two-thirds-young-people-experience-ecoanxiety-friends-earth-launch-campaign-turn>