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CHAPTER 1

The Power of Environmental Considerations to Guide Pro-environmental Behavior Among Different People and in Different Contexts
1.1 Introduction

If people acted more pro-environmentally, it would help mitigate the climate crisis that our society is facing (IPCC, 2022). Pro-environmental behavior refers to actions aimed at avoiding harm to the environment and safeguarding it (Steg & Vlek, 2009). The climate crisis refers to the situation in which urgent actions are needed to address ecological challenges and stop damage to the environment caused by the climate change (Oxford University Press, n.d.; Ripple et al., 2020). The scope and the seriousness of ecological challenges urge us to identify general factors that could facilitate various pro-environmental behaviors among different people in different contexts. Identifying these general factors could inform interventions aimed at promoting pro-environmental behavior on a large scale – by addressing the key antecedents of a wide range of pro-environmental behaviors.

Research has shown that people’s environmental considerations, in particular biospheric values and environmental self-identity, are important general factors that can foster multiple pro-environmental behaviors crucial to address the climate crisis (van der Werff et al., 2013a; van der Werff & Steg, 2016). Biospheric values reflect the extent to which people generally have the goal in their life to care about and protect nature and the environment (Steg & de Groot, 2012). Biospheric values have been found to explain multiple pro-environmental behaviors, including willingness to reduce car use, recycling and energy-efficient driving (Nordlund & Garvill, 2003; van der Werff et al., 2013b, 2014b). Biospheric values can intrinsically motivate people to protect the environment (Steg, 2016), which means that people act pro-environmentally because of the inner personal reasons, such as experiencing a sense of meaningfulness, feeling that one is doing the right thing and feeling positive emotions when conserving the environment, rather than for extrinsic incentives, such as financial rewards (Bolderdijk et al., 2013; Venhoeven et al., 2020). Intrinsic motivation is particularly important for pro-environmental behaviors because such behaviors are often not very pleasurable in a sense of convenience and comfort (e.g., taking public transportation or riding a bike might be less convenient than taking a car) and sometimes may be costlier (e.g., organic food products might be more expensive than regular options). If people are intrinsically motivated, they may consistently engage in pro-environmental
behaviors even when there are no attractive external incentives to do so (Bolderdijk et al., 2013; de Groot & Steg, 2010; Lindenberg & Steg, 2007). Notably, feeling that one is doing the right thing in general (Deci & Ryan, 2008) and for the environment protection in particular have been found to elicit positive feelings (Taufik et al., 2015) and to promote people’s well-being (Venhoeven et al., 2016, 2020). This type of well-being refers to eudaimonic well-being that is caused by a sense of meaningfulness that can motivate behavior even if that behavior does not bring immediate gratification (Ryan et al., 2008).

Biospheric values are mostly indirectly related to pro-environmental behaviors via intermediate factors, such as environmental self-identity (van der Werff et al., 2014b). Environmental self-identity reflects the extent to which one sees oneself as a person who acts environmentally friendly (van der Werff et al., 2013b). Stronger environmental self-identity leads to multiple pro-environmental behaviors, such as recycling and use of environmentally-friendly transportation for daily commuting (van der Werff et al., 2013b; Whitmarsh & O’Neill, 2010). Importantly, environmental self-identity is rooted not only in biospheric values, but also in people’s past pro-environmental behavior, which makes environmental self-identity a valuable target for interventions aimed at promoting pro-environmental behavior. Specifically, while biospheric values are relatively stable constructs, environmental self-identity can be targeted and strengthened via interventions, for example by reminding people about their past pro-environmental behavior (i.e., fuel-efficient driving style), which in turn strengthens people’s motivation to engage in (other) pro-environmental behaviors (i.e., reduce meat consumption) (van der Werff et al., 2013a, 2014a, 2014b).

Biospheric values and environmental self-identity are key general factors that can guide many different pro-environmental behaviors. Being such general factors, they can influence concrete pro-environmental behaviors via factors specific to those behaviors, such as personal norms to engage in a specific behavior (van der Werff et al., 2013a, 2013b, 2019). Personal norms are internalized moral standards expressed as a sense of moral obligation.

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1 The relationship between pro-environmental behavior and eudaimonic well-being is extensively studied in Leonore Amelie Venhoeven’s thesis (Venhoeven, 2016).
to engage in various pro-environmental behaviors (Schwartz, 1977; Steg et al., 2011), such as the personal norm to reduce car use, choose sustainable clothing, and to use green energy (Barbarossa & De Pelsmacker, 2016; Nordlund & Garvill, 2003; van der Werff et al., 2013a). As such, personal norms connect people’s biospheric values and environmental self-identity to specific pro-environmental behaviors. Once people’s personal norm to engage in a specific behavior is activated, for example by providing concrete information about how much other people engage in such behavior (de Groot et al., 2021), the behavior can further be encouraged by enabling people to act upon their personal norms, for example by removing contextual barriers that could inhibit the specific behavior (see van der Werff et al., 2019).

The whole chain of relationships from biospheric values to pro-environmental behavior mediated by environmental self-identity and personal norms has been demonstrated for various behaviors, including behaviors at home, on holidays and at work (Figure 1; Ruepert et al., 2016; van der Werff & Steg, 2016; Xu et al., 2019). At the same time, however, the model has only been tested in WEIRD countries (Western, Educated, Industrialized, Rich and Democratic; Henrich, Heine, & Norenzayan, 2010) and exclusively among adult populations. We therefore do not know how generalizable the model is in other less explored countries and beyond adult samples. If we are to use environmental considerations to promote pro-environmental behaviors at a large scale, there is a need to study the relationship between environmental considerations and pro-environmental behavior in less explored contexts and among different people that have been overlooked in previous studies. For example, people in non-WEIRD countries need to be included because of the global scale of climate change, and adolescents need to be included because they are the future generation that will be much affected by climate change and whose actions will be critical for mitigating climate change. To address this gap, in this dissertation we will explore to what extent general environmental considerations, namely biospheric values and environmental self-identity, and specific environmental considerations, namely personal norms to engage in pro-environmental behavior, can explain various pro-environmental behavior in Lithuania and for adolescents.

Given that environmental self-identity bridges the gap between biospheric values and specific pro-environmental behaviors (van der Werff et al., 2013b),
first, we clarify to what extent environmental self-identity is distinct from other constructs representing human-environment relationship, that may potentially play a role in biospheric values and pro-environmental behavior relationship. Second, we study the relationship between environmental considerations and pro-environmental behavior in a non-WEIRD country, namely Lithuania. Third, we study this relationship for adolescents in Lithuania. We also compare how well environmental considerations predict pro-environmental behavior in comparison to behavior-specific factors among adolescents. Fourth, we look at how environmental considerations could possibly form, namely by testing the relationship between parent-adolescent biospheric values, environmental self-identity and personal norms. In all these steps, we look to what extent environmental considerations explain multiple pro-environmental behaviors. Past studies that explored predictors of pro-environmental behavior in Lithuania either focused on behavior-specific factors (Jovarauskaitė, 2020; Poškus, 2019) or looked at the extent to which behavior-specific factors explain one specific behavior (Jovarauskaitė, 2020). This dissertation expands these studies and explores to what extent general environmental considerations can explain many pro-environmental behaviors.

Knowledge about which factors motivate individuals to engage in multiple pro-environmental behaviors are particularly relevant for stakeholders such as policy makers, environmental activists, educators, communities, NGOs and everyone, who works in addressing issues related to climate crisis. Identifying factors that universally motivate pro-environmental behavior among different people in different contexts can help address the climate crisis at scale. To address this need, the thesis will deliver important insights for practice. We will share insights into the extent to which environmental considerations can explain multiple pro-environmental behavior in Lithuania among adults and adolescents; how well environmental considerations explain pro-environmental behavior compared to other behavior-specific factors; and to what extent family context is important for environmental considerations to form.
1.1.1 Distinguishing Environmental Self-Identity from Other Constructs Describing Human-Environment Relationship

Being rooted in biospheric values, environmental self-identity reflects people’s intrinsic motivation to engage in multiple pro-environmental behaviors (van der Werff et al., 2013b). Besides biospheric values, environmental self-identity is also influenced by people's past behavior (van der Werff et al., 2014a). This makes environmental self-identity a more malleable construct for interventions compared to biospheric values, which are relatively stable and difficult to change (Milfont et al., 2016; Schwartz, 2012b). For example, reminding people of their past pro-environmental behaviors (i.e., fuel-efficient driving) led to stronger environmental self-identity, which in turn resulted in stronger intentions to act pro-environmentally (e.g., to reduce meat consumption; van der Werff et al., 2014b). Importantly, strengthening environmental self-identity by reminding people of their specific past pro-environmental actions may explain positive “spill over” effect to various other pro-environmental actions. Environmental self-identity is therefore a crucial factor explaining pro-environmental behavior that offers possibilities for interventions aimed at fostering pro-environmental behavior (van der Werff et al., 2014a).

Other constructs have been introduced in the literature that, similar to environmental self-identity, describe how people perceive themselves in relation to the environment.
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relation to the environment\(^2\), in particular connectedness with nature, which refers to perceiving oneself as being a part of nature (Schultz, 2002), and environmental identity, which reflects one’s feeling of being connected to certain parts of the natural environment (Clayton, 2003). Seeing oneself as part of or connected to the natural environment could also be associated with pro-environmental behavior, as people may want to protect this part of their identity (Bruni et al., 2021; Martin & Czellar, 2017; Nisbet et al., 2009). However, we argue that environmental self-identity is distinct from these constructs and is most relevant for understanding and influencing people’s different pro-environmental behaviors. This is because there could lie different types of motivations to act pro-environmentally behind one’s sense of connection with the natural environment (i.e., connectedness with nature, environmental identity) and seeing oneself as someone who acts pro-environmentally (i.e., environmental self-identity). Specifically, feeling connected to the natural environment or parts of it might not necessarily lead to consistent engagement in many pro-environmental behaviors, because people might only engage in behaviors that are exclusively related to protecting the natural environment, but not other pro-environmental behaviors that not merely protect the environment, such as saving energy (e.g., meat consumption, shower time and driving style; van der Werff et al., 2013b). Whereas if people are motivated by their environmental self-identity, they may engage in different types of pro-environmental behaviors that may not be directly related to preserving their natural environment. Therefore, in the scope of this PhD thesis, it is important to explicate how environmental self-identity is a unique concept for understanding and influencing people’s pro-environmental behavior next to other constructs explaining human-environment relationship. To achieve this, we will explore its conceptual and empirical distinction from other constructs

\(^2\) Usually another umbrella term - human-nature relationship - is used in the literature to refer to various constructs that describe the relationships between people and the environment. We also used it in Chapter 2, to align with the literature. For the rest of this thesis, however, we propose that the term human-environment relationship is more accurate because it not only refers to the extent to which people feel related to nature, but also to the environment in general. People might seek to conserve not only natural environment, but also improve the quality of the environment around them. For example, to reduce CO2 emissions by shifting to clean energy.
that describe human-environment relations, namely connectedness with nature and environmental identity. The idea that environmental self-identity is a conceptually distinct theoretical construct from other theoretical concepts representing human-environment relations was raised in the literature before (Olivos & Clayton, 2017; van der Werff et al., 2013b). Yet there have not been attempts to explore this distinction in a systematic way, including an analysis of both theoretical and empirical relationships between these constructs, which we did in this thesis. Specifically, in Chapter 2, we conduct a systematic literature review on constructs representing human-environment relationships to identify their conceptual commonalities and, more importantly, their differences. Also, we evaluate the strength of relationship between different constructs representing human-environment relationship, to gain insights about their empirical distinctions.

1.1.1.1 Overview of Method and Results of Chapter 2

We examined the conceptual and empirical similarities and differences between environmental self-identity, connectedness with nature and environmental identity. Evaluating the size of the correlation coefficients is one way to test the extent to which constructs are similar or distinct. The higher the coefficient the higher is the likelihood that constructs are similar and the other way around. Besides, we review theoretical arguments on why certain human-environment constructs are distinct from each other or similar. Thus, we looked at how strongly constructs are related with each other and whether this relationship is in line with the theory (Campbell & Fiske, 1959). We first conducted a systematic review and analysis of the literature on these three constructs, identifying how they are conceptually similar and, most importantly, what are the key conceptual differences between these constructs. Next, we carried out a meta-analysis to investigate the relationship between these three constructs, to assess their empirical overlap and distinctiveness. From the results of the theoretical analysis ($k = 14$), we concluded that connectedness with nature, environmental identity and environmental self-identity define people’s self-concept in relation to the environment. The key difference is that for connectedness with nature and environmental identity, the core of the self-concept is feeling part of the natural environment, whereas for environmental self-identity, the core of the self-concept is acting pro-environmentally. In theory, strong environmental
self-identity can lead to pro-environmental behavior irrespective of how much people consider themselves as part of the natural environment, which makes environmental self-identity a valuable target for behavioral interventions. The results from the meta-analysis ($N = 8513$) revealed a strong correlation between the measures of connectedness with nature and environmental identity ($r = .75 [0.67, 0.83]$, $k = 11$, $n = 4087$), whereas the relationship between the measures of connectedness with nature and environmental self-identity was less strong ($r = .57 [0.31, 0.84]$, $k = 5$, $n = 4426$). The results show that, despite the positive and statistically significant relationships, there is also a certain degree of empirical distinction between environmental self-identity and connectedness with nature, in line with their theoretical distinction. The significant positive relationship between connectedness with nature and environmental self-identity is not surprising given that both constructs define people’s self-concept in relation to the environment.

1.1.2 Relationships Between Environmental Considerations and Pro-Environmental Behavior in Lithuania

The research on the relationship between environmental considerations and pro-environmental behavior so far has mostly been conducted in WEIRD countries. Initial evidence from non-WEIRD countries suggests that environmental considerations can explain pro-environmental behavior in these countries too. For example, biospheric values were related to various personal norms to engage in pro-environmental behavior in Hungary (e.g., personal norm to reduce car use; de Groot et al., 2012). Furthermore, biospheric values predicted, via personal norms, efficient energy use and intentions to reduce car use in Argentina (Jakovcevic & Reyna, 2017; Jakovcevic & Steg, 2013), energy conservation behavior in Turkey (Sahin, 2013), and acceptability of car use reduction policies in Russia (Ünal et al., 2019). None of these studies, however, tested to what extent both general environmental considerations, namely biospheric values and environmental self-identity, are related to pro-environmental behavior; environmental self-identity was not examined.

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3 Systematic literature review yielded no data that would allow to measure the relationship between environmental identity and environmental self-identity.
in these studies. Yet, environmental self-identity can be a critical factor for interventions aimed at promoting pro-environmental behavior (see section 1.1). One exception is a study that found that the stronger their biospheric values, the more people perceived themselves as someone who purchases energy efficient appliances, which in turn was associated with purchasing energy efficient appliances in Vietnam (Nguyen et al., 2016). Yet, since environmental self-identity was measured at a very specific level (i.e., “Buying energy efficient appliances makes me feel that I am an environmentally friendly consumer”), we do not know to what extent it would predict other pro-environmental behaviors. In fact, all the above studies focused on a single or a few specific pro-environmental behaviors, rather than a range of different behaviors. Thus, the question remains to what extent general environmental considerations, namely biospheric values and environmental self-identity, are universal factors that can explain multiple pro-environmental behaviors in different countries. This dissertation will fill these gaps. First, in Chapter 3, we study the extent to which biospheric values and environmental self-identity can explain different pro-environmental behaviors in Lithuania, among adults.

The term WEIRD countries was coined to emphasize that studies in various disciplines including social sciences mostly rely on samples from western, educated, industrialized, rich and democratic countries, mostly from Western Europe and the United States (Ghai, 2021; Henrich et al., 2010), and overlook other samples from less affluent countries. Additionally, in the environmental context in particular, WEIRD countries typically already have a relatively long tradition of policies aimed at promoting pro-environmental behavior, whereas such policies only start to be considered in non-WEIRD countries, emphasizing the need to better understand factors that drive pro-environmental behaviors in such countries. Studies in WEIRD countries suggest that biospheric values and environmental self-identity explain various pro-environmental behaviors (e.g., energy saving, environmental activism; Ruepert et al., 2016; van der Werff & Steg, 2016). Yet, one could argue that environmental considerations only explain pro-environmental behaviors in countries where people do not face other huge challenges, such as social (e.g., high rates of poverty), demographic (e.g., drain of intellectual capital) and economic (e.g., unemployment) challenges. People preoccupied with these issues might act on other considerations, rather than environmental ones. For example, people’s behavior might
be guided by economic concerns rather than their environmental considera-
tions. Consequently, when considering whether to recycle their household 
with, people may focus on the financial consequences (e.g., is it cheaper to 
recycle than not) rather than consequences for the environment. As a result, 
environmental considerations may be related weakly or not related to people’s 
pro-environmental behavior. Noteworthy, WEIRD countries represent 12% of 
the world’s entire population, suggesting that the findings from such countries 
enable understanding only of a small fraction of countries (Henrich et al., 
2010). The results from such countries might not necessarily accurately inform 
policies in other countries and contexts. Yet, climate crisis requires joint actions 
across the world, for which we need to better understand key factors that 
guide pro-environmental behavior in different countries, especially in regions 
that have been neglected in research so far.

In this PhD thesis, we study the relationship between environmental 
considerations and behavior in Lithuania – a country in the Baltic region that 
was under the Soviet occupation for decades. During the occupation period 
and years after, people in Lithuania experienced constant shortages of variety 
of resources, from food to clothing and household items, which might have led 
people to prioritize economic more than other concerns, such as environmental 
protection. Currently, Lithuania is considered to be an economically developed 
country by OECD (Demmou, 2016) with highly educated citizens (OECD, 2022). 
Thus, one might argue that Lithuania is yet another WEIRD country. However, 
OECD experts point out that Lithuania faces a unique mixture of social, 
demographic and economic issues, that are not typical for WEIRD countries 
(Demmou, 2016). These issues include one of the highest suicide rates in 
the world (WHO, 2021), people living at risk of poverty and social exclusion4 
(country-level - 25%, in rural areas - 32%), one of the lowest incomes among 
EU countries, huge welfare gaps between urban and rural areas, high rates of 
unemployment in rural areas (country-level unemployment - 15%, in rural areas

4 Being at risk of poverty and social exclusion refers to a sum of indicators such as risk 
of poverty, severe material and social deprivation and living in a household with a 
very low work intensity. Examples of these indicators include low monthly income, 
inability to buy certain material items or engaging in social activities and working 
less than 20% of potential work-time per year (Eurostat, 2021).
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- 23%), high emigration rates and drain of the intellectual capital (Eurostat, 2022b, 2022a; Okunevičiūtė-Neverauskienė & Pocius, 2019; OSP, 2020a, 2022; Pociūtė-Sereikienė, 2019; Ubarevičienė & van Ham, 2017; UT, 2021). The need to deal with these issues might make people prioritize other concerns than environmental concerns when engaging in various behaviors, resulting in a weaker relationship between environmental considerations and environmental behavior among people in Lithuania. When asked about which issues concern them most, 68% of Lithuanian citizens indicated economic issues (e.g., rising prices, inflation and living costs), while only 1% indicated environmental issues (e.g., climate change and energy-related issues) (Eurobarometer, 2018). Studies furthermore indeed show strong materialist values among Lithuanians (Inglehart, 2018). Focus on materialist values could potentially inhibit the relationship between environmental considerations and pro-environmental behavior in Lithuania (Hurst et al., 2013; Wang et al., 2019).

It is highly relevant to study factors that influence pro-environmental behavior in Lithuania, as the country is facing serious environmental issues that are growing in scope, including air pollution, water contamination with industrial waste, deforestation and biodiversity decline (EEA, 2020; EPHA, 2018; GFW, 2022). Environmental policies in Lithuania are only starting to be implemented to address these issues. Policy measures so far have focused on making pro-environmental behavior more feasible and beneficial and making the environmentally harmful behavior costlier. Examples include developing infrastructure for recycling, improving cycling paths, implementing financial incentives, such as deposit system for recycled bottles and cans, and taxing polluting technologies (European Environment Agency, 2015; Packaging and Packaging Waste Processing Law, 2001). Developing the infrastructure and regulations to enable pro-environmental behavior is a necessary first step. However, interventions could potentially be more effective if considering people’s motives to use this infrastructure and the regulations in place. Specifically, focusing exclusively

5 Lithuania’s population decreased from 3.7 million in 1989 to 2.9 million in 2015; the largest decline among the world’s countries (Ubarevičienė & van Ham, 2017; United Nations - DESA, 2015). The population decline is especially prominent in regions outside big cities, which mostly are left by younger residents with higher education (OSP, 2020b; Ubarevičienė & van Ham, 2017).
on financial costs and benefits of specific pro-environmental behavior might draw people’s attention to practical concerns rather than environmental issues. This could reduce the effectiveness of the intervention and lower chances that people will act upon their environmental considerations (Bolderdijk et al., 2013). Namely, there is a risk that people will stop acting pro-environmentally as soon as the incentives are taken away. Whereas if people act upon their environmental considerations, they may act pro-environmentally even if there are no immediate benefits and they may do so across different types of behaviors. However, to know whether it is effective to target environmental considerations in Lithuania, it is first important to find out to what extent environmental considerations and pro-environmental behavior are related.

1.1.2.1 Overview of Method and Results of Chapter 3
In Chapter 3, we performed a cross-sectional study with a convenience adults’ sample in Lithuania (334, 79.6% females, $M_{\text{age}} = 34.28$, $SD_{\text{age}} = 12.28$). The sample is likely to be comparable to the general population. Specifically, the sample was representative in terms of the expression of biospheric values. European Social Survey (ESS-ERIC, 2020), which uses national representative data and was conducted few months after the current study found that biospheric values of people in Lithuania are expressed to a similar extent as we found in this study; 55.9% and 61.8% of respondents respectively. We used established instruments to measure people’s environmental considerations and pro-environmental behavior. Biospheric values were measured with the short version of the Schwartz’s values scale (Schwartz, 1992, 1994) developed by de Groot and Steg (2007); environmental self-identity was measured with the scale developed by van der Werff and colleagues (van der Werff et al., 2013a, 2013b); and

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6 The European Social Survey used a one-item instrument to measure biospheric values, finding that 55.9% of participants agreed with the statement “It is important to care for nature and environment.” We calculated this percentage only from the responses indicating strong agreement (i.e., “Very much like me” and “Like me”) that it is important to care for nature. In our study, we measured biospheric values using four items (e.g., “Protecting the environment and preserving nature”). Similarly, we calculated the percentage of agreement with the importance of caring for nature only from responses indicating strong agreement (i.e., “Supreme importance” and “Very important”). We then averaged the percentage across the four items.
different types of pro-environmental behaviors were measured with the items adopted from the General Ecological Behavior instrument (Kaiser & Wilson, 2004). Structural equation modeling (SEM) was used to test the relationships between biospheric values, environmental self-identity and pro-environmental behavior. The findings revealed that people’s environmental considerations were positively related with recycling and environmental activism, but not with fuel-efficient driving and the use of sustainable transportation in Lithuania. We conclude that also in Lithuania general environmental considerations can guide pro-environmental behaviors, yet for some behaviors there may be important contextual barriers that may prevent people from acting upon their environmental considerations.

1.1.3 Relationships Between Environmental Considerations and Pro-Environmental Behavior in Adolescence

General environmental considerations, namely biospheric values and environmental self-identity can explain environmental behavior of adults (e.g., Ruepert et al., 2016; van der Werff & Steg, 2016). Yet, we do not know to what extent these effects are generalizable to other age groups. Adolescents in particular are an important group to study because they are the generation that will be heavily affected by climate change and whose actions are important for further preventing the negative consequences of climate change. Adolescents also go through developmental peculiarities unique to this specific age group. Namely, adolescents’ values, identities and norms are still forming (Klimstra et al., 2010; Meeus et al., 2010; Vecchione et al., 2019), suggesting that their environmental considerations could be still in development too. Furthermore, research suggests that particularly in adolescence environmental considerations may be weaker than at other life stages, potentially surpassed by other considerations dominant at this age. For example, values related to caring for nature and other people (i.e., universalism values) are less prioritized in adolescence than later in life (Schwartz, 2012; Vecchione et al., 2019), and they are weaker than self-enhancement values (e.g., caring about achievement and power; Schwartz, 2012; Vecchione et al., 2019). Environmental self-identity might be changing too, since adolescents’ self-identities are not stable and constantly changing as they are exploring and testing their identities (e.g., Crocetti et al., 2008). Personal norms are also still developing in adolescence (Hart & Carlo, 2005; Malti et al.,
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2021), and research suggests that adolescents see pro-environmental behavior as less obligatory than younger children (Krettenauer, 2017). Furthermore, adolescents tend to engage less in pro-environmental behavior compared to children and adults (Evans et al., 2007; Krettenauer et al., 2019; Otto et al., 2019; Otto & Kaiser, 2014; Wray-Lake et al., 2017). So far, the relationship between adolescents’ biospheric values, environmental self-identity, personal norms to engage in pro-environmental behavior and pro-environmental behavior has not been studied. There is initial evidence that adolescents’ pro-environmental behavior and personal norms to engage in pro-environmental behavior are related (Collado, Staats, et al., 2017; Matthies et al., 2012), yet it has not been studied whether adolescents’ personal norms are rooted in biospheric values and environmental self-identity. Adolescents’ personal norms to engage in pro-environmental behavior could be rooted in other than environmental considerations. For example, one could feel obliged to separate waste because their parents tell them to do so or because their peers approve of such behavior. Therefore, we will study to what extent adolescents’ personal norms to engage in pro-environmental behavior are rooted particularly in biospheric values and environmental self-identity.

Given that adolescents’ environmental considerations may still be forming, the question is to what extent they can motivate multiple pro-environmental behaviors of adolescents. In this study, we study to what extent – if at all – adolescents’ pro-environmental behaviors are rooted in biospheric values, environmental self-identity and personal norms to engage in pro-environmental behavior; thereby generating further insights into the extent to which environmental considerations are universal factors that can explain multiple pro-environmental behaviors in different contexts among different people.

1.1.3.1 Overview of Method and Results of Chapter 4

To test whether environmental considerations can explain pro-environmental behavior of adolescents, in Chapter 4 we have conducted three cross-sectional studies with adolescents in Lithuania (Study 1: 256, 54.7% females, $M_{age} = 15.33$, $SD_{age} = .91$; Study 2: 349, 54.7% females, $M_{age} = 16.07$, $SD_{age} = 0.99$; Study 3: 905, 54.3% females, $M_{age} = 15.23$, $SD_{age} = .68$). We measured key variables with the same instruments as indicated in subsection 1.1.2.1. In addition, we studied how general environmental considerations (i.e., biospheric values
and environmental self-identity) relate to pro-environmental behavior via behavior-specific environmental considerations, namely personal norms to engage in pro-environmental behavior (van der Werff et al., 2013a, 2013b). SEM was used to test the relationships between biospheric values, environmental self-identity, personal norms and pro-environmental behavior of adolescents. We found that adolescents’ biospheric values and environmental self-identity were associated, via personal norms, with a wide range of pro-environmental behaviors, including recycling, environmentally friendly traveling, purchasing environmentally friendly goods and drinking tap water. We conclude that general environmental considerations are related, via personal norms, to multiple pro-environmental behaviors of adolescents. This provides additional evidence that environmental considerations are important factors explaining pro-environmental behaviors in Lithuania and among adolescents.

1.1.4 The Role of Environmental Considerations in Explaining Adolescents’ Pro-Environmental Behavior Compared to Other Factors

Biospheric values and environmental self-identity are general factors that can explain multiple pro-environmental behaviors, via personal norms to engage in specific pro-environmental behaviors. They are important because being general antecedents of behavior they could explain many pro-environmental behaviors. However, other factors that are less general and more related to specific behaviors could potentially be stronger predictors of specific pro-environmental behaviors. Specifically, the Comprehensive Action Determination Model (CADM) posits that behavior-specific factors, namely social norms, awareness about specific environmental issues (e.g., negative effects of using plastic bottles on the environment) and about the consequences of one’s own specific behavior for the environment (e.g., drinking bottled water), habits, perceived behavioral control and access to behavior can guide pro-environmental behavior (Klöckner & Blöbaum, 2010; Stern, 2000). Studies in adult samples show that such behavior-specific factors influence pro-environmental behavior, such as sustainable travel mode choice (i.e., public transportation instead of a car), recycling, environmentally friendly heating system choice, energy saving and recycling at work (Klöckner & Blöbaum, 2010; Klöckner & Friedrichsmeier, 2011; Klöckner & Oppedal, 2011; Ofstad et al., 2017; Sopha & Klöckner, 2011; van den
Broek et al., 2019). Such other factors could play an even more important role in environmental behavior of adolescents, due to developmental and contextual peculiarities at this age, as explained below.

Adolescents’ pro-environmental behavior might be affected by perceived social norms via intentions, namely the extent to which one perceives social pressure to (not)engage in a specific pro-environmental behavior or the extent to which one perceives that engaging in a specific pro-environmental behavior is (un)acceptable in one’s social environment (Fishbein & Ajzen, 2010). Individuals may internalize the moral standards of groups that are personally significant to them (e.g., peers), turning these standards into inner moral reference points – personal norms (Fishbein & Ajzen, 2010; Schwartz, 1977). Studies in adult samples showed that the more we feel people important to us expect us to use environmentally friendly means of transportation, the more we feel morally obliged to refrain from car use for the daily commutes, and the more we feel morally obliged to choose environmentally friendly transportation (Haustein et al., 2009). Social norms can be particularly relevant for adolescents. Adolescents are more sensitive than adults to social influences, especially to the pressure of their peers (Albert et al., 2013; Pinho et al., 2021). This suggests that social norms to act pro-environmentally might be an important factor influencing their personal norms to engage in pro-environmental behavior and eventually pro-environmental behavior. Yet no studies so far looked at how well general environmental considerations explain adolescents’ personal norms to engage in pro-environmental behavior compared to behavior specific factors such as social norms.

Next, personal norms to engage in a specific pro-environmental behavior can be directly affected by one’s awareness of need to protect the environment in a specific way (Klöckner & Blöbaum, 2010; Schwartz, 1977). Awareness of need reflects person’s belief that the environment is in need for protection and that certain practices or behaviors, for example, using single-use shopping bags, contributes to environmental problems (Schwartz, 1977). Perception of the existing need to act could strengthen one’s moral obligation to engage in a specific pro-environmental behavior. Similarly, awareness of consequences
of one’s specific environmental behavior\(^7\) is another factor that can affect personal norms to engage in a specific pro-environmental behavior (Klöckner & Blöbaum, 2010; Schwartz, 1968, 1977). Awareness of consequences is defined as the extent to which an individual thinks that their specific behavior has positive or negative effect on the environment (Klöckner & Blöbaum, 2010; Schwartz, 1968, 1977). For example, the level of people’s awareness that by bringing their own shopping bag to the store they conserve the environment. The more one is aware that their behavior has impact on someone’s or something’s well-being, the more likely they may feel morally obliged to reduce their negative impact (Schwartz, 1968). For example, awareness of the negative impact of the personal car use on the environment was related to one’s moral obligation to reduce car use and support for car use reduction policies (Klöckner & Blöbaum, 2010; Ünal et al., 2019)\(^8\). Environmental education partly determines the extent to which adolescents are aware of the need to protect the environment and the effects of their behavior on the environment. In some countries, including Lithuania, there is (yet) no systematic education\(^9\) about environmental issues.

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7 Awareness of consequences in some research is referred to as problem awareness (e.g., Nordlund & Garvill, 2003; van der Werff & Steg, 2015). We use the term pointed out by Schwartz (1968).

8 The key difference between awareness of need and awareness of consequences is that the former construct indicates the extent to which one recognizes the need to alleviate a condition (e.g., reducing plastic use to address plastic pollution), while the latter construct indicates the extent to which one comprehends the repercussions of certain behaviors or practices on the environment (e.g., plastic use contributes to environment pollution) (Schwartz, 1968, 1977).

9 Environmental education considered as a systematic when it meets the following criteria: facilitates the development of awareness and sensitivity towards environmental issues; provides knowledge about causes of these issues and how they are related to other social issues; enables people to form set of attitudes, values and concern that prioritize environment protection; provides relevant skills to identify and address environmental issues; and empowers people to act towards addressing environmental issues (Benedict, 1999; Hungerford et al., 1980; UNESCO -Tbilisi Declaration, 1977). Analysis of policy documents and legislation suggests environmental education in Lithuania is only gaining attention from policy makers and is mostly focused on raising awareness of and providing knowledge about environmental issues (see for a review Balundė et al., 2021, p. 10). Yet to the best of our knowledge there are no attempts to make connection between knowledge translation into pro-environmental behavior in all levels of education, from pre-school to tertiary education institutions. Efforts to address other components of environmental educations is rather fragmented; these other components of environmental education are not included into the general curriculum (Kavaliauskaitė & Leščinskaite, 2019; Poškus et al., 2019).
Consequently, adolescents may lack awareness about existing environmental issues and how their specific behaviors contribute to these issues, which can form an important barrier for their pro-environmental behavior. As such, (lack of) awareness of need and awareness of consequences could be important factors influencing adolescents’ pro-environmental behavior, either directly or via perceived personal norms to engage in the behavior.

According to CADM, personal norms to engage in pro-environmental behavior influence people’s intentions to act pro-environmentally and in turn their environmental behaviour. In addition, CADM contains factors that could directly affect people’s pro-environmental behaviour. First, perceived behavioral control – the belief that one has control over and capacity to perform specific behavior, which can directly affect personal norms to engage in pro-environmental behavior, intentions to act pro-environmentally and eventually pro-environmental behavior (Fishbein & Ajzen, 2010; Klöckner, 2013b; Klöckner & Blöbaum, 2010; Klöckner & Oppedal, 2011). Research among adults indeed suggests that the more person perceives that buying organic milk is under their control the more they feel morally obliged to do so (Klöckner & Ohms, 2009). Studies also suggest that perceived behavioral control can affect one’s intentions to act pro-environmentally (the extent to which person is willing and ready to perform certain behavior; Fishbein & Ajzen, 2010). The stronger one’s perceived behavioral control, the stronger their intentions to act pro-environmentally. For example, people who believed that they have control over their behavior to use transfer services to reduce car use, had stronger intentions to use transfer services provided by the city, both for shopping and for commuting to work (de Groot & Steg, 2007b). Adolescents might not (yet) have control over certain behaviors, such as purchasing organic products or deciding how to commute to school. If adolescents think that they have limited possibilities and it is not up to them to engage in certain pro-environmental behaviors, they may also feel less morally obliged to engage in these behaviors and could hold weaker intentions to act pro-environmentally.

People arrive from distant districts or other cities to shop or to work. They leave their car at the city-provided parking lot and continue the trip on public transportation.
Second, access to behavior – the extent to which it is easy or difficult to access the means to perform behavior (Klöckner & Blöbaum, 2010) – is another factor that might directly explain adolescents’ pro-environmental behavior. Adolescents might not have access to the means to act pro-environmentally. For example, access to clean drinking water in rural areas might be limited\textsuperscript{11}, therefore adolescents will drink bottled water; or will buy packaged meals, because there is no other option in grocery store. The easier is one’s access to behavior and the stronger is perceived behavioral control to act pro-environmentally, the more likely one will act pro-environmentally (van den Broek et al., 2019)\textsuperscript{12}.

Third, the CADM further suggests that pro-environmental behavior could depend on habit. Strong habit – automatic actions formed in frequent, repetitive and stable situations in the past (van den Broek et al., 2019) – leads to consistent (dis)engagement in pro-environmental behavior, for example car use for daily commute to work or energy conservation while cooking food (Haustein et al., 2009; van den Broek et al., 2019). For adolescents, some pro-environmental behaviors (e.g., cycling to school) might be more habitual than others (e.g., organic grocery shopping).

All in all, both general environmental considerations and behavior-specific factors constituting the CADM model can explain (intentions to engage in) pro-environmental behaviors. Yet general environmental considerations offer more opportunities for interventions, because, due to their overarching nature, they can explain multiple pro-environmental behaviors, while behavior-specific factors are only for single behaviors. Yet, it is important to understand how well general environmental considerations can explain behaviors when compared to other factors among adolescents.

\textsuperscript{11} State Food and Veterinary Service suggest that one fifth of Lithuania households use private water wells that are at risk of chemical and biological contamination (TV3, 2022).

\textsuperscript{12} The key difference between access to behavior and perceived behavioral control is that the former construct indicates the extent to which one realizes objective constrains or facilitators to perform behavior (e.g., unpackaged options are available in grocery store to reduce plastic use), while the latter construct indicates the extent to which one realizes one’s subjective capabilities to engage in behavior (e.g., one has a feeling that can engage in behaviors to reduce plastic use).
1.1.4.1 Overview of Method and Results of Chapter 5

In Chapter 5 we explored in two studies to what extent general environmental considerations, namely biospheric values and environmental self-identity explain, via perceived personal norms, various pro-environmental behaviors of adolescents compared to behavior-specific factors indicated in the CADM model. We measured environmental considerations with the same instruments as indicated in subsections 1.1.2.1 and 1.1.3.1. Social norms, awareness of need and consequences, perceived behavioral control, access to behavior, habits and intentions were measured at a behavior-specific level with the instruments adopted from previous studies (Klöckner & Friedrichsmeier, 2011; Klöckner & Ohms, 2009; van der Werff et al., 2013a). The results of Study 1 (349, 54.7% female, $M_{age} = 16$, $SD_{age} = 1$, convenience sample) and Study 2 (508, 49% female, $M_{age} = 15.10$, $SD_{age} = 1.49$, nationally representative random sample) indicated that environmental considerations as well as the behavior-specific factors explained the use of bottled water (Study 1), taking one’s own bag for shopping and giving away or selling unused items (Study 2) among adolescents reasonably well. Across these behaviors environmental considerations explained from 34% to 48% variance in intentions and from 15% to 46% variance in behavior. While the behavior-specific factors explained from 33% to 54% variance in intentions and from 35% to 59% variance in behavior. Environmental considerations and behavior-specific factors explained little variance in purchasing unpackaged goods, 1% and 6% respectively, yet they explained the intentions to purchase unpackaged goods reasonably well: 34% and 38% respectively. These results show that environmental considerations and behavior-specific factors can explain pro-environmental behavior to a rather similar extent. Environmental considerations explained a little bit less variance, which is not surprising because they are less specific, but they still explained behavior reasonably well, comparable to the behavior-specific factors. Noteworthy, environmental considerations proved to be relevant factor that can explain multiple behaviors, besides the very specific factors. This makes environmental considerations relevant for interventions, as their main advantage is that by targeting them one could potentially change many specific pro-environmental behaviors, while by targeting behavior-specific factors one would need to target only one specific behavior. These results provide first evidence that environmental considerations being general constructs and relatively distant from behavior explain adolescents’ behavior almost as well as constructs specific to behavior.
1.1.5 Relationship Between Environmental Considerations of Parents and Their Adolescent Children

If environmental considerations are indeed important determinants of pro-environmental behaviors, as suggested in this thesis, the next important question is how environmental considerations and behavior of adolescents could be possibly formed. In this section, we take the very first step in addressing this complex question. Based on previous research, we propose that family is an important basis where environmental considerations could emerge and form (Manfredo et al., 2017; Olkinuora, 1972; Schwartz, 1977), specifically, family members could influence each other's environmental considerations and behavior. Parents could play an important role in their adolescent children's formation of environmental considerations. Also, children could affect their parents' environmental considerations. The first step in understanding whether parents and their adolescent children could affect each other's environmental considerations is to test whether and to what extent environmental considerations of adolescents and their parents are related in the first place.

In adolescence, the development of values, identities and norms could be influenced by the family context (Friedlmeier & Trommsdorff, 2011; Grønhøj & Thøgersen, 2009; Knafo & Galansky, 2008; Roest et al., 2009). Adolescents may adopt environmental values, identities and norms prevalent in their family. This would result in positive relationships between environmental considerations and behavior of parents and their adolescent children. Yet adolescents may not necessarily adopt the environmental considerations of their parents. In fact, adolescents could even rebel against the values and norms of their parents and seek their own unique identity and moral standards, because this is a characteristic for this age group (Albert et al., 2013; Boykin McElhaney & Allen, 2001; Crocetti, 2017; Crocetti et al., 2008; Jager et al., 2015; Lansford et al., 2009; Pfeifer & Berkman, 2018). This might lead to environmental considerations of parents and their adolescent children being either not related or negatively related. On the other hand, parents could be influenced by their children's environmental considerations too, especially if adolescents are more engaged in environmental issues and initiate discussions at home or show examples of pro-environmental behavior. But parents may also not consider their child as a role model for environmental considerations and behavior. As the very first step in better understanding these relationships, we first of all test if environ-
mental considerations of adolescents and their parents, namely biospheric values, environmental self-identity and personal norms are at all related.

1.1.5.1 Overview of Method and Results of Chapter 6

To test the extent to which environmental considerations of parents and their adolescent children are related we conducted a study (Chapter 6) in a representative sample of adolescents (492, 49% female, $M_{age} = 15.11$, $SD_{age} = 1.39$) and their parents (492, 75.2% female, $M_{age} = 42.67$, $SD_{age} = 6.68$) in Lithuania. We measured environmental considerations with the same instruments as indicated in previous subsections. We used correlations to measure the relationship between parents and their adolescent children's environmental considerations and behavior; and SEM to measure the extent to which environmental considerations explain behavior of parents and their children. Results indicated a strong and positive relationship between environmental values, self-identity, and personal norms of parents and their adolescent children. Also, the own environmental considerations predicted various pro-environmental behaviors of both parents and adolescents. This is the first evidence that family could be a potentially important basis for shaping environmental considerations.

1.2 Summary

In this dissertation we aim to explore to what extent general environmental considerations are universal factors in explaining many different pro-environmental behaviors, especially in contexts that were not explored before and beyond adult samples. We first conduct a systematic literature review and meta-analysis to clarify the extent to which environmental self-identity is distinct from other constructs representing human-environment relationship, such as environmental identity and connectedness with nature (Chapter 2). This was an important step since environmental self-identity is a crucial link in the relationship between biospheric values and pro-environmental behavior, and it is a valuable target for interventions because it is more malleable than people's values. Next, based on the VIP model we aim to understand to what extent environmental considerations, namely biospheric values and environmental self-identity are universal in explaining various pro-environmental behaviors.
among adults in context that was not studied before, namely Lithuania (Chapter 3 and 6) and among adolescents (Chapter 4 and 5). People in different contexts may prioritize other than environmental considerations when engaging in pro-environmental behaviors, which could hinder the effects of environmental considerations on those behaviors. In particular, in Lithuania, beside environmental issues, people are dealing with other social, demographic and economic issues that have more prominent, immediate effects on their lives, such as social inequalities, financial struggles and population decline in rural areas, which could prevent environmental considerations from guiding their behavior. While for adolescents, age related peculiarities such as prioritizing self-enhancement values might push particularly environmental considerations to the background and other concerns might be more important drivers of their pro-environmental behavior. Further, we explore how well general environmental considerations (the VIP model) compared to behavior-specific factors (the CADM model), explain various specific pro-environmental behavior of adolescents (Chapter 5). This is an important step because if interventions aim at general factors, it is essential to unravel how well these factors explain multiple behaviors when compared to factors specific to those behaviors. Finally, we look at the relationships between environmental considerations and pro-environmental behavior in the family context, namely between parents and their adolescent children, in order to get the very first insights into whether family context could potentially be an important basis for the development of individuals’ environmental considerations (Chapter 6). Knowledge on the extent to which environmental considerations are relevant in explaining many pro-environmental behaviors beyond WEIRD countries and adult samples might be useful for stakeholders working in such countries and with such groups of people.