Growing environmental self-identity

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GROWING ENVIRONMENTAL SELF-IDENTITY

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1 INTRODUCTION

1.1 Introduction

We are currently facing serious environmental problems (Lavell et al., 2012; Shepherd et al., 2012). Global atmospheric concentrations of greenhouse gases have increased and far exceed pre-industrial levels, which contributes to increases in global temperature, melting of icecaps and increases in sea level. The high concentrations of greenhouse gases in the atmosphere also lead to an increase in the frequency of hot extremes, heat waves, heavy precipitation and the intensity of tropical cyclones (IPCC, 2007). In addition, pollution and climate change contribute greatly to a loss of biodiversity (Bellard et al., 2012). To overcome these problems is a big challenge. For example, to remain below an increase in global temperature of 2˚C above pre-industrial levels in order to avoid dangerous climate change we need to take much effort (Peters et al., 2012).

It is widely believed that behavioural change of consumers is needed to manage these environmental problems (IPCC, 2007). Governments and environmental organizations try to promote environmentally-friendly behaviour of individuals via various policies and campaigns. For example, the use of renewable energy sources is promoted by providing subsidies on solar panels, while an energy-efficient driving style is promoted by providing people with information on how to drive in an environmentally-friendly way. However, to promote pro-environmental actions it is important to know which factors influence our environmental behaviour, as environmental behaviour is more likely to be changed when policies target these factors. In other words, we need to understand what important antecedents of environmental behaviour are. We[1] define environmental behaviour as behaviour that changes the availability of materials or energy from the environment or alters the structure and dynamics of ecosystems and the biosphere itself (Stern, 2000). Pro-environmental behaviour can be defined as `behaviour that harms the environment as little as possible or even benefits the environment' (Steg & Vlek, 2009). In this dissertation we will study whether environmental self-identity promotes pro-environmental actions. We propose that environmental self-identity is an important antecedent of environmental behaviour as it is likely to be related to a range of pro-environmental actions, is likely to have a stable core, yet can be strengthened to promote pro-environmental actions. To test our propositions we will examine which factors affect environmental self-identity, and via which process environmental self-identity affects pro-environmental actions.

1 I use 'we' instead of 'I' throughout this dissertation when I refer to the authors, as the research described is the product of the collaboration between me and my promoters: Linda Steg and Kees Keizer.

1.2 Environmental self-identity

Self-identity is generally defined as the label used to describe yourself (Cook, Kerr, & Moore, 2002). It is the salient part of the self-concept which relates to a particular behaviour (Conner & Armitage, 1998). Several studies suggest that self-identity is an important predictor of intentions and behaviour in the environmental domain, including green consumerism (Sparks & Shepherd, 1992), recycling (Nigbur, Lyons, & Uzzell, 2010) and environmental activism (Fielding, McDonald, & Louis, 2008). However, these studies focused on specific identities (e.g., recycling identity), which are likely to be particularly or even only predictive of specific behaviours related to that identity. Can we also distinguish a more general environmental self-identity that encourages a wide range of pro-environmental actions? A general environmental self-identity would be important to study as targeting general antecedents of pro-environmental actions may affect a wide range of pro-environmental actions at once (cf. De Groot & Steg, 2008; Crompton & Kasser, 2009).

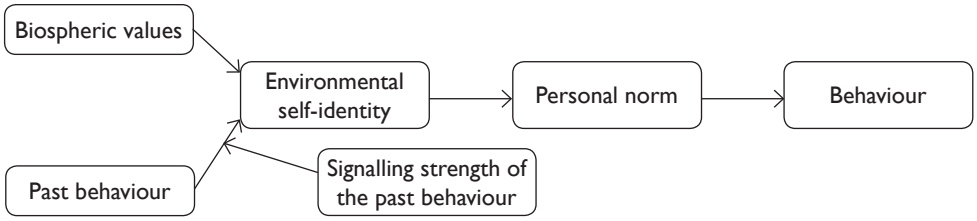
We propose there is indeed such a general environmental self-identity which is related to a range of pro-environmental actions. A few recent correlational studies suggest that a more general environmental self-identity can indeed be distinguished that reflects the extent to which you see yourself as an environmentally-friendly person. Such a general environmental self-identity appeared to predict a wide range of environmental preferences, intentions, and behaviours. For example, a general environmental self-identity has been found to be related to eco-shopping, waste reduction, water savings, domestic energy conservation (Whitmarsh & O'Neill, 2010), pro-environmental behaviours, recycling, buying fair trade products and not flying to a holiday destination (Gatersleben, Murtagh, & Abrahamse, 2012). This suggests that environmental self-identity can play an important role in explaining a wide range of pro-environmental behaviours. However, studies with experimental designs are needed to study causal relations. Also, many important questions remain. Which factors influence environmental self-identity? Does environmental self-identity have a stable basis so that it will predict a wide range of pro-environmental actions now and in the future? Often general antecedents of pro-environmental behaviour, such as biospheric values, are difficult to change (e.g., Feather, 1995). We propose that environmental self-identity can be strengthened to encourage future pro-environmental actions. This would make environmental self-identity particularly relevant to study as, in contrast to values, it can be changed to promote pro-environmental behaviour. Another important remaining question is: via which process does environmental self-identity lead to behaviour? In this dissertation we aim to address these questions. More specifically, we will test the model shown in Figure 1.1. We will elaborate on the model below.

1.3 Factors influencing environmental self-identity

Biospheric values

We first propose that environmental self-identity is influenced by values, which provide the stable factor influencing environmental self-identity. Various authors suggested a relationship between values and self-identity (Crompton & Kasser, 2009; Verplanken & Holland, 2002;

Figure 1.1 *The relationship between biospheric values, past behaviour, signalling strength of past behaviour, environmental self-identity, personal norm and behaviour*



Sparks & Shepherd, 1992), however this has rarely been studied. We aim to make a clear distinction between biospheric values and environmental self-identity and to study how they are related, as well as to study the relationship between biospheric values, environmental self-identity and environmental behaviour. Values are desirable and transsituational goals that vary in importance and serve as a guiding principle in one's life (Schwartz, 1992). Values are abstract and general and maintain stable over time (Feather, 1995). Biospheric values are particularly important for understanding and predicting environmental beliefs and behaviour (Steg & De Groot, 2012). Biospheric values have been found to be related to range of environmental beliefs, attitudes and behaviours, for example to the acceptability of climate change policies (Nilsson, von Borgstede, & Biel, 2004; Steg, De Groot, Dreijerink, Abrahamse, & Siero, 2011), sustainable consumption (Thøgersen & Ölander, 2002), environmental activism (Steg et al., 2011), pro-environmental behaviour (Schultz & Zelezny, 1998), preference for restaurants serving organic food (Steg, Perlaviciute, Van der Werff, & Lurvink, 2012), and donating money to an environmental rather than a humanitarian organisation (De Groot & Steg, 2008). People who strongly endorse biospheric values care for nature and the environment and more strongly base their decisions to engage in particular actions on the consequences of their behaviour for nature and the environment. Values reflect what people find important in their lives and should as such affect how people want to see themselves (i.e., their ideal selves) and what type of person they want to be, as well as how they actually see themselves. Therefore, environmental self-identity is likely to be particularly influenced by one's biospheric values. For example, if you think protecting the environment is a guiding principle in your life, you are likely to think that you should act upon your values and to see yourself as a person who acts environmentally-friendly.

Values are believed to be stable over time (Feather, 1995). Hence, we propose that values provide the stable factor influencing environmental self-identity. Therefore, environmental self-identity is likely to only change to some extent as it is related to one's core values. This may make environmental self-identity an important factor to study as it is likely to influence a range of pro-environmental behaviours, now and in the future.

In sum, we propose that values affect environmental self-identity, and that environmental self-identity will in turn predict pro-environmental behaviour. Hence, we assume that environmental self-identity mediates the relationship between biospheric values and pro-environ-

mental behaviour. In Chapter 2 we study if biospheric values indeed influence environmental self-identity and if this identity in turn influences environmental preferences, intentions and behaviours and thus mediates the relationship between values and behaviour. If values are indeed the stable factor influencing environmental self-identity, values should predict environmental self-identity at a later moment in time as well. Therefore, we will also test if values even predict environmental self-identity when values have been measured well ahead in time. Also, if biospheric values are the stable factor influencing environmental self-identity, they should still predict environmental self-identity if environmental self-identity has been changed. We thus propose that environmental self-identity can be changed, however only to a certain extent, as it is related to one's values. We will address this question in Chapter 3, by testing if biospheric values still influence environmental self-identity after a manipulation of environmental self-identity.

Past behaviour

We propose that although environmental self-identity is stable to a certain extent (i.e., being influenced by biospheric values), it can also be changed (via past behaviour). This suggests that environmental self-identity may be a particularly important factor to target in environmental policies as it can be strengthened to promote a wide range of pro-environmental actions, but still remains somewhat stable over time. Our proposition is based on self-perception theory. Self-perception theory states that: "Individuals come to know their own internal states, by inferring them from observations of their own overt behaviour" (Bem, 1972, p. 2). Self-perception theory mainly focuses on attitudes, for example, if someone performed an effortful task without any incentive to do so, one is likely to conclude to have a positive attitude towards this task. We expect that previous actions affect self-identity via a similar process. If environmental self-identity is influenced by past behaviour, reminding people of their past behaviour should influence the strength of their environmental self-identity. We propose that the more people perceive they acted environmentally-friendly in the past, the stronger their environmental self-identity. In contrast, we assume that one's environmental self-identity will be weaker if people perceive they rarely acted environmentally-friendly in the past. We propose that environmental self-identity is in turn related to a range of environmental behaviours, and mediates the relationship between past behaviour and subsequent environmental actions. This suggests that environmental self-identity may be an important factor in explaining positive spill-over from one pro-environmental action to another. For example, a pro-environmental driving style may strengthen environmental self-identity, which in turn can lead to a more environmentally-friendly diet.

Importantly, as explained above, we expect that after reminding people of their past environmental actions which will affect their environmental self-identity, biospheric values will still influence environmental self-identity, as we argued that values are the stable factor influencing identity. Thus we propose that environmental self-identity can be changed (by reminding people of their past actions), but is also stable to a certain extent (as it is influenced by values). In Chapter 3, 4 and 5 we study if environmental self-identity is indeed influenced

by people's past environmental actions and if subsequent pro-environmental actions can be stimulated by strengthening environmental self-identity. In Chapter 3 we test if people who acted environmentally-friendly in the past are more likely to have a strong environmental self-identity one year later. Also, we test if reminding people of their past environmental actions and providing them with feedback on the implications of this behaviour for their identity influences their environmental self-identity. Finally, in Chapter 3, 4 and 5 we test if simply reminding people of their past environmental actions influences environmental self-identity. Also, in Chapter 3 and 4 we test if the relationship between past behaviour and subsequent environmental behaviour is indeed mediated by environmental self-identity.

1.4 Signalling strength of past behaviour

Do all past behaviours influence environmental self-identity to the same extent or are there specific circumstances under which past pro-environmental actions are most likely to influence environmental self-identity? As explained above, we propose that people infer their environmental self-identity on the basis of their past actions. This may be more likely when the past pro-environmental actions clearly signal that you are an environmentally-friendly person. Based on attribution theory (Kelley & Michela, 1980) and self-perception theory (Bem, 1972), we hypothesized that the stronger the signalling strength of pro-environmental behaviours, the more likely it is that these behaviours will imply something about how pro-environmental you are, and hence, the more likely it is that engaging in these actions will strengthen your environmental self-identity. But which factors affect the signalling strength of previous environmentally-friendly actions, and hence, under which conditions is environmental self-identity most likely to be strengthened by past pro-environmental actions? We propose that the signalling function of past pro-environmental behaviour is stronger when you realise (1) you have engaged in a range of different pro-environmental actions; (2) not many others perform the pro-environmental behaviour; and (3) the pro-environmental behaviour is difficult.

First, we expect that environmental self-identity will be stronger when people realise that they have engaged in a range of past pro-environmental actions rather than a single environmentally-friendly behaviour, as a range of behaviours is more likely to signal who you are. In addition, we expect a range of behaviours to be particularly likely to signal who you are when the behaviours reflect clearly different types of pro-environmental behaviours. More specifically, the signalling function of past behaviour is likely to be stronger when the behaviours reflect environmentally-friendly actions with regard to transport, energy use and recycling instead of when the behaviours basically reflect one type of pro-environmental behaviour only, such as turning off the television, computer, charger when not in use (which all reflect whether one does not leave appliances on stand-by).

Second, we expect that when people realise that they have engaged in a pro-environmental behaviour that few others perform, this behaviour is more likely to signal their environmental self-identity. If many others perform the pro-environmental behaviour as well, one may simply follow the norm, or the behaviour may just be the most attractive behaviour that everyone would choose. However, if only few people perform the behaviour it is more likely to signal who you are.

Third, if someone performed a difficult pro-environmental action, this behaviour is more likely to signal one's identity than if someone performed an easy pro-environmental behaviour. When engaging in difficult pro-environmental actions, apparently, one was willing to take effort or to overcome barriers to act environmentally-friendly. In Chapter 4 we will test if past pro-environmental behaviours are more likely to strengthen environmental self-identity if this behaviour has a strong signalling function and we will test if environmental self-identity is in turn related to pro-environmental behaviour and mediates the relationship between past behaviour and future environmental actions.

1.5 Process via which environmental self-identity influences behaviour

As discussed above, we propose that people with a strong environmental self-identity are more likely to act pro-environmentally, even though acting environmentally-friendly may be somewhat costly or effortful. This suggests that people with a strong environmental self-identity are thus likely to act pro-environmentally even when there are no clear external incentives to do so. Why is this the case? We propose that people with a strong environmental self-identity are intrinsically motivated to act pro-environmental. That is, when environmental self-identity is strong, the motivation to act pro-environmental comes from within the individual rather than from external incentives (Frey, 1997). Being intrinsically motivated suggests that someone performs a behaviour because it is inherently satisfying or enjoyable, rather than for some separable outcome (Ryan & Deci, 2000). Are people with a strong environmental self-identity more likely to be intrinsically motivated to perform behaviour in line with that identity because they derive inherent satisfaction from it, and if so, why would acting pro-environmental be intrinsically rewarding? We argue that two types of intrinsic motivation can be distinguished: enjoyment-based intrinsic motivation and obligation-based intrinsic motivation (Lindenberg, 2001). When people have a strong enjoyment-based intrinsic motivation they act pro-environmental because they enjoy doing so. When people have a strong obligation-based intrinsic motivation they act pro-environmental because they feel morally obliged to do so. As most pro-environmental behaviours are not enjoyable, but instead are generally associated with more effort and less pleasure, we propose that obligation-based intrinsic motivation is particularly relevant for pro-environmental behaviour and environmental self-identity. Indeed, when a task is not very interesting, you are not likely to perform the behaviour because you enjoy it, and hence, enjoyment-based intrinsic motivation will not predict your behaviour (Vallerand, Pelletier, & Koestner, 2008). Instead, we expect that environmental self-identity is related to feelings of moral obligation to act pro-environmental and that people with a strong environmental self-identity are motivated to act in line with their identity because they feel morally obliged to do so. More specifically, we propose that a strong environmental self-identity strengthens one's obligation-based intrinsic motivation, which in turn promotes pro-environmental actions. Being related to intrinsic motivation suggests that environmental self-identity may be an important route to promote pro-environmental actions, as environmental self-identity may promote environmentally-friendly behaviour without external incen-

tives to do so. In Chapter 5 we test if people with a strong environmental self-identity indeed feel morally obliged to act pro-environmental and if the relationship between environmental self-identity and environmental behaviour is mediated by these feelings of moral obligation.

1.6 Summary

In sum, in this dissertation we study if environmental self-identity is related to a wide range of pro-environmental behaviours, which factors influence environmental self-identity and how it is related to environmental behaviour. More specifically, we test if environmental self-identity is influenced by biospheric values and by past environmental actions, and if environmental self-identity influences environmental behaviour via one's obligation-based intrinsic motivation. We propose that environmental self-identity is stable to a certain extent (i.e., being influenced by biospheric values), but can also be changed (via past behaviour). We expect that past behaviour will particularly strengthen environmental self-identity the more these past actions signal one's environmental self-identity. Finally, we propose that environmental self-identity influences environmental behaviour via one's obligation-based intrinsic motivation to act pro-environmental. If our reasoning is true environmental self-identity is an important factor to target in environmental policies as it predicts a range of pro-environmental actions, can be strengthened and no external incentives are needed to promote pro-environmental behaviour. We end this dissertation with a discussion of the main findings and the theoretical and practical implications of our findings. This will be discussed in Chapter 6.

2
THE VALUE OF ENVIRONMENTAL SELF-IDENTITY

Abstract

Biospheric values and environmental self-identities are considered to be important antecedents of environmental preferences, intentions, and behaviour. Although various authors suggest a relationship between values and self-identity, this has rarely been studied empirically. This paper aimed to clarify the relationship between biospheric values and environmental self-identity and to study how both are related to environmental preferences, intentions, and behaviour. We hypothesized that biospheric values are related to environmental self-identity, and that self-identity is in turn related to preferences, intentions, and behaviour. Results of three studies including a wide range of environmental preferences, intentions, and behaviour support our reasoning and show that biospheric values are related to environmental self-identity, even when measured months before. Moreover, we found that the relationship between biospheric values and environmental preferences, intentions and behaviour was fully mediated by environmental self-identity, indicating that biospheric values are related to preferences, intentions, and behaviour via one's environmental self-identity. This suggests that values need to be linked to the self in order to be influential in choices made.

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2.1 Introduction

Self-identity and values have been viewed as important influences on environmental preferences, intentions and behaviour (e.g., Sparks & Shepherd, 1992; Steg & De Groot, 2012; Gatersleben, Murtagh, & Abrahamse, 2012). Self-identity is often defined as the label that one uses to describe oneself (Cook, Kerr, & Moore, 2002). Various scholars suggested that there is a relationship between values and self-identity. For example, Crompton and Kasser (2009) stated that "values and life goals are the aspects of people's identities that reflect what they deem to be desirable, important, and worthy of striving for in their lives" (p. 8). According to Verplanken and Holland (2002) "values may form important ingredients of a person's self-concept and thus contribute to a person's sense of identity" (p. 434). Also, Sparks and Shepherd (1992) indicate that "a person's self-identity would be reflected in that person's beliefs, values, and attitudes" (p. 390). Many authors thus suggest a relationship between values and self-identity, and some even suggest that they are similar to a certain extent. In the current paper we aim to take a first step in studying the relationships between biospheric values and environmental self-identity, and how both in turn are related to environmental preferences, intentions and behaviour. First, we describe the conceptual difference between biospheric values and environmental self-identity, and discuss how they are related. Additionally, we will describe how biospheric values and environmental self-identity in turn are related to preferences, intentions and behaviours in the environmental domain. Next, we will test our theoretical model on relationships between biospheric values, environmental self-identity, and environmental preferences, intentions, and behaviours empirically. In doing so, we will integrate the two lines of research on values and self-identity, respectively.

2.1.1 Biospheric values

Values have been defined by Schwartz (1992) as desirable and transsituational goals that serve as guiding principles in one's life. Values are abstract and general and maintain stability over time (Feather, 1995). Studies showed that particularly biospheric values are strongly and consistently related to environmental preferences, intentions, and behaviour: those with strong biospheric values are more likely to have pro-environmental preferences and intentions, and to act pro-environmentally (see Steg & De Groot, 2012, for a review). People who strongly endorse biospheric values care for nature and the environment and more strongly base their decisions to engage in particular actions on the consequences of their behaviour for nature and the environment. Biospheric values have been shown to be related to a wide range of pro-environmental preferences and actions, including acceptability of climate change policies (Nilsson, Von Borgstede, & Biel, 2004; Steg, De Groot, Dreijerink, Abrahamse, & Siero, 2011), sustainable consumption (Thøgersen & Ölander, 2002), environmental activism (Steg et al., 2011), pro-environmental behaviour (Schultz & Zelezny, 1998), preference for restaurants serving organic food (Steg, Perlaviciute, Van der Werff, & Lurvink, 2012), and donating money to an environmental rather than a humanitarian organisation (De Groot & Steg, 2008). Values reflect what people find important in their lives and should as such affect how people want to see themselves (i.e. their ideal selves) and what type of person they want to be, as well as how they actually see themselves. In other words, values should influence one's self-identity.

2.1.2 Environmental self-identity

Self-identity has been defined as the label used to describe oneself (Cook et al., 2002), which relates to a particular behaviour (Conner & Armitage, 1998). Hence, we define an environmental self-identity as the extent to which you see yourself as a type of person who acts environmentally-friendly. Someone with a strong environmental self-identity will more strongly see himself or herself as the type of person who will act environmentally-friendly and consequently be more likely to act pro-environmental. Please note that our conceptualisation of environmental self-identity differs from the concept environmental identity (e.g., Clayton, 2003; Schultz & Tabanico, 2007) which has been conceptualised as a sense of connection to some part of the nonhuman natural environment that affects the way we perceive and act towards the world; a belief that the environment is important to us and an important part of who we are. Hence, environmental identity reflects whether one sees oneself as part of nature, whereas environmental self-identity reflects the view of self as a person who acts pro-environmentally. We think environmental self-identity is particularly relevant to understanding pro-environmental actions, as it more directly reflects pro-environmental actions, rather than only the importance of the environment as such for the self. Although environmental self-identity and environmental identity may be related, they are not necessarily the same. For example, you may see yourself as part of nature, but not as a person who acts pro-environmentally, for example because you do not acknowledge environmental problems, or do not link such problems to individual actions.

A few studies on self-identity in the environmental domain examined to what extent specific self-identities were related to behaviour related to that identity. These studies employed measures of self-identity that corresponded to our definition of environmental self-identity, namely: the extent to which people see themselves as the type of person who performs that particular environmental behaviour. These studies revealed that specific self-identities indeed predicted the relevant behaviours. For example, recycling self-identity appeared to be related to recycling behaviour (Nigbur, Lyons, & Uzzell, 2010), environmental activism self-identity was related to environmental activism (Fielding, McDonald, & Louis, 2008) and genetically modified food self-identity was found to be related to the intention to purchase genetically modified food (Cook et al., 2002). These specific self-identities are likely to be related to behaviours related to that self-identity, but are probably less predictive of other types of pro-environmental actions. Recent studies suggest that people may also have a more general environmental self-identity which may be related to a range of environmental preferences, intentions and behaviour. For example, green (self-)identity was related to eco-shopping, waste reduction, water savings, and domestic energy conservation (Whitmarsh & O'Neill, 2010), while the environmental self-identity was related to various pro-environmental behaviours, recycling, buying fair trade products and not flying on holiday (Gatersleben et al., 2012). Such general environmental self-identities may be promising pointers for strategies aimed at promoting pro-environmental actions, because by targeting environmental self-identity, a range of preferences and behaviours may change simultaneously. Therefore, in the current paper we will focus on general environmental self-identities which may predict a range of environmental preferences, intentions and behaviours.

2.1.3 Differences between biospheric values and environmental self-identity

There is a conceptual difference between values and self-identity: values are general and abstract principles that you strive for in life, while self-identity reflects how you see yourself. Although it is likely that biospheric values and environmental self-identity are related, as we will explain below, they may not always be consistent. The fact that you strive for unity with nature does not necessarily mean that you see yourself as the type of person who acts environmentally-friendly. For example, even though you strive for unity with nature, you may always go to work by car instead of by bike and therefore not see yourself as an environmentally-friendly person. Hence, in theory, someone can thus have strong biospheric values, but not a strong environmental self-identity as this identity also depends on the extent to which you actually engage in pro-environmental actions. Indeed, according to Biel, Dahlstrand, and Grankvist (2005), many people endorse biospheric values, but for a small minority being environmentally-friendly is part of their identity. A possible explanation for such apparent inconsistencies may be that one believes technological solutions will solve environmental problems rather than pro-environmental actions, or that others should take responsibility to reduce these problems (such as industry or the government).

2.1.4 Relationship between biospheric values and environmental self-identity

As indicated above, even though biospheric values and environmental self-identity may not always be consistent, they are likely to be related. Self-identity is likely to be influenced by one's values. For example, if you think protecting the environment is a guiding principle in your life, you are likely to think that you should act upon your values and to see yourself as a person who acts environmentally friendly. In addition, self-identity is likely to be influenced by past behaviour (e.g., Lee, Piliavin, & Call, 1999). For example, if you realise that you recycled your waste, you are more likely to see yourself as a person who acts pro-environmentally. The latter implies that self-identity is more likely to change over time (e.g., by reminding people of their past pro-environmental actions), in contrast to values that are believed to be general and relatively stable over time (Feather, 1995). However, we propose that environmental self-identity will only change to some extent as it is also related to one's core values. This may make environmental self-identity an especially important factor to study, as it is likely to be stable to a certain extent (as it is influenced by values), but also susceptible to change (via past behaviour) and thus may be strengthened (e.g., by reminding people of their previous pro-environmental actions) in order to promote pro-environmental actions. In sum, we hypothesize that one's environmental self-identity is related to biospheric values.

There is some initial evidence to suggest that values influence self-identity. Hitlin (2003) found that the strength of a volunteer identity was predicted by self-transcendent values, reflecting universalism and benevolence values. Those who found self-transcendent values more important had a stronger volunteer identity than those who found self-transcendent values less important. Interestingly, in a longitudinal study, Hitlin (2003) found that self-transcendent values predicted the volunteering identity even when controlling for prior measures of the same identity. This suggests that values may indeed be, as we reason, a stable factor influencing one's identity.

We propose that the stronger one's biospheric values, the more strongly a person sees himself or herself as an environmentally-friendly person. Moreover, the more one sees oneself as an environmentally-friendly person, the more one is motivated to act environmentally-friendly. We predict that environmental self-identity mediates the relationship between biospheric values and environmental preferences, intentions and behaviour. As explained above, values reflect your ideal self, whereas environmental self-identity is also influenced by past behaviour and thus more strongly reflects your actual self. One's actual self is likely to be a better predictor of behaviour than one's ideal self (cf. Higgins, 1987). Based on this, we propose that biospheric values are related to environmental self-identity which is in turn related to environmental preferences, intentions and behaviour. Hence, we expect that environmental self-identity mediates the relationship between biospheric values and environmental behaviour. A study by Whitmarsh and O'Neill (2010) provides some preliminary support for our reasoning. Their study showed that general environmental concern (that is, the New Environmental Paradigm; Dunlap, Van Liere, Mertig, & Jones, 2000) did not predict environmental behaviour when pro-environmental self-identity was also included in the regression analysis. This is to be expected if self-identity indeed mediates the relationship between values (or other general antecedents such as environmental concern) and behaviour. However, Whitmarsh and O'Neill (2010) did not test if the relationship was mediated by self-identity, and their study focused on environmental concern (i.e., NEP) rather than values, while values proved to be a better predictor of pro-environmental preferences and behaviour than environmental concern (Steg et al., 2011).

2.2 Present research

2.2.1 Hypotheses

In the present research we examined the relationship between biospheric values, environmental self-identity and environmental preferences, intentions and behaviour in a series of studies. Based on the above, we put forward three hypotheses. First, we hypothesized that biospheric values are not only conceptually different, but can also be empirically distinguished from environmental self-identity (Hypothesis 1). Second, we expected that biospheric values are related to environmental self-identity, as environmental self-identity is partly derived from values, with values being the stable factor influencing environmental self-identity (Hypothesis 2a). If this is true, biospheric values should predict environmental self-identity even when values are measured a few months earlier (Hypothesis 2b). Third, we expected that one's environmental self-identity in turn is related to preferences, intentions and behaviour, and that environmental self-identity mediates the relationship between values and the dependent variables. Thus, we hypothesized that environmental self-identity mediates the relationship between biospheric values and environmental preferences, intentions, and behaviour (Hypothesis 3). To test the robustness and validity of our findings, we tested these hypotheses in a series of studies, focussing on different indicators of general environmental self-identity and with different indicators of environmental preferences, intentions and behaviour.

2.2.2 Analyses

To test our hypotheses, we first conducted a confirmatory factor analysis via the multiple group method (a simple and effective type of confirmatory factor analysis, e.g., Nunnally, 1978; Stuive, 2007; Stuive, Kiers, Timmerman, & Ten Berge, 2008) to test if biospheric values and environmental self-identity can be distinguished empirically. Second, we tested the relationship between biospheric values and environmental self-identity (Hypotheses 2a and 2b). Third, we examined the relationship between biospheric values and environmental self-identity, and the dependent variables (environmental preferences, intentions, and behaviours), and whether the relationships between biospheric values and the dependent variables (environmental preferences, intentions, and behaviours) significantly reduced when environmental self-identity was controlled for; for this purpose, we report bootstrapping confidence intervals (Hypothesis 3).

2.3 Study one - Biospheric values, energy-saving self-identity and energy use

Study 1 aimed to examine factors influencing energy use. Energy use is a major contributor to environmental problems (Dietz, Gardner, Gilligan, Stern, & Vandenbergh, 2009). Energy use depends on a wide range of behaviours, including energy use at home, for transport, and indirect energy use (or: embodied energy), that is, the energy used to produce, distribute, and dispose of products (Reinders, Vringer, & Blok, 2003). We selected energy-related behaviour from three different domains, namely transport (driving style), home energy use (showering time) and food consumption (meat consumption[1]). In addition, we measured respondents' general intention to reduce their overall energy consumption. We focused on energy-saving self-identity, which is a broad category of one's self-identity in the environmental domain as it may be related to a wide range of energy-savings behaviours. We first tested if biospheric values and energy-saving self-identity can be distinguished empirically (Hypothesis 1). Second, we examined if biospheric values influenced one's energy-saving self-identity (Hypothesis 2a). Also, we studied if the relationship between biospheric values and the dependent variables was mediated by energy-saving self-identity (Hypothesis 3).

Method

Participants and procedure. Questionnaires were distributed door-to-door in a municipality in the North of the Netherlands. The questionnaire was completed by 468 respondents (a response rate of 54%). In total 229 females and 233 males participated in the study, 6 participants did not indicate their gender. Age ranged from 18 to 89 (M = 52.46, SD = 14.68). About 18% of the respondents did not complete any education or completed primary education or vocational secondary school, while 38% had completed the highest level of secondary school or vocational education, and 45% finished university. Around 7% of the sample indicated that their monthly net household income was less than 1000 Euros, 23% between 1000 and 2000

1 Meat consumption reflects indirect energy use. A substantial amount of energy is needed to produce and distribute meat (FAO, 2009).

Euros, 30% between 2000 and 3000 Euros, while 39% earned more than 3000 Euros per month.

Measures

Values. Participants first filled in a brief value questionnaire measuring their altruistic, egoistic, biospheric and hedonic values (Steg et al., 2012). Participants rated the importance of each value as a guiding principle in their life on a scale from -1 (opposed to my values) to 7 (extremely important). The biospheric value orientation was measured with four items (Respecting the earth: harmony with other species; Unity with nature: fitting into nature; Protecting the environment: preserving nature; Preventing pollution: protecting natural resources). The internal consistency of the biospheric value scale was .87 (M = 4.73, SD = 1.32).

Energy-saving self-identity. Energy-saving self-identity was measured with three items (Saving energy is an important part of who I am; I am the type of person who saves energy; I see myself as a person who saves energy), on a seven point scale ranging from *totally disagree* to *totally agree*. These items were very similar to measures of self-identity from previous research, however our items focused on the behaviour that is relevant for our study: energy saving (e.g., Fielding et al., 2008; Terry, Hogg, & White, 1999). Cronbach's alpha was .82 (M = 4.55, SD = 1.19).

Energy use. Respondents were asked to provide factual data on their behaviours whenever possible, to prevent socially desirable answers (cf. Gatersleben, Steg, & Vlek, 2002). Meat consumption was measured by asking respondents how many times per week they consume meat at their main meal of the day, and how many grams of meat they as a person eat on average when they have a meal with meat (see Staats, Harland, & Wilke, 2004). Both scores were multiplied, resulting in the total grams of meat consumed per person per week (M = 653.25, SD = 446.49). Similarly, showering time was measured by asking respondents how many times they take a shower per week, and how many minutes they shower each time on average. Again, both scores were multiplied, resulting in a score reflecting the total minutes of showering per person per week (M = 40.87, SD = 30.16). Driving style was measured with one item 'How often do you consistently drive in a fuel efficient way (look ahead, anticipate traffic, brake carefully and shift to a higher gear as soon as possible)?'. Scores ranged from 1 (never) to 7 (always) (M = 4.88, SD = 2.06). The intention to reduce energy consumption was measured with one item 'How much energy do you intend to save in the coming year?'. Responses could range from 1 (nothing at all) to 7 (a lot) (M = 4.36, SD = 1.16).

Results

We used the multiple group method (MGM) to test if biospheric values and energy-saving self-identity can not only be theoretically distinguished, but also empirically. We first computed the mean score for biospheric values and energy-saving self-identity. Next, we correlated all single items with the scale scores, after correcting for self-correlation (that is, the fact that items tend to correlate strongly with the scale to which they belong on theoretical grounds). If the items correlate strongest with the scale to which they are assigned on theoretical grounds, the factor

structure is supported (Nunnally, 1978). Table 2.1 shows that all biospheric value items correlated most strongly with the biospheric value scale and all energy-saving self-identity items correlated most strongly with the energy-saving self-identity scale, supporting Hypothesis 1.

Table 2.1 *Corrected correlations between biospheric value and energy-saving self-identity items and biospheric value and energy-saving self-identity scales via multiple group method (Study 1)*

	Biospheric values	Energy-saving self-identity
Biospheric values		
1. Respecting the earth	**.73**	.43
2. Unity with nature	**.66**	.36
3. Protecting the environment	**.76**	.45
4. Preventing pollution	**.74**	.47
Cronbach's alpha = .87		
Energy-saving self-identity		
5. Energy saving is an important part of who I am	.40	**.63**
6. I am the type of person who saves energy	.46	**.71**
7. I see myself as a person who saves energy	.44	**.69**
Cronbach's alpha = .82		

Note Correlation coefficients are corrected for self-correlations. Highest correlations for each value item are printed in **bold**

Hypothesis 2 was also supported: biospheric values explained 25% of the variance in energy-saving self-identity ($F(1, 449) = 150.75$, $p < .001$). The stronger respondents endorsed biospheric values, the stronger their energy-saving self-identity ($\beta = .50$, $p < .001$).

Next, we tested if biospheric values and energy-saving self-identity predicted the dependent variables. Indeed, biospheric values and energy-saving self-identity were both significantly related to all energy-related actions as well as to the intention to save energy (see Table 2.2).

Table 2.2 *Regression of energy-related behaviours and intention to reduce energy use on biospheric values and the energy-saving self-identity*

	Meat consumption			Showering time			Fuel efficient driving style			Intention to reduce energy use		
	ß	*t*	R^2	ß	*t*	R^2	ß	*t*	R^2	ß	*t*	R^2
Biospheric values	-.20	-4.27**	.04	-.14	-3.05*	.02	.17	3.58**	.03	.31	6.63**	.10
Energy-saving self-identity	-.27	-5.68**	.07	-.21	-4.51**	.04	.32	6.91**	.11	.55	13.46**	.30

* $p < .01$, ** $p < .001$

Respondents who more strongly endorsed biospheric values and respondents with a stronger energy-saving self-identity consumed less meat, showered less, had a more fuel efficient driving style, and had a stronger intention to reduce their energy use. More importantly, we found the expected mediation effect for all dependent variables, providing support for Hypothesis 3. The relationship between biospheric values and meat consumption was fully mediated by energy-saving self-identity, the bias-corrected bootstrap estimate of the indirect effect had a 95% confidence interval from -58.596 to -24.054, indicating that energy-saving self-identity significantly reduced the strength of the relationship between biospheric values and meat consumption. The effect of biospheric values on meat consumption was no longer significant (β = -.08, $p = .14$) when energy-saving self-identity was included in the model (β = -.24, $p < .001$). The relationship between biospheric values and showering time was fully mediated by energy-saving self-identity as well. The bias-corrected bootstrap estimate of the indirect effect had a 95% confidence interval from -3.157 to -.607. The effect of biospheric values on showering time reduced to non-significance (β = -.06, $p = .24$) when energy-saving self-identity was included in the model (β = -.17, $p < .01$). Also, energy-saving self-identity fully mediated the relationship between biospheric values and fuel-efficient driving style. The bias-corrected bootstrap estimate of the indirect effect had a 95% confidence interval from .097 to .241. Biospheric values were not significantly related to one's fuel-efficient driving style (β = .02, $p = .69$) when energy-saving self-identity was controlled for (β = .32, $p < .001$). Finally, the relationship between biospheric values and intention to reduce energy consumption was fully mediated by energy-saving self-identity. The bias-corrected bootstrap estimate of the indirect effect had a 95% confidence interval from .170 to .289, indicating that energy-saving self-identity significantly reduced the strength of the relationship between biospheric values and meat consumption. Biospheric values were not significantly related to intention (β = .04, $p = .36$) when energy-saving self-identity was controlled for (β = .52, $p < .001$).

Discussion

The MGM supported our first hypothesis: energy-saving self-identity could empirically be distinguished from biospheric values. In addition, Study 1 provided support for our second hypothesis: energy-saving self-identity was stronger when biospheric values were strong. Hypothesis 3 was also supported: we found that energy-saving self-identity fully mediated the relationship between biospheric values and all energy-related behaviours and intentions.

Study 1 focused on energy-saving self-identity. Can we replicate these findings if we focus on a different type of self-identity? If identity mediates the relationship between values and preferences, intentions and behaviour we should be able to replicate our findings when we focus on a different measure of identity, in this case environmental self-identity. Environmental self-identity is the broadest category of identities in the environmental domain, and may thus be related to a wide range of environmental preferences, intentions and behaviours. Can this broad measure of identity also be empirically distinguished from biospheric values? Also, does it mediate the relationship between biospheric values and environmental preferences, intentions and behaviour? If so, this would provide additional support for our hypothesis that biospheric values are related to preferences, intentions and behaviour via environmental self-identity. We designed Study 2 to find out.

2.4 Study two - Biospheric values, environmental self-identity and renewable energy

Study 2 aimed to replicate the findings of Study 1 with a more general measure of self-identity: environmental self-identity. Also, to further examine the validity and robustness of our findings, we included different dependent variables. More specifically, in Study 2 we focused on the use of green or renewable energy sources. If people would use more renewable energy sources instead of oil, gas or coal, CO_2 emissions could be significantly reduced. To test if environmental self-identity is related to a range of preferences and intentions we included different types of preferences and intentions related to the use of green energy, including the importance of generating green energy, willingness to pay more for green energy, intentions to switch to green energy, and willingness to reduce energy use when renewables would be used. We first tested whether biospheric values and environmental self-identity can be distinguished empirically. Second, we tested the relationship between biospheric values and one's environmental self-identity (Hypothesis 2a). Third, we examined whether environmental self-identity mediated the relationship between values and preferences and intentions (Hypothesis 3).

Method

Participants and procedure. Data were collected via an online questionnaire among a sample of the Dutch population. Participants were members of the panel of thesistools.com, and received a small reimbursement for their participation (less than 1 Euro). The questionnaire was online for 14 days in November 2010. The study was presented to participants as a study on energy use. In total, 138 participants filled in the questionnaire. The average age was 55

(*SD* = 15), 64% of the sample was male. The average net income of the sample was 2700 Euros per month, which is similar to the average Dutch household income of 2783 Euros (Statline, 2010). About 16% of the respondents did not complete any education, or completed primary education or vocational secondary school, 46% had completed the highest level of secondary school or a vocational education and 37% finished university.

Measures

Values. Participants first filled in the same value questionnaire as used in Study 1. Cronbach's alpha for the biospheric value scale was .87 (*M* = 5.14, *SD* = 1.39).

Environmental self-identity. The following three items were used to measure environmental self-identity: Acting environmentally-friendly is an important part of who I am; I am the type of person who acts environmentally-friendly; I see myself as an environmentally-friendly person. Note that the items were similar to the items in Study 1, only now they were focused on general environmental behaviour instead of saving energy. Respondents rated each item on a seven point scale, ranging from *totally disagree* to *totally agree*. Cronbach's alpha for this scale was .86 (*M* = 4.93, *SD* = 1.06).

Preferences and intentions. We included four indicators of preferences and intentions related to the use of green energy. First, participants indicated how important it is to them that green energy is generated, on a scale ranging from 1 (not important at all) to 7 (very important) (*M* = 5.02, *SD* = 1.50). Second, respondents indicated to what extent they are willing to pay more for green energy, on a seven point scale ranging from *not willing at all* to *very willing* (*M* = 3.93, *SD* = 1.90). Furthermore, participants indicated to what extent they are willing to cut down their energy use to reduce peak demand if their energy is green[2], on a seven point scale ranging from *not at all* to *totally* (*M* = 4.14, *SD* = 1.82). Finally, respondents indicated how likely it is that they will switch to green energy in the next year, on a seven point scale ranging from very unlikely to very likely (*M* = 4.89, *SD* = 1.95).

Results

Table 2.3 shows that environmental self-identity could again be distinguished empirically from biospheric values, providing further support for Hypothesis 1. In addition, biospheric values explained 46% of the variance in environmental self-identity ($F(1, 136) = 117.59$, $p < .001$), supporting Hypothesis 2a. Respondents who strongly endorsed biospheric values had a stronger environmental self-identity ($\beta = .68$, $p < .001$).

2 By reducing peak demand the efficiency of the system can be increased, because less energy needs to be generated to meet peak demand.

Table 2.3 *Corrected correlations between biospheric value and environmental self-identity items and biospheric value and environmental self-identity scales via multiple group method (Study 2)*

	Biospheric values	Environmental self-identity
Biospheric values		
1. Respecting the earth	**.73**	.59
2. Unity with nature	**.67**	.59
3. Protecting the environment	**.75**	.56
4. Preventing pollution	**.78**	.59
Cronbach's alpha = .87		
Environmental self-identity		
5. Acting environmentally-friendly is an important part of who I am	.71	**.74**
6. I am the type of person who acts environmentally-friendly	.64	**.77**
7. I see myself as an environmentally-friendly person	.48	**.70**
Cronbach's alpha = .86		

Note Correlation coefficients are corrected for self-correlations. Highest correlations for each value item are printed in **bold**

Biospheric values and environmental self-identity were both significantly related to all dependent variables (see Table 2.4). The stronger respondents' biospheric values and environmental self-identity, the more important the generation of green energy was to respondents, the more they were willing to pay for green energy, the stronger their willingness to reduce energy use if the energy is green, and the stronger their intention to switch to green energy. In addition, as expected, the relationships between biospheric values and all dependent variables were fully mediated by environmental self-identity. The relationship between biospheric values and the importance of generating green energy became non-significant ($\beta = .15$, $p = .13$) when environmental self-identity was included in the regression analysis as well ($\beta = .39$, $p < .001$). The bias-corrected bootstrap estimate of the indirect effect had a 95% confidence interval from .120 to .481. The effect of values on willingness to pay for green energy reduced

to non-significance (β = .02, p = .83) when environmental self-identity (β = .28, p < .05) was included in the model. The bias-corrected bootstrap estimate of the indirect effect had a 95% confidence interval from .024 to .478. Also, environmental self-identity fully mediated the relationship between biospheric values and willingness to reduce energy use if the energy is green. The bias-corrected bootstrap estimate of the indirect effect had a 95% confidence interval from .240 to .645. The effect of biospheric values on willingness to reduce energy use became non-significant (β = .05, p = .60) when environmental self-identity was controlled for (β = .46, p < .001). Finally, the relationship between biospheric values and the intention to switch to green energy in the next year was also fully mediated by environmental identity. The bias-corrected bootstrap estimate of the indirect effect had a 95% confidence interval from .191 to .647. The effect of biospheric values on intentions to switch to green energy was no longer significant (β = .01, p = .92) when environmental self-identity was controlled for (β = .44, p < .001). Overall, we found that biospheric values are related to environmental self-identity, and values no longer predicted preferences and behaviour when environmental self-identity is controlled for.

Table 2.4 *Regression of preferences and intention related to the use of green energy on biospheric values and the environmental self-identity*

	Importance of generating green energy			Willingness to pay for green energy			Willingness to reduce energy use if the energy is green			Intention to switch to green energy in the next year		
	ß	*t*	R^2	ß	*t*	R^2	ß	*t*	R^2	ß	*t*	R^2
Biospheric values	-.42	5.38**	.18	.21	2.54*	.05	.37	4.63**	.14	.31	3.81**	.10
Environmental self-identity	.49	6.62**	.24	.29	3.59**	.09	.50	6.72**	.25	.45	5.84**	.20

* p < .05, ** p < .001

Discussion

Even though Study 2 focused on environmental self-identity, the broadest category of identities in the environmental domain, Hypothesis 1 was supported: environmental self-identity could be empirically distinguished from biospheric values. Hypothesis 2a was also supported: biospheric values were positively related to environmental self-identity. Also, we found clear support for Hypothesis 3: environmental self-identity mediated the relationship between biospheric values and the dependent variables. In all cases, full mediation was shown, suggesting that the relationship between biospheric values and preferences and intentions related to the use of green energy runs via one's environmental self-identity. Therefore, even for the broad environmental self-identity, all hypotheses were supported.

In Study 1 and 2 we measured biospheric values and environmental self-identity at the

same time. Biospheric values are stable over time (e.g., Feather, 1995), and thus not likely to change over a short period of time. Self-identity on the other hand is more likely to change, for example because it is influenced by past behaviour (Lee et al., 1999). We proposed that biospheric values are indeed the stable factor influencing environmental self-identity. If true, values should not only predict environmental self-identity when measured at the same time (as we established in Study 1 and 2), but values should be related to environmental self-identity at a later moment in time as well. Therefore, in Study 3 we will test whether biospheric values predict environmental self-identity when values have been measured well ahead in time.

2.5 Study three - The relationship between biospheric values and environmental self-identity over time

In Study 3 we again tested if environmental self-identity is empirically distinct from biospheric values. Second, we tested if biospheric values are related to environmental self-identity several months later (Hypothesis 2b). Also, again we tested if the relationship between biospheric values and behaviour is mediated by environmental self-identity (Hypothesis 3). For this purpose, participants first filled in the short value questionnaire including biospheric values. A few months later, we asked participants to participate in a study in the lab in which we measured their environmental self-identity and environmental behaviour, which in this study involved a choice task between products with different environmental impacts.

Method

Participants and procedure. Respondents were undergraduates at a Dutch university who participated in the study in exchange for course credits. In total 99 respondents participated in this study, of which 16% was male. Age ranged from 18 to 48 (M = 20.8, SD = 3.58). Respondents first completed the value questionnaire online. One to three months later, they participated in the second part of the study in the lab that included measures of environmental self-identity and the product choice task.

Measures

Values. We used the same value questionnaire as used in Study 1 and 2. Cronbach's alpha for the biospheric values scale was .82 (M = 4.23, SD = 1.28).

Environmental self-identity. We used the same items to measure environmental self-identity as in Study 2. Cronbach's alpha was .88 (M = 4.53, SD = 1.12).

Product choice. Respondents were asked to choose one out of two options of a product. One option of the product was a sustainable choice, which was 10% more expensive than the unsustainable option. In total eight choices were offered. Respondents indicated for a pair of jeans, milk, a laptop, a pen, a writing pad, a bicycle, a pair of socks and a mobile phone if they would choose the sustainable or the unsustainable option. For example, participants chose between a pair of socks of 3 Euros which was produced in an unsustainable way and a pair of

socks of 3.30 Euros which was produced sustainably, see Appendix for a full description of the product choice task. We counted the number of times respondents chose the sustainable option (M = 5.39, SD = 1.84).

Results

The MGM again showed that environmental self-identity could be empirically distinguished from biospheric values, supporting Hypothesis 1 (see Table 2.5). In addition, as expected, biospheric values were related to environmental self-identity at a later time (Hypothesis 2b). Biospheric values explained 23% of the variance in environmental self-identity at a later time ($F(1, 94) = 28.12$, $p < .001$). The more strongly participants endorsed biospheric values, the stronger their environmental self-identity ($\beta = .48$, $p < .001$).

Table 2.5 *Corrected correlations between biospheric value and environmental self-identity items and biospheric value and environmental self-identity scales via multiple group method (Study 3)*

	Biospheric values	Environmental self-identity
Biospheric values		
1. Respecting the earth	**.62**	.35
2. Unity with nature	**.56**	.39
3. Protecting the environment	**.73**	.40
4. Preventing pollution	**.65**	.41
Cronbach's alpha = .82		
Environmental self-identity		
5. Acting environmentally-friendly is an important part of who I am	.54	**.70**
6. I am the type of person who acts environmentally-friendly	.33	**.85**
7. I see myself as an environmentally-friendly person	.39	**.77**
Cronbach's alpha = .88		

Note Correlation coefficients are corrected for self-correlations. Highest correlations for each value item are printed in **bold**

Five per cent of the variance in product choice was explained by biospheric values ($F(1, 94) = 4.79$, $p = .03$). The more strongly respondents endorsed biospheric values, the more often they chose sustainable products ($\beta = .22$, $p = .03$). Environmental self-identity explained 10% of the variance in product choice ($F(1, 95) = 11.01$, $p < .01$). The stronger one's environmental self-identity the more often one chose sustainable products ($\beta = .32$, $p < .01$).

The bias-corrected bootstrap estimate of the indirect effect had a 95% confidence interval from -.001 to .355, the 90% confidence interval ranged from .008 to .325. The effect of biospheric values on product choice was no longer significant ($\beta = .10$, $p = .36$) when environmental self-identity was controlled for ($\beta = .25$, $p = .03$).

Discussion

Again, the distinction between biospheric values and environmental self-identity was supported by the MGM, providing support for our first hypothesis. Study 3 showed that biospheric values measured at time 1 are related to environmental self-identity measured at time 2. This supports our hypothesis that values are the stable factor influencing environmental self-identity: even though environmental self-identity may change over time, it may be stable to a certain extent because it is related to values even when values are measured well before in time.

We also found support for our hypothesis that the relationship between biospheric values and behaviour is mediated by environmental self-identity, even though values had been measured well in advance, indicating that values are related to choices via environmental self-identity.

2.6 General discussion

In the present research we aimed to study the relationship between biospheric values, environmental self-identity, and environmental preferences, intentions and behaviour. Various authors suggested a relationship between values and identity, and some even suggested that they are similar to a certain extent (Crompton & Kasser, 2009; Verplanken & Holland, 2002; Sparks & Shepherd, 1992). We aimed to make a clear conceptual distinction between biospheric values and environmental self-identity, to study the relationship between the two, and to study how both are related to environmental preferences, intentions and behaviour. In all studies we found that biospheric values and environmental self-identity could not only be distinguished conceptually, but also empirically. We found this not only for energy-saving self-identity (Study 1), but also for the more general environmental self-identity (Studies 2 and 3).

We proposed that biospheric values are related to the strength of environmental self-identity. We found support for this hypothesis in all three studies: the more strongly one endorsed biospheric values, the more strongly one sees himself or herself as a person who acts pro-environmentally. This was not only true for environmental self-identity but also for energy-saving self-identity. In line with our prediction, in Study 3 we found that biospheric values even predicted environmental self-identity and environmental actions at a later moment in time, suggesting that biospheric values are indeed the stable factor related to environmental self-

identity. Thus, in all studies we found that although biospheric values and environmental self-identity could be distinguished empirically, there is a strong relationship between them. In the first study biospheric values explained 25% of the variance in energy-saving self-identity. In Study 2 we found that biospheric values explained more variance in environmental self-identity, namely 46%. However, this may be expected as environmental self-identity is a broader type of identity than energy-saving self-identity. The broader the self-identity, the stronger the relationship with biospheric values may be, because they are measured on a similar level of specificity. This is in line with the compatibility principle which states that the relationship between two variables is stronger when they are measured on the same level of specificity (Ajzen, 1996). In the last study values explained 23% of the variance in environmental self-identity measured much later in time. Therefore, even though biospheric values and environmental self-identity are clearly different constructs, there is a relationship between them.

We expected that environmental self-identity in turn relates to preferences, intentions and behaviour, and that the relationship between values and preferences, intentions and behaviour would be mediated by environmental self-identity. In all studies, we found consistent support for the mediating role of environmental self-identity. For all of our dependent variables, full mediation was found, suggesting that values are indeed related to preferences, intentions, and behaviour via environmental self-identity, although the effect was somewhat weaker in Study 3. This suggests that values influence behaviour via one's self-identity, and that this is more likely to be the case when the particular values are strongly endorsed. As our results are based on correlational data, future research is needed to test whether the results can be replicated with experimental designs, which would allow for more definite conclusions on causality. For example, future studies could test if biospheric values are still related to environmental self-identity after a manipulation of environmental self-identity (e.g., by reminding people of their past behaviour). Also, we relied on behavioural self-reports; future research is needed to test if environmental self-identity is related to actual behaviours as well, for example by observing environmental behaviour.

We studied the relationship between biospheric values, environmental self-identity and a wide range of environmental preferences, intentions and behaviours. We found that biospheric values and environmental self-identity were consistently related to a wide range of environmental preferences, intentions, and behaviours, including behaviours reflecting direct and indirect energy use, product choices, intentions to save energy, curtailment and efficiency behaviours, and preferences and willingness to pay for green energy. This suggests that environmental self-identity and biospheric values can both be considered a general antecedent of environmental preferences, intentions, and behaviour. It has been argued that values are difficult to change (e.g. Feather, 1995) while studies have shown that self-identity is influenced by past-behaviour (Lee et. al, 1999) suggesting that it can be changed more easily. Therefore, interventions targeting environmental self-identity may be a more promising approach to promote pro-environmental behaviour than interventions targeting biospheric values, as the former will probably be more easily changed. An important question for future research is whether environmental self-identity can be changed more easily than values (for example by influencing past behaviour, or reminding people of their past pro-environmental actions) and

whether campaigns or policies that address environmental self-identity result in several pro-environmental actions.

In the present study we integrated two lines of research: research on values and self-identity, respectively. Our results showed that the relationship between biospheric values and environmental preferences, intentions and behaviour is mediated by environmental self-identity. We expect that this finding can be generalized to other types of values and identities. A study by Hitlin (2003) provides some initial support that this relationship may be generalized. Hitlin found that self-transcendent values, which reflect universalism and benevolence values, are positively related to the strength of volunteer identity. However, more research is needed to test if our findings can be generalized to other types of values and identities. For example, do altruistic values predict preferences, intentions and behaviour via the altruistic self-identity?

Recent research suggests that self-identity may be an important factor in explaining environmental behaviour (e.g., Gatersleben et al., 2012; Whitmarsh & O'Neill, 2010; Nigbur et al., 2010). We found further evidence for the importance of self-identity in the environmental domain. In addition we examined which factors are related to environmental self-identity. Not much was known about environmental self-identity and how it is related to other constructs in environmental psychology. The aim of our research was to take a first step in studying the relationship between biospheric values and environmental self-identity, and examining how both are related to environmental preferences, intentions and behaviour. Importantly, we replicated our findings using different indicators of self-identity and preferences, intentions, and behaviour in the environmental domain, indicating that the findings are robust. Also, in two of the three studies we tested our hypotheses in general samples of the Dutch population. To further test the validity of our findings future research could examine how environmental self-identity is related to other important concepts related to environmental behaviour, such as connectedness to nature, environmental concern, environmental attitudes and personal norms (e.g., Schultz & Tabanico, 2007; Clayton, 2012; Thøgersen, 2009; Weigel & Weigel, 1978). We expect that environmental self-identity is influenced by other general antecedents of environmental behaviour such as connectedness to nature and environmental concern as well. Furthermore, we expect that personal norms will be influenced by environmental self-identity, because they are more behaviour specific antecedents. This may imply that people consider moral implications of not acting in line with their view of self.

In sum, we studied the relationship between biospheric values, environmental self-identity and environmental preferences, intentions, and behaviour. Our results revealed that environmental self-identity is related to biospheric values and values are related to preferences, intentions and behaviour via environmental self-identity.

Appendix

Product choice task

Imagine that you want to buy the products described below. For every product you can choose between 2 options. The first option is cheap, but not sustainably produced. The second option is sustainably produced, but more expensive. Please indicate for each product which option you would choose.

a. A designer pair of jeans of 100 euros, which is produced unsustainably.
b. A designer pair of jeans of 110 euros, which is produced sustainably.

a. A liter of milk of 65 cents, which is produced unsustainably.
b. A liter of milk of 72 cents, which is produced sustainably.

a. A new laptop of 900 euros, which is produced unsustainably.
b. A new laptop of 990 euros, which is produced sustainably.

a. A pen of 1 euro, which is produced unsustainably.
b. A pen of 1,10 euros, which is produced sustainably.

a. A writing pad of 3 euros, which is produced unsustainably.
b. A writing pad of 3,30 euros, which is produced sustainably.

a. A bicycle of 400 euros, which is produced unsustainably.
b. A bicycle of 440 euros, which is produced sustainably.

a. A pair of socks of 3 euros, which is produced unsustainably.
b. A pair of socks of 3,30 euros, which is produced sustainably.

a. The newest model mobile phone of 500 euros, which is produced unsustainably.
b. The newest model mobile phone of 550 euros, which is produced sustainably.

3
I AM WHAT I AM BY LOOKING PAST THE PRESENT

The influence of biospheric values and past behaviour on environmental self-identity

Abstract

A strong environmental self-identity increases the likelihood of a wide range of pro-environmental actions. But which factors influence identity and can we strengthen it? We propose that the environmental self-identity depends on biospheric values and on past behaviour, and that the strength of one's environmental self-identity can be changed somewhat by reminding people of their past environmental behaviour. We tested our model in a series of studies and show that both biospheric values and past environmental behaviour influence the environmental self-identity which is in turn related to subsequent environmental judgements and intentions. Furthermore, we found that although the strength of the environmental self-identity changed when we reminded people of their past environmental actions, biospheric values remained an important predictor of self-identity, suggesting that the environmental self-identity has a stable core. Our results further suggest that environmentally-friendly behaviour can be promoted by reminding people of their past pro-environmental actions as this will strengthen one's environmental self-identity.

Chapter 3 is based on: Van der Werff, E., Steg, L., & Keizer, K. (2013). I am what I am by looking past the present: The influence of biospheric values and past behaviour on environmental self-identity. *Environment and Behavior*. doi:10.1177/0013916512475209.

3.1 Introduction

Human actions are a major contributor to environmental problems (IPCC, 2007). To promote pro-environmental actions it is essential to understand which factors affect such actions and how these factors can be influenced. Several scholars consider self-identity as an important predictor of pro-environmental actions. Self-identity is generally defined as the label used to describe yourself (Cook, Kerr, & Moore, 2002). It is the salient part of the self-concept which relates to a particular behaviour (Conner & Armitage, 1998). Studies have shown a relationship between specific types of self-identity and identity-related environmental intentions and actions, including recycling (Nigbur, Lyons, & Uzzell, 2010), environmental activism (Fielding, McDonald, & Louis, 2008), and the purchase of genetically modified food (Cook et al., 2002). Specific self-identities (for example a recycling identity) were thus found to be related to specific behaviours (such as recycling). Recent research suggests a more general environmental self-identity can be distinguished as well that predicts a range of environmental actions rather than specific behaviours only. Whitmarsh and O'Neill (2010) for example found that the green identity is related to water and domestic energy conservation, waste reduction, and eco-shopping. Whereas a specific identity is likely to be more strongly related to that specific behaviour than a general identity, a general environmental self-identity (such as the green identity) may provide a more efficient instrument for explaining and promoting pro-environmental behaviour, because it is likely to be related to a wide range of judgements, intentions and behaviours rather than merely one specific type of pro-environmental action.

3.1.1 Environmental self-identity

We define the environmental self-identity as the extent to which you see yourself as a person whose actions are environmentally-friendly. It prescribes a course of action that is compatible with a sense of who you are, and as such promotes pro-environmental actions (cf. Clayton & Opotow, 2003). Hence, people with a strong environmental self-identity will more strongly see themselves as an environmentally-friendly person and be more likely to act in line with this identity. But which factors influence a general environmental self-identity? Moreover, how can we strengthen the environmental self-identity, and will this indeed increase the likelihood of further pro-environmental actions? We propose that the environmental self-identity depends on biospheric values and thus has a stable core. This is important, as this implies that the environmental self-identity is likely to affect a range of pro-environmental actions, now as well as in the future. In addition, we hypothesize that environmental self-identity depends on past behaviour, which implies that it can be changed to some extent by making people's past pro-environmental actions salient. In sum, we will test the model shown in Figure 3.1. We elaborate on our reasoning below.

3.1.2 Biospheric values and environmental self-identity

Values are desirable and transsituational goals that vary in importance and serve as a guiding principle in one's life (Schwartz, 1992). They are likely to develop early in life (Stern, Dietz, &

Figure 3.1 *The relationship between biospheric values, past environmental actions, environmental self-identity and future environmental judgements, intentions and behaviours*

Guagnano, 1995). Values are abstract and general and remain stable over time (Feather, 1995; Stern, 2000). Biospheric values are particularly important for understanding and predicting environmental behaviour (Steg & De Groot, 2012). People who strongly endorse biospheric values care for nature and the environment as such and more strongly base their judgements and decisions to engage in particular actions on the consequences of their behaviour for nature and the environment. The stronger people endorse biospheric values, the more environmentally-friendly they judge and act (e.g., Steg & De Groot, 2012; Schultz & Zelezny, 1998). Although we hypothesise that biospheric values influence one's environmental self-identity, values and self-identity may not always be consistent. Indeed, biospheric values can be a guiding principle in your life, but this does not necessarily mean that you see yourself as the type of person who acts environmentally-friendly, because under certain circumstances your behaviour may not be in line with your values. For example, you can strongly value the environment, but if you always go to work by car instead of by bike because you live far from your work, you may not see yourself as an environmentally-friendly person. Similarly, you may have strong biospheric values, but think that technological solutions are sufficient to solve environmental problems, or that industry or the government are responsible to solve these problems. Therefore, you may have strong biospheric values while not actually engaging in certain environmentally-friendly actions, and hence not see yourself as a person who acts pro-environmentally, which implies that your environmental self-identity is not very strong. However, if someone does express one's values in another way, that person may still develop an environmental self-identity. This implies that, in theory, people can have strong biospheric values, but not an equally strong environmental self-identity. Many people endorse biospheric values, but only for a minority being environmentally-friendly is part of their identity (Biel, Dahlstrand, & Grankvist, 2005).

3.1.3 Relationship between biospheric values and environmental self-identity

However, despite possible divergence between biospheric values and environmental self-identity, we do expect that biospheric values influence the environmental self-identity. Values reflect what people find important in their lives and as such affect how people want to see themselves (i.e., their ideal selves), what type of person they want to be, as well as how they actually see themselves. This implies that values are likely to influence one's self-identity. Those who strongly care for nature and the environment are more likely to see themselves as the type of person who acts environmentally-friendly and to act accordingly. Theoretically, it is

not likely that self-identity influences values. Most importantly, values are believed to develop early in life and to remain stable across time, whereas self-identity is likely to change more easily (e.g., via past behaviour; e.g., Lee, Piliavin, & Call, 1999; Hitlin, 2003). Hence, in line with previous studies (see Steg & De Groot, 2012, for a review), we propose that values affect behaviour indirectly, via the environmental self-identity.

A study by Hitlin (2003) provides initial evidence for the proposition that values are related to identity: he found that the strength of volunteer identity was predicted by self-transcendent values, reflecting universalism and benevolence values. People with strong self-transcendent values had a stronger volunteer identity than those with weaker self-transcendent values. However, it is not clear whether the same is true for biospheric values and environmental self-identity. More importantly, Hitlin (2003) did not test if identity in turn predicts future judgements, intentions and actions. We propose that biospheric values influence environmental self-identity, which in turn influences environmental judgements, intentions and behaviour.

Being influenced by values suggests that environmental self-identity is (somewhat) stable over time and place, because values are considered to be relatively stable in time (Schwartz, 1992; Feather, 1995). However, as described above, we propose that despite this, environmental self-identity is also susceptible to change, as we expect that identity also depends on past behaviour. Past behaviour may be a promising route to influence the environmental self-identity, for example by persuading people to perform a certain behaviour or by reminding them of past environmental actions.

3.1.4 Past behaviour and environmental self-identity

Besides being influenced by values and thus relatively stable, we expect that environmental self-identity can also be changed, because it is influenced by past behaviour. More specifically, the more often individuals acted environmentally-friendly in the past, the more likely it is that they will perceive themselves as environmentally-friendly persons. We propose that this effect of previous environmental actions on environmental self-identity is not dependent on the strength of one's biospheric values. The influence of past behaviour on environmental self-identity may be explained by self-perception theory, which states that: "individuals come to know their own internal states by inferring them from observations of their own overt behaviour" (Bem, 1972, p. 2). Research on self-perception theory mostly focused on attitudes rather than self-identity, however we expect a similar process for the relationship between past behaviour and self-identity. If environmental self-identity is influenced by past (pro-) environmental behaviour, it should be possible to change the strength of one's environmental self-identity by making people aware or reminding them of their past behaviour.

We propose that the more environmentally-friendly individuals' (perceptions of their) past behaviour, the stronger their environmental self-identity, which in turn influences their future environmental actions. There is some initial empirical evidence that past behaviour indeed influences self-identity and that self-identity in turn influences behaviour (Charng, Piliavin, & Callero, 1988; Lee et al., 1999). For example, Lee and colleagues (1999) found that past behaviour as a blood donor was a significant predictor of one's blood-donor identity. The

identity as a blood donor in turn influenced the intention to donate blood. However, these results are based on correlational data, so it is difficult to draw causal conclusions. Maybe people started to donate blood because they had a strong identity in the first place. Also, these studies focused on how a specific identity influenced specific behaviour related to that identity. Can we replicate these findings when focusing on the more general environmental self-identity? Importantly, we propose that specific past pro-environmental behaviours influence one's general environmental self-identity and that this general environmental self-identity will in turn influence a range of (other) pro-environmental judgements, intentions, and behaviours. This suggests that environmental self-identity may be an important factor in promoting positive spill-over from one environmentally-friendly behaviour to another. For example, adopting a fuel-efficient driving style may strengthen environmental self-identity, which in turn can promote environmentally-friendly food purchases.

Within the environmental domain there is some initial evidence that making people's past environmental behaviour salient influences future environmental judgements, intentions, and actions. Cornelissen, Pandelaere, Warlop and Dewitte (2008) asked participants to report the frequency in which they engaged in pro-environmental actions. One group received a list of pro-environmental behaviours which many people engage in, while the others received a list of behaviours that are rarely conducted. Participants who were asked to report the frequency of common pro-environmental behaviours acted more environmentally-friendly in subsequent tasks than participants who reported the frequency of less common behaviours. Also, in one of their studies they found that the manipulation of the salience of past behaviour had an effect on participants' attitudes, their sense of moral obligation and the extent to which they indicated to take environmental considerations into account in their purchase decisions (which they labelled as self-perception[1]). However, they did not test if these variables are in turn related to pro-environmental actions and if they mediate the relationship between past behaviour and subsequent pro-environmental actions. Therefore, the question remains whether the effects of the salience of past behaviour on future actions were due to changes in the strength of one's environmental self-identity. Our study will address this issue.

3.1.5 Aim current paper

The aim of the current paper is to study whether environmental self-identity is influenced by biospheric values and by past behaviour, and thus consists of a more stable part (as it is influenced by values) and of a part that can be influenced (via past behaviour). More specifically we test the model shown in Figure 3.1. Some studies provide initial evidence for parts of this model. However, in this paper we aim to integrate these lines of research and test the full model in the environmental domain. We always measured values at least one week before the main study to ensure that our measure of values did not influence the other measures in the study. We hypothesized that values and past behaviour both uniquely contribute to the explanation of environmental self-identity. Moreover, we hypothesized that the relationships

1 Note that this is different from our conceptualisation of environmental self-identity as taking environmental considerations into account does not mean that you see yourself as a pro-environmental person, and does not need to result in pro-environmental choices.

between values and environmental judgements, intentions and behaviour, and between past behaviour and subsequent environmental judgements, intentions, and actions were both mediated by environmental self-identity. To test the robustness and validity of our findings, we included different indicators of environmental judgements, intentions, and behaviour in our studies. In addition, to test if environmental self-identity may be an important factor in explaining positive spill-over, we included environmental judgements, intentions and behaviours as dependent variables that differ from the measures or manipulations of the salience of past behaviour.

We tested our model and hypotheses in a series of studies. In the first study we tested the full model in a correlational design. In the second study we tested if environmental self-identity changes after a strong manipulation of environmental self-identity in which we reminded people of their past environmental actions and provided them with feedback on the implications of their responses for their self. Also, we tested if biospheric values are still related to environmental self-identity after such a strong manipulation. This allowed us to test if values are the stable factor influencing environmental self-identity and if environmental self-identity is thus only somewhat malleable. In Study 3 we tested our full model in an experimental design, using a more subtle manipulation of the environmental self-identity, that is, we only reminded people of their past environmental actions. As an explicit measure of the environmental self-identity may influence responses on a subsequent behavioural variable, we conducted Study 4, in which we tested if the (subtle) manipulation of the salience of past behaviour influences future environmental actions.

3.2 Study one - Past driving style, biospheric values, environmental self-identity and intention to reduce meat consumption

The aim of Study 1 was to test the ecological validity of our model by studying the full model in a representative sample of the Dutch population. Also, Study 1 aimed to test whether environmental self-identity may be an important factor in explaining positive spill-over effects. Therefore, we selected two clearly distinct environmental behaviours to test if past behaviour in one domain influences future behaviour in another domain via one's environmental self-identity.

We first studied the relationship between biospheric values and past environmental behaviour and environmental self-identity, to test if environmental self-identity is somewhat stable but can also be changed. More specifically, we tested if a fuel-efficient driving style and values measured at time 1 are related to environmental self-identity one year later. Second, we tested if environmental self-identity in turn is related to future environmentally-friendly intentions, namely the intention to reduce meat consumption. Finally, we tested if the relationships between values and intention and between previous behaviour (i.e., fuel-efficient driving style) and intention were mediated by environmental self-identity.

Method

Participants and procedure. Two questionnaires were distributed door-to-door in a municipality in the north of the Netherlands in 2010 and 2011. The first questionnaire was completed by 468 respondents (a response rate of 54%). In total 229 females and 233 males participated in the study, 6 participants did not indicate their gender. Age ranged from 18 to 89 (M = 52, SD = 14.7). The questionnaire included questions on values and energy consumption, including questions on one's driving style.

One year later we returned and asked all households who participated in the first study to fill out the second questionnaire. Of the 468 original participants, 335 filled out the second questionnaire as well (72%). The participants who filled out the second questionnaire did not differ from the participants who did not fill out the second questionnaire in the two independent variables, that is, the strength of their biospheric values ($t(460) = .83$, $p = .41$) and driving style ($t(415) = .20$, $p = .84$) did not differ significantly. Among other things this questionnaire included measures of environmental self-identity and intentions to engage in pro-environmental actions. Although we stressed that the questionnaire should be completed by the same person who filled in the first questionnaire, this appeared not always to be the case. When we checked the age and gender of participants, it appeared that 103 questionnaires were filled out by a different household member or did not yield sufficient information to check if it was completed by the same person (as gender or age was not indicated); we excluded these cases from the data analyses. Hence, the resulting data set comprised 232 people, of which were 144 men and 88 women. Average age was 56 (SD = 12.8). Again, the strength of biospheric values and driving style did not differ from the participants who only filled in the first questionnaire (both $ps > .10$).

Questionnaire 1 (2010)

Values. Participants first filled in a brief value questionnaire measuring their altruistic, egoistic, biospheric and hedonic values (Steg, Perlaviciute, Van der Werff, & Lurvink, 2012). The questions were based on Schwartz's value scale (1992). Biospheric values were measured with four items ('Respecting the earth: harmony with other species'; 'Unity with nature: fitting into nature'; 'Protecting the environment: preserving nature'; 'Preventing pollution: protecting natural resources'). Participants rated the importance of each value item as a guiding principle in their life on a scale ranging from -1 (opposed to my values), 0 (not important) to 7 (extremely important). The internal consistency of the biospheric value scale was high ($\alpha = .86$). We calculated the mean score of the four value items (M = 4.79, SD = 1.26).

Driving style. Driving style was measured with one item 'How often do you consistently drive in a fuel-efficient way (look ahead, anticipate traffic, brake carefully and shift to a higher gear as soon as possible)?'. Scores could range from 1 (never) to 7 (always) (M = 5.43, SD = 1.38). Participants could also indicate if they never drive or do not have a driver's license; these respondents were excluded from the analyses. The remaining sample size was 209.

Questionnaire 2 (2011)

Environmental self-identity. In line with our definition of environmental self-identity, our measure of environmental self-identity focused specifically on whether people saw themselves as a person whose actions are pro-environmentally. The following three items were used to measure environmental self-identity: Acting environmentally-friendly is an important part of who I am; I am the type of person who acts environmentally-friendly; I see myself as an environmentally-friendly person. These items were adapted from previous research (e.g., Fielding et al., 2008; Terry, Hogg, & White, 1999). Respondents rated each item on a seven point scale, ranging from *totally disagree* to *totally agree*. We computed the mean score on these items; Cronbach's alpha for this scale was .95 (M = 4.88, SD = 1.28).

Intention to reduce meat consumption. We asked participants if they intend to reduce their meat consumption, with three items (I will probably eat less meat; I intend to eat less meat; I will reduce my meat consumption) that were rated on a scale from 1 (totally disagree) to 7 (totally agree). Mean scores were computed; Cronbach's alpha was .92 (M = 3.69, SD = 1.53).

Results

To test if biospheric values and environmental self-identity are not only theoretically distinct concepts, but can also be distinguished empirically, we performed a confirmatory factor analysis (via the multiple group method, a simple and effective type of confirmatory factor analysis; e.g., Nunnally, 1978; Stuive, 2007; Stuive, Kiers, Timmerman, & Ten Berge, 2008). The results of this confirmatory factor analysis show that biospheric values and environmental self-identity can indeed be distinguished empirically.

Table 3.1 *Correlations between biospheric values, driving style, environmental self-identity and intention to reduce meat consumption*

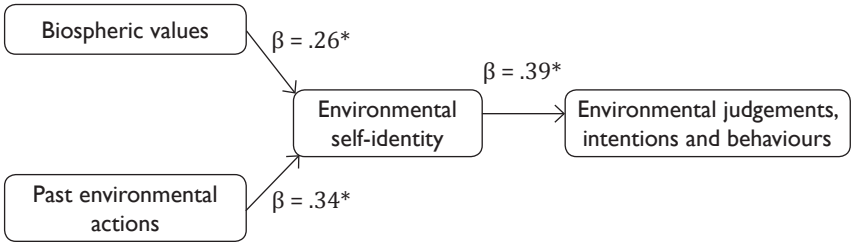
	Biospheric values	Driving style	Environmental self-identity
Driving style	.14*		
Environmental self-identity	.31**	.38**	
Intention to reduce meat consumption	.27**	.17**	.44**

* $p < .05$ ** $p < .01$

Table 3.1 shows that all variables were positively correlated. A regression analysis revealed that our first hypothesis was supported: past behaviour (one's driving style) as well as biospheric values significantly predicted environmental self-identity one year later (R^2 = .21;

($F(2,200) = 26.27$, $p < .001$, $f^2 = .27$): the stronger participants endorsed biospheric values (β = .26, $p < .001$) and the more fuel-efficient participants' driving style (β = .34, $p < .001$), the stronger their environmental self-identity one year later (see Figure 3.2). In addition, we ruled out the possibility of a significant values by past behaviour interaction as a significant predictor of identity and intentions (both *p*s > .10).

Figure 3.2 *The relationship between biospheric values, past driving style, environmental self-identity and intention to reduce meat consumption*



Betas in the model reflect tests of the full model, these may slightly differ from the betas of the separate hypotheses. * $p < .001$

As expected, environmental self-identity in turn predicted the intention to reduce meat consumption ($R^2 = .19$; $F(1,193) = 46.40$, $p < .001$). The stronger the environmental self-identity, the stronger the intention to reduce meat consumption (β = .44, $p < .001$).

Next, we tested whether identity mediated the relationship between values and future intentions and between past behaviour and future intentions. Values and past behaviour significantly predicted the intention to reduce meat consumption ($R^2 = .09$; $F(2,192) = 9.68$, $p < .001$). The stronger the biospheric values, the stronger the intention to reduce meat consumption one year later (β = .26, $p < .001$). Also, the more fuel-efficient participants' driving style, the stronger their intention to reduce meat consumption (β = .14, $p = .05$). In line with our hypothesis, environmental self-identity mediated the relationship between values and intention to reduce meat consumption and mediated the relationship between past behaviour and intention to reduce meat consumption. The 95% bootstrap confidence interval for the indirect effect of values on intention via environmental self-identity ranged from .034 to .189. The effect of values on intention significantly reduced (β = .17, $p = .01$) when identity was included in the model as well (β = .39, $p < .001$). The 95% bootstrap confidence interval for the indirect effect of past behaviour on intention via environmental self-identity ranged from .076 to .220. The effect of past behaviour on intention became non-significant (β = .00, $p = .97$) when identity was included in the model.

Discussion

In Study 1 we found support for our model (Figure 3.1): values as well as previous behaviour were related to environmental self-identity. That is, the more fuel-efficient one's driving style and the stronger one's biospheric values, the stronger their environmental self-identity one year later. Importantly, in line with our hypothesis, both values and past behaviour uniquely contributed to the prediction of environmental self-identity. Environmental self-identity was in turn positively related to a different indicator of environmental behaviour, namely the intention to reduce meat consumption, suggesting that environmental self-identity may indeed be an important factor in explaining positive spill-over between environmental behaviours. As expected, the relationships between past behaviour and intention, and between values and intention were both mediated by environmental self-identity. These results provide initial support for our hypothesis that past behaviour influences environmental self-identity, but that biospheric values also significantly predict environmental self-identity when past behaviour is controlled for. Moreover, we found that environmental self-identity in turn promotes other future environmentally-friendly intentions. However, Study 1 is based on correlational data so we cannot draw definite conclusions on causal relationships. Therefore, in Study 2, we used an experimental research design to test if the environmental self-identity can be strengthened. Also, we tested if biospheric values still influence environmental self-identity after such a manipulation.

3.3 Study two - A strong manipulation of environmental self-identity

The aim of Study 2 was to test if environmental self-identity can be strengthened and to test whether values still influence environmental self-identity after this manipulation, to examine if environmental self-identity is somewhat stable but can also be changed. In this study, we used a strong manipulation of environmental self-identity: we did not only remind people of their past environmental actions, but we also provided them with feedback on whether they are an environmentally-friendly person or not. We thus provided them with feedback in which we linked their past behaviour to their self-identity. If values still influence environmental self-identity after such a strong manipulation of identity, this clearly supports our hypothesis that values are a stable factor influencing identity and that environmental self-identity can be changed only somewhat, as values remain a predictor of self-identity.

Method

Participants and procedure. Data were collected via two online questionnaires. Participants were invited to participate in the study via email. The first questionnaire included a value scale. One week later participants were invited to fill in the second questionnaire, which included the manipulation and measures of environmental self-identity. In total, 50 participants filled in both questionnaires. Age ranged from 18 to 65, 56% of the sample was male.

Materials

Manipulation. We reminded people of their past environmental behaviour and provided them with feedback on the implications for one's identity by means of the hidden self-procedure (Spanos, Radtke, & Bertrand, 1985). The hidden self-procedure is a test which consists of questions on how often people perform certain behaviours, after which feedback is given that the test shows that they are a specific type of person. In our version of the test we asked participants to indicate how often they engage in different pro-environmental behaviours. For half of the participants, the questions were phrased extremely, for example: 'I always buy an environmentally-friendly product, regardless of the price or effort'; 'I only buy organic products'. The other half of the participants indicated how often they perform the same pro-environmental behaviours, but the questions were phrased less extremely, for example: 'I sometimes buy an organic product'; 'If the price is equal I rather buy an environmentally-friendly product than an environmentally-unfriendly product'. Participants answered on a scale from 1 (totally disagree) to 7 (totally agree). After answering the questions participants in the condition with the extreme phrasing received the following feedback: *'Acting pro-environmentally is not an important part of who you are. You are not an environmentally-friendly person. You don't often think about the environment and you would not act environmentally-friendly.'* Participants in the other condition received similar feedback but now indicating that they are an environmentally-friendly person: *'Acting pro-environmentally is an important part of who you are. You really are a pro-environmental person and people around you see you as a person who acts environmentally-friendly. You would easily consider acting environmentally-friendly'.* Four participants in the condition with the extreme phrasing had higher average scores than the midpoint of the scale. As the feedback would not have been credible to these participants we excluded them from the analyses. In the condition with the less extreme phrasing, six participants scored on average lower than the midpoint of the scale, and were excluded them from the analyses, because the feedback would not have been credible for them.

Measures

Values. Participants first filled in the same value questionnaire as used in Study 1. Cronbach's alpha for the biospheric value scale was .92 (M = 5.11, SD = 1.28).

Environmental self-identity. We measured environmental self-identity with the same 3 items as in Study 1. The items formed a reliable scale (α = .92, M = 3.92, SD = 1.33).

Results

Our first hypothesis was supported: the hidden self-procedure influenced environmental self-identity. Participants who received feedback that they are not an environmentally-friendly person reported a lower environmental self-identity (M = 3.41, SD = 1.37) than participants who received feedback that they are an environmentally-friendly person (M = 4.70, SD = .85), $t(38) = -3.53$, $p < .01$, d = 1.13. Importantly, our second hypothesis was supported as well: biospheric values measured a week before the study still influenced environmental self-identity as measured after the strong manipulation of environmental self-identity. The stronger one's biospheric values, the

stronger the environmental self-identity (β = .63, $p < .001$). Again, the results of a confirmatory factor analysis showed that biospheric values and environmental self-identity can be distinguished empirically. The manipulation and values together explained 53.4% of the variance in environmental self-identity ($F(2,37) = 21.22$, $p < .001$, $f^2 = 1.13$). Biospheric values explained 39.6% of the variance ($F(1,38) = 24.95$, $p < .001$), while the manipulation explained an additional 13.8% of the variance ($F(1,37) = 10.95$, $p < .01$). Again, there was no significant effect of the interaction between biospheric values and the manipulation on environmental self-identity (β = .03, $p = .97$).

Discussion

Study 2 showed that reminding people of their past environmental behaviour and manipulating the perception of their past behaviour via the hidden self-procedure influenced their environmental self-identity. Participants who realised that they perform several pro-environmental actions and then received feedback that they are environmentally-friendly more strongly saw themselves as an environmentally-friendly person than participants who realised that they hardly engage in pro-environmental behaviours and received feedback that they are not an environmentally-friendly person. Our assumption that environmental self-identity can be influenced is thus supported. Also, we found support for our hypothesis that biospheric values still influence environmental self-identity after the (strong) manipulation of environmental self-identity. After making past environmental actions salient and providing people with feedback on whether they are an environmentally-friendly person or not, biospheric values were still positively related to environmental self-identity. This suggests that environmental self-identity is malleable, but only partly, as biospheric values still predict environmental self-identity. Hence, even though we did not only make past environmental behaviour salient, but used a strong manipulation of identity and even though we measured values one week in advance, we still found an effect of values on identity.

In this study we did not only remind participants of their past environmental behaviour, we also manipulated the perception of this behaviour by providing participants with feedback on whether they are an environmentally-friendly person or not. Can we replicate our findings if we only make participants' past environmental actions salient without providing them with feedback on their environmental self-identity? And can we replicate that values are still an important predictor of identity? Also, in Study 2 we did not include a control condition, to address this shortcoming we included a control condition in Study 3.

3.4 Study three - Past behaviour, biospheric values, environmental self-identity and environmental intentions in an experimental design

Study 3 aimed to test if just reminding people of their past environmental actions influences environmental self-identity. Second, we aimed to replicate if biospheric values still influence environmental self-identity after the manipulation of the salience of past behaviour. We thus tested if environmental self-identity is somewhat stable, but can also be changed. Third, we

tested if environmental self-identity in turn influences environmental judgements (i.e., judgements of environmental dilemmas) and intentions. We included judgements of environmental dilemmas in addition to a measure of intentions to examine whether values, previous behaviour, and environmental self-identity are not only related to intentions, but also to judgements of dilemmas in the environmental domain, which is an easy way to present yourself as a pro-environmental person. Providing strict judgements on the environmentally-unfriendly behaviour of others is an easy way to signal that you care about the environment. Finally, we tested if environmental self-identity mediates the relationship between values and the proxies of behaviour and between past behaviour and proxies of behaviour. Hence, like in Study 1 we tested the full model (Figure 3.1), this time with an experimental design.

Method

Participants and procedure. Respondents were undergraduates at a Dutch university who participated in exchange for course credits. In total 150 respondents participated in the study, of which 98 were female, one participant did not indicate his or her gender. Age ranged from 18 to 27 (M = 20.56, SD = 1.56). Participants first filled in the value questionnaire, which was put online. One week to five months later, participants came to the lab and filled out the manipulation questions, and questions on environmental self-identity, pro-environmental intentions and environmental judgements[2].

Materials

Manipulation. We manipulated the salience of past behaviour in a similar way as Cornelissen and colleagues (2008). Participants completed questions on how frequently they engage in eight behaviours. We pretested how common several environmental behaviours are in a Dutch sample. In total 37 participants indicated on a scale from 1 (hardly ever) to 7 (very often) how often they perform 20 environmental behaviours. We selected the eight most and eight least common behaviours, see Table 3.2. One third of the participants indicated how often they performed the eight common pro-environmental behaviours; as most people perform these behaviours often this is the 'environmentally-friendly group'. Answers were given on a scale ranging from 1 (totally disagree) to 7 (totally agree). One third of the participants indicated how often they performed the uncommon pro-environmental behaviours; because most people rarely perform these behaviours this is the 'environmentally-unfriendly group'. Finally, one third of the participants indicated how often they perform behaviours which are not related to the environment (e.g., 'read the newspaper'); this is our control condition.

2 The value questionnaire was put online at the start of the semester, the lab study was conducted 5 months after the start of the semester. Participants had to fill in the value questionnaire before they could participate in the lab study. The time between filling in the questionnaire and participating in the lab study ranged from one week to 5 months in advance.

Table 3.2 *Means and standard deviations of the frequency of common and uncommon pro-environmental behaviours*

Common Behaviour	M	SD	Uncommon behaviour	M	SD
I separate paper from my waste	6.00	1.49	I often buy organic products	3.24	1.67
I bring glass bottles to the recycling bin	6.32	1.16	I shower very shortly	3.27	1.63
I do not throw litter on the street	6.08	1.55	I buy glass bottles instead of plastic bottles	3.03	1.81
I turn off electrical appliances (to save energy)	5.68	1.42	I am a member of an environmental organization	2.43	1.97
I often go to work or studies by bike instead of by car	4.86	2.45	I always actively search for the most environmentally-friendly products	2.89	1.43
I turn off the heater when I leave my room	5.32	1.47	I refuse plastic bags in clothing shops	4.05	2.11
I use energy-efficient light bulbs	5.33	1.39	I rarely eat meat	4.22	2.18
I turn off the lights when no one is in the room	6.31	.71	I always separate all my waste (chemical, plastics, organic)	4.22	1.83

Note Answers were given on a scale from 1 (never) to 7 (always)

Measures

Values. Participants first filled in the same value questionnaire as used in Study 1 and 2. Cronbach's alpha for the biospheric value scale was .89 (M = 4.18, SD = 1.46).

Environmental self-identity. We measured environmental self-identity with the same 3 items as in Study 1 and 2 (α = .92, M = 4.51, SD = 1.20).

Product choice. Participants were asked to choose one out of two options of a product. One of the options was always a more expensive environmentally-friendly option, the other was a cheaper environmentally-unfriendly option. For example, participants were asked to choose between an ecological detergent of 1.40 Euros or a regular detergent of 1.30 Euros. Participants indicated for cookies, a light bulb, deodorant, detergent, and paper towels which option they preferred. We counted the number of pro-environmental options participants chose (M = 3.82, SD = 1.32).

Judgements of environmental dilemmas. We asked participants to what extent they think it is OK or wrong to perform specific environmentally-unfriendly behaviours. We presented participants with four scenarios: a person drives a distance of 3 kilometres by car instead of walking; someone pours white spirit down the sink because the waste handling station is too far; someone turns up the heater instead of putting on a sweater; and someone puts glass waste in the regular bin instead of the recycling bin. Participants answered on a scale from 1 (perfectly OK) to 7 (extremely wrong) to what extent they thought the behaviour was OK or wrong. Cronbach's alpha was .59[3]. The average score on the dilemmas was 4.77 (SD = .93).

Results

Our manipulation of the salience of past behaviour influenced environmental self-identity ($F(2,144) = 8.42$, $p < .001$, $\eta_p^2 = .11$). T-tests revealed that participants in the environmentally-unfriendly group (M = 3.97, SD = 1.18) scored significantly lower on environmental self-identity than the control group (M = 4.66, SD = 1.17; $t(96) = -2.92$, $p < .01$, d = .59) and the environmentally-friendly group (M = 4.88, SD = 1.07; $t(95) = -3.99$, $p < .001$, d = .81). The environmentally-friendly and control group did not significantly differ in environmental self-identity ($t(97) = .96$, p = .34).

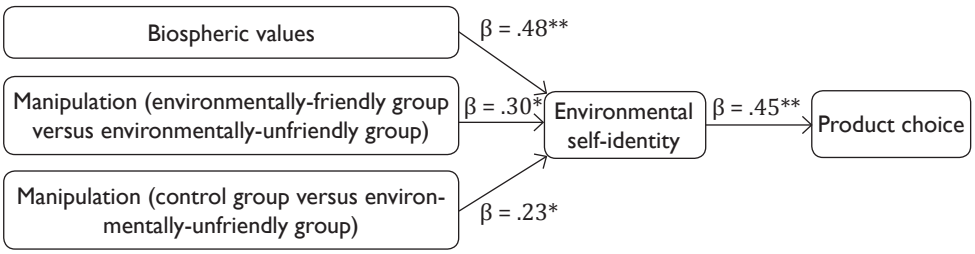
The results of the confirmatory factor analysis showed that biospheric values and environmental self-identity can be distinguished empirically. Our second hypothesis was supported as well: when the manipulation and values were both included in the regression analysis, values were still significantly related to environmental self-identity ($F(3, 120) = 19.12$, $p < .001$, $f^2 = .48$). We created dummy variables in which we compared the environmentally-unfriendly group with the control and environmentally-friendly group (as these conditions differed significantly from each other). The stronger participants' biospheric values, the stronger their environmental self-identity (β = .48, $p < .001$; see Figure 3.3 and 3.4). Again, there was not a significant effect of the interaction between biospheric values and the manipulation on environmental self-identity, product choice or judgements of environmental dilemmas (all $ps > .10$).

Environmental self-identity predicted product choice ($R^2 = .29$; $F(1,144) = 57.44$, $p < .001$). The stronger the environmental self-identity the more environmentally-friendly products participants chose (β = .53, $p < .001$). Environmental self-identity also predicted the judgements of the environmental dilemmas ($R^2 = .18$; $F(1,145) = 32.74$, $p < .001$). The stronger the environmental self-identity the more wrong the participants found transgression of environmental norms (β = .43, $p < .001$).

We then tested if values and the manipulation predicted the dependent variables. Indeed, biospheric values and the manipulation predicted product choice ($R^2 = .17$; $F(3,121) = 8.33$, $p < .001$). The stronger the biospheric values, the more environmentally-friendly products the participants chose (β = .40, $p < .001$). The manipulation was not significantly related to product choice when values were controlled for, not when the environmentally-unfriendly group was compared to the environmentally-friendly group (β = .08, p = .42), nor when the

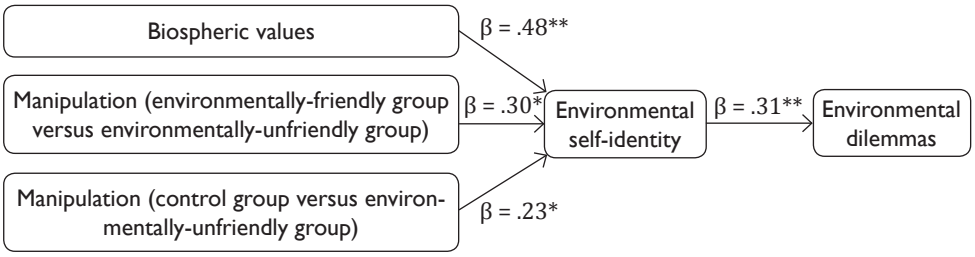
3 The reliability of this scale is relatively low. However, this categorization is justifiable because in the analyses reported below, the pattern of effects on each separate dilemma was similar to the pattern of effects on the corresponding scale.

Figure 3.3 *The relationship between biospheric values, manipulation of the salience of past behaviour, environmental self-identity and product choice.*



Betas in the model reflect tests of the full model, these may slightly differ from the betas of the separate hypotheses. ** $p < .001$, * $p < .01$

Figure 3.4 *The relationship between biospheric values, manipulation of the salience of past behaviour, environmental self-identity and judgements of environmental dilemmas.*



Betas in the model reflect tests of the full model, these may slightly differ from the betas of the separate hypotheses. ** $p < .001$, * $p < .01$

environmentally-unfriendly group was compared to the control group (β = .08, $p = .42$). However, the relationships between the independent variable and the dependent variable do not have to be significant in order to test mediation effects (James, Mulaik, & Brett, 2006; Shrout & Bolger, 2002). Other possible mediators between the independent and the dependent variable may result in a non-significant relationship between the independent variable and the dependent variable. Therefore, we conducted a mediated regression analysis. We tested if environmental self-identity mediated the relationship between the manipulation of past behaviour and product choice. We conducted mediation analysis for multicategorical independent variables (Hayes & Preacher, 2012). Dummy coding was used in which we compared the environmentally-unfriendly group with the control and the environmentally-friendly group respectively, as the ANOVA showed that these groups differed significantly in the strength of environmental self-identity. The 95% bootstrap confidence interval for the dummy variable in which we compared the environmentally-unfriendly group with the environmentally-friendly group ranged from .275 to .928. The 95% bootstrap confidence interval for the dummy vari-

able in which we compared the environmentally-unfriendly group with the control group ranged from .153 to .783. This indicates that the manipulation of past behaviour influenced product choice via environmental self-identity, both when comparing the environmentally-unfriendly group with the control and when comparing the environmentally-unfriendly group with the environmentally-friendly group. Indeed, when identity was included in the regression model as well (β = .57, $p < .001$), the relationship between the manipulation of past behaviour and product choices remained non-significant when comparing the environmentally-friendly with the environmentally-unfriendly group (β = -.09, $p = .29$), as well as when comparing the environmentally-unfriendly with the control group (β = -.11, $p = .18$).

As expected, environmental self-identity mediated the relationship between biospheric values and product choice as well. The 95% bootstrap confidence interval for the indirect effect of values on product choice via environmental self-identity ranged from .106 to .328, and the strength of the relationship between values and product choice reduced (β = .18, $p = .04$) when identity was also included in the regression analysis (β = .43, $p < .001$).

Biospheric values and the manipulation of past behaviour predicted the judgements of the environmental dilemmas ($R^2 = .16$; $F(3,122) = 7.76$, $p < .001$). The stronger participants' biospheric values the more wrong they found transgression of environmental norms (β = .40, $p < .001$). The manipulation of past behaviour was not significantly related to product choice when values were controlled for, not when the environmentally-unfriendly group was compared to the environmentally-friendly group (β = .04, $p = .69$), nor when the environmentally-unfriendly group was compared to the control group (β = -.01, $p = .88$). In line with our prediction, environmental self-identity mediated both the relationship between biospheric values and the judgements of environmental dilemmas and the relationship between the manipulation of past behaviour and the judgements of environmental dilemmas. The 95% bootstrap confidence interval for the dummy variable in which we compared the environmentally-unfriendly group with the control group ranged from .088 to .462. The 95% bootstrap confidence interval for the dummy variable in which we compared the environmentally-unfriendly group with the environmentally-friendly group ranged from .151 to .568. This indicates that the manipulation of past behaviour influenced the judgements of environmental dilemmas via environmental self-identity, both when comparing the environmentally-unfriendly group with the control group and when comparing the environmentally-unfriendly group with the environmentally-friendly group respectively. When identity was included in the regression model as well (β = .45, $p < .001$), the relationship between the manipulation of past behaviour and product choices remained non-significant when the environmentally-friendly group was compared with the environmentally-unfriendly group (β = -.06, $p = .53$), as well as when comparing the environmentally-unfriendly group with the control group (β = -.08, $p = .35$). The 95% bootstrap confidence interval for the indirect effect of biospheric values on the judgements of dilemmas via environmental self-identity ranged from .029 to .160. The relationship between biospheric values and the judgements of dilemmas significantly reduced (β = .24, $p = .01$) when environmental self-identity was also included in the regression model (β = .30, $p < .01$). Environmental self-identity thus mediated the relationship between biospheric values as well as the manipulation of past behaviour and both dependent variables.

Discussion

In Study 3 we tested our full model in an experimental setting. This study showed that just reminding people of their past behaviour had an effect on environmental self-identity. Participants who indicated how often they perform uncommon environmental behaviours, and thus realized they often do not act environmentally-friendly (environmentally-unfriendly group), had a lower environmental self-identity than participants in the control group and than participants who indicated how often they perform common environmental behaviours, and thus realized that they often act environmentally-friendly (environmentally-friendly group). However, the environmentally-friendly group did not have a significantly higher environmental self-identity than the control group. Perhaps this was due to a ceiling effect, the control group already scored relatively high on the environmental self-identity (M = 4.66), making it difficult to further strengthening environmental self-identity. The relatively high scores on environmental self-identity may be related to our sample, perhaps undergraduate students strongly see themselves as environmentally-friendly. Or it may be that in general people perceive themselves as environmentally-friendly. Future research is needed to test whether this is indeed the case. Most importantly, we found a significant difference in the environmental self-identity of the two experimental groups.

We again found support for our hypothesis that even though we manipulated environmental self-identity, values (measured one week to five months in advance) still predicted environmental self-identity. Furthermore, in line with our expectations, environmental self-identity was related to product choice and the judgements of environmental dilemmas. This shows that environmental self-identity is not only an important predictor of environmental intentions, but also of environmental judgements (an easy way to express that you are a pro-environmental person).

In line with our hypothesis we found that environmental self-identity mediated the relationship between biospheric values on the one hand and proxies of environmental behaviour on the other hand. Study 3 also provided support for our hypothesis that the relationship between the manipulation of the salience of previous behaviour and the proxies of behaviour is mediated by environmental self-identity. This suggests that reminding people of their past environmental actions influences subsequent environmental judgements and intentions via the environmental self-identity.

In sum, in Study 3 we found support for our full model. However, we did not find an effect of our manipulation on product choice or on the judgements of the dilemmas. Previous studies suggest that reminding people of their past environmental actions does influence future environmental actions (Cornelissen et al., 2008). Our results may be due to the fact that we measured environmental self-identity before the dependent variables. When asked about their identity, participants answered these questions in line with the manipulation. However, this may have resulted in a motivation to act differently, and thus, to change their environmental behaviour. For example, participants in the environmentally-unfriendly group may have felt motivated to act environmentally-friendly after indicating they had a relatively weak environmental identity. Therefore the measure of environmental self-identity may have caused a non-significant relationship between the manipulation and judgements and intentions. To test if

reminding people of their past environmental actions promotes future environmental actions and ruling out the possibility of possible confounds (by eliciting motivations by asking people to complete questions on their environmental self-identity), Study 4 will follow a similar set up, but now we exclude the measure of environmental self-identity.

3.5 Study four - Past behaviour and subsequent environmental actions

Study 4 aimed to test if environmentally-friendly behaviour can be promoted by reminding people of the pro-environmental behaviours they already perform. More specifically, we tested if reminding people of their past environmental actions affects subsequent (proxies of) environmental behaviour. In Study 4 we included two indicators of environmental behaviour. Next to product choice we included a measure of actual behaviour, that is, the amount of paper participants used in a writing task. Participants came to the lab and filled out the manipulation questions and questions on environmental behaviour.

Method

Participants and procedure. Respondents were undergraduates at a Dutch university who participated in exchange for course credits. In total 76 respondents participated in the study, of which 62 were female. Age ranged from 17 to 51 (M = 20.00, SD = 5.30).

Materials

Manipulation. Participants completed the same questions on how often they engage in different behaviours as in Study 3. One third of the participants were in the environmentally-unfriendly group, one third in the environmentally-friendly group and one third in the control group.

Measures

Product choice. We measured product choice in the same way as in Study 3. On average participants chose 2.83 (SD = .89) environmentally-friendly products.

Paper use. We measured the amount of paper used in a writing task as an indication of pro-environmental behaviour (see Cornelissen et al., 2008). Participants were asked to write down a summary of some products they saw on the computer screen on pieces of paper. We measured how environmentally-friendly participants were in their use of paper by counting the number of sheets used: the less paper they used to write down the summary statements, the more environmentally-friendly their behaviour (M = 4.73, SD = 3.88).

Results

The manipulation had an effect on the number of environmentally-friendly products the participants chose ($F(2,73) = 4.67$, $p = .01$, $\eta_p^2 = .11$). Participants in the environmentally-friendly

group chose more environmentally-friendly products (M = 3.26, SD = .75) than participants in the environmentally-unfriendly group (M = 2.75, SD = .99; $t(45) = 1.99$, $p = .05$, $d = .58$) and in the control condition (M = 2.55, SD = .78; $t(50) = 3.30$, $p < .01$, $d = .93$). The environmentally-unfriendly group did not significantly differ from the control group ($t(51) = .82$, $p = .42$).

To test if the manipulation had an effect on paper use we performed an ANCOVA in which we controlled for the number of words the participants used to describe the products. We found an effect of the manipulation on the amount of paper used ($F(2,70) = 3.11$, $p = .05$, $\eta_p^2 = .08$). Participants in the environmentally-unfriendly group used more paper (M = 6.17, SD = 4.02) than participants in the control group (M = 3.48, SD = 3.21; $F(2, 50) = 6.73$, $p = .01$, $\eta_p^2 = .12$). There was no significant difference between the environmentally-unfriendly group and the environmentally-friendly group (M = 4.81, SD = 4.14; $F(2, 42) = .05$, $p = .82$) or between the environmentally-friendly and the control group ($F(2, 47) = 1.39$, $p = .25$).

Discussion

In line with previous research (Cornelissen et al., 2008), Study 4 showed that the manipulation of the salience of past behaviour had an effect on proxies of environmental behaviour. Participants in the environmentally-friendly group chose more pro-environmental products than participants in the control and environmentally-unfriendly group. Moreover, participants in the environmentally-unfriendly group used more paper in a writing task than participants in the control group. We did not find a significant difference between the environmentally-friendly and the environmentally-unfriendly group in the amount of paper used, even though the difference in paper use was quite large. Also, the pattern of results is somewhat different for product choice and paper use. Perhaps there was a lack of power due to a relatively low sample size, as the effect size was relatively weak. A stronger manipulation of past behaviour such as actually persuading people to perform environmental actions may results in stronger and more consistent effects. Overall, the results of Study 4 provide support for our hypothesis that past behaviour promotes pro-environmental actions.

3.6 General discussion

We proposed and tested the model in Figure 3.1 to explain which factors influence environmental self-identity, and how environmental self-identity is in turn related to subsequent pro-environmental judgements, intentions and behaviour. Several studies suggested that identity is an important antecedent of environmental behaviour (e.g., Whitmarsh & O'Neill, 2010; Sparks & Shepherd, 1992). However, much remained unclear about what exactly the environmental self-identity is, which factors influence environmental self-identity, and whether environmental self-identity can be changed. Our research aimed to get more insight in how environmental self-identity is formed and how it is related to environmental judgements, intentions and behaviour.

In the first three studies, we tested whether environmental self-identity is influenced by biospheric values and (the salience of) past behaviour. We proposed that biospheric values form the stable factor influencing environmental self-identity, but that environmental self-

identity can also be changed somewhat by reminding people of their previous environmental actions. We found that biospheric values and past behaviour indeed both uniquely contributed to the prediction of environmental self-identity.

More specifically, we found that the more people believe they behaved pro-environmentally in the past, the stronger their environmental self-identity. Importantly, we did not only find an effect of past behaviour on environmental self-identity in the correlational study, but also in the experimental studies, suggesting that reminding people of their past environmental actions can indeed influence the extent to which they see themselves as an environmentally-friendly person. In the third study, we did not find a significant difference between the environmental self-identity of participants in the group that was reminded of the many previous pro-environmental actions they engaged in and the control group. However, importantly, we did find significant differences in environmental self-identity between groups that were reminded of the many pro-environmental behaviours they engaged in in the past versus those reminded of the few pro-environmental actions they performed.

Not surprisingly, reminding people of previous environmental actions combined with feedback on the implications for one's identity more strongly influenced environmental self-identity than only reminding people of their previous environmental actions, which was reflected in the larger effect size for the former. This suggests that providing people with additional feedback on whether they are an environmentally-friendly person or not influences their environmental self-identity to greater extent than only reminding them of their past behaviour. In the third study, our manipulation of the salience of past behaviour was relatively weak. We only reminded people of past environmental actions. This suggests that actually persuading people to perform an environmental action may have an even bigger effect on their environmental self-identity, especially if the behaviour is framed as pro-environmental behaviour. Future research is needed to test this proposition.

We also found consistent support for our hypothesis that values influence one's environmental self-identity. Importantly, in line with our expectations, even when people were reminded of their past environmental actions, biospheric values still influenced the environmental self-identity, suggesting that values may indeed form the stable factor influencing self-identity. In Study 2 we used a strong manipulation of identity by manipulating the perception of past behaviour, and even in this case values still predicted environmental self-identity. Also, in each study we measured values at least one week before the manipulation of the salience of past behaviour, making it very unlikely that our findings are due to an effect of our measure of values on the dependent variables. These results suggest that biospheric values are indeed an important antecedent of environmental self-identity, and that environmental self-identity is only somewhat malleable by reminding people of their previous actions.

Our hypothesis that environmental self-identity is related to environmental judgements and intentions was supported as well. The stronger the environmental self-identity, the more environmentally-friendly one's environmental judgements and intentions. We found relationships between environmental self-identity and a range of proxies of environmental behaviour, including the intention to reduce meat consumption, product choices and judgements of environmental dilemmas. Also, in Study 4 we found that our manipulation influenced the amount

of paper used in a writing task, however we did not include a measure of environmental self-identity in this study. Our results suggest that environmental self-identity may indeed be a general antecedent, related to a broad range of environmental judgements and intentions. This is in line with the study by Whitmarsh and O'Neill (2010) in which they showed that green identity is related to a range of pro-environmental behaviours. Future research should test whether our results can be replicated in other domains, including more difficult behaviours as dependent variables, such as car use.

Our results suggest a dynamic relationship between environmental self-identity and behaviour, that is, past behaviour influences one's environmental self-identity, this identity may in turn influence subsequent behaviour, which in turn will influence one's environmental self-identity, etc. Hence, environmental self-identity can change continuously based on one's past behaviour. At the same time, our studies revealed that values are the stable basis of environmental self-identity, which indicates that environmental self-identity is only malleable to some extent. We did not aim to study the dynamics between behaviour and the environmental self-identity, and think this is an important topic for future research.

Interestingly, our results suggest that environmental self-identity may be an important factor with regard to positive spill-over effects. Studies found that a specific past behaviour can influence a specific identity (e.g., donating blood can strengthen the blood donor identity, Lee et al., 1999), which in turn influences a specific subsequent action (e.g., future blood donation). We proposed that specific past pro-environmental behaviours may influence one's general environmental self-identity as well, and that this general environmental self-identity will in turn be related to a range of (other) pro-environmental judgements and intentions. Indeed, we found support for such positive spill-over effects in our studies. For example, in Study 1 we found that a fuel-efficient driving style influenced environmental self-identity which in turn promoted the intention to reduce meat consumption. Importantly, we found similar results in our experimental studies, enabling stronger inferences on causality. In Study 3 we found that reminding people of their past environmental actions influenced environmental self-identity, which in turn was related to product choices and judgements of environmental dilemmas unrelated to the behaviours included in the manipulation. This suggests that environmental self-identity may be an important factor in promoting positive spill-over from one environmentally-friendly behaviour to another, and that such positive spill-over effects are more likely when initial pro-environmental actions are linked to one's identity.

Interestingly, studies on moral licensing suggest that past pro-environmental actions may inhibit rather than promote future moral actions. For example, participants were less likely to act altruistically after purchasing green products than after purchasing conventional products (Mazar & Zhong, 2010). Also, participants were less likely to show cooperative behaviour in environmental decision making after writing a self-relevant story containing positive traits versus negative traits (Sachdeva, Iliev, & Medin, 2009). Our study suggests that such licensing effects may be less likely when strengthening one's environmental self-identity, by linking people's past behaviour to their identity. For example, by providing people with feedback or reminding them of a range of pro-environmental behaviours they engaged in, they may link their past behaviour to their identity. Future research should further test whether environmental

self-identity indeed plays an important role in promoting positive spill-over of environmentally-friendly behaviour and whether environmental self-identity may be an important buffer against moral licensing.

We found support for our hypotheses that identity mediated the relationships between values and past behaviour on the one hand, and subsequent environmental judgements and intentions on the other hand. Biospheric values were indeed related to environmental judgements and intentions via environmental self-identity. We did not only find this result in the correlational study, but also in the experimental study, suggesting that values affect behaviour via the environmental self-identity. Some studies suggest that biospheric values affect behaviour directly as well (De Groot & Steg, 2008; Steg, De Groot, Dreijerink, Abrahamse, & Siero, 2011; Steg et al., 2012; Thøgersen & Ölander, 2002). However, these studies typically tested the relationship between values and behaviour without controlling for possible mediator variables such as environmental self-identity. We would expect that if environmental self-identity is included, the relationship between values and behaviour will be mediated by environmental self-identity. Future research is needed to test whether and if so, under which conditions values influence behaviour directly and under which conditions indirectly.

Also, Study 1 and 3 showed that environmental self-identity mediated the relationship between past behaviour and subsequent pro-environmental judgements and intentions. However, we did not find an effect of reminding people of their past environmental actions on subsequent judgements and intention in Study 3. This may be due to the fact that we measured environmental self-identity before measuring environmental judgements and intentions. Participants answered the questions on their identity in line with the manipulation, but afterwards they may have become motivated to act differently. For example, participants in the environmentally-unfriendly group may have felt motivated to act pro-environmentally after indicating they had a relatively weak environmental self-identity. In Study 3 we found that participants on average chose more environmentally-friendly products than in Study 4, which may indicate that this was indeed the case. Hence, the questions on environmental self-identity could explain why our manipulation did not have an effect on behaviour in Study 3. Therefore, in Study 4 we tested whether reminding people of their past pro-environmental behaviour indeed promotes future environmentally-friendly actions when we would not include questions on environmental self-identity in between. As expected and in line with previous research (Cornelissen et al., 2008), Study 4 showed an effect of the manipulation of the salience of past environmental actions on subsequent behaviour, suggesting that reminding people about previous environmental actions may indeed promote or inhibit subsequent pro-environmental actions in another domain. This finding has important practical implications, as it shows that pro-environmental actions can be promoted by reminding people of their past environmentally-friendly actions.

In sum, similar to values, environmental self-identity is a general antecedent of behaviour, influencing a range of pro-environmental judgements and intentions. However, in contrast to values, which are believed to be highly stable over time (Schwartz, 1992; Feather, 1995), our results suggest that environmental self-identity is somewhat stable, but that the strength of environmental self-identity can also be changed by making people's past environmental

actions salient. This suggests that environmental self-identity may be an important factor to target in environmental campaigns as it can be changed while it appears to influence a wide range of judgements and intentions, now and in the future (as it is somewhat stable). Environmental campaigns could, for example, make environmental behaviours salient that many people already perform, for example, bringing their glass bottles to the recycling bin. This way environmental self-identity can be strengthened, and identity may in turn influence a wide range of other pro-environmental judgements, intentions, and actions. An important question for future research is if campaigns that address the environmental self-identity indeed result in more pro-environmental actions.

4
FOLLOW THE SIGNAL

When past pro-environmental actions signal who you are

Abstract

Research has shown that past pro-environmental actions can promote as well as inhibit subsequent environmentally-friendly behaviour. When are our past pro-environmental actions likely to lead to more environmentally-friendly behaviour? We propose that this depends on the extent to which the initial actions are linked to people's self-concept, and more specifically, to one's environmental self-identity. Furthermore, we propose that past pro-environmental actions are more likely to influence one's environmental self-identity when the behaviour implies something about you, that is, when the behaviour signals your identity. In two studies, we tested and found support for our hypothesis that past behaviour strengthens environmental self-identity to a larger extent, and thereby more strongly promotes pro-environmental choices, when the signalling function of the initial behaviour is stronger. The signalling function of previous pro-environmental actions was stronger when people considered a wide range of past pro-environmental actions, or when the initial behaviour was difficult and unique. Our results suggest that pro-environmental behaviour can be promoted by reminding people of their past pro-environmental actions, and that this is more likely when the past pro-environmental actions strongly signal that one is a pro-environmental person, thereby strengthening environmental self-identity.

Chapter 4 is based on: Van der Werff, E., Steg, L., & Keizer, K. (under review). Follow the signal: when past pro-environmental actions signal who you are. The manuscript is resubmitted after an invitation to revise and resubmit.

4.1 Introduction

Campaigns aiming to promote pro-environmental behaviour often focus on a single pro-environmental behaviour. For example, people are encouraged to take the bus instead of going by car, or campaigns aim to promote recycling by encouraging people to bring their glass bottles to the recycling bin. These campaigns may be effective in promoting the action that they aim to promote. But will such campaigns encourage other pro-environmental actions as well? Will these encouragements increase the likelihood that we make pro-environmental choices in other domains as well? For example, if a campaign aims to motivate people to recycle will it also make them more likely to choose sustainable products if they go shopping afterwards? Or will it rather increase the likelihood that they choose the cheap and unsustainable option in a subsequent choice, as they already did their bit?

Research has shown that our past pro-environmental actions can promote future pro-environmental actions. For example, a Danish longitudinal correlational study on consumer behaviour showed that engagement in pro-environmental actions is related to engagement in other pro-environmental behaviours the following years (Thøgersen & Ölander, 2003). Also, in experimental studies people were more likely to choose sustainable products after they were reminded of a range of pro-environmental actions they often perform (Cornelissen, Pandelaere, Warlop, & Dewitte, 2008; Van der Werff, Steg, & Keizer, 2013a). Past pro-environmental behaviour may thus promote subsequent environmentally-friendly actions. However, in some cases past pro-environmental behaviour did not seem to lead to more pro-environmental behaviour or seemed even to result in less environmentally-friendly behaviours. For example, in the study on consumer behaviour by Thøgersen and Ölander (2003) mentioned earlier, there was no or even a negative relationship between some environmentally-friendly behaviours in one year and pro-environmental actions in the following years, suggesting that engaging in some pro-environmental behaviours in one year did not promote or even inhibited some subsequent pro-environmental actions (Thøgersen & Ölander, 2003). Also, research on moral licensing suggests that past pro-environmental behaviours may inhibit rather than promote future pro-environmental actions, as people may feel licensed to act immorally after their good deed (Mazar & Zhong, 2010; Sachdeva, Iliev, & Medin, 2009). Our past pro-environmental actions may thus promote subsequent environmentally-friendly behaviour (i.e., positive spill-over) or inhibit future pro-environmental behaviour (i.e., negative spill-over; Thøgersen & Crompton, 2009). Therefore, an important question is: When do pro-environmental actions lead to more environmentally-friendly behaviours and when is this less or even not likely to be the case?

4.1.1 Environmental self-identity

We propose that the extent to which past pro-environmental actions will promote future pro-environmental behaviour depends on the level to which the initial actions are linked to one's self-concept, and more particularly, to one's environmental self-identity. Environmental self-identity can be defined as the extent to which people see themselves as an environmentally-friendly person. Research has shown that a stronger environmental self-identity increases

the likelihood that one engages in pro-environmental behaviour, and that environmental self-identity is an important predictor of pro-environmental behaviour. For example, people with a strong environmental self-identity are more likely to conserve energy, reduce waste, and eco-shop (Whitmarsh & O'Neill, 2010), are more likely to engage in pro-environmental behaviours, recycle, buy fair trade products and refrain from flying to a holiday destination (Gatersleben, Murtagh, & Abrahamse, 2012), and use less energy, are more likely to use green energy, choose more sustainable products and use paper more economically (Van der Werff, Steg, & Keizer, 2013a; 2013b).

In addition, research has found that reminding people of their past pro-environmental actions can strengthen their environmental self-identity, which in turn promotes subsequent pro-environmental behaviour (Van der Werff et al., 2013a). When people were reminded of eight pro-environmental behaviours they often perform, their environmental self-identity was strengthened and they were more likely to act pro-environmentally afterwards, while the opposite was true for people who realized that they often do not act environmentally-friendly.

Past pro-environmental actions may thus strengthen one's environmental self-identity and thereby promote subsequent environmentally-friendly behaviour. But when does past pro-environmental behaviour strengthen one's environmental self-identity? Do people need to be reminded of various pro-environmental actions as was the case in the study described above? Or is it sufficient to remind people of one past pro-environmental action? And can it be any type of pro-environmental behaviour or should it be a particular type of pro-environmental behaviour in order to influence one's environmental self-identity? The aim of this research is to study which factors influence the extent to which past pro-environmental actions strengthen environmental self-identity, thereby promoting subsequent pro-environmental actions. We propose that the more past environmental behaviour implies something about you, that is, the more strongly the behaviour signals your identity, the more it will influence environmental self-identity. This suggests that the extent to which environmental self-identity is influenced by previous environmental actions depends on the signalling strength of that behaviour.

4.1.2 When does past behaviour have a signalling function?

According to attribution theory, past behaviour can signal someone's traits or motivations (Kelley, 1973; Kelley & Michela, 1980). We use information about others' actions and the circumstances under which it occurs to explain the cause of their behaviour. The behaviour is either attributed to internal characteristics of the person (such as personality traits or motivations) or to external factors (Kelley, 1967). Attribution theory mainly focuses on inferences about other people's behaviour. However, following self-perception theory (Bem, 1972), we propose that people also make inferences about their own behaviour. Therefore, your own past behaviour may signal what type of person you are in a similar way, thereby affecting the strength of your self-identity.

Based on attribution theory we propose that three types of information about pro-environmental behaviour influence whether the behaviour signals who you are and hence, whether the behaviour is attributed to internal factors (Kelley, 1967). People are more likely to attrib-

ute their behaviour to internal factors when (1) they perform a range of pro-environmental behaviours instead of only one, and more particularly when these behaviours reflect different types of pro-environmental behaviours instead of very similar behaviours, (2) not many other people perform the behaviour, and (3) when the pro-environmental action is rather difficult. Therefore, if you perform many different environmentally-friendly behaviours, that are difficult and performed by few others, the behaviour is more likely to be attributed to internal factors and you are more likely to see yourself as a type of person who acts environmentally-friendly. Based on this, we first hypothesized that environmental self-identity will particularly be strengthened when one engages in many pro-environmental behaviours rather than engaging in a single behaviour only, as the former is more likely to signal who you are. However, we expect that a range of past pro-environmental behaviours is particularly likely to signal who you are when it concerns a variety of past pro-environmental actions. For example, when you perform environmentally-friendly actions with regard to transport, recycling, as well as energy use, the behaviours will signal more about your identity than when you only engage in actions that all concern switching off appliances.

Second, we hypothesized that the signalling strength of behaviour is stronger when only few others perform the behaviour. Hence, we propose that the effect of past pro-environmental actions on one's environmental self-identity is likely to depend on the uniqueness of the behaviour. When few people perform a certain pro-environmental behaviour, this behaviour is more likely to be an indication of that person's environmental self-identity than when many others perform that behaviour. After all, if everyone does it, you may not perform the behaviour because you find it important, but mainly be externally motivated. For example, you may simply follow the norm, or acting pro-environmentally may simply be the most attractive option. Research indeed showed that when a product is highly unique, it is more likely to influence the impression people have of the owner (Belk, 1981). We expect that this may also be the case for pro-environmental behaviours and how this affects one's self-concept: The more unique the behaviour is (that is, the fewer others perform it), the more strongly it will influence how you see yourself.

Third, we hypothesized that the difficulty of the pro-environmental behaviour influences the extent to which behaviour signals your identity. The more effort it takes you to perform a certain pro-environmental action, the more the behaviour will signal your environmental self-identity. Some initial support for this proposition can be found in research on moral behaviour. When participants performed a moral behaviour that took effort, their moral identity was strengthened more than when they performed a moral behaviour that did not take much effort (Gneezy, Imas, Brown, Nelson, & Norton, 2012). Hence, we propose that environmental self-identity is likely to be particularly strengthened when people engaged in difficult pro-environmental actions.

4.1.3 Current research

To our knowledge it has not been studied yet under which conditions past pro-environmental actions are most likely to strengthen one's environmental self-identity, thereby promoting sub-

sequent environmentally-friendly actions (i.e., positive spill-over), and the role of the signalling function of previous actions in this respect. The aim of the current research is to study which factors influence the extent to which past pro-environmental actions strengthen one's environmental self-identity and promote subsequent pro-environmental actions. We propose that past pro-environmental behaviour is more likely to lead to subsequent environmentally-friendly behaviour when this past behaviour signals your identity, and hence, when this behaviour strengthens environmental self-identity. We argued that this is more likely to be the case when the signalling function of the initial actions is high, that is, when it concerns a range of different behaviours, when the behaviour is rather unique and when the behaviour is difficult. In the first study we will test if environmental self-identity is more likely to be strengthened when people consider a range of pro-environmental behaviours they engaged in before instead of only one, and when these behaviours reflect a variety of past pro-environmental actions rather than very similar actions. In the second study we will test whether considering a single past pro-environmental action may also strengthen the environmental self-identity. More specifically, we will test if environmental self-identity will be strengthened more when the signalling strength of the relevant behaviour increases, which is more likely to be the case when the behaviour is rather unique or difficult, and even more so when it is unique and difficult. In both studies, we will also test if environmental self-identity in turn promotes subsequent pro-environmental actions and if environmental self-identity mediates the relationship between past pro-environmental actions and subsequent pro-environmental behaviour. If so, we gain a better understanding of the process through which past pro-environmental actions promote future pro-environmental behaviour, and thus promote positive spill-over.

4.2 Study one - Effects of the number and variety of pro-environmental actions on environmental self-identity

In Study 1 we tested if reminding people of a range of different past pro-environmental behaviours is indeed more likely to strengthen environmental self-identity compared to reminding them of a range of similar past pro-environmental actions or a single past pro-environmental action. We hypothesized that reminding people of eight rather different past pro-environmental actions will strengthen the environmental self-identity (as compared to a control group). In contrast, we expected that reminding people of eight pro-environmental actions that basically reflect a similar type of environmental behaviour or of a single pro-environmental action will not strengthen environmental self-identity (compared to a control group), as the signalling function of these behaviours may not be sufficiently strong to affect environmental self-identity. Finally, we hypothesized that environmental self-identity is in turn positively related to subsequent pro-environmental choices and that environmental self-identity mediates the relationship between past behaviour and subsequent pro-environmental choices.

Method

Participants and procedure. Respondents were students at a Dutch university who were approached in three cafeterias and one lecture hall of the university. In total 267 respondents participated in the study, of which 148 were female; 11 participants did not indicate their gender. Age ranged from 16 to 33 (M = 21.5, SD = 2.74).

Materials

Pilot test. To ensure that the effects of our manipulation do not result from differences in environmentally-friendliness or difficulty of the behaviours selected, or from the frequency of engagement in the behaviours, we first conducted a pilot study to select pro-environmental behaviours to be included in our manipulation. In the pilot test 50 participants rated how often they perform 32 pro-environmental behaviours reflecting different types of behaviours as well as one basic type of behaviour (on a scale from 1 *totally disagree* to 7 *totally agree*), how environmentally-friendly they think the behaviours are (on a scale from 1 *very environmentally-unfriendly* to 7 *very environmentally-friendly*) and how difficult they think the behaviours are (on a scale from 1 *very easy* to 7 *very difficult*). Based on the results, we selected eight behaviours reflecting different types of behaviour (i.e., transport, recycling and home energy use) and eight behaviours reflecting one basic type of behaviour (i.e., switching off appliances) that were all performed relatively often and seen as relatively environmentally-friendly (see Table 4.1). These behaviours were included in the manipulation of the main study. The eight behaviours reflecting one basic type of pro-environmental behaviour (M = 1.94, SD = 1.34) as well as the eight different behaviours (M = 2.10, SD = 1.44) were seen as relatively easy. In addition, we selected the behaviour 'I sometimes buy an organic product' for the experimental group that was reminded of one environmentally-friendly behaviour, because this behaviour was also performed relatively frequently (M = 5.74, SD = 1.72), seen as environmentally-friendly (M = 5.38, SD = 1.60) and found the least easy compared to the other behaviours (M = 2.57, SD = 1.66). By selecting a single action that was not too easy, we were able to have a fair test of whether a single action can affect environmental self-identity as well.

Manipulation. We manipulated past behaviour by reminding people of their previous pro-environmental actions in a similar way as Cornelissen and colleagues (2008); research showed that this manipulation indeed influences environmental self-identity (Van der Werff et al., 2013a). The manipulation of previous pro-environmental actions involved that participants had to indicate on a scale from 1 (totally disagree) to 7 (totally agree) how often they performed the pro-environmental behaviours. One fourth indicated how often they perform the eight behaviours reflecting different types of pro-environmental behaviour (M = 5.17, SD = .91), one fourth indicated how often they perform the eight behaviours reflecting one basic type of behaviour (M = 4.96, SD = 1.12), one fourth indicated how often they perform one pro-environmental behaviour (i.e., buying organic products; M = 4.06, SD = 1.82), and finally one fourth indicated how often they perform eight behaviours which are not related to the environment (e.g., 'read the newspaper'); this is our control condition (M = 3.45, SD = .79).

Table 4.1 *Means and standard deviations of the frequency and environmentally-friendliness of behaviours reflecting different types of environmental behaviours and of behaviours reflecting one basic type of environmental behaviour included in the manipulation of Study 1*

8 behaviours reflecting different types of behaviour	Frequency		Environmentally-friendliness	
	M	SD	M	SD
I often go to work or studies by bike instead of by car	5.10	2.53	6.64	.94
I bring glass bottles to the recycling bin	6.16	1.71	5.96	1.16
I do not throw litter on the street	6.34	1.08	5.89	1.39
I turn off electrical appliances (to save energy)	4.44	1.86	5.74	1.26
I separate paper from my waste	5.40	1.85	5.91	1.28
I turn off the heater when I leave my room	6.10	1.23	6.30	1.04
I use energy-efficient light bulbs	5.50	1.61	6.21	1.10
I turn off the lights when no one is in the room	6.08	1.18	6.09	1.10
Overall	5.64	1.08	6.09	.97
8 behaviours reflecting one basic type of behaviour	**Frequency**		**Environmentally-friendliness**	
	M	SD	M	SD
I turn electrical devices off instead of putting them on standby (to save energy)	4.44	1.86	5.74	1.26
I turn the heater off when I go to bed	6.30	1.22	6.36	1.01
I turn the lights off in a room where nobody is present	6.08	1.18	6.09	1.10
I turn my laptop or computer off at night, instead of leaving it on standby	6.02	1.55	5.96	1.20
I turn the television off when I'm not watching it	6.14	1.29	6.04	1.22
I disconnect the plug of my charger from the power point when I'm not charging my phone	5.38	2.07	5.66	1.19
I turn the DVD player off instead of putting it on standby when I'm not using it	5.50	2.17	5.72	1.23
I turn down the thermostat when I leave home	6.10	1.23	6.30	1.04
Overall	5.74	1.02	5.98	.99

Measures

Environmental self-identity. We measured environmental self-identity with three items: Acting environmentally-friendly is an important part of who I am; I am the type of person who acts environmentally-friendly; I see myself as an environmentally-friendly person. These items were adapted from previous research and proved to be a valid measure (e.g., Fielding, McDonald, & Louis, 2008; Terry, Hogg, & White, 1999; Van der Werff et al., 2013a; 2013b). Respondents rated each item on a seven point scale, ranging from totally disagree to totally agree. We computed the mean score on these items; Cronbach's alpha for this scale was .88 (M = 4.11, SD = 1.33).

Product choice. Respondents were asked to choose one out of two options of a product (see Van der Werff et al., 2013b). One option of the product was a sustainable choice, which was 10% more expensive than the other, unsustainable, option. In total eight choices were offered. Respondents indicated for a pair of jeans, milk, a laptop, a pen, a writing pad, a bicycle, a pair of socks and a mobile phone if they would choose the sustainable or the unsustainable option. For example, participants chose between a pair of socks of 3 Euros which was produced in an unsustainable way and a pair of socks of 3.30 Euros which was produced sustainably. We counted the number of times respondents chose the sustainable option (M = 3.71, SD = 2.28).

Results

As expected, the manipulation influenced environmental self-identity ($F(3,260) = 3.78$, $p = .01$, $\eta_p^2 = .04$). Subsequent specific contrasts revealed that participants who were reminded of eight behaviours reflecting different types of behaviour (M = 4.48, SD = 1.20) indeed had a marginally significant stronger environmental self-identity than participants in the control group (M = 4.09, SD = 1.36; $t(260) = 1.79$, $p = .07$, $d = .30$). As expected, the environmental self-identity of participants who were reminded of eight behaviours reflecting one basic type of behaviour (M = 4.16, SD = 1.37; $t(260) = .28$, $p = .78$) and of one behaviour (M = 3.75, SD = 1.36; $t(260) = -1.56$, $p = .12$) did not differ significantly from the control group.

The manipulation did not have an effect on product choice ($F(3, 261) = .87$, $p = .46$). However, as expected, environmental self-identity was related to product choice after controlling for the manipulation ($F(4, 258) = 12.12$, $p < .001$). The stronger the environmental self-identity, the more sustainable products people chose ($\beta = .39$, $p < .001$).

We then tested if environmental self-identity mediates the relationship between the manipulation and product choice. We conducted mediation analysis for multicategorical independent variables (Hayes & Preacher, 2012). We used stratified bootstrap sampling because the four groups did not comprise an equal number of participants. Dummy coding was used in which all experimental groups were compared one by one to the control group. We only tested the dummy variable in which the group that was reminded of eight behaviours reflecting different types of behaviour was compared to the control group, because this was the only group that differed from the control group in the strength of environmental self-identity (as there needs to be a significant relationship between the independent variable and the mediator to be able to test mediation effects). The 95% bootstrap confidence interval of the indirect effect for

this dummy variable ranged from -.009 to .580, while the 90% bootstrap confidence interval ranged from .032 to .527, indicating that there is a marginally significant indirect effect of the manipulation on product choice via environmental self-identity, and hence that the effect of the manipulation on product choice was indeed mediated by environmental self-identity. As expected, this mediation effect was only significant for the group in which people were reminded of eight behaviours across domains versus the control group.

Discussion

Study 1 showed that reminding people of their past pro-environmental actions can strengthen one's environmental self-identity, and that this is particularly likely when the initial behaviour has a stronger signalling function, thus being indicative of who we are. In line with our expectations, we found that when people are reminded of a range of different past pro-environmental actions, environmental self-identity was strengthened. In contrast, when participants were reminded of a range of very similar pro-environmental behaviours, or of a single action, the environmental self-identity was not strengthened. Apparently, the signalling function of the range of very similar actions and of the single action were not strong enough to significantly strengthen environmental self-identity.

Next, in line with our hypothesis, we found that environmental self-identity was in turn related to sustainable choices. The stronger one's environmental self-identity, the more sustainable products one chose. Also, as expected, environmental self-identity mediated the relationship between the manipulation and product choice. Our results thus suggest that reminding people of a variety of eight pro-environmental behaviours leads to more environmentally-friendly choices via one's environmental self-identity.

Study 1 thus showed that reminding people of a range of eight very similar pro-environmental actions, or of one pro-environmental action may not have a strong signalling function, and consequently, not significantly strengthen one's environmental self-identity and thereby lead to more environmentally-friendly behaviour. Although we selected a single action that was not too easy, this action did not significantly strengthen environmental self-identity. Perhaps this behaviour was not difficult enough to strengthen environmental self-identity, or maybe one signalling feature (i.e., difficulty) is not sufficient to strengthen environmental self-identity. Probably, other signalling features need to be present as well, such as the behaviour being difficult as well as unique, in order to strengthen one's environmental self-identity. Therefore, we designed Study 2 to test under which circumstances a single action may have a clear signalling function as well.

4.3 Study two - Effects of uniqueness and difficulty of a single action on environmental self-identity

The aim of Study 2 was to test if engagement in a single pro-environmental behaviour may strengthen one's environmental self-identity, and thereby promote subsequent environmentally-friendly choices. We hypothesised that this may be the case when the signalling function

of the relevant behaviour is strong enough, making the behaviour indeed signal who you are. We tested whether the signalling functions of previous pro-environmental actions may be sufficiently high when the behaviour is difficult and/or unique. We expected an interaction effect in which environmental self-identity is strengthened most when the behaviour is difficult and unique compared to when only one of these or none of these conditions are fulfilled. When the behaviour is only difficult or only unique we expected environmental self-identity to be stronger than when it is not unique and easy. Furthermore, we again expected that a strong environmental self-identity will in turn be related to pro-environmental choices and mediate the relationship between past behaviour and subsequent pro-environmental choices. Hence, we tested if the relationship between the manipulation and product choice would be mediated by environmental self-identity; we only tested this mediation effect if the manipulation indeed affected the self-identity of the groups that were reminded of previous difficult and/or unique behaviour.

Method

Participants and procedure. Respondents were undergraduates at a Dutch university who participated in exchange for course credits. In total 157 respondents participated in the study, of which 103 were female, 19 participants did not indicate their gender. Age ranged from 18 to 33 (M = 20.7, SD = 1.84).

Materials

Manipulation. We presented the participants with one out of four scenarios, and asked them to imagine that they work at a company and just bought an electric car. The experiment followed a 2 * 2 design in which we manipulated the difficulty and uniqueness of this pro-environmental action. First, for half of the participants we indicated that buying an electric car was relatively easy, because the company where they work had a special arrangement and took care of everything. For the other half we indicated that buying an electric car was relatively difficult, because they had to figure out and arrange everything themselves. Second, for half of the participants, it was indicated that only few people drive an electric car, and for the other half it was indicated that most of their colleagues drive an electric car. Below is an example of the scenario in which the behaviour was difficult and unique and of the scenario in which the behaviour was not difficult and not unique:

'Imagine that you work at a company and need a car to get to work every day. You bought an electric car. You spent a lot of time figuring out which electric car was most environmentally-friendly. The car was much more expensive than a regular car, and it is not likely that you will recover the costs. Only few people buy an electric car.'

'Imagine that you work at a company and need a car to get to work every day. You bought an electric car. At work there was a special arrangement. They figured out which electric car was best for you, and arranged everything with the car dealer, you did not have to do anything. The car was not more expensive than a regular car. Most of the people at work drive an electric car.'

Measures

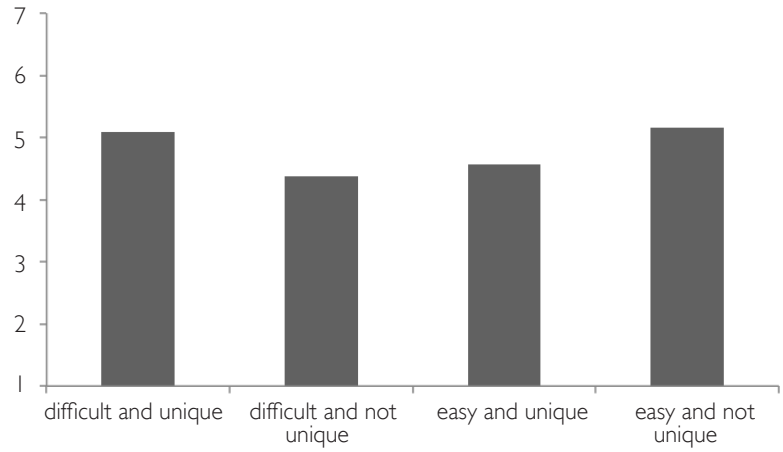
Environmental self-identity. Environmental self-identity was measured with the same items as in Study 1. The items formed a reliable scale (α = .91, *M* = 4.79, *SD* = 1.34).

Product choice. Product choice was measured in the same way as in Study 1. On average participants chose 5.15 sustainable products (*SD* = 2.20).

Results

There was no main effect of difficulty of the initial behaviour on environmental self-identity ($F(1, 153) = .29$, $p = .59$). We also did not find a main effect of uniqueness of the initial behaviour on environmental self-identity ($F(1, 153) = .09$, $p = .77$). However, we did find a significant interaction effect ($F(1, 153) = 9.65$, $p < .01$). When people were reminded of behaviour that had two signalling features, environmental self-identity was stronger compared to when they were reminded of behaviour that had one signalling feature only. More specifically, in line with our expectations, specific contrasts showed that environmental self-identity was stronger when the initial behaviour was unique and difficult ($M = 5.09$, $SD = 1.37$) compared to when it was only difficult, but not unique ($M = 4.38$, $SD = 1.38$, $t(153) = 2.40$, $p = .02$, $d = .52$) and marginally stronger compared to when it was only unique but not difficult ($M = 4.56$, $SD = 1.40$; $t(153) = 1.82$, $p = .07$, $d = .38$; see Figure 4.1). Unexpectedly, however, we did not find a difference in environmental self-identity between the groups that were reminded of behaviour with two (when the initial behaviour was unique and difficult) or no signalling features (when it was not unique and easy; $M = 5.15$, $SD = 1.04$; $t(153) = -.17$, $p = .86$).

Figure 4.1 *Average score on environmental self-identity*



There was no main effect of difficulty of the initial behaviour on product choice ($F(1, 153) = .89$, $p = .35$) and of uniqueness of the initial behaviour on product choice ($F(1, 153) = .20$, $p = .65$). Again, we found a significant interaction effect ($F(1, 153) = 3.90$, $p = .05$). When the initial

behaviour had two signalling features people chose more sustainable products compared to when the behaviour had one signalling feature only. Specific contrasts revealed that when the initial behaviour was unique and difficult, participants chose more sustainable products (M = 5.74, SD = 2.14) than when it was unique but easy to do so (M = 4.73, SD = 2.39, $t(153) = 2.07$, $p = .04$, $d = .45$). Also, participants chose marginally significant more sustainable products if the initial behaviour was unique and difficult compared to when it was not unique and difficult (M = 4.90, SD = 2.46; $t(153) = 1.71$, $p = .09$). Again, unexpectedly, there was no difference in sustainable choices when the initial behaviour was unique and difficult compared to when it was not unique and easy (M = 5.26, SD = 1.67; $t(153) = .99$, $p = .33$).

As expected, environmental self-identity was related to product choice after controlling for the manipulation ($F(4, 152) = 8.49$, $p < .001$). The stronger the environmental self-identity, the more sustainable products participants chose ($\beta = .40$, $p < .001$). Next, we tested if the effect of the manipulation on product choice was mediated by environmental self-identity. We used dummy coding in which we compared the scenario in which it was difficult and unique to buy an electric car to all other scenarios. We only tested mediation effects for the scenarios that differed significantly in environmental self-identity from the scenario in which the initial behaviour was described as difficult and unique. Hence, we compared the scenario depicting the initial behaviour as difficult and unique to the scenarios in which the behaviour was difficult but not unique and to the scenario in which the behaviour was unique but not difficult. When the scenario in which buying an electric car was difficult and unique was compared to the scenario in which it was difficult but not unique, we found that environmental self-identity indeed mediated the relationship between the manipulation and product choice, with the 95% bootstrap confidence interval ranging from -.974 to -.096. When the scenario in which buying an electric car was difficult and unique was compared to the scenario in which it was unique but not difficult, the indirect effect of the scenarios on product choice was marginally significant: The 90% bootstrap confidence interval ranged from .081 to .894. This suggests that environmental self-identity indeed mediated the relationship between the manipulation and product choice.

Discussion

In Study 2 we found that reminding people of a single past pro-environmental action can indeed strengthen environmental self-identity if this initial behaviour has multiple signalling features. More specifically, we found that environmental self-identity was stronger when the past action was difficult and unique than when this action was difficult but not unique and compared to the situation where the action was unique but easy, supporting our hypothesis. This suggests that only one signalling feature does not significantly strengthen environmental self-identity, and that two signalling features are needed to strengthen environmental self-identity. However, interestingly, participants who read the scenario in which the past behaviour was difficult and unique did not have a stronger environmental self-identity than participants who read the scenario that the past behaviour was easy and not unique. Apparently, the latter behaviour also signals one's identity to a certain extent. Perhaps this result is due to a contrast effect, if everyone does it and it is easy you need to show in another way that you are

an environmentally-friendly person, perhaps by indicating that you are an environmentally-friendly person, which would be expressed in a stronger environmental self-identity. Alternatively, the fact that your company arranged an electric car for you and most of your colleagues drive an electric car may signal that the group to which you belong is very environmentally-friendly, and therefore you may also see yourself more strongly as an environmentally-friendly person. Future research is needed to explicitly test this explanation and the underlying processes.

As expected we found that a stronger environmental self-identity was in turn related to more environmentally-friendly choices. Importantly, as hypothesized, we found that environmental self-identity mediated the relationship between the manipulation and product choice, in case the behaviour was difficult as well as unique compared to when it was only difficult or only unique. These results are in line with our expectation that past pro-environmental actions strengthen environmental self-identity most and are most likely to lead to subsequent environmentally-friendly choices when the behaviour is difficult and unique.

4.4 General discussion

We tested under which circumstances past behaviour is most likely to strengthen one's environmental self-identity, and how identity is in turn related to pro-environmental choices. Research suggests that past pro-environmental actions may promote subsequent environmentally-friendly behaviour (Cornelissen et al., 2008; Thøgersen & Ölander, 2003), but may also inhibit subsequent pro-environmental actions (Mazar & Zhong, 2010; Thøgersen & Ölander, 2003). We proposed that past pro-environmental behaviour will particularly promote subsequent environmentally-friendly behaviour if it strengthens environmental self-identity. Reminding people of their past pro-environmental behaviour can strengthen environmental self-identity (Van der Werff et al., 2013a). However, this may not always be the case. We argued that environmental self-identity is more likely to be strengthened when the past behaviour implies something about the person performing the behaviour. On the basis of attribution theory (Kelley & Michela, 1980) and self-perception theory (Bem, 1972), we proposed that past pro-environmental actions will strengthen environmental self-identity to a larger extent when this behaviour has a stronger signalling function. We proposed that this is more likely to be the case when the initial behaviour concerns a range of rather different pro-environmental behaviours, or when a single initial pro-environmental behaviour is rather difficult and unique.

In the first study we tested if environmental self-identity is indeed strengthened more when it concerns a range of rather different pro-environmental behaviours rather than a range of very similar behaviours or a single not too easy action. We found support for our hypothesis. Only when people were reminded of a range of rather different pro-environmental actions, their environmental self-identity was strengthened. When people were reminded of a range of very similar behaviours, or of a single action that was not too easy, their environmental self-identity was not strengthened. This suggests that the signalling function of a range of similar actions or of a single action may not be strong enough to strengthen environmental self-identity. A single behaviour may strengthen environmental self-identity when it has stronger signalling functions.

Indeed, in the second study we found support for our hypothesis that past pro-environmental behaviour strengthens environmental self-identity most when the behaviour has multiple signalling features. Interestingly, we did not find main effects of the single signalling features, suggesting that these features alone were too weak to signal one's identity. More specifically, we found that environmental self-identity was stronger when the behaviour was difficult and unique, compared to when the behaviour was difficult but not unique and compared to when the behaviour was unique but easy. However, we found that reminding people of pro-environmental behaviour that had two signalling features as well as those who were reminded of pro-environmental behaviour with no signalling features had a stronger environmental self-identity. More specifically, environmental self-identity did not differ for people who considered engaging in behaviour that was easy and not unique compared to when the behaviour was difficult and unique. Perhaps this was due to a contrast effect: participants were motivated to indicate that they are environmentally-friendly even though the behaviour is easy and most people do it, which was reflected in a stronger environmental self-identity. Alternatively, environmental self-identity may have been strong in this group because people realised that the organisation to which people belong is environmentally-friendly, as they arranged the electric car and most of their colleagues drive an electric car. This may strengthen the extent to which you see yourself as an environmentally-friendly person. Future research is needed to test this explanation.

Our results suggest that past pro-environmental actions indeed particularly influence environmental self-identity when the past actions have a strong signalling function. The strength of the signalling function depends on whether it concerns a range of different pro-environmental actions and whether the behaviour has multiple signalling features, such as when it is difficult and unique. Our findings are a first indication of the conditions under which past pro-environmental actions may strengthen environmental self-identity. Future research could more explicitly test whether the effects on environmental self-identity are indeed due to the signalling strength of the initial behaviours, for example by directly measuring the signalling strength of different pro-environmental behaviours and whether this depends on the number of behaviours, and specific signalling features such as the uniqueness and difficulty of behaviours. Also, future research could study whether other factors may also strengthen the signalling function of past pro-environmental actions, thereby strengthening environmental self-identity. For example, the signalling strength may also depend on whether the behaviour was performed autonomously or not. If someone freely chose to perform a pro-environmental behaviour, the behaviour may be more likely attributed to internal factors, hence environmental self-identity may be strengthened more than when people were more or less forced to act pro-environmentally. The level of conceptual abstraction of past behaviour (the extent to which past behaviours are conceptualized on an abstract or concrete level) may also influence the signalling function. Indeed, research on moral behaviour suggests that participants who recalled a temporally distant abstract moral behaviour acted moral on a subsequent task, while participants who recalled a recent concrete moral behaviour acted immoral on a subsequent task (Conway & Peetz, 2012). Also, the environmental impact of pro-environmental behaviour may influence the signalling strength of past behaviour. Behaviour with a significant

environmental impact may more strongly signal that someone is the type of person who acts environmentally-friendly than if the behaviour hardly influences environmental quality. Future research is needed to test whether these and other factors influence the signalling strength of pro-environmental actions, and thereby influence environmental self-identity.

In both studies we found that a strong environmental self-identity in turn predicted subsequent pro-environmental actions. Indeed, both studies revealed that the stronger one's environmental self-identity, the more sustainable products one chose. This is in line with research showing that environmental self-identity predicts pro-environmental behaviour (Gatersleben et al., 2012; Van der Werff et al., 2013a; 2013b; Whitmarsh & O'Neill, 2010). More importantly, we also found support for our prediction that environmental self-identity mediates the relationship between past pro-environmental actions and subsequent pro-environmental behaviour. When people are reminded of a range of different pro-environmental behaviours or when they are reminded of a difficult and unique pro-environmental action they were more likely to engage in subsequent sustainable choices via their strengthened environmental self-identity. Environmental self-identity thus seems to be a process through which initial pro-environmental actions may spill over to subsequent pro-environmental behaviour.

In our studies we found an effect of our manipulation on environmental self-identity. However, our manipulation of past behaviour was still relatively weak, we only reminded people of past actions they already performed. The effects may be stronger when people are persuaded to actually perform pro-environmental actions that clearly signal their identity. Also, we expect that our model is a dynamic model: Past pro-environmental behaviour may strengthen environmental self-identity, which in turn promotes other environmentally-friendly behaviour, these behaviours may in turn strengthen environmental self-identity and so forth. Future research is needed to test whether actually persuading people to perform pro-environmental actions has a stronger effect on environmental self-identity and if past pro-environmental actions indeed promote future environmentally-friendly actions via such a dynamic model.

Studies found that past pro-environmental actions may inhibit as well as promote subsequent environmentally-friendly behaviour. Our results may explain the inconclusive results of earlier studies, and explain why some studies found that past pro-environmental behaviour promotes subsequent environmentally-friendly actions while other studies found that past pro-environmental behaviour inhibits subsequent environmentally-friendly behaviour. Our findings suggest that studies that demonstrated that pro-environmental actions may inhibit subsequent environmentally-friendly behaviour may be due to the fact that the initial behaviours did not strongly signal that one is a pro-environmental person, and thus did not result in a strengthened environmental self-identity. For example, in the study by Mazar and Zhong (2010) people who shopped in a conventional store (where most products were unsustainable products) were less likely to act moral than people who shopped in a green-product store (where they had to select some sustainable products). However, buying sustainable products in an online store may not strongly signal that you are environmentally-friendly person, because behaviours performed privately do not have a strong signalling function (cf. Griskevicius, Tybur, & Van den Bergh, 2010). Also, in this study pro-environmental behaviour was not performed autonomously, but participants were forced to select some green products. When one

does not freely choose to perform the pro-environmental action the behaviour may not have a strong signalling function. In the research by Sachdeva and colleagues (2009) participants were asked to copy a list of nine words containing positive traits, negative traits or neutral words and to write a story about themselves containing these words. Participants who wrote a story containing the positive traits were in a subsequent scenario task less likely to pay money to prevent pollution. However, writing nine positive traits is not likely to signal how pro-environmental one is, thereby not influencing one's environmental self-identity. Future research is needed to test if moral licensing is indeed less likely to occur when the initial behaviour signals who you are and has clear implications for your environmental self-identity.

Our findings suggest that in order to promote environmentally-friendly actions, campaigns should focus on the pro-environmental actions that people already perform. For example, campaigns could stress engagement in a range of different common pro-environmental behaviours, such as bringing glass bottles to the recycling bin or separating paper from the regular waste. However, the stronger the signalling function of these behaviours, the more likely it is that it will strengthen people's environmental self-identity and thereby lead to subsequent pro-environmental actions. Therefore, it may not be enough if campaigns stress, for example, one easy pro-environmental action, as a single action may only strengthen one's environmental self-identity and lead to more pro-environmental behaviour when the behaviour has a clear signalling function. Instead campaigns should focus on, for example, a range of rather different pro-environmental actions or on single actions that have multiple signalling features. Campaigns could stress a range of different past behaviours or a past behaviour that was for example difficult as well as unique, as this is likely to increase the signalling strength of the behaviour, thereby strengthening environmental self-identity and promoting subsequent pro-environmental choices. Future research is needed to test if campaigns that stress pro-environmental behaviours that signal who you are indeed promote subsequent environmentally-friendly behaviour via one's environmental self-identity. Also, future research is needed to test if other factors may also increase the signalling function of behaviour, such as the level of conceptual abstractness, autonomy, and environmental impact of the behaviour (as we explained above), and whether campaigns that focus on these signalling features are successful in strengthening environmental self-identity and encouraging pro-environmental behaviour.

In our studies we focused on student samples. Future research is needed to test whether similar results are found with other samples as well. We expect similar findings with different samples, as we expect that the influence of past pro-environmental actions on environmental self-identity is not likely to depend on individual characteristics. Also, in our studies we tested whether environmental self-identity influenced people's preferences for sustainable products. Future studies should test whether people are also more likely to perform actual pro-environmental actions after their environmental self-identity is strengthened by their past pro-environmental actions, for example, by observing actual environmental behaviour.

In sum, we studied the relationship between the signalling strength of past pro-environmental actions, environmental self-identity and subsequent environmental behaviour. Our results showed that past pro-environmental actions can strengthen environmental self-identity and thereby promote subsequent environmentally-friendly behaviour, and that this is particu-

larly likely when the past actions have a strong signalling function, that is when it concerns a range of different pro-environmental behaviours, or a single action that is difficult and unique.

5
IT IS A MORAL ISSUE

The relationship between environmental self-identity, obligation-based intrinsic motivation and pro-environmental behaviour

Abstract

In order to effectively mitigate climate change people need to adopt environmentally-friendly actions. We argue that some people act environmentally-friendly without external incentives to do so, but rather because they are intrinsically motivated to do so. There is some initial evidence to suggest that this is particularly likely for people with a strong environmental self-identity. Environmental self-identity may thus be an important factor in promoting one's intrinsic motivation to act environmentally-friendly, thereby encouraging pro-environmental actions. However, not much is known about how environmental self-identity influences pro-environmental actions. In this research, we aimed to test whether, and if so, the process via which environmental self-identity is related to environmentally-friendly behaviour. In three studies we found support for our hypotheses that environmental self-identity is related to one's obligation-based intrinsic motivation (that is, feelings of moral obligation) to act pro-environmentally, which in turn affects pro-environmental actions. As expected, the obligation-based intrinsic motivation mediates the relationship between environmental self-identity and environmentally-friendly behaviour. Our findings suggest that strengthening environmental self-identity may be a cost-effective way to promote pro-environmental actions, as people with a strong environmental self-identity are likely to act environmentally-friendly without an external incentive to do so.

Chapter 5 is based on Van der Werff, E., Steg, L., & Keizer, K. (in press). It is a moral issue: The relationship between environmental self-identity, obligation-based intrinsic motivation and pro-environmental behaviour. *Global Environmental Change.*

5.1 Introduction

In order to effectively mitigate climate change people need to adopt environmentally-friendly actions (IPCC, 2007). Policy makers often try to promote environmentally-friendly behaviour by providing external incentives as to make the pro-environmental behaviour more attractive or to make the environmentally-unfriendly behaviour less attractive. But are such external incentives always needed? Research suggests that some people act environmentally-friendly even though it is not extrinsically rewarding, and that some people act pro-environmental in spite of it being costly or effortful (e.g., Steg, Perlaviciute, Van der Werff, & Lurvink, 2012). These people are likely to be intrinsically motivated to act environmentally-friendly. When people are intrinsically motivated, the motivation comes from within the individual, rather than from external rewards (Frey, 1997). But why would people be intrinsically motivated to act pro-environmentally? We propose that environmental self-identity, that is, the extent to which you see yourself as a type of person whose actions are environmentally-friendly, plays an important role in this process.

Research in the environmental domain showed that one's self-identity, that is, the label you use to describe yourself (Cook, Kerr, & Moore, 2002), is an important predictor of environmental actions. More specifically, specific types of environmental self-identity appeared to be related to a range of pro-environmental actions, including eco-shopping, energy conservation, pro-environmental behaviours, recycling and environmental activism (Whitmarsh & O'Neill, 2010; Gatersleben, Murtagh, & Abrahamse, 2012; Nigbur, Lyons, & Uzzell, 2010; Fielding, McDonald, & Louis, 2008). However, not much is known about the process through which self-identity is related to environmental behaviour. Learning more about why people act environmentally-friendly and if and how self-identity affects such actions will provide more insight into how pro-environmental behaviour can be promoted. The aim of the current research is to study if environmental self-identity influences environmental actions, and if so, via which process environmental self-identity influences environmental actions.

Studies on the relationship between environmental self-identity and pro-environmental actions (reported above) suggest that people with a strong environmental self-identity are likely to act environmentally-friendly when there are no external incentives to do so, as behaviours such as eco-shopping and environmental activism typically involve additional costs or effort. Does this mean that people with a strong environmental self-identity are intrinsically motivated to act environmentally-friendly? This is not a trivial question, as understanding ways to strengthen one's intrinsic motivation may be an important and cost-efficient way to promote pro-environmental behaviour, because no external incentives (e.g., financial rewards) are needed. In this research, we will test if environmental self-identity is related to environmental behaviour via one's intrinsic motivation to do so.

5.1.1 Environmental self-identity

We focus on one's general environmental self-identity, which we define as the extent to which you see yourself as a type of person whose actions are environmentally-friendly. People with

a strong environmental self-identity more strongly see themselves as an environmentally-friendly person and are more likely to act in line with this identity than those with a weak environmental self-identity. Why are people with a strong environmental self-identity more likely to act pro-environmentally? Two explanations may be given. First, people with a strong environmental self-identity may act environmentally-friendly because they enjoy doing so. Second, people with a strong environmental self-identity may engage in environmentally-friendly actions because they feel morally obliged to do so. Acting pro-environmentally because you enjoy performing the behaviour suggests that you are intrinsically motivated to do so for the inherent satisfaction derived from it rather than for some separable consequence (Ryan & Deci, 2000). Ryan and Deci define intrinsic motivation as doing something because it is inherently interesting or enjoyable. According to Ryan and Deci (2002) people are more likely to be intrinsically motivated when specific values, goals and needs related to that behaviour are integrated as a part of the self. As values influence one's environmental self-identity (Van der Werff, Steg, & Keizer, 2013b), we may argue that people with a strong environmental self-identity are more likely to be intrinsically motivated to perform behaviour in line with that identity because they derive inherent satisfaction from it. This line of reasoning is supported by a study on exercise identity, which was strongly related to the intrinsic motivation to derive satisfaction from exercising (Vlachopoulos, Kaperoni, & Moustaka, 2011). This suggests that people with a strong exercise identity exercise because they believe it is fun to do so. Does this imply that people with a strong environmental self-identity act environmentally-friendly because they find it enjoyable? A study by Pelletier, Tuson, Green-Demers, Noels, and Beaton (1998) indeed suggests that people who more often perform pro-environmental actions more strongly associate these actions with pleasure than people who less often act environmentally-friendly. However, in this study the items measuring intrinsic motivation did not focus on enjoying the pro-environmental actions for its own sake, but they focused on the pleasure derived from contributing to improving environmental quality. Hence, they did not study whether people engaged in pro-environmental action because of the inherent pleasure for doing so, but whether people derived pleasure from doing the right thing (in this case, acting pro-environmentally).

5.1.2 Two types of intrinsic motivation

We argue that two different types of intrinsic motivation should be distinguished: enjoyment-based intrinsic motivation, reflecting whether the behaviour itself is enjoyable to do, and obligation-based intrinsic motivation, reflecting whether performing the 'right' behaviour gives you a good feeling (Lindenberg, 2001). According to Lindenberg (2011), leisure activities are more likely to be related to enjoyment-based intrinsic motivation, whereas civic behaviours (e.g., tax paying, voting) are more likely to be related to obligation-based intrinsic motivation as such actions are mostly not enjoyable to do so as such, but they may elicit positive feelings by contributing to the good cause. Indeed, when a task is not very interesting or enjoyable, (enjoyment-based) intrinsic motivation, in the sense of the behaviour being fun to perform, becomes less relevant for performing this task (Vallerand, Pelletier, & Koestner, 2008).

As most pro-environmental behaviours are not fun to perform either, we think the obligation-based intrinsic motivation is particularly relevant for environmental behaviour, while enjoyment-based intrinsic motivation is less relevant in the environmental domain. Many environmentally-friendly actions are associated with more effort and less pleasure. For example, showering shorter means less comfort, using green energy may be more of a hassle, cycling is more effortful than driving, and reducing the temperature setting in your house reduces comfort. Hence, many pro-environmental behaviours are probably not performed because the behaviour itself is pleasurable. Indeed, recent research shows that people with strong hedonic values (who strive for pleasure in life) are likely to refrain from pro-environmental behaviour, probably because these behaviours are not pleasurable or fun or because they reduce comfort (Steg et al., 2012). This suggests that it is less likely that people are intrinsically motivated to act environmentally-friendly because of the fun of doing so (i.e., enjoyment-based intrinsic motivation). Instead we expect that environmental self-identity influences behaviour via one's obligation-based intrinsic motivation (i.e., via a moral route), namely that people with a strong environmental self-identity will be more likely to feel morally obliged to act pro-environmentally.

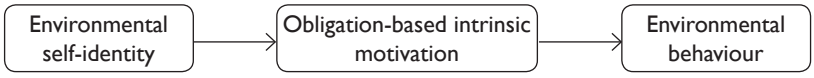
We thus propose that environmental self-identity influences behaviour because it elicits feelings of moral obligation to do so. Some support for this reasoning is found in research on collective action. Like environmental behaviour, collective action (e.g., joining a demonstration) is likely to be associated with more effort and less pleasure. Van Zomeren, Postmes, and Spears (2012) found that moral convictions are important for collective action to occur. If people feel strongly about a moral issue they are more likely to engage in collective action. The study showed that this is particularly true for people with identities with a normative content (such as environmental self-identity), suggesting that people with a strong normative identity are more likely to experience moral feelings and to act in line with their identity. Our line of reasoning is also supported by research that showed that people experience guilt when they do not act in line with their moral identity (Stets & Carter, 2012). This suggests that people with a strong environmental self-identity may be motivated to act morally (i.e., pro-environmentally) because they feel obliged to do so. Not acting in line with a sense of moral obligation to do so may lead to feelings of guilt (Schwartz, 1970). However, this correlational study tested whether people with a moral identity feel guilty after refraining from moral actions. We propose that in addition, people anticipate these feelings, that is, they are motivated to act in line with their identity because they anticipate feeling guilty if they would not act environmentally-friendly.

5.1.3 Aims current research

In the current research we will study if intrinsic motivation can be strengthened via environmental self-identity. We will test if environmental self-identity indeed influences pro-environmental actions via a moral route, thus via an obligation-based intrinsic motivation. More, specifically, we test the model in Figure 5.1. We first hypothesized that environmental self-identity is related to the obligation-based intrinsic motivation, that is, feelings of moral obligation to act environmentally-friendly (Hypothesis 1). Second, we hypothesized that feelings of moral

obligation to act environmentally-friendly mediate the relationship between environmental self-identity and environmental intentions (Hypothesis 2). We tested these hypotheses in three studies. In our first study, we tested our hypotheses in a sample of the general population using a correlational design. In the second study, we aimed to replicate our findings with a different indicator of moral obligation and with a different dependent variable. In the third study, we tested our model in an experimental design. More specifically, we tested if people feel more strongly morally obliged to act environmentally-friendly, and act in line with their moral obligation, when environmental self-identity has been strengthened.

Figure 5.1 *The relationship between environmental self-identity, obligation-based intrinsic motivation and environmental behaviour*



5.2 Study one - Environmental self-identity, personal norm and green energy

Method

Participants and procedure. Data were collected via an online questionnaire among a sample of the Dutch population. Participants were members of the panel of thesistools.com, and received a small reimbursement for their participation (less than 1 Euro). The questionnaire was online for 14 days in November 2010. The study was presented to participants as a study on energy use. In total, 138 participants filled in the questionnaire. The average age was 55 (*SD* = 15), 64% of the sample was male. The average net income of the sample was 2700 Euros per month, which is similar to the average Dutch household income of 2783 Euros (Statline, 2010). About 16% of the respondents did not complete any education, or completed primary education or vocational secondary school, 46% had completed the highest level of secondary school or a vocational education and 37% finished university.

Measures

Environmental self-identity. The following three items were used to measure environmental self-identity: Acting environmentally-friendly is an important part of who I am; I am the type of person who acts environmentally-friendly; I see myself as an environmentally-friendly person. These items were adapted from previous research (e.g., Fielding et al., 2008; Terry, Hogg, & White, 1999). Respondents rated each item on a seven point scale, ranging from totally disagree to totally agree. We computed the mean score on these items, Cronbach's alpha for this scale was .86 (M = 4.93, SD = 1.06).

Personal norm. We measured obligation-based intrinsic motivation via the personal norm. Personal norm can be defined as 'the extent to which you feel morally obliged to per-

form a certain action' (Schwartz, 1973), and thus reflects feelings of obligation to act environmentally-friendly. Personal norm was measured with three items: I feel morally obliged to act environmentally-friendly; I would feel guilty if I did not act environmentally-friendly; I would be a better person if I would act environmentally-friendly. Respondents rated each item on a seven point scale, ranging from totally disagree to totally agree. We computed the mean score, Cronbach's alpha was .62 (M = 4.59, SD = 1.09).

Intention to use green energy. Respondents indicated how likely it is that they will use green energy in the next year, on a seven point scale ranging from very unlikely to very likely (M = 4.93, SD = 1.91).

Results

Hypothesis 1 was supported: environmental self-identity explained 45.2% of the variance in the personal norm ($F(1, 136) = 112.10$, $p < .001$). The stronger the environmental self-identity, the stronger the personal norm ($\beta = .67$, $p < .001$).

We found that environmental self-identity and personal both predicted the intention to use green energy. The stronger one's environmental self-identity the stronger the intention to use green energy ($\beta = .47$, $p < .001$). Also, the stronger one's personal norm, the stronger the intention to use green energy ($\beta = .46$, $p < .001$).

Next, we found that personal norm mediated the relationship between environmental self-identity and intention to use green energy. The bootstrap estimate of the indirect effect had a 95% confidence interval from .021 to .227. The effect of environmental self-identity on intention significantly reduced ($\beta = .30$, $p < .01$) when personal norm was controlled for ($\beta = .26$, $p = .01$).

Discussion

In Study 1 we tested and found support for the full model. The results suggest that environmental self-identity influences the personal norm (supporting Hypothesis 1), while personal norm predicted the intention to use green energy. Our second hypothesis that feelings of moral obligation (personal norm) mediated the relationship between environmental self-identity and environmental intentions was supported as well. This study is a first indication that environmental self-identity is related to environmental intentions via a moral route. To test the validity and reliability of our findings it is important to replicate our results with different variables (McCrae, Zonderman, Costa, Bond, & Paunonen, 1996; Koole & Lakens, 2012). Can we replicate these findings with different indicators of personal norm and with a different dependent variable? We tested this in Study 2.

5.3 Study two - Environmental self-identity, general and specific personal norm and product choice

Study 2 aimed to replicate the findings of Study 1 with two measures of personal norm: a general personal norm to act pro-environmentally and a specific personal norm to engage in a particular pro-environmental action (in this case the personal norm to buy sustainable products). Also, we included a different dependent variable, namely product choice. We first tested if environmental self-identity is related to a general and to a specific personal norm (Hypothesis 1). Second, we tested if both types of personal norms mediate the relationship between environmental self-identity and the intention to buy sustainable products (Hypothesis 2).

Method

Participants and procedure. Data were collected via an online questionnaire among students. In total 45 participants filled in the questionnaire, of which 34 were women; 3 people did not indicate their gender. The average age was 22.6 (*SD* = 3.71).

Measures

Environmental self-identity. The same items as in Study 1 were used to measure environmental self-identity. The items formed a reliable scale (α = .77, *M* = 5.89, *SD* = .87).

General personal norm. We measured general personal norm in a similar way as Study 1. The two items focused on acting environmentally-friendly in general: I feel morally obliged to act environmentally-friendly; I would feel guilty if I would not act environmentally-friendly. We computed the mean score: the items formed a reliable scale (α = .70, *M* = 5.78, *SD* = 1.08).

Specific personal norm. The specific personal norm focused on the dependent variable in our study, namely buying sustainable products. Two items were used to measure specific personal norm: I feel morally obliged to buy sustainable products; I would feel guilty if I would buy non-sustainable products. The mean score was computed, Cronbach's alpha of this scale was .75 (*M* = 5.59, *SD* = 1.16).

Product choice. Respondents were asked to choose one out of two options of a product (see Van der Werff et al., 2013b). One option of the product was a sustainable choice, which was 20% more expensive than the other, unsustainable, option. In total eight choices were offered. Respondents indicated for a pair of jeans, orange juice, a laptop, a pen, a writing pad, a bicycle, a pair of socks and a mobile phone if they would choose the sustainable or the unsustainable option. For example, participants chose between a pen of 1 Euro which was produced in an unsustainable way and a pen of 1.20 Euros which was produced sustainably. We counted the number of times respondents chose the sustainable option (*M* = 6.12, *SD* = 1.76).

Results

Environmental self-identity explained 52.9% of the variance in the general personal norm to act pro-environmentally ($F(1, 42) = 47.10$, $p < .001$). The stronger the environmental self-

identity, the stronger the general personal norm (β = .73, $p < .001$). Environmental self-identity also predicted the specific personal norm ($R^2 = .27$; $F(1, 42) = 15.38$, $p < .001$). The stronger the environmental self-identity, the stronger the personal norm to buy sustainable products (β = .52, $p < .001$).

Second, we tested if the general personal norm mediates the relationship between environmental self-identity and product choice. Environmental self-identity significantly predicted product choice (β = .33, $p < .03$), as did the general personal norm (β = .50, $p < .01$). When environmental self-identity and the general personal norm were both included in the regression analysis, the effect of environmental self-identity became non-significant (β = -.04, p = .87), while the effect of the general personal norm on product choice remained significant (β = .51, $p < .02$). The bias-corrected bootstrap estimate of the indirect effect had a 95% confidence interval from .258 to 1.334, indicating that the general personal norm mediated the relationship between environmental self-identity and product choice.

Next, we tested whether the specific personal norm mediated the relationship between environmental self-identity and product choice. The specific personal norm significantly predicted product choice (β = .53, $p < .01$). When environmental self-identity and the specific personal norm were both included in the regression analysis, the effect of environmental self-identity became non-significant (β = .10, p = .56), while the effect of the specific personal norm on product choice remained significant (β = .47, $p < .01$). The bias-corrected bootstrap estimate of the indirect effect had a 95% confidence interval from .177 to 1.044, indicating that the specific personal norm mediated the relationship between environmental self-identity and product choice.

Discussion

In Study 2 we found that environmental self-identity was related to a general personal norm to act pro-environmentally as well as to a specific personal norm to purchase sustainable products. These results suggest that people with a strong environmental self-identity do not only feel more morally obliged to act environmentally-friendly in general, but also feel a stronger moral obligation to perform specific pro-environmental behaviours. Furthermore, as expected, both types of personal norm mediated the relationship between environmental self-identity and product choice. This suggests that environmental self-identity indeed promotes pro-environmental action, because people with a strong environmental self-identity feel morally obliged to perform environmentally-friendly actions. However, in Study 1 and 2 we used correlational designs, making it difficult to draw any definite conclusions on causality. Therefore we will use an experimental design in Study 3.

5.4 Study three - The effect of a manipulation of enviromental self-identity on personal norm and product choice

In Study 3 we used an experimental design. We manipulated environmental self-identity and tested if our manipulation influenced a general personal norm. Second, we tested if personal norm mediated the relationship between the manipulation of environmental self-identity and pro-environmental intentions, in this case: product choice.

Method

Participants and procedure. Respondents were undergraduates at a Dutch university. In total 75 respondents participated in the study, 5 participants were excluded from the dataset because they did not answer all questions or gave the same answer to all questions, leaving 70 participants in the final dataset. Age ranged from 19 to 34 (M = 22.2, SD = 2.79); 46 women participated in the study and 23 men, one person did not indicate his or her gender.

Materials

Manipulation. We manipulated environmental self-identity by reminding people of their past environmental behaviour. This manipulation is based on a study by Cornelissen, Pandelaere, Warlop, and Dewitte (2008) and has been shown to strengthen environmental self-identity (see Van der Werff, Steg, & Keizer, 2013a). Participants completed questions on how frequently they engage in eight behaviours. We pretested how common several environmental behaviours are in a Dutch sample. In total 37 participants indicated on a scale from 1 (hardly ever) to 7 (very often) how often they perform 20 environmental behaviours. We selected the eight most common behaviours and the eight least common behaviours. One third of the participants indicated how often they performed the eight common pro-environmental behaviours; as most people perform these behaviours often this is the 'environmentally-friendly group'. One third of the participants indicated how often they performed the uncommon pro-environmental behaviours; because most people rarely perform these behaviours this is the 'environmentally-unfriendly group'. Finally, one third of the participants indicated how often they perform behaviours that are not related to the environment (e.g., 'read the newspaper'); this is our control condition. In all conditions, answers were given on a scale ranging from 1 (totally disagree) to 7 (totally agree).

Measures

Environmental self-identity. The same items as in Study 1 and 2 were used to measure environmental self-identity, which served as a manipulation check. We computed the mean score, the items formed a reliable scale (α = .92, M = 3.98, SD = 1.38).

Personal norm. Three items were used to measure personal norm: I feel morally obliged to act environmentally-friendly; I would feel guilty if I would not act environmentally-friendly; Acting environmentally-friendly would give me a good feeling. The items were transformed into a mean score, Cronbach's alpha was .88 (M = 4.71, SD = 1.42).

Product choice. Product choice was measured in a similar way as in Study 2. However, this time the sustainable choice was 10% more expensive than the unsustainable option. On average participants chose 4.06 sustainable products (*SD* = 2.33).

Results

Our manipulation was successful, as it had an effect on environmental self-identity ($F(2,66) = 5.13$, $p < .01$, $\eta_p^2 = .13$). T-tests revealed that participants in the environmentally-friendly group ($M = 4.68$, $SD = 1.21$) had a significantly stronger environmental self-identity than the control group ($M = 3.74$, $SD = 1.18$; $t(44) = -2.67$, $p = .01$, $d = .79$) and the environmentally-unfriendly group ($M = 3.52$, $SD = 1.50$; $t(44) = -2.89$, $p < .01$, $d = .85$). The environmentally-unfriendly and control group did not significantly differ in their environmental self-identity ($t(44) = .55$, $p = .59$).

Our manipulation influenced the personal norm ($F(2,67) = 5.65$, $p < .01$, $\eta_p^2 = .14$) as well. T-tests revealed that participants in the environmentally-friendly group ($M = 5.38$, $SD = 1.29$) had a stronger personal norm to act pro-environmentally than the environmentally-unfriendly group ($M = 4.07$, $SD = 1.50$; $t(45) = -3.20$, $p < .01$, $d = .94$), and a marginally significant stronger personal norm than the control group ($M = 4.71$, $SD = 1.18$; $t(44) = -1.83$, $p = .08$, $d = .54$). We found no significant difference in personal norm between the environmentally-unfriendly group and the control group ($t(45) = 1.62$, $p = .11$).

The manipulation was not significantly related to product choice ($F(2,67) = .64$, $p = .53$). However, the relationship between the independent variable and the dependent variable do not have to be significant in order to test mediation effects (James, Mulaik, & Brett, 2006; Shrout & Bolger, 2002). Other possible mediators between the independent and the dependent variable may result in a non-significant relationship between the independent variable and the dependent variable. Personal norm did influence product choice ($R^2 = .20$; $F(1, 69) = 17.36$, $p < .001$). The stronger the personal norm, the more sustainable products people chose ($\beta = .45$, $p < .001$). We conducted mediation analysis for multicategorical independent variables to test if the relationship between the manipulation of environmental self-identity and product choice was mediated by the personal norm (Hayes & Preacher, 2012). Dummy coding was used in which we compared the environmentally-friendly group with the control group and with the environmentally-unfriendly group, as the ANOVA showed that these groups differ significantly in the strength of personal norm. The 95% bootstrap confidence interval for the dummy variable in which we compared the environmentally-friendly group with the control group ranged from -1.206 to -.019, indicating that the manipulation of environmental self-identity influenced product choice via personal norm. The 95% bootstrap confidence interval in which we compared the environmentally-friendly group to the environmentally-unfriendly group ranged from -1.989 to -.453, indicating that the manipulation of environmental self-identity influenced product choice via personal norm.

Discussion

In Study 3 we found support for our hypotheses in an experimental design. Our manipulation of environmental self-identity was successful. People in the environmentally-friendly group had a stronger environmental self-identity than people in the environmentally-unfriendly group and the control group. There was no significant difference in environmental self-identity between the environmentally-unfriendly group and the control group. This suggests that it may be easier to strengthen people's environmental self-identity than to weaken it. Also, it suggests that the control group was more similar to the environmentally-unfriendly group, i.e., they see themselves as not very environmentally-friendly. The manipulation of environmental self-identity also influenced the strength of personal norm: the environmentally-friendly group felt more strongly morally obliged to act environmentally-friendly than the environmentally-unfriendly group. Again, we found no significant difference in personal norms between the environmentally-unfriendly group and the control group. Also, we found support for our hypothesis that personal norm mediated the relationship between environmental self-identity and pro-environmental choices, in this case product choice. The results are in line with our hypotheses that environmental self-identity influences environmental actions via a moral route.

5.5 General discussion

To promote pro-environmental actions without external incentives, it is important to strengthen the intrinsic motivation to act environmentally-friendly. We argued that this intrinsic motivation can be strengthened via environmental self-identity. Research showed that environmental self-identity is an important predictor of pro-environmental behaviour (e.g., Gatersleben et al., 2012; Whitmarsh & O'Neill, 2010), and that people with a strong environmental self-identity are likely to act environmentally-friendly, even when there are no external incentives to do so. Does this imply that environmental self-identity strengthens one's intrinsic motivation to act pro-environmentally, which in turn affects pro-environmental actions? Thus far, little was known about how environmental self-identity affects environmental behaviour. The aim of the current research was to study via which process environmental self-identity is related to pro-environmental actions, and more specifically, to test whether intrinsic motivation is an important factor in this process. We proposed that people with a strong environmental self-identity are likely to act environmentally-friendly because they are intrinsically motivated to do so. More specifically, we hypothesised that environmental self-identity strengthens one's obligation-based intrinsic motivation to act environmentally-friendly. As pro-environmental behaviours are generally not enjoyable, but often associated with less pleasure, we assumed that environmental self-identity will be related to one's obligation-based intrinsic motivation and thus influences pro-environmental actions via a moral route. Hence, we hypothesised that environmental self-identity is related to feelings of moral obligation to act environmentally-friendly, and these feelings of moral obligation mediate the relationship between environmental self-identity and environmental actions.

We conducted three studies to test our hypotheses, following correlational as well as experimental designs, and including different types of personal norms and different types of intentions and behaviours. In all three studies we found that a stronger environmental self-identity was

indeed related to stronger feelings of moral obligation to act environmentally-friendly. We did not only find this in the correlational studies, but also in Study 3 in which we manipulated environmental self-identity and found that when environmental self-identity was strengthened, people felt a stronger moral obligation to act pro-environmental than when the environmental self-identity was weakened. Interestingly, we did not find a difference in environmental self-identity and the strength of feelings of moral obligation between the control group and the environmentally-unfriendly group. This suggests that it may be easier to strengthen environmental self-identity than to weaken environmental self-identity. This is a promising finding from a practical point of view, as practitioners are most likely particularly interested in strengthening environmental self-identity as to encourage pro-environmental actions. In Study 2 we found that a strong environmental self-identity coincides with a general moral obligation to act environmentally-friendly, but also with feelings of moral obligation to perform specific environmental behaviours. This suggests that a strong environmental self-identity not only strengthens general feelings of moral obligation to act pro-environmentally, but also personal norms to engage in specific pro-environmental actions.

If the environmental self-identity affects pro-environmental behaviour via a moral route, the relationship between environmental self-identity and pro-environmental intentions should be mediated by personal norms. We found that this was indeed the case in all three studies, that included different indicators of personal norm and different indicators of environmental behaviour. Importantly, we did not only find this in the correlational studies, but also in the experimental study, suggesting that environmental self-identity indeed influences environmental intentions via a moral route.

Our results suggest that environmental self-identity may promote pro-environmental behaviour because it is related to one's obligation-based intrinsic motivation to act environmentally-friendly. As explained above, we focused on obligation-based intrinsic motivation, since we argued that enjoyment-based motivation is probably less relevant in the environmental domain as many pro-environmental behaviours are not fun to perform, but are rather associated with less comfort or with less pleasure. Our results show that people with a strong environmental self-identity indeed act environmentally-friendly because they believe it is the right thing to do. These results align with the research by Stets and Carter (2012) that showed that people with a strong moral identity feel guilty when they do not act moral. However, in their study they found that people feel guilty after not acting in line with their identity, while we proposed that people may anticipate these feelings and thus may be motivated by these anticipated feelings to act in line with their identity. Our studies indeed suggest that people with a strong environmental self-identity are motivated to act environmentally-friendly because they anticipate feeling guilty. This is in line with findings from earlier research showing that people anticipate feeling good when they would act environmentally-friendly or feeling bad when they would not act environmentally-friendly (Bolderdijk, Steg, Geller, Lehamn, & Postmes, 2012; Carrus, Passafaro, & Bonnes, 2008; Smith, Haugtvedt, & Petty, 1994).

In our research we found that people with a strong environmental self-identity act environmentally-friendly because they feel morally obliged to do so. We did not test if environmental self-identity is also related to enjoyment-based intrinsic motivation because we argued that this

may be less relevant in the environmental domain. However, in some cases enjoyment-based intrinsic motivation may be relevant for pro-environmental behaviour. For example, someone may enjoy cycling home after a day of work instead of driving home by car. In such cases enjoyment-based intrinsic motivation may also be important. Future research is needed to test in which cases enjoyment-based intrinsic motivation is important for pro-environmental actions and in which cases obligation-based intrinsic motivation is more relevant. Also, future research is needed to test whether people with a strong environmental self-identity are more likely to have a stronger enjoyment-based intrinsic motivation to act environmentally-friendly than people with a weak environmental self-identity.

We found that people with a strong environmental self-identity have a stronger obligation-based intrinsic motivation to act environmentally-friendly. Being intrinsically motivated to act environmentally-friendly suggests that people with a strong environmental self-identity will perform pro-environmental behaviours without external rewards. Currently, many policies aim to promote pro-environmental behaviour by stressing or changing the external incentives related to the behaviour, such as communicating how much money you can save by acting pro-environmentally, or by making such behaviour relatively cheaper. For example, various governments subsidize the use of renewable energy or energy-efficient appliances. Also, rules and regulations are installed as external incentives to influence behaviour. For example, the conventional light bulb is banned in the European Union in order to promote the use of energy-saving lighting. Our results suggest that changing the external incentives may not always be needed, and that policies could also try to strengthen environmental self-identity, thereby strengthening one's moral considerations to act pro-environmentally. This may in fact be a cost-effective way of promoting environmentally-friendly behaviour, because expensive external incentives to promote pro-environmental options (e.g., subsidies or implementing and enforcing rules and regulations) may no longer be necessary. In fact, providing external incentives for pro-environmental actions may even undermine the intrinsic motivation to act environmentally-friendly. Research on blood donation showed for example that an external (financial) reward made people less likely to donate blood because it undermined their intrinsic motivation to do so (Mellström & Johannesson, 2008). Also, external incentives may mainly have short-term effects, as long as the incentive is in place (Bolderdijk, Knockaert, Steg, & Verhoef, 2011), whereas intrinsic motivation may have long term effects as people may continue to feel morally obliged to act pro-environmentally. Future research is needed to test if campaigns that focus on environmental self-identity that strengthen the obligation-based intrinsic motivation are effective in promoting a range of environmentally-friendly behaviours, in the short as well as in the long term. Also, future research is needed to test if external rewards may undermine the obligation-based intrinsic motivation to act environmentally-friendly.

In sum, we studied the process via which environmental self-identity influences environmental behaviour, and particularly examined the role of intrinsic motivation in this process. We found that environmental self-identity is related to an obligation-based intrinsic motivation, which in turn promotes pro-environmental actions. As expected, the relationship between environmental self-identity and environmental actions was mediated by the obligation-based intrinsic motivation. This suggests that environmental self-identity promotes environmentally-friendly actions via a moral route.

6
GENERAL DISCUSSION

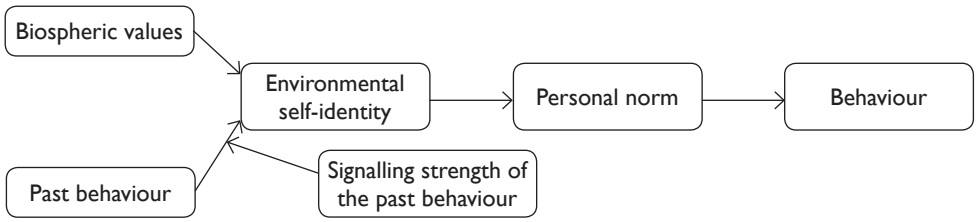
6.1 Environmental self-identity

To promote pro-environmental behaviour, it is important to understand which key factors affect such behaviour as interventions are likely to be more effective if they target such key antecedents. In this dissertation we studied whether and how environmental self-identity affects pro-environmental behaviour. We argued that this is a general predictor of pro-environmental behaviour, which implies that it should be related to a wide range of environmentally-friendly actions. Studies suggest that self-identity may be an important factor in explaining environmental behaviour (e.g., Fielding, McDonald & Louis, 2008; Terry, Hogg, & White, 1999). However, these studies focused on specific identities related to specific environmental behaviours, such as the recycling identity. We proposed that a more general environmental self-identity can also be distinguished which should predict a wide range of pro-environmental actions. If true, general environmental self-identity would be particularly relevant for promoting pro-environmental behaviour as this identity can promote a range of environmentally-friendly actions at once. Some correlational studies indeed suggest that such a general environmental self-identity may exist and that this identity is positively related to many different pro-environmental actions (Whitmarsh & O'Neill, 2010; Gatersleben, Murtagh, & Abrahamse, 2012). However, not much is known about environmental self-identity and many questions remain, including: Does environmental self-identity indeed predict a wide range of environmental behaviours? Which factors influence environmental self-identity? Can it be strengthened to promote pro-environmental behaviour? And why are people with a strong environmental self-identity likely to act pro-environmental? The aim of this dissertation was to find answers to these questions.

We argued that environmental self-identity is particularly relevant to promote pro-environmental behaviour because we expect it to be stable to a certain extent, thereby influencing a range of behaviours now and in the future, while at the same time it can be strengthened, at least to some extent, to promote environmentally-friendly actions. More specifically, we expected that biospheric values are the stable factor influencing environmental self-identity. Therefore, we first studied the relationship between biospheric values and environmental self-identity. Second, we expected that reminding people of their past environmental actions influences environmental self-identity as well, and that environmental self-identity can thus be strengthened or weakened via people's past actions. Interestingly, studies showed that after acting pro-environmental people may feel licensed to act immoral (Mazar & Zhong, 2010; Sachdeva, Iliev, & Medin, 2009). However, we proposed that when the past pro-environmental action would strengthen environmental self-identity, people will not feel licensed to act immoral, in fact, we proposed that it may actually promote more subsequent environmentally-friendly actions. Third, we proposed that past behaviour would be particularly likely to strengthen environmental self-identity when the signalling function of the past behaviour(s) is high. Finally, we tested why people with a strong environmental self-identity are motivated to act pro-environmental. We argued that individuals with a strong environmental self-identity are likely to act environmentally-friendly even if the behaviour may be costly or effortful, because people with a strong environmental self-identity feel morally obliged to act pro-environmental. More specifically, we hypothesised that environmental self-identity is related

to an obligation-based intrinsic motivation to act environmentally-friendly. This suggests that environmental self-identity is an important predictor of environmental behaviour to target as it may motivate people to act pro-environmental without any external incentives to do so. In sum we tested the model shown in Figure 6.1. In Chapter 2 and 3 we tested the relationship between biospheric values and environmental self-identity. In Chapter 3, 4, and 5 we tested if past behaviour influences environmental self-identity, and under which circumstances past behaviour is most likely to influence environmental self-identity. Finally, in Chapter 5 we tested if environmental self-identity affects environmental behaviour via an obligation-based intrinsic motivation to act pro-environmental.

Figure 6.1 *The relationship between biospheric values, past behaviour, signalling strength of past behaviour, environmental self-identity, personal norm and behaviour*



6.2 Is environmental self-identity a general antecedent of environmental behaviour?

The results showed that environmental self-identity indeed is a general antecedent of environmental behaviour. We found that environmental self-identity is related to a range of environmental preferences, intentions and behaviours, both in the correlational and experimental studies, suggesting that environmental self-identity predicts many different pro-environmental actions. More specifically, our studies showed that environmental self-identity is related to energy consumption, the use of renewable energy, product choice, the intention to reduce meat consumption, and the evaluation of environmental dilemmas. This suggests that environmental self-identity is indeed a general antecedent of environmental behaviour. Environmental self-identity may therefore be an important starting point for policy interventions, as policies targeting environmental self-identity may promote a wide range of environmentally-friendly actions at once.

6.3 Biospheric values provide the stable core of environmental self-identity

We hypothesised that biospheric values influence environmental self-identity and are the stable factor influencing environmental self-identity. We found support for our hypothesis in

Chapter 2 and 3. Results showed that biospheric values and environmental self-identity can be distinguished empirically, yet there is a strong relationship between the two. Even when values were measured well in advance, they were still related to environmental self-identity as measured at a later moment in time, suggesting that biospheric values provide the stable factor influencing environmental self-identity. Environmental self-identity is therefore likely to influence environmental actions now as well as in the future. Importantly, in Chapter 3 we found that values were still related to environmental self-identity when identity was manipulated. This was even the case in Study 2 in Chapter 3 in which we used a strong manipulation of environmental self-identity by explicitly linking people's past actions to their environmental self-identity. In sum, our results suggest that biospheric values indeed provide the stable factor influencing environmental self-identity, and that environmental self-identity can thus only be changed to a certain extent.

We proposed that biospheric values influence environmental self-identity and that environmental self-identity in turn influences pro-environmental preferences, intentions and behaviour. The findings in Chapter 2 and 3 support our hypothesis. Environmental self-identity mediated the relationship between biospheric values and environmental actions. This was not only the case in the correlational studies, but also in the experimental studies in which we manipulated environmental self-identity. This suggests that environmental self-identity is a process variable via which biospheric values are related to environmental behaviour. Some studies have suggested that biospheric values influence environmental behaviour directly, even when possible mediator variables are controlled for. However these studies typically included more specific antecedents of environmental behaviour, such as behaviour specific beliefs and norms, and not more general antecedents, such as the environmental self-identity (De Groot & Steg, 2008; Steg, De Groot, Dreijerink, Abrahamse, & Siero, 2011; Steg, Perlaviciute, Van der Werff, & Lurvink, 2012; Thøgersen & Ölander, 2002). Our studies suggest that biospheric values influence environmental behaviour via environmental self-identity and that values need to be linked to the self in order to influence environmental behaviour.

6.4 Past behaviour and environmental self-identity

We found that next to having this stable core (as being influenced by biospheric values), environmental self-identity can also be changed to a certain extent. On the basis of self-perception theory, we proposed that environmental self-identity is influenced by people's past environmental actions, as "individuals come to know their own internal states, by inferring them from observations of their own overt behaviour" (Bem, 1972, p. 2). In Chapter 3, 4 and 5 we found support for our hypothesis. Reminding people of past pro-environmental actions indeed strengthened or weakened environmental self-identity. As expected, we found that when people are reminded of the many past pro-environmental actions they have engaged in their environmental self-identity is strengthened. When people realise they often do not act pro-environmental their environmental self-identity is weakened. Moreover, we found that environmental self-identity is in turn related to environmental preferences, intentions and behaviour. Environmental self-identity thus mediated the relationship between people's past

environmental actions and their future environmental behaviour. Our findings are in line with studies which indicated that specific past actions are related to that specific identity, which is in turn related to subsequent action (Lee, Piliavin, & Call, 1999; Hitlin, 2003). Interestingly, in our studies we found that reminding people of certain pro-environmental behaviours strengthens their general environmental self-identity, which is in turn related to other types of environmental behaviours. This suggests that environmental self-identity may be an important factor promoting so-called positive spill-over effects: past pro-environmental actions lead to more environmentally-friendly behaviour as far as the former strengthen one's environmental self-identity. For example, reminding people of their environmentally-friendly transport choices may strengthen their general environmental self-identity which may in turn promote pro-environmental behaviour in the house.

Our findings revealed that past behaviour may strengthen as well as weaken environmental self-identity. However, although we always found a significant difference between the group that realised they often act pro-environmental and the group that realised they often do not act pro-environmental, we did not always find a significant difference between the experimental groups and the control group. In Chapter 3 we found that people who realised they often do not act pro-environmental had a weaker environmental self-identity compared to a control group, but the environmental self-identity of people who realised they often act pro-environmental was not stronger than that of a control group. In Chapter 5, however, we found that when compared with a control group, environmental self-identity was strengthened when people realised they often act environmentally-friendly, but environmental self-identity was not weakened when people realised they often do not act environmentally-friendly. This may be due to the fact that our manipulation of past behaviour was still relatively weak; we only reminded people of their past pro-environmental actions. If people are persuaded to actually perform environmentally-friendly (versus environmentally harmful) actions this may have a stronger effect on environmental self-identity and in that case both groups may differ from the control group. Future research is needed to test if a stronger manipulation of past behaviour indeed more strongly influences environmental self-identity and under which circumstances past pro-environmental actions are most likely to strengthen or weaken environmental self-identity.

Our findings suggest that the relationship between past behaviour and environmental self-identity may be a dynamic relationship. More specifically, past pro-environmental actions influence environmental self-identity, which is in turn related to subsequent pro-environmental actions, these actions may in turn influence environmental self-identity etcetera. Past actions may thus continuously strengthen environmental self-identity. However, each time someone does not act pro-environmental the environmental self-identity may be weakened. Future research is needed to test if past actions indeed continuously influence environmental self-identity via such a dynamic model and whether biospheric values remain the stable factor influencing environmental self-identity. This will reveal how environmental self-identity will develop in the long term, following a range of subsequent environmental actions.

Our results thus suggest that although environmental self-identity has a stable core (i.e., being influenced by biospheric values), it can be influenced to some extent by reminding peo-

ple of their past pro-environmental actions. Environmental self-identity is thus an important antecedent of environmental behaviour as it is related to a range of environmental actions now and in the future (as it is partly stable), but can also be strengthened to promote pro-environmental behaviour.

Signalling strength

We found that reminding people of their past pro-environmental actions may influence environmental self-identity. But is this always the case or are there specific circumstances under which past actions are most likely to influence environmental self-identity? Is, for example, reminding people of one single behaviour they conducted enough to strengthen environmental self-identity and thereby promote subsequent environmentally-friendly actions? Self-perception theory (Bem, 1972) states that people infer who they are from their own actions. These past actions are most likely to influence how you see yourself when these past actions imply something about you, in other words: when the signalling function of these actions is strong. We thus proposed that the extent to which past pro-environmental actions influence environmental self-identity and thereby promote environmentally-friendly behaviour depends on the signalling strength of the behaviour. On the basis of attribution theory and self-perception theory we hypothesised that the more the behaviour signals how environmentally-friendly you are the more likely it is to influence environmental self-identity. We proposed that the signalling function of past pro-environmental actions is likely to be stronger when it concerns a range of different past pro-environmental actions, when the past behaviour is difficult and when it is performed by few others. If the behaviour is performed by only few others you apparently do not simply follow the norm and the behaviour is not likely to be the most attractive option, therefore it is more likely to really indicate something about who you are. In line with our hypotheses we found that environmental self-identity is strengthened more when it concerns a range of different past environmentally-friendly actions rather than a single action or a range of behaviours reflecting basically one type of environmental behaviours (such as switching off appliances). Also, we found that past pro-environmental behaviour is more likely to strengthen environmental self-identity when the behaviour is difficult and unique compared to when it is only difficult or only unique. However, there was no significant difference in environmental self-identity when the past behaviour was difficult and unique compared to when the behaviour was easy and not unique. This result may be explained by a contrast effect: if many people perform the behaviour and it is easy, you need to show in another way that you are an environmentally-friendly person, perhaps by indicating that you are an environmentally-friendly person, which would be expressed in a stronger environmental self-identity. Also, it may be that under these conditions a different strong signal was provided, namely that it signalled that the group to which you belong is environmentally-friendly and therefore you are also more likely to see yourself as an environmentally-friendly person. Future research is needed to test whether this finding holds in other studies as well and to test these propositions as to better understand why engaging in easy behaviour that is performed by many others strengthens environmental self-identity.

In sum, we found that the signalling strength of past environmental actions indeed affects

the likelihood that environmental self-identity is strengthened. Signalling strength appeared to depend on the number of behaviours individuals engaged in, and the difficulty and the uniqueness of this behaviour. Future studies are needed to test which other factors influence the signalling strength of past pro-environmental behaviour. For example, past behaviour may be more likely to strengthen environmental self-identity when the behaviour was performed autonomously instead of when it was more or less involuntary. When people realise that they did not perform the behaviour to benefit the environment, but performed it because they were more or less forced to do so or for some other reason their environmental self-identity may not be strengthened. Also, the environmental impact of the behaviour may influence signalling strength. If people realise that have performed pro-environmental actions with a big environmental impact it is more likely to influence environmental self-identity than when they realise they have performed actions with a marginal impact on the environment. Future studies are needed to test if these, and other factors, indeed influence the signalling strength of pro-environmental behaviour.

We again found support for the remaining part of our model: environmental self-identity was in turn related to subsequent pro-environmental actions suggesting that environmental self-identity may be a process via which past environmentally-friendly actions promote future pro-environmental behaviour, and that environmental self-identity may be a process behind positive spill-over effects. Hence, when the signalling strength of the past pro-environmental actions is strong enough, environmental self-identity is strengthened which in turn promotes more pro-environmental behaviour, and thus results in positive spill-over effects. Our findings may explain why some studies found that past pro-environmental behaviour promotes subsequent environmentally-friendly actions while other studies found that past pro-environmental behaviour inhibits subsequent environmentally-friendly behaviour. Studies that found that pro-environmental actions inhibit subsequent pro-environmental behaviour may have included initial behaviours that did not strongly signal that one is a pro-environmental person, and thus may not have strengthened environmental self-identity. For example, after shopping green products in an online store people were less likely to act moral, compared to when they shopped conventional products (Mazar & Zhong, 2010). Perhaps the initial behaviour (in this case purchasing green products in an online store) did not strongly signal how pro-environmental someone is, thereby not strengthening environmental self-identity and therefore not promoting more environmentally-friendly behaviour. For example, shopping in an online store may not influence self-identity because behaviours performed privately do not strongly signal who you are (cf. Griskevicius, Tybur, & Van den Bergh, 2010). Also, participants in this study were forced to buy some green products. As explained above, engaging in involuntary actions may not strongly signal who you are. A study by Sachdeva and colleagues (2009) showed that after writing a story on one's positive traits participants were less likely to act pro-environmental. However, writing a story on one's positive traits is not likely to signal how environmentally-friendly you are and thus not influence environmental self-identity. Future studies are needed to test if moral licensing in the environmental domain is less likely to occur if the behaviour strongly signals that you are an environmentally-friendly person, and whether linking previous pro-environmental action to the self promotes positive spill-over and inhibits moral licensing.

Interestingly, we found that when the behaviour is performed by few others (and when it is difficult), environmental self-identity is more likely to be strengthened than when the behaviour is performed by many others. Environmental self-identity in turn promoted pro-environmental actions, suggesting that people do not always follow the norm, but that environmental self-identity may be a buffer against an environmentally-unfriendly descriptive norm and in some cases (this or other) pro-environmental behaviour may actually be promoted because it is not the norm to act pro-environmental. This seems to contradict research on descriptive social norms that suggests that pro-environmental behaviour is more likely when many engage in it, that is, when it is the norm. For example, research on feedback on household energy use shows that when people receive feedback that their energy consumption is higher than average, they are likely to lower their energy use (Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007). When the feedback indicates that their energy consumption is lower than average, they are likely to increase their energy consumption. Studies on descriptive social norms thus suggest that if acting pro-environmental is not the norm and you act pro-environmental, you are likely to become less pro-environmental. Our results suggest that environmental self-identity may be a buffer against an environmentally-unfriendly descriptive norm, it even suggests that when you act pro-environmental while this is not the norm, doing so may strengthen environmental self-identity and thereby promote subsequent pro-environmental behaviours. Future research is needed to test under which circumstances realising that only few others engage in pro-environmental behaviour will make people abandon this or other pro-environmental behaviour (because they adapt their behaviour to the norm) versus make them more likely to engage in this and other pro-environmental actions (as it signals that you are an environmentally-friendly person).

Also, we found that difficult pro-environmental behaviour is more likely to strengthen environmental self-identity than easy pro-environmental behaviour. Environmental self-identity was in turn related to pro-environmental choices. Often pro-environmental behaviour is rather difficult, for example, travelling by bicycle instead of by car requires more effort, and sustainable products are typically more expensive than unsustainable products. As many pro-environmental behaviours are relatively difficult to perform compared to the environmentally-unfriendly behaviour, many environmental actions may strengthen environmental self-identity, which may in turn promote subsequent pro-environmental actions. Future research is needed to test whether stressing the difficulty of pro-environmental actions is indeed more likely to strengthen environmental self-identity and thereby promote subsequent environmentally-friendly behaviour.

6.5 Via which process does environmental self-identity affect environmental behaviour?

Our hypothesis that people with a strong environmental self-identity are intrinsically motivated to act pro-environmental and, more specifically, have an obligation-based intrinsic motivation, was supported. In Chapter 5 we found that a strong environmental self-identity is indeed related to feelings of moral obligation to act environmentally-friendly. In correlational

as well as experimental studies we found that the stronger one's environmental self-identity the stronger one's personal norm to act pro-environmental. We replicated this finding with different types of personal norm and different types of pro-environmental intentions and behaviours. In the experimental study participants who realised they often act pro-environmental had a stronger personal norm than participants who realised they often do not act pro-environmental. However, we did not find a significant difference in the strength of personal norm between participants who realised they often do not act pro-environmental and the control group. As indicated above, our manipulation of environmental self-identity was relatively weak, we only reminded people of their past pro-environmental actions. A stronger manipulation in which people for example actually perform an environmentally-friendly action may have stronger effects on environmental self-identity and personal norm. Future research is needed to test if a stronger manipulation indeed results in stronger differences in environmental self-identity and personal norm and if both experimental conditions will differ from the control group in this case.

We hypothesised that people with a strong environmental self-identity feel morally obliged to act pro-environmental, and that these feelings of moral obligation are in turn related to pro-environmental actions. We indeed found that personal norm mediates the relationship between environmental self-identity and environmental actions, in the correlational as well as in the experimental studies. Our results show that people with a strong environmental self-identity act pro-environmentally because they feel morally obliged to do so, they anticipate feeling guilty if they would not act pro-environmental and feeling good if they would do so and therefore act in line with their identity.

Our results show that people with a strong environmental self-identity have an obligation-based intrinsic motivation to act pro-environmental. Being intrinsically motivated to act pro-environmental suggests that people with a strong environmental self-identity do not always need extrinsic incentives to engage in pro-environmental behaviour. Often, environmentally-friendly behaviour is promoted via external incentives, for example by stressing the financial benefits of acting pro-environmental, or by installing rules and regulations to enforce pro-environmental behaviour. This may be a costly approach as resources are needed to enforce rules and regulations and to provide subsidies to stimulate environmentally-friendly actions. Also, external incentives may only be effective as long as the incentive is in place (Bolderdijk, Knockaert, Steg, & Verhoef, 2011), while intrinsic motivation may have long lasting effect on behaviour because it does not depend on external incentives. Our findings suggest that it is not always needed to provide external incentives to promote environmentally-friendly behaviour, but that policies that strengthen environmental self-identity may be another way to promote pro-environmental behaviour. Future research should test if policies that aim to strengthen environmental self-identity will strengthen the intrinsic motivation to act pro-environmental and if this in turn is successful in promoting environmentally-friendly actions without the need for external incentives.

Our results suggest that it can even be expected that promoting environmentally-friendly action via external incentives (e.g., penalties or financial rewards) can inhibit subsequent environmentally-friendly actions. When people realise they acted pro-environmental for ex-

trinsic reasons, their past actions may not strengthen environmental self-identity and thereby not promote subsequent environmentally-friendly actions. Studies even suggest that providing external incentives to promote environmentally-friendly behaviour may undermine one's intrinsic motivation to perform environmentally-friendly behaviours. For example, a study on blood donation showed that people were less likely to donate blood because it undermined the intrinsic motivation to do so (Mellström & Johannesson, 2008). Future research is needed to test if environmental self-identity is less likely to be strengthened if people perform a pro-environmental action for extrinsic reasons. Furthermore, future studies could test how strategies in which external incentives are used to promote pro-environmental behaviour can be adapted in such a way that environmental self-identity is strengthened at the same time, thereby not undermining intrinsic motivation and perhaps even promoting future environmentally-friendly actions. For example, when a rule is installed to promote pro-environmental behaviour the pro-environmental action could be linked to one's environmental self-identity or the rule could be seen as a signal that people are environmentally-friendly. Also, when people receive feedback on their energy consumption not only the financial gains could be stressed, but also the extent to which their energy consumption signals how environmentally-friendly they are. By linking external incentives to one's environmental self-identity, intrinsic motivation may not be weakened, making it less likely that future environmentally-friendly behaviour will be inhibited.

6.6 Additional concerns and future directions

In our studies we strongly focused on behavioural self-reports. Only in Chapter 3 we studied actual behaviour (the use of scrap paper). Future research is needed to test if our model can be replicated with other actual behaviours as well, for example by measuring actual energy consumption or by observing behaviour.

We found that the measurement of environmental self-identity may have an influence on the results. Similarly, measuring environmental behaviour may affect environmental self-identity as past behaviour influences environmental self-identity. Studies in which effects on both environmental self-identity and environmental behaviour are studied may thus be problematic, as measuring environmental self-identity and environmental behaviour may influence each other. This is important to take into account when conducting studies on environmental self-identity and environmental behaviour. Also, future research could test if environmental self-identity could be measured in a more indirect way which has less influence on subsequent environmental actions. For example, studies could test if environmental self-identity could be measured in an implicit test, for example by measuring the strength of the association between one's self and pro-environmental actions.

We expect that our model is a general model and that the findings can be replicated to other types of values, identity, personal norm and behaviour. For example, future studies could test if altruistic values influence one's moral identity and whether moral identity can be strengthened by reminding people of their past moral actions.

6.7 Practical implications

Our studies provide important suggestions for campaigns and policies aiming to promote pro-environmental behaviour. We found that environmental self-identity is a general antecedent of environmental behaviour and predicts a wide range of pro-environmental actions. Our findings show that environmental self-identity is stable to a certain extent, and thus influences a range of environmental behaviours now and in the future. However, importantly, it can be strengthened to some extent as well as to promote pro-environmental behaviours. Environmental self-identity can be targeted via people's past environmental actions. Policies that stress one's past environmentally-friendly behaviours may thus be a successful strategy to strengthen environmental self-identity. A strengthened environmental self-identity is likely to promote a wide range of other environmentally-friendly actions. Policies or campaigns that strengthen environmental self-identity are thus likely to lead to positive spill-over, as past behaviour from one domain (e.g., recycling) may strengthen environmental self-identity and in turn lead to pro-environmental actions in other domains (e.g., energy use, transport). However, our model also shows that one needs to be careful which past actions to target. The findings from our studies show that past behaviour will only strengthen environmental self-identity when the past behaviour clearly signals how environmentally-friendly someone is. Therefore policies should focus on behaviours that strongly signal one's identity, for example by stressing that people already engaged in a range of past pro-environmental actions, or engaged in past behaviour which is difficult and performed by only few people. Also, importantly, policies or campaigns should focus on past environmentally-friendly actions that people already perform. Our findings show that reminding people of pro-environmental behaviours they rarely perform is likely to weaken environmental self-identity and thereby reduce the likelihood of subsequent pro-environmental actions. Currently, policies often stress the pro-environmental actions that people do not perform. For example, it is stressed that we should use the bicycle more often or that we consume too much energy. Our research suggests that stressing past actions that people rarely perform may weaken environmental self-identity and reduce subsequent pro-environmental behaviour. It is thus important to stress the many pro-environmental behaviours that people already engage in. Once past behaviours have been selected that have a strong signalling function and are performed by the target group, environmental self-identity is likely to be strengthened and, importantly, our findings suggest that this may promote a wide range of long lasting pro-environmental actions as people with a strong environmental self-identity are intrinsically motivated to act pro-environmental.

6.8 Conclusions

In this dissertation we proposed and tested the model shown in Figure 6.1. Parts of this model have been suggested or studied in previous research. For example, some authors suggested a relationship between values and identity (Crompton & Kasser, 2009; Verplanken & Holland, 2002; Sparks & Shepherd, 1992). Others found that specific past actions strengthen a specific self-identity which in turn promotes that specific behaviour (Lee et al., 1999). We

aimed to integrate research on values, identity, personal norm and behaviour and to study the relationships between them in an integrated manner. Our results show that environmental self-identity is influenced by biospheric values and by past behaviour, and that environmental self-identity mediates the relationship between values and environmental actions and between past behaviour and subsequent environmental actions. Furthermore, we found that only if past behaviour has a sufficiently strong signalling function it is likely to affect environmental self-identity. Finally, we found that people with a strong environmental self-identity feel morally-obliged to act in line with their identity and these feelings of moral obligation in turn influence their environmental actions. Importantly, we found support for our model using different indicators of past behaviour, self-identity, personal norm and environmental preferences, intentions and behaviour. Our results suggest that environmental self-identity is an important antecedent to target in environmental policies as it can be strengthened to promote environmentally-friendly actions, is related to a wide range of pro-environmental behaviours, and it is likely to strengthen one's intrinsic motivation to act environmentally-friendly.

7
NEDERLANDSE SAMENVATTING

7.1 Introductie

Eén van de belangrijke uitdagingen van dit moment is het oplossen van milieuproblemen. Deze worden voor een groot deel veroorzaakt door gedrag van mensen (Vlek & Steg, 2007). Om milieuproblemen op te kunnen lossen is het van belang dat mensen hun gedrag veranderen (IPCC, 2007). Om deze gedragsverandering te bewerkstelligen moeten we eerst weten wat de belangrijkste voorspellers zijn van milieuvriendelijk gedrag. In dit proefschrift gaan we na of de milieu-zelfidentiteit een belangrijke voorspeller is van milieuvriendelijk gedrag. Ook gaan we na welke factoren van invloed zijn op de milieu-zelfidentiteit, en via welk proces de milieu-zelfidentiteit invloed heeft op gedrag. We verwachten dat milieu-zelfidentiteit gerelateerd is aan een breed scala aan milieugedragingen, en dat het in bepaalde mate stabiel is, maar ook enigszins te veranderen is om zo milieuvriendelijk gedrag te stimuleren.

7.2 Zelfidentiteit

Zelfidentiteit kan worden gedefinieerd als het etiket dat mensen gebruiken om zichzelf te beschrijven (Cook, Kerr, & Moore, 2002). Zelfidentiteit blijkt een belangrijke voorspeller te zijn van verschillende milieugedragingen, zoals groen consumentengedrag (Sparks & Shepherd, 1992), recyclen (Nigbur, Lyons, & Uzzell, 2010) en milieu-activisme (Fielding, McDonald, & Louis 2008). In deze onderzoeken werd echter een verband gevonden tussen een specifieke zelfidentiteit (bijvoorbeeld de recycle-zelfidentiteit) en het daar bijbehorende specifieke gedrag (recyclen). Is er eveneens een algemene milieu-zelfidentiteit te onderscheiden die gerelateerd is aan een breed scala milieugedragingen? Als dat het geval is, zou een algemene milieu-zelfidentiteit een belangrijke factor kunnen zijn om beleid en interventies op te richten, omdat het mogelijk een hele reeks aan milieugedragingen beïnvloedt (cf. De Groot & Steg, 2008; Crompton & Kasser, 2009). We definiëren de algemene milieu-zelfidentiteit als de mate waarin je jezelf ziet als een milieuvriendelijk persoon. Een aantal correlationele onderzoeken laat zien dat deze milieu-zelfidentiteit inderdaad gerelateerd is aan een reeks van milieugedragingen, zoals milieuvriendelijk winkelen, het verminderen van afvalproductie, water besparen, huishoudelijke energiebesparing (Whitmarsh & O'Neill, 2010), milieuvriendelijk gedrag, afval scheiden, fair trade producten kopen en het niet vliegen naar een vakantiebestemming (Gatersleben, Murtagh, & Abrahamse, 2012). Op basis van deze correlationele onderzoeken kan echter niet worden geconcludeerd dat de milieu-zelfidentiteit deze gedragingen heeft veroorzaakt, wellicht worden zowel de identiteit als gedrag bepaald door een derde factor die niet is meegenomen in het onderzoek. Om causale verbanden te onderzoeken zijn experimentele studies nodig. Bovendien blijven belangrijke vragen onbeantwoord in onderzoek naar relaties tussen milieu-zelfidentiteit en gedrag. Welke factoren beïnvloeden een algemene milieu-zelfidentiteit? Is de milieu-zelfidentiteit in bepaalde mate stabiel zodat het niet alleen invloed heeft op gedrag nu, maar ook op gedrag in de toekomst? Kan de milieu-zelfidentiteit worden versterkt om zo een hele reeks milieuvriendelijke gedragingen te stimuleren? En via welk proces beïnvloedt de milieu-zelfidentiteit gedrag? Het doel van dit proefschrift is om antwoorden te vinden op deze vragen.

7.3 Biosferische waarden zijn de stabiele factor die milieu-zelfidentiteit beïnvloedt

We verwachtten dat biosferische waarden de stabiele factor zijn die de milieu-zelfidentiteit beïnvloedt. Waarden zijn stabiel over tijd (Feather, 1995), daarom verwachtten we dat de milieu-zelfidentiteit in bepaalde mate stabiel zal zijn. Waarden geven aan wat mensen belangrijk vinden in het leven en zullen daarom invloed hebben op hoe mensen zichzelf zouden willen zien (je ideale zelf), het type persoon dat ze willen zijn en hoe ze zichzelf daadwerkelijk zien. Voor de milieu-zelfidentiteit en milieugedrag zijn vooral biosferische waarden relevant, dat wil zeggen de mate waarin de kwaliteit van de natuur en milieu een leidraad is in iemands leven (Steg & De Groot, 2012): mensen met sterke biosferische waarden zullen zichzelf meer zien als een milieuvriendelijk persoon, en vaker milieuvriendelijk gedrag vertonen. Daarom

verwachtten we dat biosferische waarden de stabiele factor zijn die de milieu-zelfidentiteit beïnvloedt. In hoofdstuk 2 en 3 werd onze hypothese bevestigd. Biosferische waarden en milieu-zelfidentiteit konden duidelijk empirisch worden onderscheiden, maar zoals verwacht vonden we een sterk verband tussen beide. Zelfs wanneer waarden enige tijd van tevoren waren gemeten waren ze nog steeds gerelateerd aan de milieu-zelfidentiteit. In hoofdstuk 3 vonden we bovendien dat waarden na een sterke manipulatie van de milieu-zelfidentiteit nog steeds de milieu-zelfidentiteit voorspelden. Deze resultaten suggereren dat biosferische waarden inderdaad de stabiele factor zijn die de milieu-zelfidentiteit beïnvloedt.

We verwachtten dat de milieu-zelfidentiteit vervolgens gerelateerd is aan milieugedrag en de relatie tussen biosferische waarden en gedrag medieert. In hoofdstuk 2 en 3 vonden we empirische ondersteuning voor deze hypothese. In zowel correlationele als experimentele studies medieerde de milieu-zelfidentiteit de relatie tussen biosferische waarden en gedrag. Dit geeft aan dat de milieu-zelfidentiteit een verklaring geeft voor hoe (ofwel via welk proces) biosferische waarden gerelateerd zijn aan gedrag; de resultaten suggereren dat waarden gekoppeld moeten zijn aan het zelfbeeld willen ze invloed hebben op gedrag.

7.4 Gedrag uit het verleden en milieu-zelfidentiteit

We verwachtten dat de milieu-zelfidentiteit naast deze stabiele kern (want beïnvloed door waarden) ook in bepaalde mate kan worden veranderd. Volgens de zelf-perceptie theorie (Bem, 1972) baseren mensen hun beeld van wie zij zijn op hun gedragingen uit het verleden. Op basis hiervan verwachtten wij dat de milieu-zelfidentiteit kan worden versterkt of verzwakt door mensen te herinneren aan hun eigen (milieu)gedragingen uit het verleden. Wanneer mensen zich realiseren dat ze vele milieuvriendelijke gedragingen hebben vertoond verwachtten we dat dit hun milieu-zelfidentiteit zal versterken, terwijl het omgekeerde het geval zal zijn wanneer ze zich realiseren dat ze weinig milieuvriendelijke gedragingen hebben vertoond. Daarnaast verwachtten we dat de milieu-zelfidentiteit vervolgens gerelateerd zal zijn aan daaropvolgend milieugedrag en dat de relatie tussen gedrag uit het verleden en opvolgend milieugedrag gemedieerd wordt door de milieu-zelfidentiteit.

Onze hypothese werd bevestigd: als mensen zich realiseren dat ze eerder veel verschillende milieuvriendelijke gedragingen hebben vertoond hebben ze een sterkere milieu-zelfidentiteit dan wanneer ze zich realiseren dat ze weinig milieuvriendelijke gedragingen hebben vertoond. De milieu-zelfidentiteit kan dus zowel worden verstrekt als verzwakt door mensen te herinneren aan hun vele dan wel weinige milieuvriendelijke gedragingen uit het verleden. De milieu-zelfidentiteit was vervolgens gerelateerd aan verschillende daaropvolgende milieugedragingen en medieerde de relatie tussen gedrag uit het verleden en daaropvolgend gedrag. Deze uitkomsten sluiten aan bij resultaten van onderzoeken die laten zien dat gedrag uit het verleden gerelateerd is aan de daar bijhorende specifieke zelfidentiteit, welke vervolgens weer datzelfde gedrag in de toekomst beïnvloedt (Hitlin, 2003; Lee, Piliavin, & Call, 1999). Echter, in ons onderzoek vonden we dat bepaald gedrag uit het verleden de algemene milieu-zelfidentiteit beïnvloedt welke vervolgens andere typen milieugedrag in de toekomst voorspelt. Dit geeft aan dat de milieu-zelfidentiteit mogelijk een belangrijke rol speelt met

betrekking tot zogenaamde 'positieve spill-over' effecten: milieuvriendelijk gedrag uit het ene domein zorgt voor milieuvriendelijk gedrag in een ander domein, als het initiële gedrag leidt tot een versterking van de milieu-zelfidentiteit. Onze resultaten laten dus zien dat de milieu-zelfidentiteit in bepaalde mate stabiel is (want beïnvloed door waarden), maar ook veranderd kan worden (door mensen bewust te maken van hun gedrag uit het verleden).

Sterkte van de signaalfunctie van gedrag uit het verleden

Milieuvriendelijk gedrag uit het verleden kan dus de milieu-zelfidentiteit versterken en zo tot meer milieuvriendelijk gedrag leiden. Maar werkt dit altijd, of zijn er bepaalde voorwaarden waaronder gedrag uit het verleden de milieu-zelfidentiteit vooral versterkt? De zelf-perceptie theorie (Bem, 1972) stelt dat mensen een beeld vormen van wie zij zijn op basis van hun gedrag uit het verleden. Op basis van deze theorie en de attributie theorie (Kelley & Michela, 1980) verwachtten we dat gedrag uit het verleden in sterkere mate zal beïnvloeden hoe je jezelf ziet naarmate het gedrag meer over jou zegt, oftewel: wanneer de signaalfunctie van dat gedrag sterker is. Wij hebben betoogd dat gedrag uit het verleden meer zal zeggen over wie jij bent en dus de milieu-zelfidentiteit sterker zal beïnvloeden wanneer het meerdere verschillende gedragingen betreft, wanneer het gedrag moeilijk is of wanneer het gedrag uniek is (dat wil zeggen: slechts weinig anderen voeren het gedrag ook uit).

In hoofdstuk 4 werd onze hypothese bevestigd. De milieu-zelfidentiteit werd inderdaad vooral versterkt wanneer het een reeks verschillende gedragingen uit het verleden betrof en wanneer het gedrag zowel moeilijk was als uniek. We vonden echter geen verschil in milieu-zelfidentiteit wanneer het een gedraging betrof die zowel moeilijk was als uniek versus een gedraging die gemakkelijk en niet uniek was. Mogelijk is de laatste bevinding het gevolg van een contrast effect: wellicht wilden de mensen die een gemakkelijke milieugedraging hadden gedaan die bijna iedereen doet alsnog laten zien dat ze milieuvriendelijk waren, bijvoorbeeld door aan te geven dat ze een milieuvriendelijk persoon zijn en dus een sterke milieu-zelfidentiteit hebben. Een andere verklaring kan zijn dat het makkelijke en gangbare gedrag in dit geval alsnog een sterke signaalfunctie had, namelijk dat de groep waar je bij hoort milieuvriendelijk is, waardoor je jezelf ook als milieuvriendelijk ziet.

De milieu-zelfidentiteit was vervolgens opnieuw gerelateerd aan milieuvriendelijk gedrag. Dit suggereert opnieuw dat de milieu-zelfidentiteit een relevant proces kan zijn waarlangs eerder milieuvriendelijk gedrag tot meer milieuvriendelijk leidt, en dus voor positieve 'spill-over' effecten zorgt. Onze bevindingen bieden ook een mogelijke verklaring voor het gegeven dat in eerdere onderzoeken in sommige gevallen wel positieve 'spill-over' effecten werden vonden en in andere gevallen niet. In de onderzoeken waarin geen positieve 'spill-over' effecten werden gevonden was de signaalfunctie van de eerste gedraging mogelijk niet sterk genoeg om de milieu-zelfidentiteit te versterken, waardoor initiële milieuvriendelijke keuzes niet leiden tot meer milieuvriendelijke keuzes op een later moment.

7.5 Langs welk proces beïnvloedt de milieu-zelfidentiteit gedrag?

Mensen met een sterke milieu-zelfidentiteit zullen zich waarschijnlijk milieuvriendelijker gedragen ook al is dit gedrag relatief moeilijk of kostbaar. Wij verwachtten dat mensen met een sterke milieu-zelfidentiteit intrinsiek gemotiveerd zullen zijn om milieuvriendelijk te handelen, en dat de motivatie dus vanuit henzelf komt en niet het gevolg is van externe prikkels (Frey, 1997). Lindenberg (2001) onderscheidt twee typen intrinsieke motivatie: op plezier beruste intrinsieke motivatie en op plicht beruste intrinsieke motivatie. Aangezien milieugedragingen meestal niet plezierig zijn, maar juist vaak samengaan met meer moeite en kosten verwachtten we dat de op plicht beruste intrinsieke motivatie vooral van belang is voor milieuvriendelijk gedrag. Een indicator voor de op plicht beruste intrinsieke motivatie is de persoonlijke norm, dat wil zeggen de mate waarin men zich moreel verplicht voelt om milieuvriendelijk te handelen (Schwartz, 1973). We verwachtten dus dat mensen met een sterke milieu-zelfidentiteit een sterke persoonlijke norm zullen hebben, en dat de persoonlijke norm de relatie tussen milieu-zelfidentiteit en milieuvriendelijk gedrag medieert.

In hoofdstuk 5 werd onze hypothese bevestigd. Mensen met een sterke milieu-zelfidentiteit hadden een sterke persoonlijke norm, en voelden zich dus meer moreel verplicht, om milieuvriendelijk te handelen. In zowel correlationele als experimentele studies, en met verschillende indicatoren van persoonlijke norm en milieuvriendelijk gedrag vonden we dat hoe sterker de milieu-zelfidentiteit is des te sterker de persoonlijke norm is om milieuvriendelijk te handelen. De persoonlijke norm was vervolgens gerelateerd aan milieuvriendelijke handelingen en medieerde de relatie tussen milieu-zelfidentiteit en milieuvriendelijk gedrag. Deze uitkomsten suggereren dus dat mensen met een sterke milieu-zelfidentiteit milieuvriendelijk handelen omdat ze zich daar moreel verplicht toe voelen, en dat ze verwachten zich schuldig te voelen als ze niet milieuvriendelijk handelen en een goed gevoel te krijgen (zoals trots) als ze wel milieuvriendelijk handelen, waardoor ze zich in overeenstemming met hun identiteit gedragen.

7.6 Praktische implicaties

Onze resultaten bieden een aantal interessante aanknopingspunten voor interventies gericht op het stimuleren van milieuvriendelijk gedrag. De milieu-zelfidentiteit blijkt inderdaad een voorspeller te zijn van een hele reeks aan milieuvriendelijke gedragingen. In ons onderzoek bleek de milieu-zelfidentiteit gerelateerd te zijn aan energieverbruik, het gebruik van duurzame energiebronnen, productkeuze, de intentie om vleesconsumptie te verminderen en het beoordelen van milieudilemma's. Dit geeft aan dat milieu-zelfidentiteit een belangrijke factor is om beleid en interventies op te richten omdat het een breed scala aan gedragingen kan beïnvloeden. Verder vonden wij in ons onderzoek dat de milieu-zelfidentiteit in bepaalde mate stabiel is (want het wordt beïnvloed door biosferische waarden) waardoor het gedrag nu en in de toekomst voorspelt. Maar, nog belangrijker, de milieu-zelfidentiteit kan ook in bepaalde mate worden versterkt door mensen bewust te maken van hun milieuvriendelijke

gedrag uit het verleden. Dit is vooral het geval als het eerdere gedrag een sterke signaalfunctie heeft. Beleid zou zich dus kunnen richten op mensen bewust te maken van hun eerdere milieuvriendelijke gedragingen, en dan vooral gedragingen met een sterke signaalfunctie. Door mensen bewust te maken van het feit dat ze vaak milieuvriendelijk gedrag vertonen, zal hun milieu-zelfidentiteit worden versterkt, waardoor men zich meer moreel verplicht zal voelen om milieuvriendelijk te handelen, en vervolgens meer milieuvriendelijk gedrag zal vertonen. Ons onderzoek suggereert dat dit proces vooral in gang wordt gezet als beleid mensen bewust maakt van het feit dat ze bijvoorbeeld veel verschillende milieugedragingen vertonen, of milieuvriendelijk gedrag vertonen dat zowel moeilijk als uniek is. Dit impliceert dat het versterken van de milieu-zelfidentiteit bovendien kan zorgen voor positieve 'spill-over' effecten: door mensen bewust te maken van hun milieuvriendelijke gedragingen in het ene domein kan de milieu-zelfidentiteit worden versterkt welke vervolgens milieuvriendelijk gedrag in een ander domein kan stimuleren. De milieu-zelfidentiteit is eveneens van belang voor beleid en interventies, omdat onze resultaten laten zien dat mensen met een sterke milieu-zelfidentiteit intrinsiek gemotiveerd zijn om milieuvriendelijk te handelen, zonder dat er duidelijke externe prikkels aanwezig zijn om dit gedrag te vertonen. Het is dus niet altijd nodig om via externe prikkels (zoals geld of regels) milieuvriendelijk gedrag te stimuleren, maar het kan ook door de milieu-zelfidentiteit te versterken.

7.7 Vervolgonderzoek

In ons onderzoek hebben we mensen herinnerd aan hun gedrag uit het verleden, waardoor de milieu-zelfidentiteit werd versterkt of verzwakt. Onze manipulatie was een relatief zwakke manipulatie van de milieu-zelfidentiteit, we herinnerden mensen slechts aan hun gedrag uit het verleden. Wanneer mensen daadwerkelijk milieuvriendelijk gedrag hebben vertoond heeft dit mogelijk een sterker effect op milieu-zelfidentiteit dan wanneer zij er slechts aan herinnerd worden. Vervolgonderzoek is nodig om te testen of het effect op milieu-zelfidentiteit groter is als mensen worden overgehaald om daadwerkelijk een milieugedraging uit te voeren, en zich bewust worden van het feit dat ze milieuvriendelijk handelen.

Onze resultaten suggereren dat de relatie tussen gedrag uit het verleden en milieu-zelfidentiteit een dynamische relatie is. Gedrag uit het verleden beïnvloedt de milieu-zelfidentiteit, welke vervolgens weer gerelateerd is aan nieuwe milieuvriendelijke handelingen, deze handelingen kunnen daarna de milieu-zelfidentiteit weer versterken enzovoorts. Milieuvriendelijk gedrag uit het verleden kan de milieu-zelfidentiteit dus continue versterken. Echter, iedere milieuonvriendelijke handeling kan de milieu-zelfidentiteit ook verzwakken. Vervolgonderzoek is nodig om na te gaan of de relatie tussen gedrag uit het verleden en de milieu-zelfidentiteit inderdaad een dynamische relatie is en om te onderzoeken of biosferische waarden de stabiele factor blijven die de milieu-zelfidentiteit beïnvloedt. Dit zal meer inzicht geven in de ontwikkeling van milieu-zelfidentiteit op de lange termijn, na het uitvoeren van een reeks aan milieugedragingen.

Het effect van gedrag uit het verleden op milieu-zelfidentiteit bleek af te hangen van de mate waarin het gedrag iets over je zegt, oftewel van de sterkte van de signaalfunctie van de

gedragingen. In ons onderzoek vonden we dat de milieu-zelfidentiteit vooral wordt versterkt wanneer het een reeks verschillende gedragingen betreft of wanneer het een gedraging betreft die zowel moeilijk als uniek is. Vervolgonderzoek is nodig om te testen welke andere factoren de signaalfunctie van gedrag uit het verleden beïnvloeden. De sterkte van de signaalfunctie hangt mogelijk ook af van de mate waarin het gedrag vrijwillig wordt vertoond. Wanneer iemand er zelf voor kiest om milieuvriendelijk te handelen heeft het mogelijk een sterker effect op milieu-zelfidentiteit dan wanneer iemand min of meer wordt gedwongen om milieuvriendelijk te handelen. Daarnaast de impact van het gedrag op het milieu mogelijk ook invloed op de sterkte van de signaalfunctie. Hoe groter het effect van het gedrag op het milieu, hoe sterker de invloed op de milieu-zelfidentiteit mogelijk is. Vervolgonderzoek is nodig om te onderzoeken of deze en andere factoren de signaalfunctie van milieugedrag beïnvloeden.

Onze resultaten laten zien dat externe prikkels niet altijd nodig zijn om milieuvriendelijk gedrag te stimuleren. Door beleid te richten op het versterken van de milieu-zelfidentiteit kan milieuvriendelijk gedrag worden gestimuleerd. De uitkomsten van ons onderzoek suggereren bovendien dat externe prikkels de intrinsieke motivatie mogelijk ondermijnen. Wanneer mensen zich realiseren dat ze milieuvriendelijk hebben gehandeld vanwege externe redenen (bijvoorbeeld financieel voordeel) zullen deze milieuvriendelijke handelingen de milieu-zelfidentiteit waarschijnlijk niet versterken en zal het eerdere gedrag dus niet tot meer milieuvriendelijk gedrag leiden. Vervolgonderzoek is nodig om te testen of milieu-zelfidentiteit niet wordt versterkt wanneer mensen milieuvriendelijk handelen vanwege externe prikkels. Daarnaast is het belangrijk om te onderzoeken hoe externe prikkels kunnen worden gekoppeld aan de milieu-zelfidentiteit zodat externe prikkels de intrinsieke motivatie niet ondermijnen.

Samenvattend bleek uit ons onderzoek dat de milieu-zelfidentiteit een belangrijke voorspeller is van een breed scala aan milieugedragingen. De milieu-zelfidentiteit blijkt in bepaalde mate stabiel te zijn waardoor het van invloed is op gedrag nu en in de toekomst, maar kan ook worden versterkt door mensen bewust te maken van hun gedrag in het verleden en op deze manier milieuvriendelijk gedrag stimuleren. Echter, milieuvriendelijk gedrag kan ook worden tegengegaan door mensen bewust te maken van hun weinige milieuvriendelijke gedragingen in het verleden. Milieu-zelfidentiteit zal vooral worden versterkt wanneer het gedrag een sterke signaalfunctie heeft, bijvoorbeeld wanneer mensen zich realiseren dat ze een breed scala van milieuvriendelijke gedragingen hebben vertoond of wanneer het eerdere milieuvriendelijke gedrag moeilijk en uniek is. Mensen met een sterke milieu-zelfidentiteit zijn meer geneigd om ook in de toekomst milieuvriendelijk gedrag te vertonen omdat ze intrinsiek gemotiveerd zijn om milieuvriendelijk te handelen. Dit betekent dat mensen met een sterkere milieu-zelfidentiteit meer geneigd zijn om zich milieuvriendelijk te gedragen, ook als er geen sterke externe prikkels zijn om dat gedrag te stimuleren, de milieu-zelfidentiteit is daarmee mogelijk een stabiele basis voor milieuvriendelijk gedrag. De resultaten uit ons onderzoek suggereren dus dat de milieu-zelfidentiteit een belangrijk aangrijpingspunt is voor interventies.

REFERENCES

Ajzen, I. (1996). The directive influence of attitudes on behavior. In P.M. Gollwitzer & J. A. Bargh (Eds), *The psychology of action: Linking cognition and motivation to behaviour.* (pp. 385-403). New York: Guilford Press.

Belk, R. W. (1981). Determinants of consumption cue utilization in impression formation: An association derivation and experimental verification. *Advances in Consumer Research, 8*(1), 170-175.

Bellard, C., Bertelsmeier, C., Leadley, P., Thuiller, W., & Courchamp, F. (2012). Impacts of climate change on the future of biodiversity. *Ecology Letters, 15*(4), 365-377. doi: 10.1111/j.1461-0248.2011.01736.x

Bem, D. J. (1972). Self-perception theory. In L. Berkowitz (Ed.). *Advances in Experimental Social Psychology* (Vol. 6, pp. 1-62). New York: Academic Press.

Biel, A., Dahlstrand, U., & Grankvist, G. (2005). Habitual and value-guided purchase behaviour. *Ambio, 34*, 360-365.

Bolderdijk, J. W., Knockaert, J., Steg, E. M., & Verhoef, E. T. (2011). Effects of pay-as-you-drive vehicle insurance on young drivers' speed choice: Results of a dutch field experiment. *Accident Analysis & Prevention, 43*(3), 1181-1186. doi: 10.1016/j.aap.2010.12.032.

Bolderdijk, J.W., Steg, L., Geller, E.S., Lehman, P.K., & Postmes, T. (2012). Comparing the effectiveness of monetary versus moral motives in environmental campaigning. *Nature Climate Change, 3*, 413-416. doi: 10.1038/nclimate1767.

Carrus, G., Passafaro, P., & Bonnes, M. (2008). Emotions, habits and rational choices in ecological behaviours: The case of recycling and use of public transportation. *Journal of Environmental Psychology, 28*(1), 51-62. doi: 10.1016/j.jenvp.2007.09.003.

Centraal Bureau voor de Statistiek (2010). *Gemiddeld inkomen; particuliere huishoudens naar diverse kenmerken.* Retrieved April 21, 2011, from http://statline.cbs.nl/StatWeb/publication/?DM=SLNL&PA=70843ned&D1=a&D2=0&D3=0&D4=a&HDR=G1,G2,G3&STB=T&VW=T.

Charng, H., Piliavin, J. A., & Callero, P. L. (1988). Role identity and reasoned action in the prediction of repeated behavior. *Social Psychology Quarterly, 51*(4), 303-317. doi:10.2307/2786758.

Clayton, S. (2003). Environmental identity: A conceptual and operational definition. In S. Clayton & S. Opotow (Eds). *Identity and the natural environment: The psychological significance of nature* (pp. 45-65). Cambridge, MA US: MIT Press.

Clayton, S. (2012). Environment and identity. In S. Clayton (Ed.), *The handbook of environmental and conservation psychology.* (pp. 164 – 180). New York: Oxford University Press.

Clayton, S., & Opotow, S. (Eds., 2003). *Identity and the natural environment: The psychological significance of nature.* Cambridge, MA US: MIT Press.

Conner, M., & Armitage, C. J. (1998). Extending the theory of planned behavior: A review and avenues for further research. *Journal of Applied Social Psychology, 28*, 1429-1464.

Conway, P., & Peetz, J. (2012). When does feeling moral actually make you a better person? Conceptual abstraction moderates whether past moral deeds motivate consistency or compensatory behaviour. *Personality and Social Psychology Bulletin, 38*, 907-919. doi. 10.1177/0146167212442394.

Cook, A. J., Kerr, G. N., & Moore, K. (2002). Attitudes and intentions towards purchasing GM food. *Journal of Economic Psychology, 23*, 557-572.

Cornelissen, G., Pandelaere, M., Warlop, L., & Dewitte, S. (2008). Positive cueing: Promoting sustainable consumer behavior by cueing common environmental behaviors as environmental. *International Journal of Research in Marketing, 25*(1), 46-55. doi: 10.1016/j.ijresmar.2007.06.002.

Crompton, T., & Kasser, T. (2009). *Meeting environmental challenges: The role of human identity.* Godalming, UK: WWF-UK.

De Groot, J. I. M., & Steg, L. (2008). Value orientations to explain beliefs related to environmental significant behavior: How to measure egoistic, altruistic, and biospheric value orientations. *Environment and Behavior, 40*, 330-354.

Dietz, T., Gardner, G. T., Gilligan, J., Stern, P. C., & Vandenbergh, M. P. (2009). Household actions can provide a behavioral wedge to rapidly reduce US carbon emissions. *Proceedings of the National Academy of Sciences, 106*, 18452-18456.

Dunlap, R., Van Liere, K., Mertig, A. G., & Jones, R. E. (2000). Measuring endorsement of the new ecological paradigm: a revised NEP scale. *Journal of Social Issues, 56*, 425–442.

FAO. (2009). *Livestock's long shadow environmental issues and options.* Food and Agriculture Organization of the United Nations, Global Perspective Studies Unit, Rome.

Feather, N. T. (1995). Values, valences, and choice: The influences of values on the perceived attractiveness and choice of alternatives. *Journal of Personality and Social Psychology, 68*, 1135-1151.

Fielding, K. S., McDonald, R., & Louis, W. R. (2008). Theory of planned behaviour, identity and intentions to engage in environmental activism. *Journal of Environmental Psychology, 28*, 318-326.

Frey, B.S. (1997). *Not just for the money.* An economic theory of personal motivation. Brookfield: Edward Elgar Publishing.

Gatersleben, B. C. M., Murtagh, N., & Abrahamse, W. (2012). Values, identity and pro-environmental behavior. *Contemporary Social Science: Journal of the Academy of Social Sciences*, 1-19.

Gatersleben, B., Steg, L., & Vlek, C. (2002). Measurement and determinants of environmentally significant consumer behavior. *Environment and Behavior, 34*, 335-362.

Gneezy, A., Imas, A., Brown, A., Nelson, L. D., & Norton, M. I. (2012). Paying to be nice: Consistency and costly prosocial behavior. *Management Science, 58*(1), 179-187. doi: 10.1287/mnsc.1110.1437.

Griskevicius, V., Tybur, J.M., & Van den Bergh, B. (2010). Going green to be seen: Status, reputation, and conspicuous conservation. *Interpersonal Relations and Group Processes, 98*, 392-404. doi 10.1037/a0017346.

Hayes, A. F., & Preacher, K., J. (2012). Statistical mediation analysis with a multicategorical independent variable. *Manuscript submitted for publication.*

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 94*, 319-340.

Hitlin, S. (2003). Values as the core of personal identity: Drawing links between two theories of self. *Social Psychology Quarterly, 66*, 118-137.

IPCC (2007). Summary for Policymakers. In S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, … H.L. Miller (Eds.), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of theIntergovernmental Panel on Climate Change* (pp. 1-18) . Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

James, L. R., Mulaik, S. A., & Brett, J. M. (2006). A tale of two methods. *Organizational Research Methods, 9*(2), 233-244. doi:10.1177/1094428105285144.

Kelley, H. H. (1967). Attribution theory in social psychology. In D. Levine (Ed.), Nebraska Symposium on Motivation (Vol. 15, pp. 192-238). Lincoln: University of Nebraska Press.

Kelley, H. H. (1973). The processes of causal attribution. *American Psychologist, 28*(2), 107-128. doi: 10.1037/h0034225.

Kelley, H. H., & Michela, J. L. (1980). Attribution theory and research. *Annual Review of Psychology, 31*(1), 457-501.

Koole, S. L., & Lakens, D. (2012). Rewarding replications: A sure and simple way to improve psychological science. *Perspectives on Psychological Science, 7*, 608-614. doi:10.1177/1745691612462586.

Lavell, A., Oppenheimer, M., Diop, C., Hess, J., Lempert, R., Li, J., … Myeong, S. (2012). Climate change: new dimensions in disaster risk, exposure, vulnerability, and resilience. In C.B. Field, V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, … P.M. Midgley (Eds.). *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC)* (pp. 25-64). Cambridge University Press, Cambridge, UK, and New York, NY, USA.

Lee, L., Piliavin, J. A., & Call, V. R. A. (1999). Giving time, money, and blood: Similarities and differences. *Social Psychology Quarterly, 62*, 276-290.

Lindenberg, S. (2001). Intrinsic motivation in a new light. *Kyklos, 54*(2), 317-342.

Mazar, N., & Zhong, C. (2010). Do green products make us better people? *Psychological Science, 21*(4), 494-498.

McCrae, R. R., Zonderman, A.B., Costa, P.T., Bond, M.H., & Paunonen, S.V. (1996). Evaluating replicability of factors in the revised NEO personality inventory: Confirmatory factor analysis versus procrustes rotation. *Journal of Personality and Social Psychology, 70*(3), 552. doi: 10.1037/0022-3514.70.3.552.

Mellström, C., & Johannesson, M. (2008). Crowding out in blood donation: Was Titmuss right? *Journal of the European Economic Association, 6*(4), 845. doi: 10.1162/JEEA.2008.6.4.845.

Nigbur, D., Lyons, E., & Uzzell, D. (2010). Attitudes, norms, identity and environmental behaviour: Using an expanded theory of planned behaviour to predict participation in a kerbside recycling programme. *British Journal of Social Psychology, 49*, 259-284.

Nilsson, A., von Borgstede, C., & Biel, A. (2004). Willingness to accept climate change strategies: The effect of values and norms. *Journal of Environmental Psychology, 24*, 267-277.

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.

Pelletier, L. G., Tuson, K. M., Green-Demers, I., Noels, K., & Beaton, A. M. (1998). Why are you doing things for the environment? The motivation toward the environment scale (MTES). *Journal of Applied Social Psychology, 28*(5), 437-468. doi: 10.1111/j.1559-1816.1998.tb01714.x

Peters, G.P., Andrew, R.M., Boden, T., Canadell, J.G., Ciais, P., Le Quere, C., … Wilson, C. (2012). The challenge to keep global warming below 2 degrees Celsius. *Nature and Climate Change, 3*, 4-6. doi: 10.1038/nclimate1783

Reinders, A. H. M. E., Vringer, K., & Blok, K. (2003). The direct and indirect energy requirement of households in the european union. *Energy Policy, 31*, 139-153.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78. doi: 10.1037/0003-066X.55.1.68.

Ryan, R. M., & Deci, E. L. (2002). Overview of self-determination theory: An organismic-dialectical perspective. In E. L. Deci, & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 3-33). Rochester, NY US: University of Rochester Press.

Sachdeva, S., Iliev, R., & Medin, D.L. (2009). Sinning saints and saintly sinners: The paradox of moral self-regulation. *Psychological Science, 20*, 523-528.

Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms. *Psychological Science, 18*(5), 429-434. doi: 10.1111/j.1467-9280.2007.01917.x

Schultz, P. W., & Tabanico, J. (2007). Self, identity, and the natural environment: Exploring implicit connections with Nature. *Journal of Applied Social Psychology, 37*, 1219-1247.

Schultz, P. W., & Zelezny, L. C. (1998). Values and proenvironmental behavior: A five-country survey. *Journal of Cross-Cultural Psychology, 29*, 540-558.

Schwartz, S. H. (1970). Elicitation of moral obligation and self-sacrificing behavior: An experimental study of volunteering to be a bone marrow donor. *Journal of Personality and Social Psychology, 15*(4), 283-293. doi: 10.1037/h0029614.

Schwartz, S. H. (1973). Normative explanations of helping behavior: A critique, proposal, and empirical test. *Journal of Experimental Social Psychology, 9*(4), 349-364. doi: 10.1016/0022-1031(73)90071-1.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. P. Zanna, & M. P. Zanna (Eds.), *Advances in experimental social psychology*, (pp. 1-65). San Diego, CA US: Academic Press.

Shepherd, A., Ivins, E. R., A, G., Barletta, V. R., Bentley, M. J., Bettadpur, S., . . . Zwally, H. J. (2012). A reconciled estimate of ice-sheet mass balance. *Science, 338* (6111), 1183-1189. doi: 10.1126/science.1228102

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods, 7*(4), 422-445. doi:10.1037/1082-989X.7.4.422 .

Smith, S. M., Haugtvedt, C. P., & Petty, R. E. (1994). Attitudes and recycling: Does the measurement of affect enhance behavioral prediction? *Psychology & Marketing, 11*(4), 359-374. doi: 10.1002/mar.4220110405.

Spanos, N. P., Radtke, H. L., & Bertrand, L. D. (1984). Hypnotic amnesia as a strategic enactment: Breaching amnesia in highly susceptible subjects. *Journal of Personality and Social Psychology, 47*(5), 1155-1169. doi:10.1037/0022-3514.47.5.1155 .

Sparks, P., & Shepherd, R. (1992). Self-identity and the theory of planned behavior: Assessing the role of identification with "green consumerism". *Social Psychology Quarterly, 55*, pp. 388-399.

Staats, H., Harland, P., & Wilke, H. A. M. (2004). Effecting durable change: A team approach to improve environmental behavior in the household. *Environment and Behavior, 36*, 341-367.

Steg, L., & De Groot, J.I.M. (2012). Environmental values. In S. Clayton (Ed.), *The handbook of environmental and conservation psychology.* (pp. 81 – 92). New York: Oxford University Press.

Steg, L., De Groot, J.I.M., Dreijerink, L., Abrahamse, W., & Siero, F. (2011). General antecedents of personal norms, policy acceptability, and intentions: The role of values, worldviews, and environmental concern. *Society & Natural Resources: An International Journal, 24*, 349-367.

Steg, L., Perlaviciute, G., Van der Werff, E., & Lurvink, J. (2012). The significance of hedonic values for environmentally relevant attitudes, preferences, and actions. *Environment and Behavior*, 1-30. doi:10.1177/0013916512454730.

Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology, 29*(3), 309-317.

Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues, 56*, 407-424.

Stern, P. C., Dietz, T., & Guagnano, G.A. (1995). The new ecological paradigm in social-psychological context. *Environment and Behavior, 27*(6), 723-743.

Stets, J. E., & Carter, M. J. (2012). A theory of the self for the sociology of morality. *American Sociological Review, 77*(1), 120-140. doi: 10.1177/0003122411433762.

Stuive, I. (2007). *A comparison of confirmatory factor analysis methods: Oblique multiple group method versus confirmatory common factor method.* PhD thesis, University of Groningen, Faculty of Behavioural and Social Sciences.

Stuive, I., Kiers, H.A.L., Timmerman, M. E., & Ten Berge, J. M.F. (2008). The empirical verification of an assignment of items to subtests: The oblique multiple group method versus the confirmatory common factor method. *Educational and Psychological Measurement, 68*, 923-939.

Terry, D. J., Hogg, M. A., & White, K. M. (1999). The theory of planned behaviour: Self-identity, social identity and group norms. *British Journal of Social Psychology, 38*, 225-244.

Thøgersen, J. (2009). The motivational roots of norms for environmentally responsible behavior. *Basic and Applied Social Psychology, 31*, 348-362.

Thøgersen, J., & Crompton, T. (2009). Simple and painless? The limitations of spillover in environmental campaigning. *Journal of Consumer Policy, 32*, 141-163. doi: 10.1007/s10603-009-9101-1.

Thøgersen, J., & Ölander, F. (2002). Human values and the emergence of a sustainable consumption pattern: A panel study. *Journal of Economic Psychology, 23*, 605-630.

Thøgersen, J., & Ölander, F. (2003). Spillover of environment-friendly consumer behaviour. *Journal of Environmental Psychology, 23*(3), 225-236. doi: 10.1016/S0272-4944(03)00018-5

Vallerand, R. J., Pelletier, L. G., & Koestner, R. (2008). Reflections on self-determination theory. *Canadian Psychology/Psychologie Canadienne, 49*(3), 257-262. doi: 10.1037/a0012804.

Van der Werff, E., Steg, L., & Keizer, K. (2013a). I am what I am by looking past the present: The influence of biospheric values and past behaviour on environmental self-identity. *Environment and Behavior.* doi:10.1177/0013916512475209

Van der Werff, E., Steg, L., & Keizer, K. (2013b). The value of environmental self-identity: The relationship between biospheric values, environmental self-identity and pro-environmental preferences, intentions and behaviour. *Journal of Environmental Psychology, 34*, 55-63. doi. 10.1016/j.jenvp.2012.12.006.

Van Zomeren, M., Postmes, T., & Spears, R. (2012). On conviction's collective consequences: Integrating moral conviction with the social identity model of collective action. *British Journal of Social Psychology, 51*(1), 52-71. doi: 10.1111/j.2044-8309.2010.02000.x

Verplanken, B., & Holland, R. W. (2002). Motivated decision making: Effects of activation and self-centrality of values on choices and behavior. *Journal of Personality and Social Psychology, 82*(3), 434-447. doi: 10.1037/0022-3514.82.3.434.

Vlachopoulos, S. P., Kaperoni, M., & Moustaka, F. C. (2011). The relationship of self-determination theory variables to exercise identity. *Psychology of Sport and Exercise, 12*(3), 265-272. doi: 10.1016/j.psychsport.2010.11.006.

Vlek, C., & Steg, L. (2007). Human behavior and environmental sustainability: Problems, driving forces, and research topics. *Journal of Social Issues, 63*(1), 1-19. doi: 10.1111/j.1540-4560.2007.00493.x

Weigel, R., & Weigel, J. (1978). Environmental concern. *Environment and Behavior, 10*, 3-15.

Whitmarsh, L., & O'Neill, S. (2010). Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours. *Journal of Environmental Psychology, 30*, 305-314.

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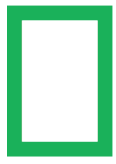

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