SUSTAINING A SUSTAINABLE LIFESTYLE: A LONGITUDINAL AND EXPERIMENTAL INVESTIGATION OF ENVIRONMENTAL IDENTITY AND PRO-ENVIRONMENTAL BEHAVIORS

by

JULIE E. DELOSE

(Under the Direction of Michelle R. vanDellen)

ABSTRACT

Harmful changes in the natural environment are occurring at an alarming rate, many of which are related to human behavior; individuals must start acting more sustainably (i.e., engaging in behaviors that help and do not harm the natural environment). The current study examined the role of environmental identity on behavior and whether one's identity as an environmentalist changes over time. Participants were randomly assigned to complete a new behavior related to sustainability (*sustainable* condition) or a behavior related to a personal on-going goal pursuit (*control* condition). Participants completed a 3-week longitudinal study with four sessions, each 1 week apart, rating environmental identity (EI) and pro-environmental behaviors (PEBs; e.g., shopping using reusable bags, eating less meat) at each session. Results showed condition did not affect change in EI nor change in PEBs over time. However, condition did affect behavior at Session 4, choosing to learn about sustainability, such that individuals in the *sustainable* condition were more likely to choose to watch a 15-minute narrated PowerPoint

about sustainability. Ignoring condition, EI decreased over the course of the study; PEBs did not change. Moderators of the effect of time on environmental identity were egoistic and biospheric values, connectedness to nature, ecocentric and anthropocentric attitudes, and political orientation. Although change in EI did not predict change in PEBs and vice versa, EI at Session 1 predicted PEBs at Session 2, PEBs at Session 2 predicted EI at Session 3, and EI at Session 3 predicted PEBs at Session 4 (each controlling for previous levels of EI and PEBs). Thus, evidence suggests EI and PEBs do influence one another but at different times.

INDEX WORDS: Identity, Environment, Sustainable Behavior, Pro-Environmental Behavior, Psychology

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JULIE E. DELOSE

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JULIE E. DELOSE

Major Professor:	Michelle vanDellen
Committee:	Leonard Martin
	Adam Goodie

Electronic Version Approved:

Suzanne Barbour
Dean of the Graduate School
The University of Georgia
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DEDICATION

I dedicate this manuscript to every person who inspired me and helped me throughout my graduate studies!

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CHAPTER 1

INTRODUCTION

"*We cannot hope to create a sustainable culture with any but sustainable souls."*

— Derrick Jensen, Endgame, Vol. 1: The Problem of Civilization

Between now and 2050, the world population is projected to increase by almost 33% (United Nations, 2015). Increasing population rates means even greater concern about environmental degradation, climate change, loss of species and biodiversity, hunger, and sources for energy, among many others (Dietz & Rosa, 1997; Godfray et al., 2010; McKee, Sciulli, Fooce, & Waite, 2004; Vitousek, Mooney, Lubchenco, & Melillo, 1997). Although new technologies and innovative solutions are required, addressing global and local sustainability challenges, such as the ones listed above, relies on individual human behavioral changes including decreases in energy use (McDaniel & Borton, 2002), waste production (U.S Environmental Protection Agency, 2016), and meat and dairy consumption (Eshel, Shepon, Makov, & Milo, 2014; McMichael, Powles, Butler, & Uauy, 2007; Stehfest et al., 2009). The good news is that people have the ability to change their behavior for the good of the planet and society. One way may be to view the self as an environmentalist (Lacasse, 2016; Mancha & Yoder, 2015; Stets & Biga, 2003; van der Werff, Steg, & Keizer, 2013; Whitmarsh & O'Neill, 2010).

Sustainability has been defined by national and world organizations as emphasizing a quality human life within earth's carrying capacity (e.g., UNEP, IUCN). Sustainability research aims to find creative solutions to address problems that affect communities, nations, and the

entire globe. An inherently interdisciplinary approach, all areas of research and expertise are crucial (e.g., biology, ecology, psychology, engineering, geography, sociology, business). The current manuscript focuses on how social psychological research can be applied to increase the goal of a more sustainable society, specifically applied to individuals living in the United States.

The current research examines how individuals' conceptualization of the self as an environmentalist may lead to more pro-environmental behaviors over time and vice versa; that is, individuals may begin to act in more sustainable ways, and this behavior may in turn lead to positive changes in how they view the self as an environmentalist. I borrow this definition of pro-environmental behavior from Kollmus and Agyeman (2002): "behavior that consciously seeks to minimize the negative impact of one's actions on the natural and built world (e.g., minimize resource and energy consumption, use of non-toxic substances, reduce waste production". Throughout this manuscript pro-environmental behaviors and sustainable behaviors are used interchangeably.

Humans and the Natural Environment

Humans have always relied on the natural environment. The biophilia hypothesis suggests humans have a natural "inclination to affiliate with life and lifelike process" (Wilson, 1984). The biophilia hypothesis assumes this natural inclination is biological and "likely to increase the possibility for achieving individual meaning and personal fulfillment" (Ulrich, 1993; Wilson, 1984; Wilson & Kellert, 2013). Thus, humans may not only think of the natural world (e.g., plants, animals, weather, landscapes) as a means to an end but also as something of beauty and being responsible agents for conservation. Indeed, people generally care about the environment, and concern for environmental problems is universal (Leiserowitz, Kates, & Parris, 2005; Milfont & Schultz, 2016; Schultz & Zelenzy, 1998).

People also benefit both physically and psychologically from more natural environments. For instance, patients post-surgery were less likely to stay in a hospital and to take pain medication when their room had a view of a natural area full of trees versus a brick wall (Ulrich, 1984) or when they were randomly assigned to a room with a potted plant in it (Park, 2006). Other studies have shown greater area of green space around one's home is related to better overall physical and mental health (De Vries, Verheij, Groenewegen, & Spreeuwenberg, 2003; Takano, Nakamura, & Watanabe, 2002). People also seek nature for restorative benefits (Korpela, Hartig, Kaiser, & Fuhrer, 2001) and receive restorative effects such as increased attention and lower heart rate after being in nature (Berman, Jonides, & Kaplan, 2008; Hartig, Mang, & Evans, 1991; Kaplan, 1995). Being in a natural environment (e.g., nature trail) is associated with greater positive affect (Hartig et al., 1991; Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2009) and reduced anger and aggression (Hartig et al., 1991; Hartig, Evans, Jamner, Davis, & Garling, 2003). Furthermore, walking in a natural area (e.g., a nature preserve) can help with reflecting on a life problem (Mayer et al., 2009).

Empirical support for Attention Restoration Theory (ART; Kaplan, 1995), the idea that nature restores people after long periods of directed attention, shows even pictures of nature (vs. urban scenes) can promote recovery from mental fatigue (Berto, 2005). Another theory about how nature provides restoration, Stress Recovery Theory (Ulrich, Simons, Losito, Fiorito, Miles, & Zelson, 1991), proposes positive affective responses come about from features in the environment (e.g., symmetry, natural content, and absence of threats), and these quick, positive affective responses provide restoration for individuals. Individuals who are stressed are able to recover quicker if exposed to natural (vs. urban) video clips (Ulrich et al., 1991). Further evidence suggests people who seek out psychological benefits from natural environments may be

more likely to engage in sustainable behaviors. For instance, individuals who use natural environments for psychological restoration tend to act more sustainably, and this relationship is partially mediated by concern for the environment (Hartig, Kaiser, & Strumse, 2007). Thus, feeling connected to the natural environment may be an important antecedent to environmental identity (e.g., Mayer & Frantz, 2004). Connectedness to nature and related constructs and their relation to environmental identity and pro-environmental behaviors are discussed later on in the introduction. Next, I discuss some barriers to acting sustainably.

A Mismatch between Care for Environment and Acting Sustainably

Although people care about the environment, few people engage in everyday sustainable behaviors (e.g., Hartig et al., 2007; Kollmuss & Agyeman, 2002). The following section will discuss how factors such as human evolutionary tendencies, temporal distance, valuing of rewards, judgments and decision making, and locus of control influence whether people are likely to act sustainably.

People may feel positive about the natural environment, as theorized in the biophilia hypothesis (Wilson, 1984), but people have other goals and needs that may conflict with caring for the environment (Emmons, 1986; Lindenberg & Steg, 2014). This mismatch between caring and acting pro-environmentally may be due to humans not being hard-wired to worry about the environment (Griskevicius, Cantu, & Van Vugt, 2012). For instance, nomadic hunter-gatherer ancestors would move to another location after they used up the resources available at their previous site (Griskevicius et al., 2012; Penn, 2003). Thus, despite the popular belief that humans began neglecting the environment just recently, evolutionary research shows this is not a modern phenomenon but was exhibited by human ancestors (Penn, 2003). One specific ancestral tendency people generally continue to exhibit that influences their behavior is self-interest:

prioritizing individual over group gain (Griskevicius et al., 2012). Hardin's (1968) economic theory, the tragedy of the commons, suggests individuals tend to be selfish and exploit common resources; individuals acting independently and rationally according to each's self-interest behave in opposition to what is best for the group, by depleting some common resource (Hardin, 1968). A current example of this phenomenon is overfishing in oceans, which has led to many species that are threatened for extinction (Nieto et al., 2015). In addition, overconsumption of material items, especially in developed countries, may be due to social status and mate attraction (Penn, 2003); materialism is an antithesis to sustainability (e.g., Myers, 2010).

Furthermore, temporal distance plays a large role in people's perceptions and behaviors related to sustainability. When thinking about distant events, people tend to think in more abstract terms but when thinking of near events tend to think in more specific ways (Freitas, Gollwitzer, & Trope, 2004; Liberman & Trope, 1998; Trope & Liberman, 2003). Because environmental issues are often thought of as manifesting in the future, people may be less likely to think of them in ways that lead to action (Liberman & Trope, 1998). Temporal distance may also refer to spatial distance; for instance individuals living in the U.S. are far away from seeing ice melting in the polar regions and thus are physically distant from this issue, but they also may be psychologically distant from this and other environmental issues (Trope & Liberman, 2010). People also think about goal pursuits differently depending on when they would be completed, perceiving goal pursuits to be increasing easier in the future than in the present; for instance, individuals are think going to the gym will be more difficult to do in the present than in a week from the present (Delose & vanDellen, 2014). Likewise, preliminary evidence suggests time influences how people think about the *convenience* of specific sustainable behaviors. People's perceptions of the convenience of walking for transportation increased over time, meaning that in

the present walking for transportation seemed more inconvenient but in the future walking was perceived as less inconvenient (Delose & vanDellen, 2017).

Furthermore, research from many domains (e.g., food, money) shows people value rewards differently depending on time; people tend to value immediate rewards over delayed rewards (e.g., Ainslie & Haslam, 1992; Green & Myerson, 2004; Loewenstein & Thaler, 1989), which may also play out in sustainable behaviors. For example, wanting to enjoy a delicious dinner sooner rather than later may mean ordering take-out instead of preparing leftovers from the night before. Consequently, one may inadvertently create more waste from the take-out containers, which are typically made from Styrofoam and hard to recycle in many cities in the U.S. Moreover, because enacting sustainable behaviors likely provide benefits in the future, and to other humans and species besides oneself, people may be less willing to sacrifice immediate benefits for rewards to be realized in the future. Some of these sacrifices include eating less or no meat, taking shorter showers, composting organic waste, driving and flying less, and purchasing products that last long and can also be recycled after use. Not only may the effects of people valuing immediate rewards influence sustainable behaviors, but people's perceptions about the importance of sustainable behaviors may differ based on how near or far they imagine doing them. For instance, people perceived that using less electricity would be more valuable over increasing temporal distances (Delose & vanDellen, 2017), showing that certain pro-environmental behaviors are actually valued differently based on time.

Moreover, people have many goals they are pursuing at a given time (Emmons, 1986; Emmons & King, 1988), and so it is not uncommon to have conflicting goals (Emmons & King, 1988). For instance, wanting to drive to work to be comfortable may outweigh the goal of reducing one's reliance on fossil fuels. Still, riding a bike to school or work could satisfy many

goals at once, such as reducing fossil fuels, exercising, and saving money on gas (i.e., multifinality; Kruglanski et al., 2002), yet still the goal of reducing one's fossil fuels may be out-won by the goal to be comfortable. Goal-framing theory (Lindenberg & Steg, 2007) states there are three main goals (i.e., hedonic, gain, normative) that are salient at different times. Hedonic (i.e., to feel pleasure now) and gain (i.e., to improve resources) goals are the most dominant and contradict sustainable actions. Normative goals—goals carried out for the good of the group—need the most support from being taken over by hedonic and gain goals (Lindenberg & Steg, 2014). Social values, presence of others, the behaviors of others, and self-regulatory capacity are some ways to ensure the normative goal is salient and thus can positively influence sustainable behavior (Lindenberg & Steg, 2014).

People's judgments about the likelihood of events may also influence whether one acts pro-environmentally. People often make judgments based on how easily they can bring pertinent instances to mind (availability heuristic; Tversky & Kahneman, 1973); this idea can be applied to thoughts about climate change/global warming, with people basing their judgments off of local weather, media, and other people's beliefs. Indeed, perceptions of global warming may differ based on the perceived local temperature. Participants who thought it was hotter outside the day of a research study believed global warming was occurring to a greater extent than people who thought the temperature outside was cooler (Li, Johnson, & Zaval, 2011). This effect, termed the local warming effect, occurs because people use less relevant information (e.g., the local temperature) instead of more diagnostic information such as global climate patterns (Zaval, Keenan, Johnson, & Weber, 2014). Sometimes judgments may actually increase sustainable behaviors. For example, individuals who thought it was hotter (vs. cooler) than usual donated more money to a charity aimed to decrease global warming (Li et al., 2011). But these effects are

not likely to be long-lasting since they are based on local cues. Because of the volatility of people's judgments, people may make inaccurate judgments and decisions, which in turn may affect sustainable behaviors. For instance, people underestimated how good they would feel after taking a walk outdoors, and after they walked outdoors (vs. indoors) they were more likely to feel connected to nature (Nisbet & Zelenski, 2011). Feeling connected to nature is positively associated with engaging in sustainable behaviors (Mayer & Frantz, 2004).

In addition, people are influenced by the way information is presented. For instance, whether people are asked about *climate change* or *global warming* depends on how they respond to beliefs about climate change/global warming (Schuldt, Knorath, & Schwarz, 2011). Specifically, Republicans were more likely to endorse that *climate change* is occurring compared to *global warming*; Democrats responded equally to these frames (Schuldt et al., 2011). In turn, these beliefs may affect subsequent environmental behavior (e.g., Zaval et al., 2014). And, people are easily influenced by framing of pro-environmental behaviors: they think of themselves as someone who behaves more sustainably when primed with a measure that is intended to make them feel that they do not harm the environment (vs. that they help the environment; Wade-Benzoni, Li, Thompson, & Bazerman, 2007).

Still, some people may not behave sustainably because they do not think their actions have any impact on the world. Locus of control generally refers to the extent to which a person feels responsible for outcomes:

> internal versus external control refers to the degree to which persons expect that a reinforcement or an outcome of their behavior is contingent on their own behavior or personal characteristics versus the degree to which persons expect that the reinforcement

or outcome is a function of chance, luck, or fate, is under the control of powerful others, or is simply unpredictable (Rotter, 1990).

Thus, individuals with an internal locus of control tend to feel they have control over their lives, whereas individuals with an external locus do not. People with an internal locus of control are more likely to exhibit pro-environmental behaviors (Blake, 1999; Hines, Hungerford, & Tomera, 1986) and to be willing to pay a higher price for sustainable products (Trivedi, Patel, & Savalia, 2015). Related constructs, such as self-efficacy, perceived behavioral control, and autonomous motivation, show similar patterns (Ajzen, 1991; Pelletier, Tuson, Green-Demers, Noels, & Beaton, 1998).

In sum, although people do care about the environment, they may or may not make big changes to their daily lives in order to reduce their environmental impact. I discussed how factors such as human evolutionary tendencies, temporal distance, valuing of rewards, judgments, and locus of control influence pro-environmental behaviors. This list of factors is not exhaustive; there are many other reasons that may influence whether one will behave sustainably or not.

Predictors of Pro-Environmental Behaviors (PEBs)

Past research has focused on examining factors that promote sustainable behaviors. Some of these predictors are knowledge about issues, specific attitudes and beliefs about the environment, connection to the natural world, values, and environmental identity. Below I discuss these constructs and their role on PEBs.

Knowledge. Knowledge about environmental issues may affect whether people act sustainably. Based on the norm-activation model (NAM; Schwartz, 1977), awareness of an environmental issue must be high before people can feel a strong personal norm to engage and then an intention to act (Steg & de Groot, 2010). Although knowledge influences attitudes,

research suggests giving people information is not very effective in changing behavior (Abrahamse, Steg, Vlek, & Rothengatter, 2005). Additionally, knowledge about environmental issues does not differ in people who identify themselves as environmentalists vs. non-environmentalists (Kempton, Boster, & Hartley, 1995). Overall, knowledge about environmental issues is ineffective for long-term behavioral change (Abrahamse et al., 2005; Whitmarsh & O'Neill, 2010), unless individuals are also given feedback about their behavior and have pressures to act based on social influence (Staats, Harland, & Wilke, 2004).

Specific attitudes and beliefs about environment and humans. An attitude is an "evaluation of the entity in question…on a bipolar evaluative or affective dimension" (Ajzen & Fishbein, 1977) and "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (Eagly & Chaiken, 1998). Attitudes have played an important role in social psychological research predominately because they have the potential to influence behavior. Attitudes and behavior do not always align (e.g., LaPiere, 1934; Wicker, 1969); yet in other studies, attitudes are positive predictors of behavior (Ajzen, 1991). Overall, there is variability in the relationship between attitudes and subsequent behavior (Ajzen, 2000). One meta-analysis showed a statistically significant effect of attitudes on behavior across 88 studies (Kraus, 1995). Another meta-analysis showed attitudes are more predictive of behavior when people are motivated to think about the object they are considering, have direct experience with the attitude object, report their attitudes frequently, and believe their attitudes are correct (Glasman & Albarracin, 2006).

The misalignment of attitudes and behaviors in the area of environmental psychology shows that positive attitudes about the environment aren't enough for people to *act* pro-environmentally (e.g., Cleveland, Kalamas, & Laroche, 2005; Kollmuss & Agyeman, 2002;

Minton & Rose, 1997). Evidence more strongly supports the idea that attitudes are better predictors of behavior when the attitude and behavior correspond to each other (Ajzen & Fishbein, 1977; Fishbein & Ajzen, 1975; Glasman & Albarracin, 2006; Kraus, 1995). For example, if Jim has a positive attitude toward recycling, his attitude toward recycling should predict that Jim will recycle at home. Jim's attitude toward recycling may not predict whether he bikes or drives to work.

One way attitudes about the natural environment have been measured is based on the extent to which individuals value nature for its own sake (ecocentrism) or valuing nature for human benefit (anthropocentrism; Thompson & Barton, 1994). People who are higher on ecocentrism are more likely to engage in sustainable behaviors generally. Moreover, they are more willing to engage in environmental citizenship behaviors (e.g., giving their names and phone numbers to get involved with a campus environmental action organization; Thompson & Barton, 1994).

Worldviews, generalized beliefs about the world, also influence the extent to which an individual will engage in pro-environmental behaviors. Belief in climate change (Kollmus & Agyeman, 2002) and belief about the relationship between humans and nature are two examples. Individuals with greater belief in climate change are more likely to intend to act sustainably (Heath & Gifford, 2006). Additionally, the New Ecological Paradigm (NEP) Scale primarily measures "primitive beliefs" about the nature of the earth and humanity's relationship with it (Dunlap, Van Liere, Mertig, & Jones, 2000). In one study, the NEP Scale (Dunlap et al., 2000) did not positively predict any of the 24 PEBs measured (Whitmarsh & O'Neill, 2010), whereas in other studies scores on the NEP have positively related to sustainable behaviors (e.g., Davis, Green, & Reed, 2009; Gatersleben, Murtagha, & Abrahamseb, 2014). The NEP has also been

shown to be highly related to the construct of awareness of consequences to the environment (Stern, Dietz, Kalof, & Guagnano, 1995) and also operationalized as awareness of consequences (Schultz & Zelezny, 1998).

Connection to natural world. The construct of connectedness to nature has been defined as an experiential sense of oneness with the world, measured by the Connected to Nature Scale (CNS; Mayer & Frantz, 2004). The higher one is on connectedness to nature the more likely one is to engage in sustainable behaviors (Mayer & Frantz, 2004). Furthermore, commitment to the environment is defined by Davis et al. (2009) as "psychological attachment to and long-term orientation toward the natural world" (pg. 174). Higher commitment to the environment relates to greater levels of PEBs such as turning off the computer when not using it and recycling used paper. In addition, manipulating commitment to the environment showed that people meant to feel high (vs. low) commitment to the environment had greater pro-environmental intentions and were more willing to volunteer time for a river clean-up (Davis et al., 2009).

Values. Values serve as guiding principles in one's life (Schwartz, 1992). They tend to be stable over situations and time and guide individuals to behavior that is in line with their values (Schwartz & Bilsky, 1987). There are 10 universal values that are broken up into four dimensions: conservation (tradition, conformity, security), self-transcendence (universalism, benevolence), self-enhancement (power, achievement), and openness (self-direction, stimulation, hedoism; Schwartz, 1992). Individuals who score higher on the items from the self-transcendence dimension report a greater willingness to behave sustainably (Stern et al., 1995) and greater amounts of past pro-environmental behaviors (Karp, 1996; Schultz & Zelezny, 1998). Individuals high in self-enhancement report low levels of pro-environmental behaviors (Schultz & Zelezny, 1998). Scores on the NEP relate negatively to egoism, and positively to

biospherism (De Groot & Steg, 2008) and self-transcendence (Schultz & Zelenzy, 1999). A literature review by Dietz, Fitzgerald, and Shwom (2005) provides consensus that values, especially altruism, are related to intended and actual environmental behaviors.

Environmental identity. Environmental identity has been defined as "the extent to which you see yourself as a person whose actions are environmentally friendly" (Van der Werff, Steg, & Keizer, 2014; pg. 627). In addition, Clayton (2003) states:

> environmental identity is one part of the way in which people form their self-concept: a sense of connection to some part of the nonhuman natural environment, based on history, emotional attachment, and/or similarity, that affects the ways in which we perceive and act toward the world; a belief that the environment is important to us and an important part of who we are (pg. 46).

Therefore, environmental identity is not only *feeling* a connection to the natural environment but *acting* in ways that help and not harm the environment. Indeed, having a strong environmental identity may be one of the strongest predictors of sustainable actions (Clayton, 2003; Whitmarsh & O'Neill, 2010). Past research shows a positive relationship between environmental identity and pro-environmental behaviors (Almanzar, Sullivan-Catlin, & Deane, 1998; Dresner, Handelman, Braun, & Rollwagen-Bollens, 2015; Dunlap & McCright, 2008; Freed, 2016). People who identify more strongly as an environmentalist rate themselves as behaving more sustainably, such as turning off the lights when they leave the room, and are more likely to resolve an environmental conflict by picking the pro-environmental resolution (Clayton, 2003). Whitmarsh and O'Neill (2010) found environmental identity was a strong predictor of some of the pro-environmental behaviors measured: waste reduction, eco-shopping and eating, and regular waste and domestic energy conservation. Furthermore, an ethnographic study of a high

school environmental science class showed some students had an increase in both identity as an environmentalist and behaviors that benefit the environment (e.g., eating less meat) over the course of the class (Blatt, 2013). It is important to note that environmental identity has been shown to predict pro-environmental behavior above and beyond other measures of environmental constructs such as attitudes and values (Clayton, 2003).

Moreover, specific environmental identities (e.g., conserver of natural resources) impact specific, congruent pro-environmental behavior (e.g., conserving water; Mallett & Melchiori, 2016). Students living in resident halls were randomly assigned to either a 1) retrofit condition, where toilets, showers heads, and faucets were changed to be low-flowing, an 2) identity-building campaign, which exposed students to posters and stickers with slogans describing the university community as water savers, 3) both retrofit and identity-building conditions, or 4) neither (control condition). Ten weeks later, participants rated their conservation identity (i.e., "It is personally important to me to conserve natural resources"). Participants also self-reported shower length and the extent to which they conserved water while brushing teeth and washing dishes. Individuals in the retrofit condition and individuals in the identity-building condition used less water post-intervention. For participants in the identity-building campaign condition, identity-building campaign indirectly affected self-reported water use through adoption of a self who conserves natural resources (Mallett & Melchiori, 2016). Therefore, individuals used less water partially because they came to identify themselves as conservers of natural resources.

Identity can also be influenced by contextual and situational factors. In one study, participants rated how often they engage in sustainable behaviors compared to their peers, but they were randomly assigned to a condition where the phrasing of the items was more likely to either lead them to 1) think of themselves as not making things worse for the environment or 2)

as someone who is helping the environment. Participants were more likely to rate themselves as higher on environmental identity (compared to their peers) when they were in the former condition (i.e., items phrased in a way that not harming the environment is salient; Wade-Benzoni et al., 2007). Recent evidence suggests that when people perceive they do a lot for the environment, their environmental identity is strengthened; this in turn leads to greater support for policies that support sustainability, but also reduced guilt, which leads to less support for climate change (Study 1; Lacasse, 2016). When individuals who were in a condition that rated many (vs. few) PEBs and then were told they were environmentalists, they were more likely to show positive contextual spillover in terms of greater concern for climate change and endorsement of sustainability initiatives on campus (Study 2; Lacasse, 2016). These studies provide evidence that environmental identity can influence subsequent sustainable behaviors but also that perception of one's past pro-environmental behavior influences identity as an environmentalist.

The idea of identity as a broad construct (i.e., an environmentalist) and a specific aspect of environmentalism (e.g., vegetarian, water conserver, zero-waster) have both been shown to relate to pro-environmental behaviors. For instance, specific identity of being an environmentalist (e.g., a carbon off setter) significantly predicted offsetting intention (i.e., intention to offset their carbon footprint), and general identity as an environmentalist also predicted offsetting intention (Whitmarsh & O'Neill, 2010). Thus, a broad identity as an environmentalist still predicted a specific pro-environmental intention.

Identity Theories, Self-Perception Theory, & Inferring Environmental Identity

According to William James (1890), a "man's Self is the sum total of all that he can call his, not only his body and his psychic powers, but his clothes and his house, his wife and children, his ancestors and friends, his reputation and works, his lands and horses, and yacht and

bank-account" (p. 291). James's conceptualization of the self, along with others (Burke, 1980; Stryker, 1980), highlights that the self is made up of people, objects, and identities. According to identity theory, people have distinct components of the self, called role identities, for each role position one occupies in society (Stryker, 1968; Burke, 1980). Identity theory was born out of the symbolic interactionist perspective, the idea that the self becomes defined through social interactions with others. A role is a set of expectations that tell people how to behave, and when people perceive they are acting in accordance to the role they feel positive about themselves; if they are not meeting the expectations of the defined role, they may feel low self-esteem and even psychological distress (Thoits, 1991). People are motivated to maintain consistency between their identity and behavior (Stets & Burke, 2003). Identities act as cybernetic control systems, where a dissonance-reduction function works to motivate people to modify their behavior to match their identities (Burke, 1980, 1991).

People often have many identities which may sometimes conflict (Stets & Burke, 2003). For instance, environmental identity may conflict with other identities such as a family identity (Blatt, 2013). Additionally, cognitive dissonance theory states people will feel negative arousal when there are inconsistencies between their thoughts, emotions, and behavior and will try to restore consistency when there is a mismatch (Festinger, 1954). And, people may also ignore or disregard information that is inconsistent with their prior beliefs and attitudes (Festinger, 1964).

Social identity theory (Hogg & Abrams, 1988; Tajfel & Turner, 1979), suggests people define themselves in terms of social categories, and these group memberships describe and prescribe how an individual should behave. Thus, one's social identities guide one's actions to be in line with one's identities. A student who categorizes herself as an environmentalist will behave in ways that conform to that social identity; she may join an environmental club or try to

find other students who categorize themselves as environmentalists. Social identities also have an evaluative function, and people are motivated to make in-group/outgroup comparisons that favor the in-group. Social identity theory suggests that the groups individuals belong to have a strong bearing on one's self-esteem (Tajfel & Turner, 1979).

There are differences between identity theory and social identity theory (Hogg, Terry, & White, 1995), but both theories suggest that identities guide behavior. Many empirical studies examining how identities relate to behavior show a positive relationship between identity and behavior consistent with that identity. For instance, people who view the self as moral are likely to behave morally (Hertz & Krettenauer, 2016), and people who identify as an exerciser are more likely to exercise with greater intensity and frequency (Anderson, Cychosz, & Franke, 1998; Strachan & Brawley, 2008).

Although people have many attitudes about people, objects, and events, sometimes people do not have a strong attitude. Self-perception theory states people "come to 'know' their own attitudes, emotions, and other internal states partially by inferring them from observation of their own overt behavior and/or circumstances in which this behavior occurs" (Bem, 1972, p.5). Self-perception processes are more likely when people are unsure about their attitudes, that is, "internal cues are weak, ambiguous, or uninterpretable" (Bem, 1972, p.5). Although self-perception theory is inherently about attitudes, research testing the theory has merged the constructs of attitudes and identity. For instance, in one study participants rated their attitudes about being an environmentalist/conservationist, and two weeks later, they were randomly assigned to complete an ecology-related behaviors questionnaire framed as pro- or anti- ecology. This framing task manipulated the ratings of one's past pro-environmental behavior to seem high or low. Afterwards, participants rated the extent to which they felt they were an

environmentalist. People who did not have a highly consistent environmentalist identity were more likely to be influenced by external cues about their identity as an environmentalist (Chaiken & Baldwin, 1981). Individuals without a well-defined attitude about being an environmentalist were more likely to have high consistency between priming of environmental behaviors and attitudes: people were less likely to think of themselves as an environmentalist when primed with anti-ecology behaviors and more likely to think of themselves as an environmentalist when primed with pro-ecology behaviors (Chaiken & Baldwin, 1981). This study suggests that people will infer environmental identity based on the framing of their own past pro-environmental behavior when they do not have a strong environmental identity to begin with.

CHAPTER 2

THE CURRENT STUDY

Although past research has examined the relationship between environmental identity and judgments, intentions, and past and present sustainable behaviors (Cleveland et al., 2005; Van der Werff, Steg, & Keizer, 2014; Wade-Benzoni et al., 2007), there have not been studies investigating the causal nature of this relationship between environmentalist identity and sustainable behaviors. For instance, many studies examining environmental identity and sustainable behaviors are cross-sectional (i.e., measured at one time point), so the nature of the relationship between identity as an environmentalist and PEBs has not been examined (Clayton, 2003; Lacasse, 2016; Whitmarsh & O'Neill, 2010). Thus, the current research is differentiated from past work in many ways. First, the current work assessed environmental identity and pro-environmental behavior longitudinally, over three weeks, allowing for the examination of both identity and behavior *change over time*. Second, the study employed an experimental design to assess how being asked to complete a pro-environmental behavior (sustainable) versus a behavior unrelated to sustainability (control) over the course of the study influences environmental identity and pro-environmental behaviors. Furthermore, the current study examined individual differences that may account for differences in trajectories of environmentalist identity and pro-environmental behaviors.

Study Aims and Hypotheses

The current study had four aims, each with their own respective hypotheses and exploratory research questions.

Aim 1: Examine how random assignment to a behavior condition (sustainable, control) affects the trajectory of environmental identity (EI) and pro-environmental behaviors (PEBs) over time.

H1: Condition will affect change of EI over time, such that individuals in the sustainable behaviors (vs. control) condition will show a greater positive change in EI over time.

H2: Condition will affect change of PEBs over time, such that individuals in the sustainable behaviors (vs. control) condition will show a greater positive change in PEBs over time.

Aim 2: Examine the relationship between environmental identity (EI) and pro-environmental behaviors (PEBs) over time.

H3: Based on Self-Perception Theory (Bem, 1972), I expected change in PEBs to predict change in EI.

H4: Based on previous research that environmental identity is related to engaging in sustainable behaviors (Clayton, 2003), I expected change in EI to predict change in PEBs.

Exploratory research questions:

ERQ1: Does EI at Session 3 predict PEBs at Session 4 to a greater extent than PEBs at Session 3?

ERQ2: Does commitment to the environment mediate the relationship between change in EI and change in PEBs?

Aim 3: Examine individual differences in EI over time.

H5: Greater change in EI will occur for individuals who begin the study low in EI (S1) and who attempted/completed sustainable behaviors throughout the study.

H6: Individuals with greater (vs. small) identity conflict will show a decrease in EI over time.

Exploratory research question:

ERQ3: Which factors (e.g., values, beliefs about climate change, ecological worldview) moderate EI over time?

Aim 4: Examine individual differences in PEBs over time.

H7: Greater change in PEBs will occur for individuals who begin the study low in past PEBs (S1) and who attempted/completed sustainable behaviors throughout the study.

Exploratory research question:

ERQ4: Which factors (e.g., values, beliefs about climate change, ecological worldview) moderate PEBs over time?

Participants completed a longitudinal study that spanned three continuous weeks. Participants came into the lab for Sessions 1 and 4 and completed Sessions 2 and 3 on their own computer or phone. Session 1 lasted approximately one hour, Sessions 2 and 3 lasted 15 minutes, and Session 4 lasted 30 minutes or less. See Appendix (A) for the timeline and the measures participants completed during each session.

CHAPTER 3

METHOD

Participants. Undergraduate students from UGA's research participant pool were recruited and received partial course credit for participation. One hundred twenty-five participants completed S1. At each session there was an attention filter in the environmental identity questionnaire. Participants who missed this attention filter twice or more (n = 9) were excluded from analyses. In addition, participants who indicated they did not want their data used in analyses were excluded (n = 6). Furthermore, due to the nature of longitudinal research, some participants did not complete all sessions. The final sample at each session in chronological order is 110 (80% female), 93, 90, and 84.

Procedure.

Session 1. After reading and signing the study consent form, participants completed a variety of measures related to their values, beliefs, and attitudes toward the natural environment. Next, participants indicated the extent to which they identify as an environmentalist. Then they listed and rated other identities they have and rated their commitment to the environment, belief in climate change, attitudes about the environment, and questions about environmental locus of control. Participants then rated how often in the past week they completed a range of pro-environmental behaviors and were asked if they would like to sign up for UGA's Office of Sustainability Weekly Email Update.

Afterwards, participants were randomly assigned to one of two conditions: pro-environmental behavior (sustainable) or personal goal behavior (control). They were asked to

nominate a task to complete in line with the condition they were in and to make a concrete plan (i.e., an implementation intention) of how, when and where they would engage in the task. Last, they completed demographic questions.

Sessions 2 and 3. Participants were emailed one and two weeks after Session 1 to complete Session 2 and Session 3, respectively. The emails contained a Qualtrics survey link and listed the task participants nominated during Session 1. The emails were sent at approximately 9am the day the survey was to be completed, and participants were asked to complete the survey by 11pm that same day. Participants who completed the survey later than 11pm or the next day were still included in analyses and still received credit for completing the survey.

The surveys in Sessions 2 and 3 were identical. First, participants were asked to think about the task they nominated in S1. They recounted on their past behavior in relation to the task for the past 8 days (which included the day in which they were taking the survey). Afterwards, participants rated how often they engaged in a variety of PEBs in the past week and rated environmental identity and commitment to the environment. Then, they were asked to make an implementation intention for the upcoming week, typing where, when, and how they would complete the task they nominated in S1. Last, they were asked again if they wanted to be added to UGA's Office of Sustainability Weekly Email Update Listserv, indicating their email if they chose to be signed up.

Session 4. Participants came into the lab and completed the same measures as in S2 and S3 to indicate 1) the past week's behavior of the nominated task and 2) how often they engaged in a wide range of PEBs in the past week. Then, they rated environmental identity and commitment to the environment. Then, they were asked if they would like to watch a 15 min narrated PowerPoint module about sustainability, a way to operationalize pro-environmental

behavior, specifically environmental citizenship. Note that watching this module was included as part of the time for the study, so it did not require an extra time commitment on the participants; participants might not have realized this though. Last, participants rated their political affiliation, guessed the hypothesis of the study, and were debriefed.

Measures. For each measure, items that needed reverse-scoring were computed prior to creating scale averages. Tables 1, 2 and 3 offer descriptive statistics of most of the measures. In addition, Table 4 presents correlations between individual difference measures.

Values. Participants completed two values measures, both based off Schwartz's (1992) values scale. First, participants completed the Ten Item Value Inventory (TIVI; Sandy, Gosling, Schwartz, & Koelkebeck, 2016), which uses 1-item to measure each of ten values using the scale 1 (*not like me at all*) to 6 (*very much like me*): conformity (*M* = 5.08, *SD* = 1.02), tradition (*M* = 3.60, *SD* = 1.94), benevolence (*M* = 5.33, *SD* = 0.86), universalism (*M* =5.46, *SD* = 0.86), self-direction (*M* = 5.19, *SD* = 0.86), stimulation (*M* = 4.14, *SD* = 1.31), hedonism (*M* = 4.40, *SD* =1.09), achievement (*M* = 4.81, *SD* = 1.10), power (*M* = 3.33, *SD* = 1.24), and security (*M* = 4.19, *SD* = 1.38). Next, participants completed a questionnaire of 16 items made up of four value domains: hedonic (e.g., gratification for oneself, enjoying life), egoistic (e.g., authority, wealth, ambitious), altruistic (e.g., social justice, equality), and biospheric (e.g., protecting the environment, respecting the earth; Steg, Perlaviciute, van der Werff, & Lurvink, 2012). Participants rated each item using the scale -1 (*opposed to my values*), 0 (*not important*) – 7 (*extremely important*). More information about these four values is presented in Table 1.

Environmental sustainability awareness. Participants completed four items to assess their current awareness and knowledge of environmental sustainability. They were asked "Do you think it is important for individuals to know ways to help the environment?" and "Do you think it

is important for individuals to know ways to not harm the environment?" using a 5 point scale from 1(*definitely yes*) to 5(*definitely not*; *M*= 1.35, *SD*= 0.53). The average response falls between 'definitely yes' and 'probably yes', suggesting participants don't want to maliciously cause damage to the environment. Then they were asked "In your own words, what do you think about when you hear or read the phrase 'environmental sustainability?' Examples of responses from participants are 'Keeping the environment at a healthy state to strive for centuries to come' and 'Being able to live life in a way that is possible to keep up while using resources responsibly'. Last, participants were asked if they have taken classes at UGA about the environment and/or sustainability, and if so, which ones; almost two-thirds of the sample reported not having taken any courses at UGA related to the environment and/or sustainability (39.09% of the sample indicated haven taken a course).

Ecocentric-anthropocentric attitudes. Participants completed Thompson & Barton's (1994) 33-item scale that captures the extent to which individuals value nature for its own sake (ecocentric), values nature for human benefit (anthropocentric), and feels apathetic towards the natural environment (apathy). The scoring for the measure separates these three subscales; no items needed reverse-scoring. An example of an ecocentric subscale item is "One of the worst things about overpopulation is that many natural areas are getting destroyed for development", an example of an anthropocentric subscale item is "The most important reason for conservation is human survival", and an example of an apathy subscale item is "I find it hard to get too concerned with environmental issues". See Table 1 for more information about each subscale.

Concern about the environment. Four-items from Hartig et al. (2007) were presented to participants to measure the extent to which they are concerned about the environment in the past, present, and future. Participants were asked to rate on a scale from 1 (*very little*) to 5 (*very much*)

"How worried are you personally about environmental problems?", "How much do you think environmental problems affect your health here and now?", "How much do you think environmental problems affected your health in the past, say 10 years ago?", and "How much do you think environmental problems will affect the health of our children and grandchildren, say over the next 25 years?". See Table 1 for more information about this scale.

Connectedness to nature scale (CNS). Participants completed a 14-item scale that measures how embedded one feels with the natural environment (Mayer & Frantz, 2004), using a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). An average of the items was created; three items needed reverse-scoring. Example items are "I often feel a kinship with animals and plants" and "I have a deep understanding of how my actions affect the natural world". See Table 1 for more information about this scale.

Environmental identity (EI). Participants first completed a 1-item graphical representation item adapted from Aron, Aron, and Smollan's (1992) measure of Inclusion of Other in Self (IOS) Scale and Schultz's (2001) Inclusion of Nature in Self (INS) Scale. The INS measures the extent to which an individual includes nature within their cognitive representation of self. In Schultz (2001) participants were shown seven pairs of circles with varying overlap, representing one's relationship between 'self' and 'nature'. In the current study, participants were shown these same circle pairs, with one circle in a pair labeled 'environmentalist' and one circle labeled 'self'. They were asked to "Please select the picture that best describes your opinion of yourself as an environmentalist, someone who believes the environment is an important part of who they are and also acts in ways to benefit and not harm the environment." The depictions start with the circles with no overlap (1) to complete overlap (7).

Participants also completed the Environmental Identity (EID) Scale (Clayton, 2003), which measures the extent to which the natural environment plays an important role in one's self-definition. Both of the measures of environmental identity were used in S1, S2, S3, and S4. The EID Scale has 29 items. The full scale was used in S1; only 13 items from the scale were used in S2 to S4 to reduce participant demand. Example items used during all four sessions are "Acting environmentally friendly is an important part of who I am", "I am the type of person who act environmentally friendly", and "I would call myself an environmentalist". Items were rated using the scale 1 (*totally disagree*) to 7 (*totally agree*).

A measure of environmental identity for each session was created by averaging the items from Clayton (2003). Then, an average was created based on the average of the EID Scale and the 1-item graphical depiction measure. These measures were highly correlated at each time point (S1: $r = .72$, $p < .0001$, S2: $r = .74$, $p < .0001$, S3: $r = .72$, $p < .0001$, S4: $r = .78$, $p < .0001$). See Table 2 for more information about environmental identity at each session. On average, throughout the course of the study participants did not feel particularly strong about being environmentalists ($M = 3.59$).

Other identities. In S1 participants were asked to answer the question "Who am I?", indicating identities they have based on a procedure by Kuhn and MacPartland (1954). After each identity they listed, they were asked "How strongly do you identify with [identity]?", using the scale 1 (*identify very little*) to 7 (*identify very much*). After listing five identities, they were asked if they would like to continue listing identities or move on with the survey. The most identities they could have listed was 10.

This measure of listing other identities was meant to measure the extent to which an individual has conflict with an identity of an environmentalist. A more qualitative approach is

needed to better characterize someone with low vs. higher identity conflict with the identity as an environmentalist. As a crude way of conceptualizing conflict, participants' identities were examined. Participants listed 5 to 10 identities, depending on how many they wanted to list. Participants who listed identities related to a high level of environmental identity were categorized as having identities that are likely to promote engagement in PEBs, which I call *high facilitation of PEBs*. Identities included were 'environmentalist', 'nature lover', 'vegetarian', and 'vegan'. Participants who did not list these identities were considered to have other identities with *low facilitation of PEBs.*

Commitment to the environment. Participants completed an 11-item measure developed by Davis, Green, and Reed (2009) at S1, S2, S3, and S4. This scale is based off interdependence relational theory and measures the extent to which an individual is committed to the natural environment. One item was reverse-scored. Example items are "Feeling a connection with environment is important to me" and "When I make plans for myself, I take into account how my decisions many affect the environment". In addition, three items were added to measure commitment toward working toward environmental sustainability (e.g., "I am committed to acting in ways that help the environment"). The scale used to rate the items was 1 (*do not agree*) to 8 (*agree* completely). These 14 items were averaged together. See Table 2 for more information about this measure.

Beliefs about climate change. A 21-item scale assessed perceptions about global climate change (Heath & Gifford, 2006). Some wording of the items uses 'global warming'; whenever this was the case, 'climate change' was used instead. Six items measure that climate change is occurring, but only five items were used. An example item is "I am quite sure that climate change is occurring now". Four more subscales of this scale were also used: 1) *perception of*

causes (e.g., "Climate change is mainly due to natural causes, not human activity"; reverse-scored), with higher numbers representing perception that climate change is due to humans; 2) *perception of consequences* (e.g., "Unlike what most scientists say, there will be some positive consequences of climate change for the environment"; reverse-scored), with higher numbers representing the belief that climate change will bring more negative than positive concerns; 3) *self-efficacy* (e.g., "I believe that little things I can do will make a difference to alleviate the negative effects of climate change"); 4) *intentions to act* (e.g., "I plan to take some actions to stop climate change". Items were rated on a 1 (*strongly disagree*) to 5 (*strongly agree*) scale. See Table 1 for more information about these subscales.

Ecological worldview (NEP). Participants rated their beliefs about humans' relationship with nature using the New Ecological Paradigm Scale (NEP; Dunlap et al., 2000), a 15-item scale with seven items needing reverse-scoring. Example items are "Humans were meant to rule over the rest of nature" (reverse-scored) and "If things continue on their present course, we will soon experience a major ecological catastrophe". Participants rated each item using the scale 1 (*strongly disagree*) to 5 (*strongly agree*). See Table 1 for more information about this scale.

Environmental locus of control (ECOL). Participants completed a 12-item scale by Cleveland et al. (2005), the Environmental Locus of Control (ECOL) Scale, which measures whether individuals believe their actions positively affect the environment or not. The ECOL consists of four subscales: 1) external locus of control-biospheric-altruism (EXLBA; e.g., "With so much water in the U.S., I don't see why people are worried about leaking faucets and flushing toilets"; reverse-scored), 2) external locus of control-corporate skepticism (EXLCS; e.g., "Packaged food companies are acting responsibly toward the environment"; reverse-scored), 3) internal locus of control-economic motivation (INLEM; e.g., "I would accept paying 10% more

taxes to pay for an environmental cleanup program"), and 4) internal locus of control-individual recycling efforts (INLIR; e.g., "Recycling is too much trouble"' reverse-scored). Items were rated on a scale from 1 (*strongly disagree*) to 9 (*strongly agree*). See Table 1 for more information about these subscales.

Pro-environmental behaviors (PEBs). In Session 1, participants' initial level of PEBs was measured with the Pro-Environmental Behaviors Scale (PEBS; Markle, 2013), a 19-item measure of four domains of pro-environmental behaviors: conservation, environmental citizenship, food, and transportation. The wording of the questions was altered so that participants rated their behavior in the past week. An example of a conservation item is "How often do you cut down on heating or air conditioning to limit energy use?", an example of an environmental citizenship item is "How frequently do you watch television programs, movies, or internet videos about environmental issues?", an example of a food item is " During the past week have you decreased the amount of beef you consume?", and an example of a transportation item is "During the past week how often have you walked or cycled instead of driving?" I added an additional item "How often do you bring bags with you when shopping so you do not need to use plastic or paper bags?". Most items were rated on a 1(*never*) to 5 (*always*); some items had different anchor labels or had to be recoded. After recoding, all items were on a scale from 1(*low*) to 5 (*high*).

A different measure was used in S2, S3, and S4 based on a measure by Hartig et al. (2007). Participants read "We would like to know about other things you may have done during the past week. Think about what you did in the last week, including today. Please rate the frequency of each behavior listed below". Items not related to the environment were embedded in this questionnaire to make it less obvious that the study was strictly about environmental

behaviors. Some filler items were “cooked a meal at home”, “spent time doing something you really enjoy”, and “waited until the last minute to complete a difficult task”. Participants rated a total of 31 pro-environmental behaviors, using the scale 1 (*not at all*) to 6 (*five times or more*) or N/A. More information about scale averages are presented in Table 2. In addition, exact items and means and standard deviations of each item are presented in Table 3.

Office of sustainability weekly update. At S1, S2, and S3 participants read

> “UGA has an Office of Sustainability, whose mission is to coordinate, communicate, and advance sustainability initiatives at UGA in the areas of teaching, research, service & outreach, student engagement and campus operations. Each week UGA's Office of Sustainability sends out an email to inform students about sustainability initiatives and events happening at UGA and in the Athens local community.”

They were asked if they wanted to be signed up to receive this update and could select 1) yes, 2) already on the list, and 3) no. Participants who indicated ‘yes’ were asked to give their email so they could be added. Emails were added to the listserv every Friday, so that participants could receive the weekly emails that are sent out every Monday. At S1, eight people indicated they were already on this listserv (7.14%). About one fourth of the sample wanted to sign up for the listserv at S1 (25.96%). At S2, seven participants indicated they wanted to be added, with 17 indicating they were already on the list, and 69 participants indicating they did not want to be added to the list. At S3, three participants wanted to be added, 22 were already on the list, and 64 did want to be added. In sum, as a result of participating in the study, a total of 37 participants now receive a weekly update about sustainability.

Additionally, the email software used to send out the weekly emails (MailChimp.com) allows the tracking of whether listserv email users open the email each week. At the time of data

collection I was an intern at the Office of Sustainability and had access to these records. A research assistant assessed whether or not participants who signed up for the listserv emails opened the email each week, depending on when they were added to the listserv (e.g., after S1, S2, or S3). Results have not been conducted yet; thus, this data is not discussed further.

Behavior condition. During S1, participants were randomly assigned to either the *sustainable* or *control* condition. Of the 110 participants, 43.64% were in the control condition and 56.36% were in the sustainable condition. Participants in both conditions first read "We are interested in goals that you are currently pursuing now and in the next few weeks. Think about some of the goals you are pursuing this semester. List them below. List as many as you wish." Then, participants in the *sustainable* condition read:

> "One thing we will ask you to do in this study is to be consistent in one behavior that will benefit/not harm the environment. Right now, think about what you currently do to benefit/not harm the environment. For the next 7 days, we would like you to **complete a task that you do not already do** in your daily or weekly routine. This task should be something that you can realistically do within the next 7 days. It should be as specific as possible. Below is a list of tasks to choose from. If you already do everything that is listed or would like to come up with your own task, you may do so too. What would you like to do?"

Participants were offered the following choices: 1) eat less meat one day or more per week, 2) every shower is 5 minutes or less of running water, 3) bike, bus, or walk to campus one day or more per week, 4) bring and use a reusable bag when shopping, 5) recycle all plastics, paper, glass, and metal, 6) unplug your electronics (TV, computer, chargers, coffee makers, lamps, etc.) when you're not using them, 7) compost all of your organic waste (e.g., vegetables, fruit cores),

8) flush toilets in place of residence less often to conserve water, and 9) other [enter task]. After their choice they were asked to type the task they chose. Figure 1 shows the breakdown of tasks participants chose in the sustainable condition. As shown in Figure 1, almost a third of participants nominated to eat less meat one or more day per week, and a fourth of participants nominated to bring a reusable bag when shopping.

Participants in the *control* condition read:

> "One thing we will ask you to do in this study is to be consistent in one behavior for one of your goals. Right now, think about one of your goals, and the things that you need to do to reach your goal. For the next 7 days, we would like you to **complete a task** for one of your goals. This task should be something that you can realistically do within the next 7 days. It should be as specific as possible. What would you like to do?"

Participants were asked to type the task they chose to complete. Examples of tasks chosen in the control condition are 'studying 30 mins extra', 'eating fruits or vegetables with every meal', 'take a full length practice MCAT', and 'read two chapters of my book that is not for school'.

Implementation intention. After participants in both conditions chose a task to complete during the upcoming week (S1), they made an implementation intention in order to maximize the likelihood of completing the behavior (Gollwitzer & Sheeran, 2006); participants also made an implementation intention in S2 and S3. Although high commitment to a goal is important for goal pursuit (Fishbach, Zhang, & Koo, 2009) strong commitment does not ensure goal attainment (Gollwitzer & Oettingen, 2013). Implementation intentions help people attain their goals by defining when, where, and how they will behave in the future (Gollwitzer, 1999). Forming implementation intentions for a new behavior has been shown to increase the likelihood of forming new habits, and these effects can be long-lasting. For instance, individuals assigned to

form implementation intentions for recycling at work were more likely recycle old paper and cups, even 2 months after the beginning of the study (Holland, Aarts, & Langendam, 2006).

Participants were asked to be as specific as possible and to type where they will complete the task, when they will complete the task, and how they intend to complete the task. They also indicated their expectations about completing the task in the next week by rating five items using the scale 1 (*do not agree*) to 9 (*fully agree*). The task was embedded into the questions so it was clear which task they were being asked about. The items were "I feel committed to complete this task", "I feel I have to complete this task", "Such tasks, like [task], are easy for me", "I think I'll find the time to do [task]", and "This task doesn't seem to be difficult".

Demographic information. Participants were asked their age, sex, race, fluency in English, year and major at UGA, and whether they are vegan, vegetarian, pescatarian, or other and why.

Self-report of past behavior of nominated task. In S2, S3, and S4, participants completed a modified version of a Timeline FollowBack (TLFB; Sobell & Sobell, 1992), a measure used in research studies for individuals to track past drug use (e.g., alcohol and cigarettes). First, participants were asked to type the task they listed from Session 1, which allowed their text response to be entered in subsequent questions. Participants answered one question asking if they completed or tried to complete the task (yes, no). If yes was selected, they then were asked the % of the task they felt they achieved for that day (using a scroll bar with anchors of 0% to 100%). They were asked these two questions, starting with 'today' and then for 'yesterday', and so on. The actual date they were recalling for was embedded in the survey to help with recall. After recounting on the past 8 days (which included the day of the survey), they could type any further information about their experiences with the task in the past week if they choose to do so.

Pro-environmental behavior (PEB) in the lab at S4. Most of the current study relies on self-report, so measuring actual behavior in the lab was included in S4. Participants read:

> Now at this time, you have the opportunity to learn about what sustainability means and ways that sustainable solutions are being implemented at UGA and in Athens. The Office of Sustainability at UGA has developed a learning tool, a narrated PowerPoint that provides an introduction to sustainability. The narrated PowerPoint takes about 15 minutes to watch and you can watch it right now. Are you interested in completing this? Please briefly explain why you chose the answer you did.

The module was created by me, students, and staff at UGA's Office of Sustainability. The module starts off with a brief history and definition of sustainability and the three main spheres (social, ecological, economic). Then, definitions of terms related to each sphere are introduced, such as ecosystem services and cradle to cradle. In addition, examples of sustainable solutions at the international and local scale are introduced. Last, the module ends with ways students can get involved in sustainability events and initiatives happening in Athens, GA. About one-fourth (28.57%) of participants at S4 chose to watch the module. See Appendix (B) for more information about this learning module.

Political orientation. Participants completed a 1-item measure at the end of S4: "We hear a lot of talk these days about 'liberals' and 'conservatives'. Here is an 11-point-scale on which people's political views are arranged from extremely liberal to extremely conservative. Where would you place yourself on this scale 1(*extremely liberal*) to 11 (*extremely conservative*)?" (based on Kroh, 2007). On average, participants were moderate in political orientation (M = 5.94, SD = 2.75).

CHAPTER 4

RESULTS

Analytic Strategy

Longitudinal analyses allows for measuring 1) intra-individual change, examining how the same individuals change throughout the study, and 2) inter-individual differences in intra-individual change, examining factors that influence differences among individuals in how they change over time (Preacher, Wichman, MacCallum, & Briggs, 2008; Raudenbush & Bryk, 2002). The analyses I conduct focus on inter-individual differences in intra-individual change. My hypotheses and exploratory research questions were tested using hierarchical linear modeling using HLM software (Raudenbush, Bryk, & Congdon, 2010), structural equation modeling (SEM) in Mplus (Muthén & Muthén, 1998- 2012), and SAS and the PROCESS macro (Hayes, 2012).

Aims 1, 2, and 4 (H1, H2, H5, H6, H7, ERQ3, ERQ4) were tested in HLM. Two data files in SPSS were created, one for level-1 variables and one for level-2 variables. In the level-1 file were the outcome variables (EI, PEBs) and time (in days: 0, 7, 14, 21). The level-2 variables were condition (sustainable, control) and the individual difference measures. Longitudinal analyses in HLM require level-1 data to be transformed from wide-format to long-format. Data for each individual was organized into a long format data set, which means each person has a row for each piece of data. All analyses in HLM used raw data (uncentered) and fixed effects. Results are reported based on final estimations of fixed effects. Results with robust standard errors should be reported when the sample size of level-2 observations is at least 100 (Cheong,

Fotiu, & Raudenbush, 2001). HLM does not use data for participants if there are any missing outcome data points. Additionally, because complete data with the primary outcome variables (EI and PEBs) was available for 76 to 75 participants (depending on variable), results with robust standard errors were not used.

Aim 3 (H3, H4, ERQ1) was examined in Mplus and in SAS (ERQ2). Structural equation modeling relies on regression techniques and is a general, powerful multivariate technique that offers many benefits over traditional multiple regression models. Some advantages of using SEM include measuring both measurement and structural models, testing multiple dependent variables in one model, and more flexible assumptions (e.g., error terms are not assumed to be zero). Longitudinal data analysis is well suited for SEM analyses. Like HLM, Mplus drops participants from analyses that do not have complete data on the outcome variable.

The data for Mplus was prepared by first using observed variables as indicators. Because of the small sample size and large number of parameters to be estimated, the model was not identified. Two options to consider were parcels and mean level data. Parcels offer a way to use groups of individual items as indicators of latent factors (Bandalos, 2002). There are both pros and cons to using parcels (Little, Rhemtulla, Gibson, & Schoemann, 2013); parcels tend to reduce model complexity by reducing the number of indicators of a latent factor (Nasser & Takahashi, 2003). However, parceling individual items may produce biased estimates of model parameters (Bandalos, 2002). Thus, I decided to use mean level indicators in all analyses.

Hypotheses 3 and 4 were tested using latent growth modeling (LGM). A latent growth model allows the examination of how change in one variable affects change in another variable. Latent growth models use a structural regression (SR) method of testing longitudinal data. A SR model addresses both measurement and structural models. Latent growth models require a

continuous dependent variable measured on at least three different times, the same construct is measured during each time, and the data for all cases must have the same intervals (Duncan, Duncan, Strycker, Li, & Alpert, 1999; Kline, 2011). All of these requirements were met in the current study. When conducting a latent growth model with one variable, two latent factors are estimated: 1) initial level (intercept) and 2) linear change (slope). The initial level is akin to an intercept in a regression equation. In the models I used, the unstandardized factor loadings are fixed to 1. For the linear change latent factor, each factor loading was fixed to a value to model a linear trend (i.e., 0, 1, 2, 3). If there is change in one variable then one can model whether change in one variable predicts change in another variable.

ERQ2 was examined using SAS and the PROCESS macro (Hayes, 2012). Specifically, I tested whether the effect of change in environmental identity (from S1 to S2) on environmental behaviors at S2 was mediated by commitment to behaving environmentally.

Environmental Identity (EI) Over Time

The following analyses rely on a sample size of 76. First, environmental identity (EI) at all four time points was plotted for each participant to examine participants' trajectories. As shown in Figure 2, there were many kinds of patterns of EI over the course of the study. Before testing H1, I examined whether there was a change in EI over time, ignoring condition. To examine whether there was a linear effect of time, EI was entered into the model as the outcome variable and time (in days) was entered as the predictor variable. Environmental identity did change over time, $B = -8.00 \times 10^{-3}$, $t\ (227) = -2.77$, $p = .006$; participants showed decreasing levels of environmental identity over the course of the study.

Next, I tested whether random assignment to condition (sustainable or control) affected change of environmental identity (EI) over time, hypothesizing that people in the sustainable

condition would show a greater change in EI over time (H1). To examine the linear effect of time moderated by condition, time (in days) was entered as the predictor variable and condition (sustainable=1, control=0) was added as a level-2 variable. Results showed environmental identity did differ at baseline (S1) between participants in the sustainable (vs. control) condition, t (74) = 2.01, p = .049. Condition did not lead to differences in EI over time, t (226) = 0.75, p = .453. As shown in Figure 3, both participants in the sustainable and control conditions showed similar slopes. Thus, H1 was not supported.

Pro-Environmental Behaviors (PEBs) Over Time

The sample size for the following analyses was 75. First, PEBs at S2 to S4 were plotted for each participant to examine participants' trajectories. As shown in Figure 4, the two main patterns that exist are small or no change in PEBs over time and increases around S3 and then decreases at S4. Note that only S2 to S4 were modeled because PEBs measuring during S1 were gathered with a different measure. Before testing H1, I examined whether there was a change in PEB over time, ignoring condition. Results showed PEBs remained the same from S2 to S4, $B = 7.62 \times 10^{-4}$, t (149) = 0.22, p = .824.

Next, I tested H2, which stated that people in the sustainable (vs. control) condition would show a greater change in PEBs over time. As shown in Figure 5, condition did not affect the influence of time on PEBs, $B = 3.79 \times 10^{-3}$, t (148) = -0.55, p = .583. But, the intercepts of the lines did differ, with people in the sustainable condition reporting engaging in more PEBs from S1 to S2 than people in the control condition, t (73) = 2.01, p = .049. Although PEBs at S2 differed based on condition, amount of PEBs completed from S2 to S4 did not differ based on condition. Overall, H2 was not supported.

Impact of Condition on PEB in Lab at S4

Although not a main hypothesis of the study, I was interested in the effect of condition on pro-environmental behavior (PEB) in the lab at S4. A logistic regression was conducted with the outcome variable of choosing to watch the learning module during S4 based on condition (sustainable vs. control). There was an effect of condition on choosing to learn about sustainability, $B = 1.02$, χ^2 Wald = 3.88, $p = .049$, Odds Ratio (OR) = 2.78, 95% CI [1.01, 7.67]. The odds ratio of 2.78 suggests that participants in the sustainable condition are 2.78 times more likely to choose to learn about sustainability compared to participants in the control condition. In addition, a probability estimate can be calculated by taking the odds ratio and dividing it by 1+ OR: 2.78/3.78 = .7354. Thus, people in the sustainable (vs. control) condition have a 73.54% chance of choosing to learn more about sustainability.

Change in PEBs Predicting Change in EI

Hypothesis 3 tested whether change in PEBs predicted changes in EI. Because condition did not affect change in environmental identity (EI) over time (H1) nor did condition affect pro-environmental behaviors (PEBs) over time (H2), I did not examine the role of condition. In addition, the model only includes participants with full data on PEBs from S2 to S4. I conducted a mean-level latent growth model (LGM) to determine whether there was change over time in PEBs, which should replicate the results from HLM—that there was not a change in PEBs over time. The model fit for the data was decent, $\chi^2 (1) = 0.82$, $p = .37$, RMSEA < 0.001, CFI = 1.00, TLI = 1.01, SRMR = 0.02. The results in Mplus showed the same pattern of results as when I ran the same model using HLM: the slope was not statistically different from zero, $B = -0.005$, $SE = 0.03$, $p = .87$. As shown in Figure 6, there was not a statistically significant covariance of initial level of PEBs (at S2) and linear change of PEBs (from S2 to S4), $B = -.005$, which shows PEBs

at S2 did not predict a linear change in PEBs. Although not significant, the value is negative, suggesting a higher level of PEBs would show steeper linear decreases of PEBs over time.

Because there was not a change in PEBs over time, it did not make sense to continue to predict change in EI from change in PEBs. One thing to note on this model in Figure 6 is that the residual variance (error) for PEBS4 was negative. There are many reasons why this could occur, one in particular being small sample size. One way to deal with this issue is fixing the residual variance to zero (Muthén, 1999). After setting the residual variance for PEBS4 to 0, the model showed very similar results [χ^2 (2) = 0.71, p = .702, RMSEA < 0.001, CFI = 1.00, TLI = 1.01, SRMR = 0.01], as shown in Figure 7. Overall, results from the LGMs show H3 was not supported—change in PEBs did not predict change in EI from S2 to S4.

Change in EI Predicting Change in PEBs

Hypothesis 4 tested whether change in EI would predict changes in PEBs. As done for H3, I used means instead of items. First, I examined whether there was change over time in EI from S1 to S4. The results are similar to what I found in HLM; in the LGM model, there was a negative EI slope, B = -0.04, SE =.03, p = .149, but it was not statistically different from zero. Because ultimately I wanted to examine change in EI on change in PEBs, I then modeled EI from S2 to S4 (PEB at S1 was measured differently than PEBs at S2 to S4). Results showed somewhat decent model fit, χ^2 (10) = 4.128, p = .941, RMSEA < 0.001, CFI = 1.00, TLI = 1.01, SRMR = 0.02. This model showed a small, positive slope of EI from S2 to S4, B = 0.05 (SE = 0.03), p = .048. Although this result is contrary to what I found in HLM, I only modeled S2 to S4. As shown in Figure 8, there was not a statistically significant covariance between EI at S2 and change in EI from S2 to S4. The mean of the intercept value (iei) was B = 3.44 (SE = 0.12). Because there was change in EI, I then conducted a linear mean LGM of S2 to S4 with both EI

and PEBs, with change in EI predicting change in PEBs. Model fit showed decent results, χ^2 (9) = 4.62, p = .866, RMSEA < 0.001, CFI = 1.00, TLI = 1.01, SRMR = 0.04. As shown in Figure 9, EI at S2 predicted PEB at S2, but change in EI did not predict change in PEBs from S2 to S4, B = -0.22, SE = 0.403, t = -0.54, p = .587. Thus, H4 was not supported.

Change in EI Based on Initial EI and Completion Amount of Sustainable Task

I tested H5, that for people in the sustainable condition there would be a greater change in EI for people who began the study low in EI and attempted and/or completed sustainable behaviors throughout the study, using HLM. This analysis only includes participants who were in the sustainable condition (n = 40 complete cases). I regressed time, EI at S1, average completion of PEBs from S2-S4, and the product term of EI at S1 x CompletionAmount, on environmental identity. Average completion was created by averaging their ratings from 0%-100% for each session, and then creating an average of completion amounts at S2, S3, and S4. The interaction term for EI at S1 and average completion was created by multiplying the variables and was uncentered.

First, I used all time points and results showed that the effect of both initial EI and completion amount of the task did not predict different trajectories of EI over the course of the study, $B = 8.4 \times 10^{-5}$, t (116) = -0.64, p = .526. When I only model EI from S2 to S4, the results remain similar, $B = 2.8 \times 10^{-5}$, t (76) = -0.18, p = .862. Hypothesis 5 was not supported.

Change in EI Based on Identity Conflict

Hypothesis 6 was that individuals with greater (vs. smaller) identity conflict will show a decrease in EI over time. As mentioned in the measures section, identity conflict was measured by having participants list identities. Participants who listed identities related to environmentalist identity were categorized as having identities that are likely to promote them to engage in PEBs,

high facilitation of PEBs whereas participants who did not list identities related to environmentalist were coded as having *low facilitation of PEBs.* Of the people in the sustainable condition, only six participants were considered to have high facilitation of PEBs. Thus, there is not much variability in this measure. Although there was not much variability in participants' responses on this measure of facilitation, I still tested my hypothesis. Results showed individuals who listed an identity either as an environmentalist or an identity that is likely related to environmentalism had a higher level of environmental identity at S1 than individuals who did not list an environmental identity, t (38) = 6.06, $p < .001$. In terms of level of facilitation on EI over time, results show no effect of level of facilitation of PEBs on EI, t (118) = -1.02, p =.308. Hypothesis 6 was not supported.

Change in PEBs Based on Initial PEBs and Completion Amount of Sustainable Task

Hypothesis 7 is similar to Hypothesis 5. Hypothesis 7 stated that for people in the sustainable condition there would be a greater change in PEBs for people who began the study low in PEBs and attempted and/or completed sustainable behaviors throughout the study. Again, this analysis only includes participants with complete data who were in the sustainable condition (n = 40). I regressed time, PEBs at S1, average completion of PEBs from S2-S4, and PEB at S1 x AvgCompletion on PEBs from S2-S4. Results showed PEB at S1 and average amount of completion of the sustainable task throughout the study did not influence change of PEB over time, $B = 1.59 \times 10^{-4}$, t (76) = -0.56, p = .579. Thus, H7 was not supported.

ERQ 1

The main question of ERQ1 was which predictor (EI at S3 or PEB at S3) would have a larger influence on PEBs at S4? Because ultimately this manuscript examines the effect of PEBs on EI and the impact of EI on PEBs, I ran a recursive path model to examine all the effect of EI

on PEBs at every session (EI at S1 on PEB at S2, EI at S2 on PEBs at S3, EIS3 on PEBs at S4) and the effects of PEBs at S2 on EI at S3 and PEBs at S3 on EI at S4. The path model was conducted in MPlus and estimated 11 regression coefficients and 4 correlations.

Results showed decent model fit, χ^2 (13) = 21.35, p = .066, RMSEA = 0.08, CFI = 0.99, TLI = 0.98, SRMR = 0.03. The model and estimated paths are presented in Figure 10. All regression coefficients are statistically significant at the $p < .05$ level, expect for the path from EI at S2 → PEBs at S3, B = 0.05, p = .26 and PEBs at S3→ EI at S4, B = 0.001, p = .99. The recursive path model offers more insight into the relationship between EI and PEBs, showing some evidence that both PEBs predict EI and that EI predicts PEBs. PEBs at S2 predicted EI at S3, controlling for previous levels of EI (at S1 and S2) and PEBs (at S1). In addition, EI at S1 predicted PEBs at S2 and EI at S3 predicted PEBs at S4 (controlling for previous levels of EI and PEBs). Thus, this model offers some evidence that supports the main idea of the current study—that both EI and PEB influence one another.

Examining the standardized values shows that the effect of E1 at S3 had a significant but smaller effect on PEBs at S4, β = 0.14, p = .012, than PEBs at S3, β = 0.83, $p < .001$. Thus, the effect of PEBs at S3 was a greater predictor of PEBs at S4 than EI at S3.

ERQ 2

I explored whether commitment to the environment mediated the relationship between change in environmental identity from S1 and S2 and amount of pro-environmental behaviors reported at S2. Change in environmental identity was created by subtracting EI at S1 from EI at S2. Then, in SAS and using the PROCESS macro, I regressed change in EI from S1 to S2 on PEB at S2, regressed change in EI from S1 to S2 on PEB at S2, and regressed commitment at S2 on PEB at S2. There was not a statistically significant direct

effect of change in EI from S1 to S2 on PEB at S2, *B* = 0.11, *SE* = 0.10, 95 % CI [-0.09, 0.32]. The indirect effect was statistically significant, *B* = 0.19, *SE* = 0.07, 95 % CI [0.08, 0.35], as zero was not in the 95% confidence interval. Thus, participants who had a greater change in EI from S1 to S2 engaged in more PEBs at S2 because they felt a higher commitment to the environment at S2.

The same mediation model was conducted but controlling for PEB at S1. Results were somewhat similar. With the covariate there was a direct effect of change in EI from S1 to S2 on PEBs at S2, *B* = 0.19, *SE* = 0.09, 95% CI [0.02, 0.36]. The indirect effect was marginally statistically significant, *B* = 0.06, *SE* = 0.05, 95% CI [-0.004, 0.18], as zero is just barely present in the confidence interval. Thus, the evidence supports the idea that commitment to the environment is an important link between EI and PEBs. ERQ2 was supported.

ERQ3

Next, ERQ3 was examined for participants only in the sustainable condition and modeled whether environmental identity was moderated by individual differences such as biospheric values, attitudes about the natural environment, and climate change beliefs. I conducted separate models regressing time (level-1) and each individual difference measure (level-2) on EI. In total, this equated to 20 models. Table 5 displays the results of each model, first with the effect of the individual measure on the intercept of the predicted line and then in the third column, the effect of the individual difference measure on the slope of the predicted line. Besides the values of egoism and hedonism from Steg et al. (2012), all individual difference measures show a statistically significant effect in EI at S1. For all measures (expect anthropocentric and apathy attitudes), there was a positive relationship between level on the individual difference measure and level of EI at S1.

In terms of individual differences moderating the slopes of EI, results show effects of egoism values, connectedness to nature, ecocentric attitudes, and anthropocentric attitudes and a marginal effect of biospheric values. Again, these results refer only to participants in the sustainable condition. The significant and marginal effects were plotted for +1 and -1 SDs from the mean. As shown in Figure 11, participants low in egoism tended to remain the same in EI over time, whereas participants high in egoism tended to decrease in EI over the course of the study. As shown in Figure 12, participants low (vs. high) in biospheric values had a lower EI but tended to remain stable over the course of the study, whereas those high in biospheric values decrease in EI; Figures 13 and 14 shows similar patterns but with connectedness to nature and ecocentric attitudes, respectively. Individuals higher in anthropocentric attitudes (think of the environment has being important for human benefit) actually showed an increase in EI over the course of the study, whereas individuals low on anthropocentric attitudes had about the same level of EI.

The role of political orientation on EI over time. Another exploratory question was to examine how one's political orientation might influence environmental identity. Political orientation was added to the study late (after a week of running the study), and so it was measured at S4. Although not ideal to use this measure as a predictor of EI over time, I do not expect political orientation to change much over the course of three weeks. When modeling whether political orientation relates to differences in trajectories of EI over time, there was a statistically significant effect of political orientation, t (217) = -2.09, p = .038. As shown in Figure 16, participants who were more liberal did not change in EI over the course of the study; participants who were more conservative decreased in EI over the course of the study.

ERQ4

I examined moderators of the effect of time on PEBs. The same approach was taken to examine ERQ4 as in ERQ3, the only two differences being 1) the outcome variable was PEBs, and 2) I only modeled S2 to S4 because PEBs were measured differently at S1. As presented in Table 6, many of the individual differences had an effect on PEBs at S2. People higher (vs. lower) on biospheric values, belief that humans and nature are integrated (NEP scale), commitment to the environment at S1, subscales of ECOL, connectedness to nature, concern for the environment, and perceptions about climate changes reported higher amounts of PEBs at S2. None of the individual differences moderated the effect of time on PEBs from S2 to S4.

CHAPTER 5

DISCUSSION

The results of a three week longitudinal study on environmental identity and pro-environmental behaviors showed that individuals asked to complete a new pro-environmental behavior (vs. a personal goal-related task) did not report higher environmental identity over the course of the study nor greater amounts of a variety of sustainable behaviors. However, one specific pro-environmental behavior—choosing to learn about sustainability—was more likely to occur for individuals who were asked to complete a sustainable task over the course of the study. Thus, being asked to complete a new pro-environmental behavior for three continuous weeks seems to translate into higher environmental citizenship behavior 3 weeks later.

In addition, ignoring condition (*sustainable/control*), participants' level of environmental identity decreased over the course of the study and amount of pro-environmental behaviors engaged in remained stable. One possible reason for a decrease in environmental identity may be due to motivation. Participants who were more intrinsically motivated may have become less so because they were asked to complete behaviors that were related to behaviors they already did. Thus, based on findings from the overjustification effect (Lepper, Greene, & Nisbett, 1973), they may have inferred over the course of the study that their sustainable behavior is not because of having a high environmental identity but due to external concerns (i.e., completing the study). Motivation toward the environment was not measured in the current study, but will be measured in future studies with the Motivation Toward the Environment Scale (MTES; Pelletier et al., 1998). The MTES measures six kinds of motivation, relying on research from Self-

Determination Theory (Deci & Ryan, 1985). Individuals high in autonomous motivation are more likely to engage in PEBs, whereas individuals high in amotivation tend to not engage in PEBs (Pelletier et al., 1998). Future research should examine the role of motivation toward the environment on change in environmental identity.

There were some moderators of the effect of time on environmental identity: egoistic values, biospheric values, connectedness to nature, ecocentric attitudes, and anthropocentric attitudes. The pattern of results was similar for biospheric values, connectedness to nature, and ecocentric attitudes, showing that participants high in the individual difference measure showed a decrease in environmental identity over the course of the study whereas individuals low on the measure remained at the same levels of environmental identity. I would have expected participants high on variables that relate positively to environmental identity to have a positive effect on time or no effect on time. Instead, it was participants who value protecting the environment (biospheric values), feel connected to the natural world (connectedness to nature), and who think nature is important for its own sake (ecocentric attitudes) that reported a decrease in environmental identity over the course of the study. It is important to reiterate that these analyses only refer to participants who were in the sustainable condition. Thus, it may be that participants who started the study high on these variables realized that they could have done more to be an environmentalist and thus there was a discrepancy between their actual and ideal self or actual and ought self (Higgins, 1987). Or, participants may have experienced cognitive dissonance and thus changed their attitude about themselves as environmentalists (Festinger, 1954). Mood and arousal were not measured in the current study, so these accounts cannot be tested with the current data. It is important to note that although individuals high in biospheric values, connectedness to nature, and ecocentric values showed a decrease in environmental

identity over the course of the study, they still remained at higher levels of environmental identity at S4 compared to individuals low on the measures.

Participants high and low in egoism began the study with equal levels of environmental identity but diverged over the course of the study. Specifically, participants high in egoism showed a decrease in environmental identity over the course of the study whereas participants low in egoism showed stable levels. Participants who value things such as wealth and authority maybe also have identities related to these values. For instance, materialism tends to be in conflict with sustainability (Myers, 2013). Thus, they may have experienced greater conflict with environmental identity throughout the study and subsequently began viewing themselves lower on environmental identity. Additionally, individuals high on anthropocentric attitudes increased in environmental identity over the course of the study, whereas individuals low on anthropocentric attitudes remained stable in their sense of environmental identity.

Political orientation also influenced environmental identity over time. Participants with a liberal political orientation did not change in environmental identity over the course of the study, but participants with a conservative political orientation showed a decrease in environmental identity over the course of the study. Previous work has shown individuals who identified as Democrats were less likely to act sustainably after previously completing a sustainable act, and this relationship was mediated by environmental identity (Truelove, Yeung, Carrico, Gillis, & Raimi, 2016). Thus, engaging in a small act lowered environmental identity for people who affiliate as a Democrat. Although this finding of decreased environmental identity in Democrats by Truelove et al. (2016) is contrary to the current results, the current study shows change over time in identity. Furthermore, the current study was conducted during the beginning of President Donald Trump taking office. Because of his proposed budget cuts to many organizations that

help to protect the natural environment and because liberals are more concerned with climate change (Pew Research Center, 2016), it may be that participants who identify as liberal in the current study did not decrease in environmental identity because it was salient that their worldviews and identity were being threatened. As stated previously, these results should be taken with caution since political orientation was measured at S4.

Moreover, structural equation models revealed that there was not a change in PEBs predicting change in EI or vice versa. Part of this lack of findings is due to PEBs not changing over the course of the study; there was a negative change in EI from S1 to S4. Although *change* (in PEBs, EI) did not predict *change* (in EI, PEBs), evidence does support that PEBs do influence EI at a later time point and vice versa. For instance, level of environmental identity at S1 positively predicted amount of PEBs at S2, controlling for level of PEBs at S1. Environmental identity did not predict PEBs at S2 but positively predicted PEBs at S3. Pro-environmental behaviors also showed results of predicting environmental identity at certain time points: PEBs at S2 predicted EI at S3 but PEBs at S3 did not predict EI at S4. It is interesting that PEBs and EI show opposite patterns based on session. It may be that one week is too short of a time frame for the relationship between environmental identity and pro-environmental behaviors to remain continuously reciprocating.

In addition, environmental identity may be defined based on the cultural conception of what it means to be an environmentalist, but a related, distinct conceptualization is *environmental striving*, based on Emmons's (1986) goal striving construct (Kashima, Paladino, & Margetts, 2014). Kashima et al. (2014) define environmental striving "as the extent to which the maintenance and improvement of the natural environment is a person's important personal goal in life" and as closely related to intrinsic motivation. Thus, participants may differ in how

they actually define what it means to an environmentalist. Commitment to the environment may be an underlying distinction between a 'mundane environmentalism' (from Kashima et al., 2014) and a deeper sense of environmentalism. Commitment to the environment played an important role in the relationship between environmental identity and pro-environmental behaviors in the current study. The change in identity from S1 to S2 predicted amount of pro-environmental behaviors at S2 because of a higher commitment. Commitment may be more malleable over short time spans and may in turn change environmental identity in the long-term. Moreover, all participants made implementation intentions at S1, S2, and S3, in order to increase the chances of being successful in their behavior. Although implementation intentions can help people close the gap between goal intentions and goal attainment, goal commitment moderates this effect: individuals high in commitment benefit from implementation intentions, but individuals low in commitment tend not to benefit (Gollwitzer & Oettingen, 2013). Thus, people higher in commitment to the environment may have been more likely to engage in pro-environmental behaviors. Future analyses will examine whether commitment to the environment changed over the course of the study and whether condition led to differences over time.

The current study relied on *self*-identity as an environmentalist and not on social identities. Although self-identities cannot be isolated from social contexts (Burke, 1980; James, 1890; Stryker, 1980), the current study did not examine the role of social contexts on environmental identity and pro-environmental behaviors. The physical environment and social norms may be more important than identity in some cases (Freed, 2016). In addition, social identities play a role in whether one is likely to engage in pro-environmental behaviors; individuals who have a public self-identity as an environmentalist will engage in only public

behaviors displaying their environmental identity, whereas individuals with a private self-identity as an environmentalist will engage in sustainable behaviors regardless of the social context (Brick, Sherman, & Kim, 2017).

An important finding of condition shows that being asked to complete pro-environmental behaviors over the course of three weeks (vs. a personal goal task) predicted a greater chance of choosing to learn about sustainability at S4. Thus, although being asked to complete a sustainable task did not affect the trajectory of a range of pro-environmental behaviors over the course of the study, it did predict actual behavior in the lab. It may be that the manipulation did affect behavior but that is takes time to affect people's identity and behavior. An important aspect of the current research that will be examined in the future is positive and negative spillover. Positive spillover is the idea that engaging in one behavior leads one to engage in the same or related behavior; negative spillover occurs when engaging in one behavior leads to less of the same or related behavior. Self-identity in particular seems important in positive and negative spillover effects (Nilsson et al., 2017). In future analyses, I will examine participants in the sustainable condition and determine whether there is a relationship between participants' completion of the sustainable task vs. other sustainable behaviors and whether environmental identity moderates this relationship.

Some limitations of the current study include missing data and a small sample size. One way to account for missing data is to conduct a missingness imputation procedure. The level of missingness of the current data is at the person-level. However, the missing data technique for this type of missingness has not been examined thoroughly enough to determine whether it is a valid technique (Newman, 2014). Ideally, more data should be gathered to increase the total sample size. Additionally, although condition did not affect self-reported environmental identity

nor self-reported pro-environmental behaviors, it is important to note that participants in both conditions were being exposed to environmental sustainability informational influences by being in the study and being asked to think about their environmental attitudes, beliefs, and behaviors. Future research should include a more inconspicuous way to manipulate introducing new pro-environmental behaviors in individuals' everyday lives. Furthermore, the role of identity conflict as reasons individuals may not complete pro-environmental behaviors needs further examination. In the current study, a more qualitative approach is needed to better characterize someone with low vs. higher conflict between identities and conflict with environmental identity. In future studies, environmental identity conflict should be measured differently than in the current study.

CHAPTER 6

CONCLUSION

Asking individuals to complete one pro-environmental behavior they do not already do (vs. a personal goal-related task) may be one way to increase pro-environmental behaviors in the long-term. Although self-reported pro-environmental behaviors, on average, did not increase over the course of the study, participants' environmental citizenship behavior in the lab measured three weeks after the initial study session showed participants were more likely to choose to learn more about sustainability. Additionally, commitment to the environment may be an important mediator in the relationship between environmental identity and pro-environmental behaviors. Future research should further examine moderators of changes of environmental identity over time, in particular focusing on the impact of decreasing environmental identity on sustainable behavior and positive and negative spillover effects.

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Table 1

Descriptive Statistics for Individual Difference Measures (at S1)

Variable	*Mean*	*SD*	*Min*	*Max*	*Cronbach's α*	*# of Items*
Values						
Hedonic	5.37	1.24	0	7.00	.75	3
Egoistic	4.23	1.37	0	6.60	.82	5
Altruistic	5.91	1.29	0	7.00	.90	4
Biospheric	4.82	1.91	0	7.00	.95	4
Belief in Climate Change						
Belief	4.22	0.82	1.40	5.00	.92	5
Human Caused	3.78	0.93	1.00	5.00	.84	4
Negative Consequences	3.93	0.71	2.00	5.00	.93	4
Self-Efficacy	3.33	0.84	1.00	5.00	.87	4
Intentions to Act	3.34	0.96	1.00	5.00	.94	4
Environmental Locus of Control (ELOC)						
EXLBA	7.72	1.17	4.50	9.00	.84	4
EXLCS	6.46	1.51	3.00	9.00	.70	2
INLEM	5.47	1.90	1.00	9.00	.82	3
INLIR	7.19	1.67	1.00	9.00	.90	3
Ecocentric and Anthropocentric Attitudes Toward the Environment						
Ecocentric	3.84	0.49	2.42	4.67	.74	12
Anthropocentric[a]	2.99	0.52	1.83	4.42	.74	11
Apathy	2.26	0.59	1.33	3.89	.83	8
New Ecological Paradigm (NEP)	3.59	0.63	1.80	5.00	.87	15
Concern for Environment	3.36	0.85	1.50	5.00	.80	4
Connectedness to Nature (CNS)	3.32	0.64	1.64	4.79	.84	14
Political Orientation	5.94	2.75	1.00	10.00	n/a	1

Note. [a]Two items from the anthropocentric subscale were not related to the overall reliability index and were not included in the average.

Table 2

Descriptive Statistics for Outcome Variables and Mediator Variable

Variable		*N*	*Mean*	*SD*	*Min*	*Max*	*Cronbach's α*
Environmental Identity (EI)							
	S1	110	3.87	1.10	1.34	6.66	.96
	S2	93	3.43	1.24	1.00	6.65	.97
	S3	90	3.49	1.17	1.00	6.46	.96
	S4	84	3.55	1.27	1.00	6.39	.97
Pro-Environmental Behaviors (PEBs)							
	S1[a]	110	2.86	0.55	1.75	4.10	.77
	S2[b]	93	2.72	0.76	1.34	4.52	.87
	S3[b]	89	2.76	0.75	1.45	5.31	.89
	S4[b]	84	2.76	0.74	1.62	4.65	.89
Commitment to the Environment							
	S1	110	5.67	1.85	1.00	9.0	.96
	S2	93	5.19	1.85	1.43	9.0	.96
	S3	89	5.34	1.75	1.64	8.86	.97
	S4	84	5.40	1.90	1.29	8.79	.97

Note. [a]PEBs at S1 were measured with a different measure than S2-S4; [b] two items (ate fish; ate dairy or eggs) had a low or negative relationship to the scale average so they were not included in the average.

Table 3

Pro-Environmental Behaviors (PEBs) Measured From S2 to S4

	S2			S3			S4		
	n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Took a shorter shower than you wanted to conserve water	93	**2.66**	1.75	89	**2.73**	1.77	83	**2.88**	1.83
Brought a re-useable bag when shopping instead of using plastic/ paper bag	81	**1.70**	1.25	78	**1.71**	1.23	72	**1.82**	1.30
Saved products to recycle	93	**3.73**	2.06	87	**3.67**	1.91	84	**3.70**	1.97
Unplugged electronic devices that were not being used	93	**3.02**	1.86	89	**3.36**	1.83	84	**3.49**	1.78
Turned off the television when it was not being used	76	**4.89**	1.63	77	**4.62**	1.71	69	**4.80**	1.53
Walked to a destination instead of driving	91	**4.71**	1.71	88	**4.73**	1.62	83	**4.78**	1.69
Biked to a destination instead of driving	67	**1.16**	0.67	64	**1.27**	0.78	59	**1.14**	0.51
Paid more for environmentally-friendly products	75	**1.64**	0.97	80	**1.61**	1.10	76	**1.64**	0.99
Flushed toilet less often to conserve water	89	**1.56**	1.22	85	**1.48**	1.13	81	**1.54**	1.03
Read publications focusing on environmental issues	93	**1.39**	0.87	88	**1.58**	1.18	84	**1.54**	1.03
Recycled paper	92	**3.21**	1.88	89	**3.37**	1.79	84	**3.58**	1.84
Recycled glass	80	**2.11**	1.68	81	**2.32**	1.77	75	**2.08**	1.59
Saved hazardous waste to recycle at the appropriate place	71	**1.49**	1.29	66	**1.85**	1.62	54	**1.35**	0.99
Composted organic waste	78	**1.26**	0.81	71	**1.35**	1.00	68	**1.41**	1.10
Avoided purchasing unrecyclable containers	75	**1.48**	1.07	78	**1.50**	1.09	75	**1.52**	1.00
Bought or used biodegradable non-phosphate soaps or detergents	76	**1.25**	0.75	75	**1.33**	0.84	75	**1.37**	1.00
Watched television or movies about environmental issues	92	**1.24**	0.75	85	**1.41**	0.95	83	**1.31**	0.71
Talked to others about environmental issues	93	**1.84**	1.24	88	**1.86**	1.16	84	**1.96**	1.28
Kept containers or bags that can be re-used	92	**3.14**	1.72	88	**3.15**	1.69	82	**2.99**	1.61
Reduce use of plastic wrapping	76	**2.05**	1.52	74	**2.18**	1.67	73	**1.99**	1.38
Purchased long-lasting-items	80	**2.28**	1.38	81	**2.36**	1.49	79	**2.32**	1.26
Reduced use of paper towels	88	**2.83**	1.78	84	**2.71**	1.75	83	**2.46**	1.56
Put on a sweater instead of turning up the heat	81	**3.26**	1.86	74	**3.11**	1.84	69	**3.32**	1.82
Turned off electronics when they were not in use	93	**3.71**	1.93	89	**4.03**	1.72	84	**4.00**	1.67
Purchased organically grown food	78	**1.94**	1.48	77	**1.78**	1.31	72	**1.78**	1.14
Turned off water when brushing your teeth to conserve water	93	**4.72**	1.90	87	**4.55**	1.93	84	**4.76**	1.89
Ate beef (reverse-scored)	92	**4.15**	1.56	88	**4.34**	1.41	82	**4.49**	1.60
Ate pork (reverse-scored)	90	**4.99**	1.47	87	**4.79**	1.46	80	**5.01**	4.42
Ate poultry (reverse-scored)	93	**2.98**	1.78	88	**3.10**	1.59	83	**3.01**	1.69

Note. Items measured on scale from 1 (*not at all*) to 6 (*five times or more*); could also select N/A.

Table 4

Pearson's r Correlation Coefficients Between each Individual Difference Measure

Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1. Hedonism value	-											
2. Egoism value	.64***	-										
3. Altruism value	.40***	.28**	-									
4. Biospheric value	.34***	.25**	.63***	-								
5. NEP	.15	.10	.29**	.43***	-							
6. CNS	.31***	.11	.37***	.63***	.57***	-						
7. Commitment to Environment at S1	.26**	.13	.42***	.77***	.58***	.77***	-					
8. Ecocentric Attitude	.30**	.11	.35***	.61***	.48***	.65***	.72***	-				
9. Anthropocentric Attitude	.20*	.25**	.00	-.07	-.39***	-.20*	-.17	-.21*	-			
10. Apathetic Attitude	-.12	-.07	-.43***	-.54***	-.71***	-.44***	-.63***	-.43***	.33***	-		
11. Concern for environment	.19*	.15	.38***	.54***	.63***	.57***	.62***	.39***	-.17	-.55***	-	
12. Belief in climate change	.18	.15	.23*	.29**	.59***	.31***	.30**	.19*	-.21*	-.52***	.56***	-

Note. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$; NEP= New Ecological Paradigm; CNS=Connectedness to Nature Scale

Table 5

Moderators of the Effect of Time on EI

Variable	Effect of variable on intercept	Effect of variable on slope
Hedonism Value	t (38) = 0.99, p = .330	t (118) = -0.52, p = .605
Egoism Value	t (38) = -0.27, p = .793	t (118) = -2.64, p = .010
Altruistic Value	t (38) = 2.49, p = .017	t (118) = -0.01, p = .991
Biospheric Value	t (38) = 7.59, p <.001	t (118) = -1.91, p = .058
New Ecological Paradigm (NEP)	t (38) = 6.01, p <.001	t (118) = -0.78, p = .439
Commitment to the Environment at S1	t (38) = 10.58, p <.001	t (118) = -1.50, p = .137
External Locus of Control-Biospheric-Altruism (EXLBA)	t (38) = 5.23, p <.001	t (118) = -1.53, p = .128
External Locus of Control-Corporate Skepticism (EXLCS)	t (38) = 2.97, p = .005	t (118) = 1.08, p = .282
Internal Locus of Control-Economic Motivation (INLEM)	t (38) = 3.90, p < .001	t (118) = 1.47, p = . 143
Internal Locus of Control-Individual Recycling Efforts (INLIR)	t (38) = 2.24, p = .031	t (118) = 0.50, p = .620
Connectedness to Nature Scale (CNS)	t (38) = 8.60, p <.001	t (118) = -2.75, p = .007
Ecocentric Attitude	t (38) = 5.38, p <.001	t (118) = -3.05, p = .003
Anthropocentric Attitude	t (38) = -3.26, p = .002	t (118) = 2.16, p = .033
Apathetic Attitude	t (38) = -4.66, p <.001	t (118) = 0.26, p = .797
Concern for Environment	t (38) = 5.05, p <.001	t (118) = -1.13, p = .261
Belief in Climate Change	t (38) = 3.95, p <.001	t (118) = 0.44, p = .660
Belief Climate Change Caused by Humans	t (38) = 3.85, p <.001	t (118) = 0.95, p = .345
Belief Climate Change has Negative Effects	t (38) = 5.11, p <.001	t (118) = 0.37, p = .715
Self-Efficacy toward Climate Change	t (38) = 3.91, p < .001	t (118) = -0.75, p = .454
Intention to Act toward Climate Change	t (38) = 8.12, p <.001	t (118) = 0.52, p = .607

Note. Only includes participants in the s*ustainable c*ondition (n = 40)

Table 6

Moderators of the Effect of Time on PEBs

Variable	Effect of variable on intercept	Effect of variable on slope
Hedonism Value	t (38) = 1.88, p = .068	t (78) = -0.70, p = .485
Egoism Value	t (38) = 0.75, p = .456	t (78) = -1.13, p = .260
Altruistic Value	t (38) = 1.55, p = .129	t (78) = 0.87, p = .388
Biospheric Value	t (38) = 3.62, p < .001	t (78) = -0.84, p = .406
New Ecological Paradigm (NEP)	t (38) = 3.49, p = .001	t (78) = -0.03 p = .978
Commitment to the Environment at S1	t (38) = 3.10, p = .004	t (78) = 0.14, p = .89
External Locus of Control-Biospheric-Altruism (EXLBA)	t (38) = 3.15, p = .003	t (78) = 0.24, p = .811
External Locus of Control-Corporate Skepticism (EXLCS)	t (38) = 0.87, p = .391	t (78) = 0.89, p = .38
Internal Locus of Control-Economic Motivation (INLEM)	t (38) = 2.66, p = .011	t (78) = 0.23, p = .822
Internal Locus of Control-Individual Recycling Efforts (INLIR)	t (38) = 3.28, p =.002	t (78) = -1.04, p = .303
Connectedness to Nature Scale (CNS)	t (38) = 3.01, p = .005	t (78) = 0.54, p = .589
Ecocentric Attitude	t (38) = 3.61, p < .001	t (78) = -0.25, p = .802
Anthropocentric Attitude	t (38) = -0.68, p = .504	t (78) = -1.65, p = .103
Apathetic Attitude	t (38) = -1.98, p = .055	t (78) = -1.13, p = .261
Concern for Environment	t (38) = 2.66, p = .011	t (78) = -0.32, p = .747
Belief in Climate Change	t (38) = 3.46, p = .001	t (78) = -1.14, p = .256
Belief Climate Change Caused by Humans	t (38) = 2.80, p = .008	t (78) = 0.80, p = .427
Belief Climate Change has Negative Effects	t (38) = 2.86, p = .007	t (78) = 0.70, p = .488
Self-Efficacy toward Climate Change	t (38) = 1.75, p = .088	t (78) = 0.70, p = .490
Intention to Act toward Climate Change	t (38) = 3.62, p < .001	t (78) = 0.46, p = .648

Note. Only includes participants in the s*ustainable c*ondition (n = 40)

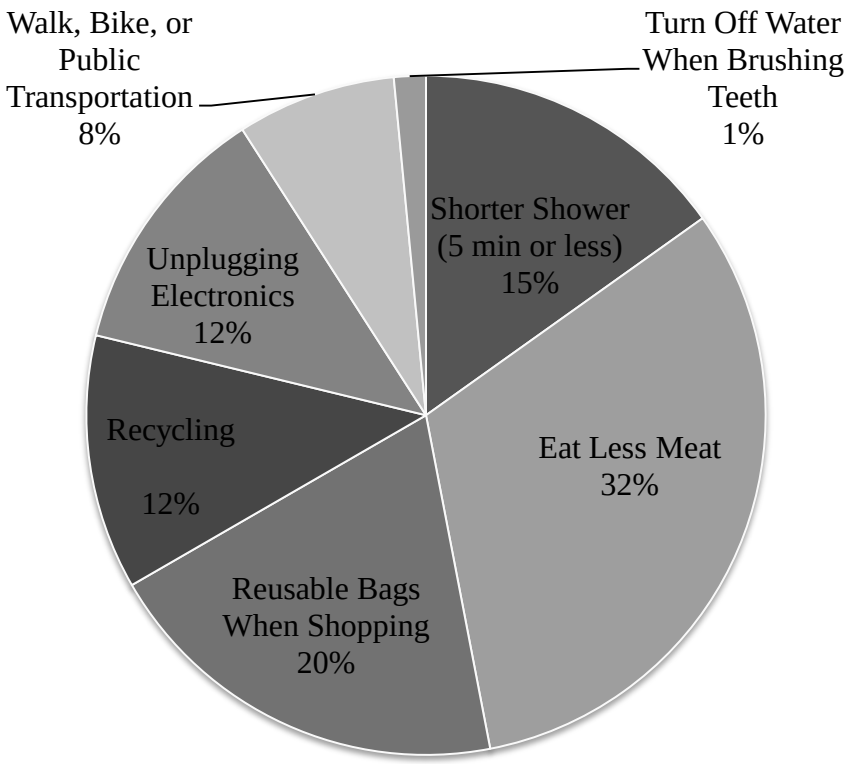

Figure 1. Tasks participants in the sustainable condition chose to complete over the course of the study.

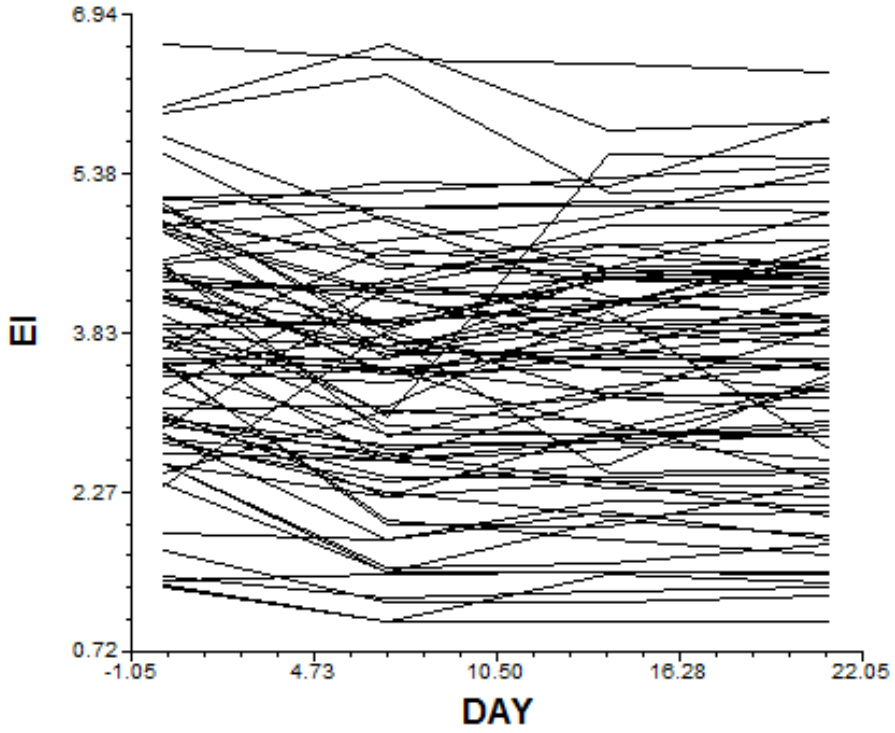

Figure 2. Trajectories of environmental identity (EI) from S1 to S4 for participants with full data (*n* = 76).

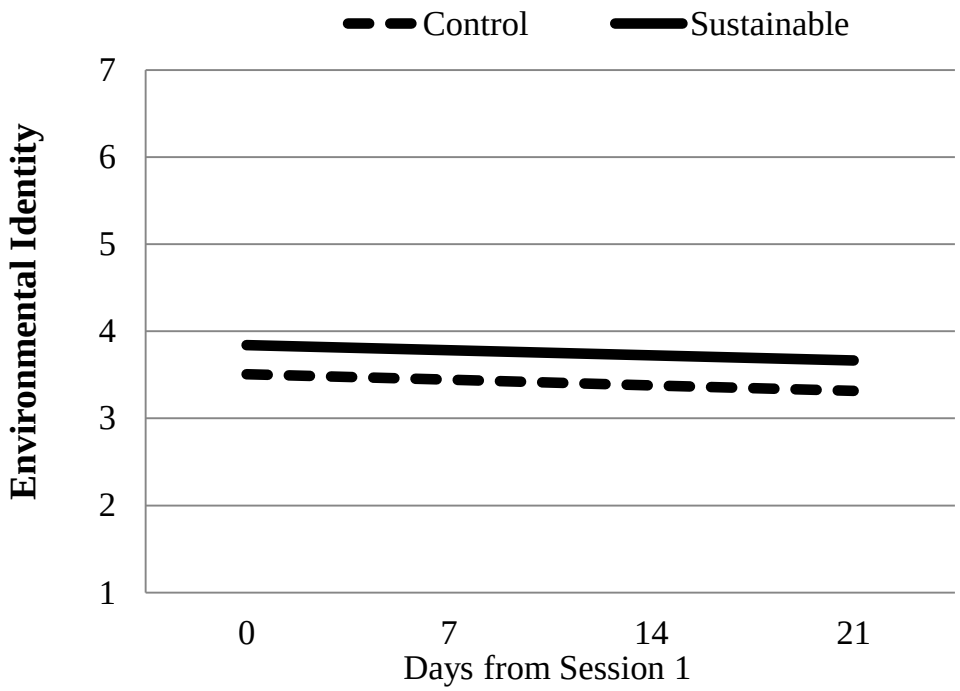

Figure 3. Non-significant effect of condition on environmental identity (EI) over time for participants with full data.

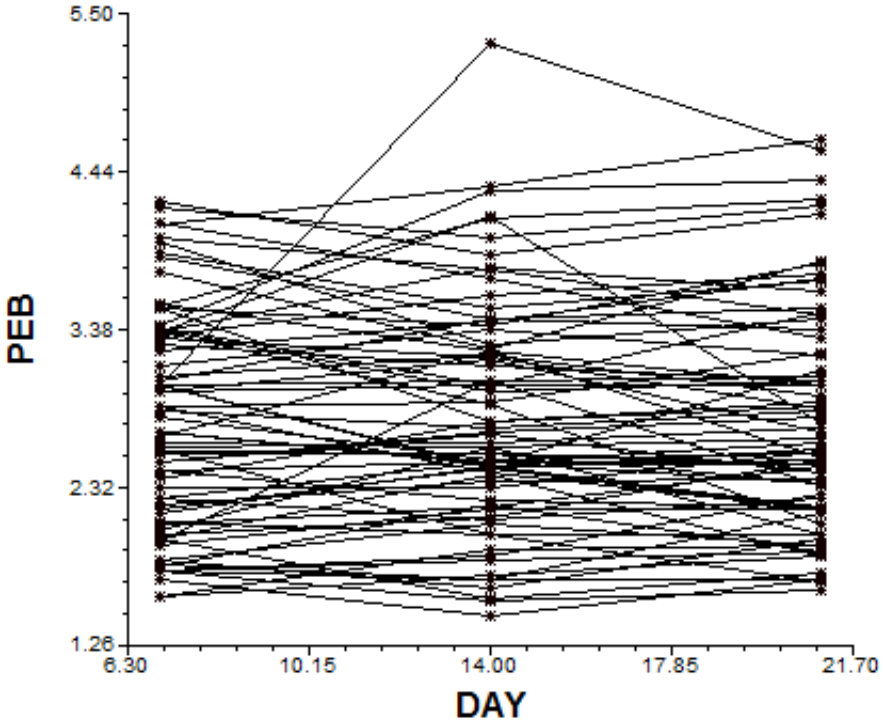

Figure 4. Trajectories of environmental identity (EI) from S1 to S4 for participants with full data (n = 76).

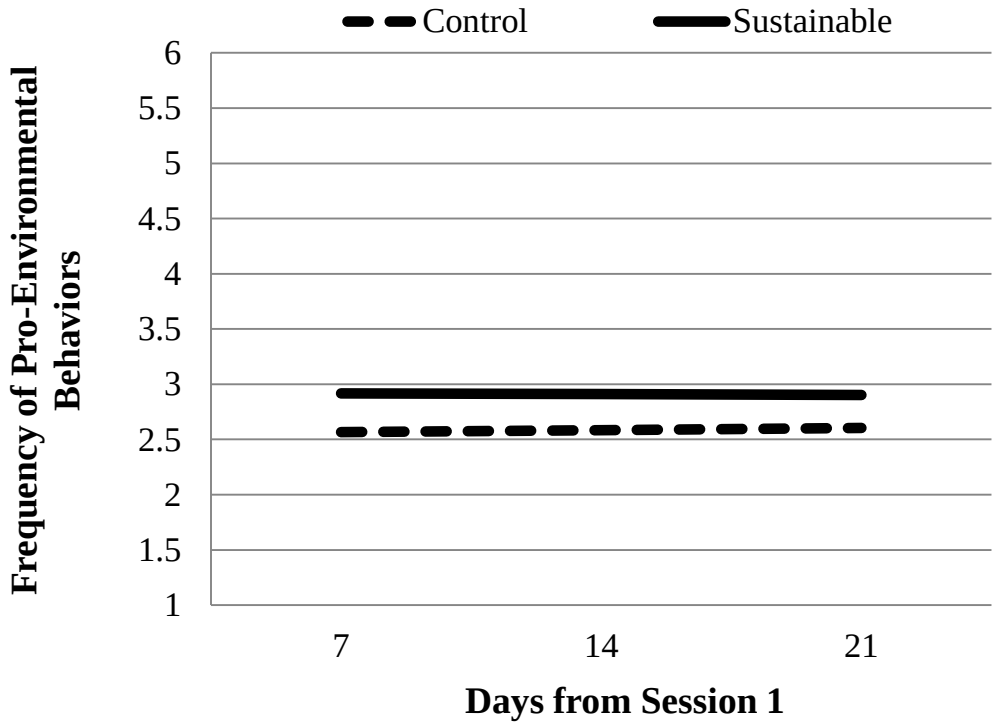

Figure 5. Non-significant effect of condition on frequency of pro-environmental behaviors (PEBs) over time for participants with full data.

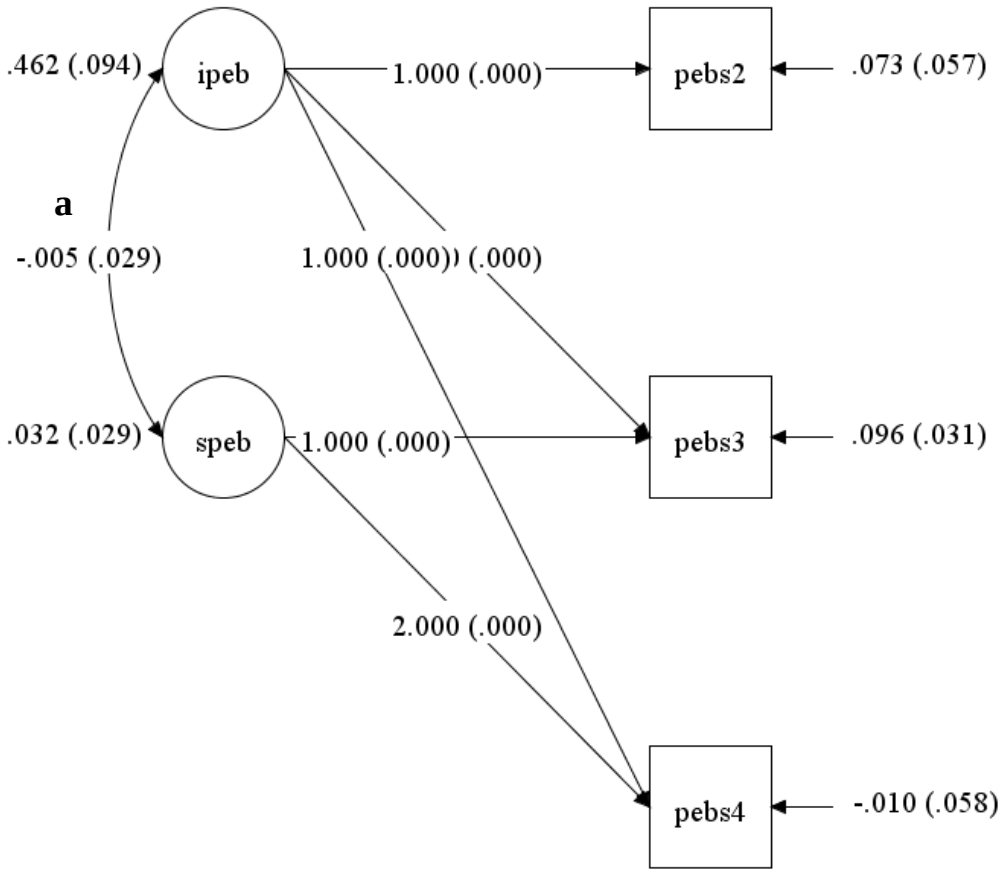

Figure 6. Latent growth model of PEBs from S2 to S4. Path **a** shows a non-statistically significant covariance of initial level of PEBs (at S2) and linear change of PEBs (from S2 to S4). Values next to latent variables and indicators represent *B (SE)*.

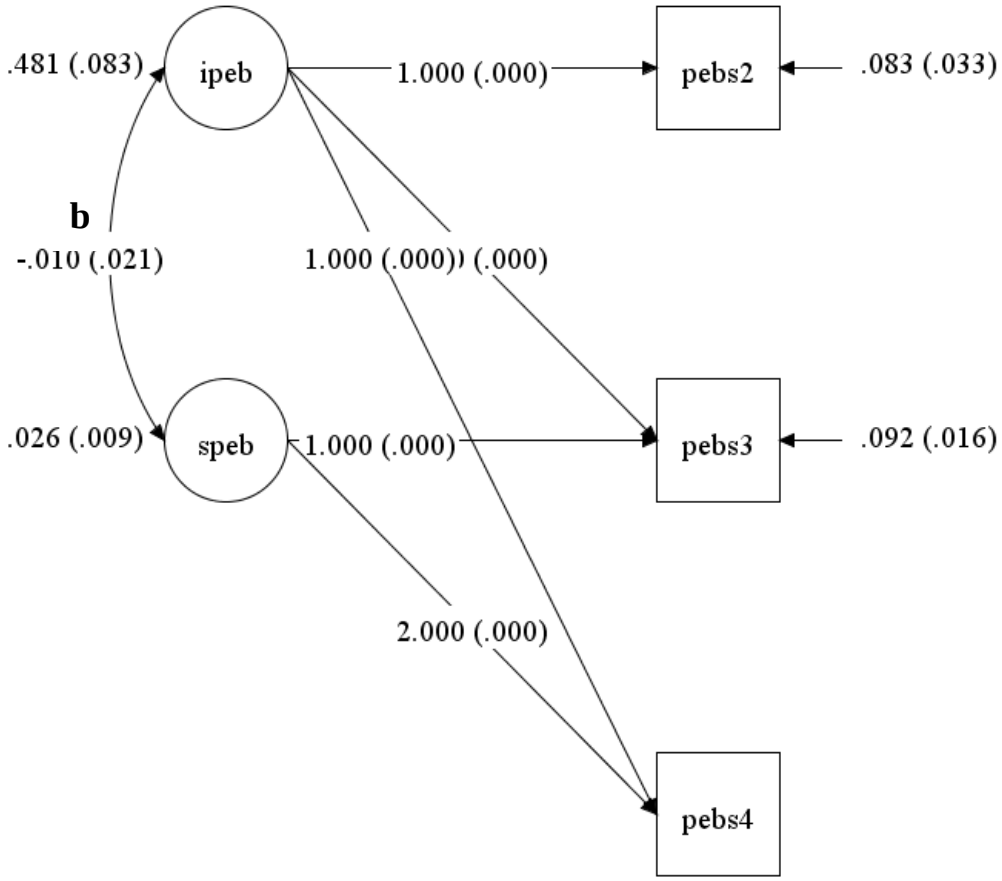

Figure 7. Latent growth model of PEBs from S2 to S4, with residual variance for PEB4 fixed to zero. Path **b** shows a non-statistically significant covariance of initial level of PEBs (at S2) and linear change of PEBs (from S2 to S4). Values next to latent variables and indicators represent *B (SE)*.

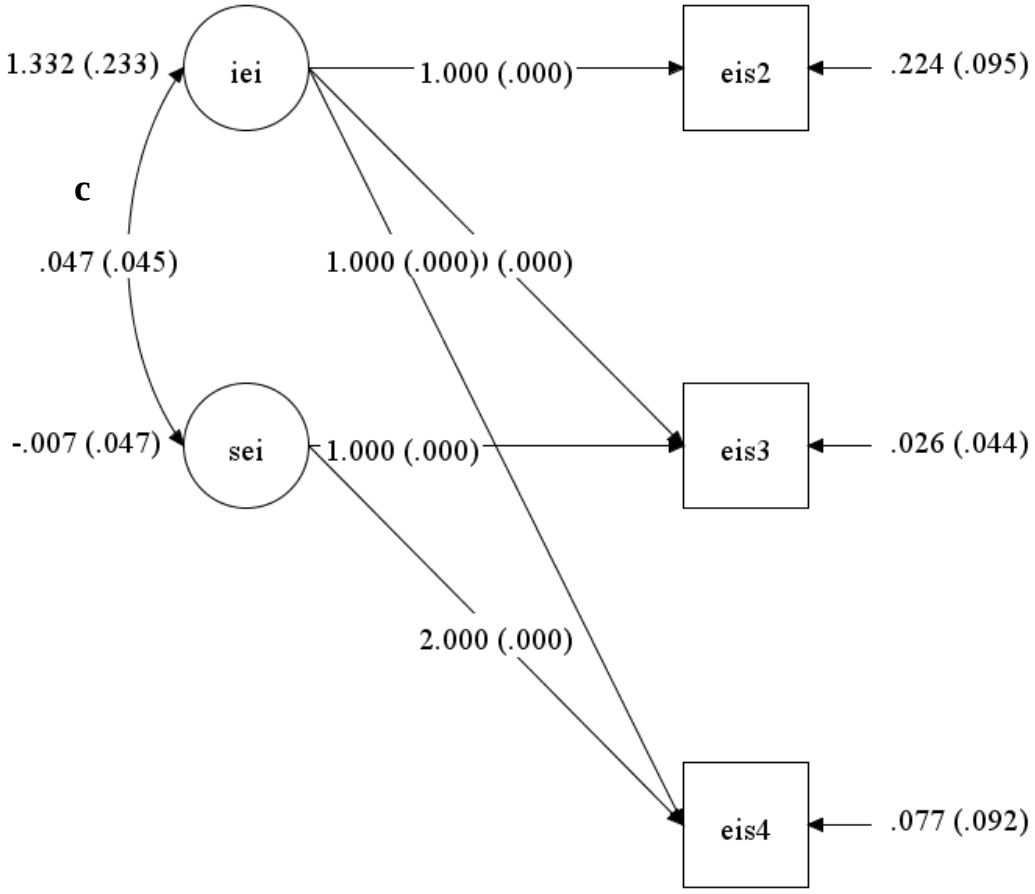

Figure 8. Latent growth model of EI from S2 to S4. Path **c** shows a non-statistically significant covariance of initial level of EI (at S2) and linear change of EI (from S2 to S4). Values next to latent variables and indicators represent *B (SE)*.

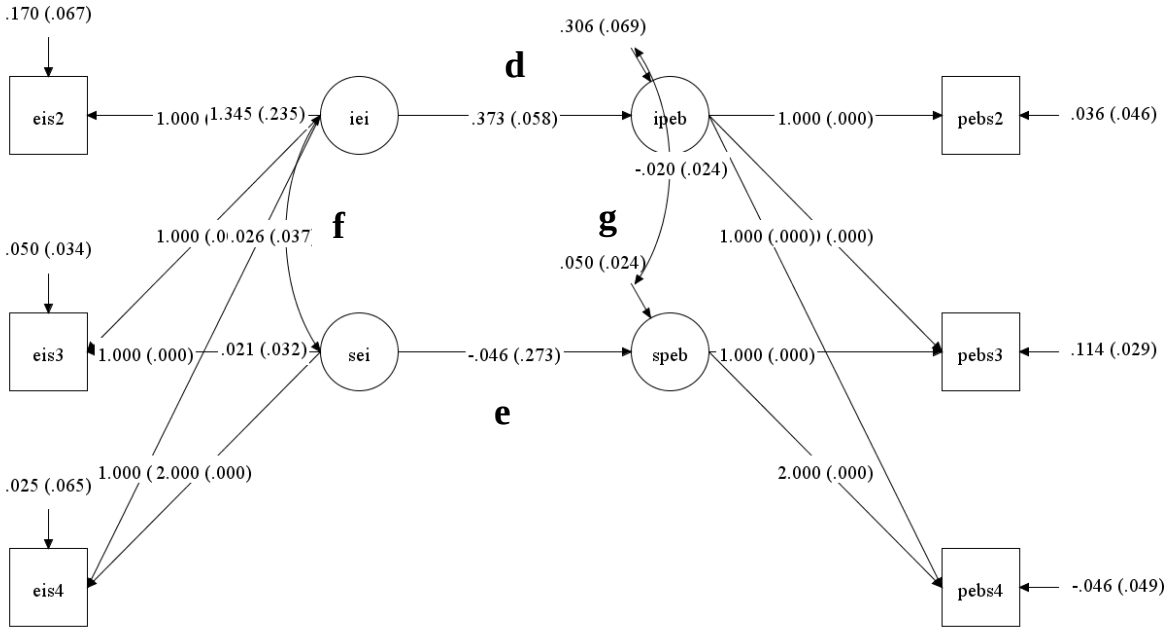

Figure 9. Linear mean latent-growth model of change in EI predicting change in PEB from S2 to S4. Path **d** shows a statistically significant effect of initial level of EI (at S2) on initial level of PEBs (at S2). Paths **e, f,** and **g** show non-statistically significant relationships.

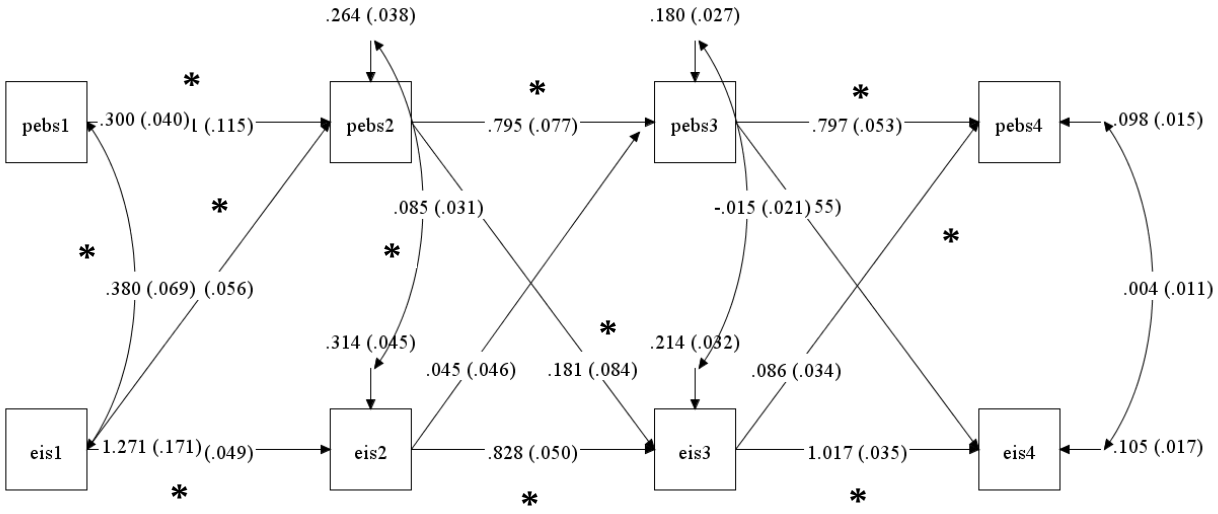

Figure 10. Recursive path model examining the effect of EI on PEBs and PEBs on EI. Paths with * next to them represent statistically significant paths.

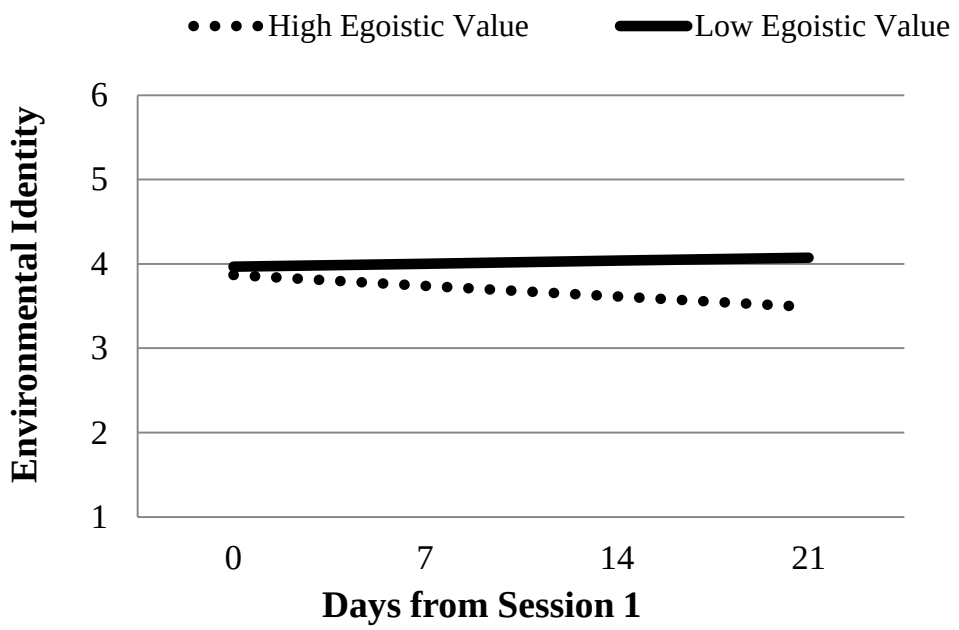

Figure 11. The effect of egoistic values (high = +1 SD from mean; low = -1 SD from mean) on the effect of time on EI from S1 to S4.

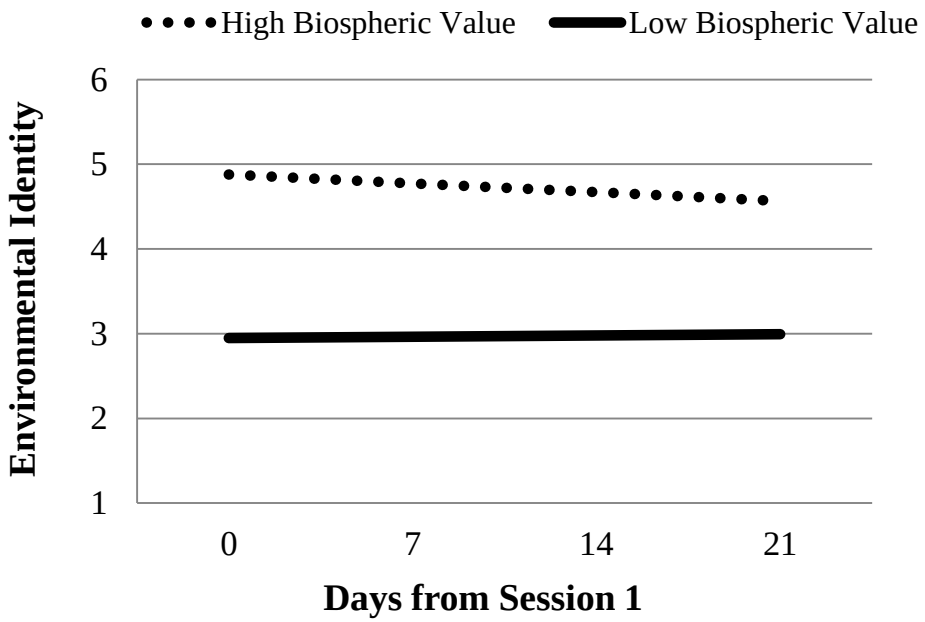

Figure 12. The effect of biospheric values (high = +1 SD from mean; low = -1 SD from mean) on the effect of time on EI from S1 to S4.

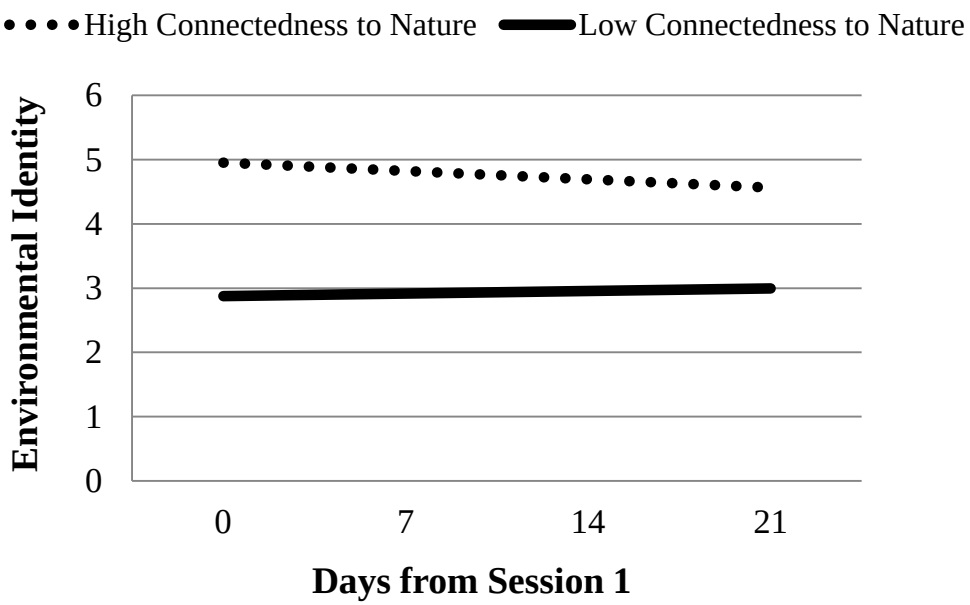

Figure 13. The effect of connectedness to nature (high = +1 SD from mean; low = -1 SD from mean) on the effect of time on EI from S1 to S4.

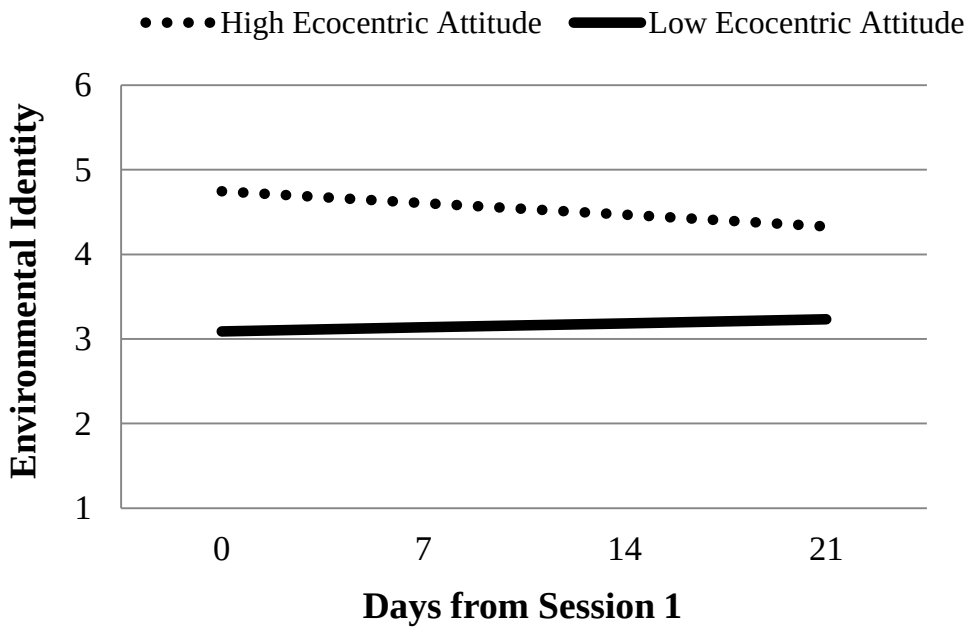

Figure 14. The effect of ecocentric attitudes (high = +1 SD from mean; low = -1 SD from mean) on the effect of time on EI from S1 to S4.

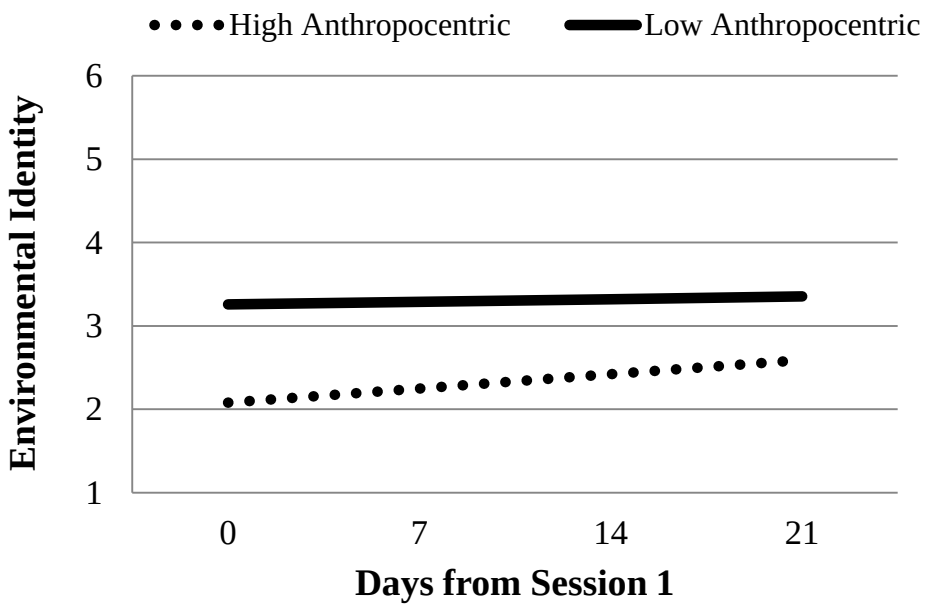

Figure 15. The effect of anthropocentric attitudes (high = +1 SD from mean; low = -1 SD from mean) on the effect of time on EI from S1 to S4.

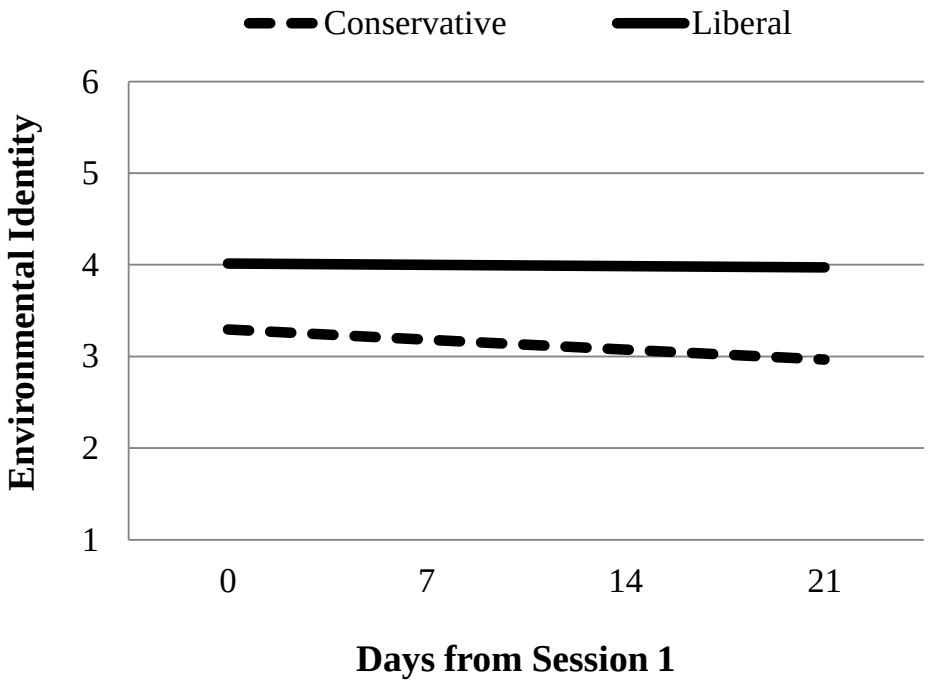

Figure 16. The effect of political orientation (+1 SD from mean: conservative; -1 SD from mean: liberal) on the effect of time on EI from S1 to S4.

APPENDICES

A. Study Session Timeline

Timeline of each session and the measures participants completed in each session, which are organized in the order in which they were completed.

Session	Timeline	Duration	Location	Completed Measures
One (S1)	Baseline	60 minutes	Psychology Building Lab	Consent Form Values Scales Sustainability Awareness/Knowledge Ecocentric/Anthropocentric Attitudes Concern about Environment Connectedness to Nature Scale Environmental Identity Other Identities Commitment to the Environment Beliefs about Climate Change Ecological Worldview Environmental Locus of Control Pro-Environmental Behaviors Office of Sustainability Listserv Email Random Assignment to Behavior Condition Implementation Intention Demographic Information
Two (S2)	+ 1 Week	15 minutes	On Personal Device	TLFB Completion Ratings of Task Pro-Environmental Behaviors Environmental Identity Commitment to the Environment Office of Sustainability Listserv Email Implementation Intention
Three (S3)	+ 2 Weeks	15 minutes	On Personal Device	TLFB Completion Ratings of Task Pro-Environmental Behaviors Environmental Identity Commitment to the Environment Office of Sustainability Listserv Email Implementation Intention
Four (S4)	+ 3 Weeks	30 minutes	Psychology Building Lab	TLFB Completion Ratings of Task Pro-Environmental Behaviors Environmental Identity Commitment to the Environment Office of Sustainability Module Debriefing

B. Introduction to Sustainability Learning Module

Narrated PowerPoint available and other learning tools at:

https://sustainability.uga.edu/academics/faculty/module/