

## Commitment to the environment: the role of subjective norms in college and community samples

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### Abstract

We tested a model of antecedents and outcomes of commitment to the environment, defined as psychological attachment and long-term orientation to the natural world, hypothesizing that satisfaction with, investments in, and subjective norms about the environment would predict commitment, which, in turn, would predict willingness to sacrifice for the environment. In two studies, the model was supported in undergraduate and community samples, and for general commitment to the environment as well as commitment to specific proenvironmental behaviors. Individuals who are satisfied with and invested in the natural world, and who believe that those close to them value it as well, are likely to be committed to the environment and be willing to forego selfish interests to behave proenvironmentally.

Ongoing global climate change largely is driven by human activity. Primarily through motor vehicle use and residential heating, individuals and households contribute more carbon dioxide emissions than any other economic sector in the United States (Gardner & Stern, 2008; Stern, 2011; US Energy Information Administration, 2007). Because human behavior change is necessary to mitigate cascading environmental problems, understanding individuals' motivations and subsequent actions is essential for addressing global climate change. Gifford (2011) provided a framework including three phases of overcoming barriers to changing behavior to achieve greater congruence between proenvironmental attitudes and behavior. First, individuals must have sufficient knowledge of how their behaviors influence their carbon footprint. Then, they must overcome psychological processes that block such knowledge from being translated into action. Finally, their behavior change must be effective and sufficient to cause improvement. Our research is squarely situated within the second phase, as it examines the mechanisms by which action is activated. Given a goal of changing human behavior, it is critical to identify processes that encourage individuals to engage in behaviors that support the well-being of the natural world, and—when necessary—to even be willing to sacrifice their preferences or habits for the sake of the natural world.

Researchers have addressed this goal from various theoretical perspectives, examining the impact on proenvironmental behavior of variables such as attitudes, moral norms, and

perceived behavioral control. In their meta-analysis of 57 studies, Bamberg and Moser (2007) reported that these three predictors equally contributed about 50% of the variance in proenvironmental behavioral intentions. Their meta-analysis also revealed that perceived behavioral intention accounted for just 27% of the variance in actual behavior. Together, these results highlight the need for broader models of antecedents of proenvironmental behavior. One fruitful approach has been the growing body of research on the person-environment relationship, which has demonstrated the predictive power of constructs such as commitment to the environment (Davis, Green, & Reed, 2009), connectedness to nature (Mayer & Frantz, 2004), environmental identity (Clayton, 2003), inclusion of nature in the self (Schultz, 2002), and nature relatedness (Nisbet, Zelenski, & Murphy, 2009). A commonality across all approaches to studying the person-environment relationship is the recognition that individuals vary in the degree to which they feel connected to nature and that degree of connectedness has important consequences for environmental attitudes and behavior above and beyond the well-studied contributions of attitudes, social norms, moral norms, and perceived behavioral control (Brugger, Kaiser, & Roczen, 2011; Sparks, Hinds, Curnock, & Pavey, 2014).

### Commitment to the environment

Davis et al. (2009) offered a novel perspective on predicting proenvironmental behavior by highlighting the

interdependent structure of humans' relationship with the natural world, characterized by bidirectional influence on the well-being of humans and nature. Just as human actions affect the well-being of the natural world (e.g., resource conservation), the natural world influences individuals (e.g., physical and mental health). Working within the framework of interdependence theory (Thibaut & Kelley, 1959) and Rusbult's (1980) commitment model, Davis et al. (2009) theorized that the interdependent structure of this relationship should lead individuals to experience some degree of felt commitment to the environment, defined as psychological attachment to and long-term orientation toward the natural world. Several studies indicate that individuals do indeed vary in their level of commitment to the environment (Coy, Farrell, Gilson, Davis, & Le, 2013; Davis et al., 2009; Davis, Le, & Coy, 2011; Tam, 2013), just as they vary in their level of commitment to organizations, a particular consumer brand, or romantic partners (Le & Agnew, 2003).

Collectively, past research has examined commitment to the environment using both experimental and correlational studies. This work has demonstrated the robustness of the model in predicting proenvironmental responses such as support for a local environmental cause, self-reported ecological behavior, and environmental movement activism (Coy et al., 2013; Davis et al., 2009, 2011; Tam, 2013). More broadly, Tam (2013) reported a positive association of commitment to the environment with subjective well-being. Importantly, commitment to the environment predicts proenvironmental behavioral intentions above and beyond related measures such as other person-environment measures (e.g., connectedness to nature, environmental identity, inclusion of nature in the self) or environmental attitudes (Davis et al., 2011; Tam, 2013). Moreover, when examined simultaneously with eight other person-environment measures in United States and Hong Kong samples, commitment to the environment predicted support for environmental causes and self-reported ecological behavior with effect sizes comparable to or larger than related measures (Tam, 2013).

### **Bases of commitment to the environment**

How do individuals develop commitment to the natural environment? Bases of commitment are well understood within the context of Rusbult's (1980) commitment model, which was derived from interdependence theory (Thibaut & Kelley, 1959) and posits that commitment is a function of three factors: satisfaction, alternatives, and investments, with satisfaction and investments positively associated with commitment and alternatives negatively associated with commitment. The structure of this model has been broadly applied and is well-supported by more than three decades of research in interpersonal and noninterpersonal contexts, including commitment to the environment (e.g., Coy et al., 2013; Davis

et al., 2011; Dix, Emery, & Le, 2014; Hoffman, Agnew, Lehmiller, & Duncan, 2009; Lehmiller & Konkel, 2013; Pollack, Coy, Green, & Davis, in press; Rusbult & Farrell, 1983; Rusbult, Martz, & Agnew, 1998). Furthermore, these three factors collectively account for two-thirds of the variance in commitment across various contexts (see meta-analysis by Le & Agnew, 2003). In addition to these three bases of commitment, subjective norms, or beliefs about others' approval (or disapproval) of a behavior (Fishbein & Ajzen, 1975), have been examined in an expanded commitment model and are positively associated with commitment beyond satisfaction, alternatives, and investments (e.g., Dix et al., 2014; Etcheverry & Agnew, 2004). For example, in a study examining students' commitment to an academic honor code, subjective norms predicted commitment to the honor code above and beyond the effects of the other bases of commitment (Dix et al., 2014). When close others approve of a behavior, individuals tend to be more committed to it. The role of subjective norms in predicting behavioral intentions also has been studied extensively within the framework of the theory of reasoned action (Fishbein & Ajzen, 1975), although with mixed results.<sup>1</sup> The present research was the first to investigate the role of subjective norms in an expanded model of commitment to the environment.

Within the context of the natural environment, satisfaction refers to the subjective evaluation of the relative positivity or negativity experienced in individuals' interactions with the environment, and partly is a function of benefits accrued from the natural environment such as recreational opportunities or clean water. Investments are the tangible or intangible resources tied to individuals' relationship with the environment, including the time and effort they have put into the natural environment or aspects of self-identity associated with being environmentally-conscious. Alternatives refer to the extent to which individuals' needs could be met without the natural environment, including perceptions of the availability of alternative ways to receive benefits imparted by the natural environment (e.g., meeting recreational needs in the built environment). Finally, subjective norms refer to close others' attitudes about the natural

<sup>1</sup>Subjective norms have been examined extensively in the context of the theory of reasoned action, with mixed support for the predictive utility of subjective norms on behavioral intentions. Subjective norms predict behavioral intentions related to aspects of automobile use, membership in environmental organizations, and communication to others regarding their nonecological actions (Kaiser & Gutscher, 2003). In addition, subjective norms predict intentions to save energy, use environmentally-friendly paper, and take alternative forms of transportation, but not intentions to conserve water while brushing one's teeth (Harland, Staats, & Wilke, 1999; Sparks et al., 2014). Similarly, although some studies have shown a significant association between subjective norms and recycling (e.g., Cheung, Chan, & Wong, 1999; Chu & Chiu, 2003; Laudenslager, Holt, & Lofgren, 2004), other studies have not (Kaiser & Gutscher, 2003; Knussen, Yule, MacKenzie, & Wells, 2004).

environment, specifically the beliefs of individuals' friends or family members about proenvironmental behavior. Past work on commitment to the environment has supported the positive associations of satisfaction and investments with commitment, with commitment mediating the effects of satisfaction and investments on general ecological behavior and willingness to sacrifice for the environment; however, alternatives were not significantly associated with commitment in the framework of the full model (Davis et al., 2011). Past work on commitment in other domains (e.g., interpersonal relationships, academic honor code) has supported the positive association of subjective norms with commitment, with commitment mediating the effect of subjective norms on behavior or behavioral intentions (Dix et al., 2014; Etcheverry & Agnew, 2004). The present research explored an expanded model of the bases of the commitment to the environment including all four theoretical bases of commitment.

### ***Willingness to sacrifice for the environment***

Commitment to the environment, in turn, promotes proenvironmental action (Coy et al., 2013; Davis et al., 2009, 2011). From the perspective of interdependence theory (Kelley & Thibaut, 1978; Rusbult, Arriaga, & Agnew, 2001), individuals sometimes move from acting in accordance with self-interested motives to acting in accordance with broader goals and motives, including others' well-being as well as societal norms. This process, known as *transformation of motivation*, reflects a shift from behaving in a self-centered manner to behaving prosocially, and occurs as a function of commitment in interpersonal as well as noninterpersonal relationships (Agnew & Le, in press; Dix et al., 2014; Finkel, Rusbult, Kumashiro, & Hannon, 2002; Rusbult, Yovetich, & Verette, 1996). Due to the interdependent nature of their relationship with the natural environment (e.g., deriving satisfaction from spending time in nature), committed individuals perceive that they have a stake in the well-being of the natural environment such that it is in their long-term interest to make choices that benefit it, even at the expense of immediate self-interest.

Across a range of contexts, commitment predicts individuals' *willingness to sacrifice* (Etcheverry & Le, 2005), defined as "foregoing one's own immediate self-interests to promote the well-being of the partner or relationship" (Van Lange, Agnew, Harinck, & Steemers, 1997, p. 1331). Most relevant to the current research, commitment to the environment is associated with willingness to sacrifice for the environment, mediating the effects of satisfaction with the environment and investments in the environment on willingness to sacrifice for the environment as well as general ecological behavior (Coy et al., 2013; Davis et al., 2011). Committed individuals are more likely to enact the more costly or effortful behavior if it benefits the natural environment. Importantly, commit-

ment to the environment predicts ecological behavior and willingness to sacrifice for the environment above and beyond related measures such as connectedness to nature (Mayer & Frantz, 2004), environmental identity (Clayton, 2003), inclusion of nature in the self (Schultz, 2002), and the new ecological paradigm scale (Dunlap, Van Liere, Mertig, & Jones, 2000).

### **Commitment to specific environmental behaviors**

Although there is support for a general model of commitment to the natural environment (Davis et al., 2011), we also sought to explore whether the commitment model can be applied to specific proenvironmental behaviors. For example, past work based on Rusbult's (1980) commitment model has shown that investments and rewards (which contribute to satisfaction), but not alternatives, predict commitment to behaviors associated with musical activities (e.g., buying music, playing a musical instrument or singing; Koslowsky & Kluger, 1986). Similarly, models of sport commitment (e.g., Raedeke, 1997) share many commonalities with the Rusbult commitment model, with sport enjoyment (akin to satisfaction) and investments predicting commitment to playing a sport (Carpenter & Coleman, 1998; Schmidt & Stein, 1991). In short, the commitment model has been successfully applied to specific behaviors, and our goal was to investigate commitment to two specific domains that have been identified as important environmental behaviors—recycling (e.g., Castro, Garrido, Reis, & Menezes, 2009) and using alternative modes of transportation (e.g., Joireman, Van Lange, & Van Vugt, 2004).

### **Study goals and hypotheses**

Past research using undergraduate student samples has demonstrated that commitment to the environment predicts proenvironmental behavior beyond other environmental attitudes and beliefs and introduced a model of commitment to the environment wherein satisfaction and investments uniquely predict commitment to the environment, which, in turn, predicts a willingness to sacrifice for the environment (Coy et al., 2013; Davis et al., 2009, 2011). The goals of the current work were to (a) replicate previous findings in a student sample (Study 1) and explore the generalizability of these findings to a nonundergraduate community sample (Study 2), (b) expand the commitment to the environment model by examining the role of subjective norms, and (c) investigate a model of general commitment to the environment (both studies) as well as models of commitment to the specific environmental behaviors of recycling and using alternative transportation (Study 2).

Hypothesis 1 was that satisfaction with the environment and investments in the environment would predict

**Table 1** Factor Loadings of Items in Study 1

	Factor 1 commitment	Factor 2 satisfaction	Factor 3 alternatives	Factor 4 subjective norms	Factor 5 investments	Factor 6 willingness to sacrifice
Feeling a connection with the environment is important to me.	.81	.03	.11	.04	.14	.10
I feel strongly linked to the environment.	.70	.02	.10	.07	.19	.15
I feel very attached to the natural environment.	.67	.07	.11	.05	.29	.05
I expect that I will always feel a strong connection with the environment.	.64	.11	.07	.04	.25	.15
It makes me feel good when something happens that benefits the environment.	.60	.18	.07	.10	.07	.00
I am interested in strengthening my connection to the environment in the future.	.58	.06	.04	.06	.12	.16
I believe that the well-being of the natural environment can affect my own well-being.	.51	.20	.11	.10	.06	.06
It seems to me that humans and the environment are interdependent (e.g., they affect one another).	.42	.02	.00	.21	.23	.02
I feel committed to keeping the best interests of the environment in mind.	.39	.16	.03	.16	.27	.12
It is unlikely that I'll feel a connection to the environment in the future.	.36	.14	.00	.09	.08	.01
When I make plans for myself, I take into account how my decisions may affect the environment.	.35	.05	.02	.08	.25	.26
The natural environment does a good job meeting my needs for activity, relaxation, and adventure.	.08	.93	.01	.06	.02	.06
Spending time in the natural environment makes me very happy.	.04	.89	.07	.04	.04	.04
I am satisfied when I spend time in the natural environment.	.02	.88	.06	.01	.11	.06
The natural environment is an ideal place to spend time.	.05	.85	.01	.04	.00	.01
Spending time in the natural environment is rewarding.	.12	.84	.05	.03	.03	.05
I have other ways of occupying my time besides spending time in the natural environment.	.15	.04	.83	.06	.04	.05
Generally speaking, my alternatives to spending time in the natural environment are appealing.	.02	.01	.78	.01	.05	.03
When I'm not in the natural environment I find other appealing places to spend my time.	.02	.12	.74	.02	.04	.04
My needs for activity, relaxation, and adventure could easily be fulfilled somewhere other than the natural environment.	.05	.09	.72	.04	.00	.03
Compared to the natural environment, there are other places where I could spend time that would be more enjoyable.	.03	.20	.64	.10	.04	.04
*My friends and family think acting in a proenvironmental manner is important.	.03	.03	.00	.85	.03	.01
*Family members and friends think that I should act in a proenvironmental fashion	.08	.02	.05	.81	.04	.11
*People who are important to me think I should be proenvironmental.	.01	.06	.06	.77	.01	.02
*Most people who are important to me think that engaging in proenvironmental behavior is desirable.	.12	.08	.13	.77	.02	.02
*People whose opinion matters to me think proenvironmental behavior is vital	.07	.04	.07	.73	.03	.12

**Table 1.** Continued

	Factor 1 commitment	Factor 2 satisfaction	Factor 3 alternatives	Factor 4 subjective norms	Factor 5 investments	Factor 6 willingness to sacrifice
People who influence my decisions think I should act favorably towards the natural environment.	.14	.09	.04	.65	.15	.06
Peers who are close to me view the environment as a worthy cause.	.09	.09	.03	.59	.06	.07
My closest friends and family approve taking measures to preserve the environment.	.12	.24	.06	.57	.07	.06
I feel very involved with the natural environment; like I have put a great deal into it.	.00	.03	.05	.17	.84	.02
Compared to other people I know, I have invested a great deal in the environment.	.08	.02	.07	.04	.83	.06
I have put a lot of effort into the well-being of the natural environment.	.06	.05	.03	.11	.76	.06
I have put a lot of time, energy, and effort into the well-being of the natural environment.	.08	.04	.00	.06	.74	.15
Overall I have a lot invested in the natural environment.	.05	.02	.16	.17	.70	.04
Even when it is inconvenient to me, I am willing to do what I think is best for the environment.	.00	.04	.02	.01	.04	.94
I am willing to go out of my way to do what is best for the environment.	.14	.04	.00	.08	.03	.91
I am willing to give things up that I like doing if they harm the natural environment.	.09	.04	.01	.05	.03	.53
I am willing to do things for the environment, even if I'm not thanked for my efforts.	.19	.25	.02	.04	.01	.46
I am willing to take on responsibilities that will help conserve the natural environment.	.23	.13	.02	.01	.16	.39

Note. We used maximum likelihood estimation with an oblique oblimin rotation. The pattern matrix is reported; items loaded onto the same factors in the structure matrix. \* Indicates items used for the subjective norms scale in the analyses.

**Table 2** Intercorrelations among Measures in Studies 1 and 2

	1.	2.	3.	4.	5.	6.
1. Satisfaction	–	.38***	–.23***	.40***	.59***	.47***
2. Investments	.49***	–	–.20**	.57***	.63***	.53***
3. Alternatives	–.03	–.03	–	–.15*	–.18*	–.05
4. Subjective norms	.48***	.59***	.10	–	.59***	.49***
5. Commitment	.57***	.79***	–.01	.76***	–	.64***
6. Willingness to sacrifice	.49***	.67***	–.04	.73***	.75***	–

Note. \*\*\* $p < .001$ . \*\* $p < .01$ . \* $p < .05$ . Study 1 correlations are above the diagonal ( $n = 200$ ), and Study 2 correlations are below the diagonal ( $n = 188$ ).

commitment to the environment. Hypothesis 2 was that subjective norms also would predict commitment to the environment. Davis et al. (2011) reported a significant correlation between alternatives to the environment and commitment to the environment, but the association did not remain significant within a larger structural model; therefore, we did not form hypotheses regarding alternatives. Most importantly, Hypothesis 3 was that commitment to the environment would at least partially mediate the effects of the bases of commitment (satisfaction, investments, and subjective norms) on willingness to sacrifice for the environment. We tested these three hypotheses

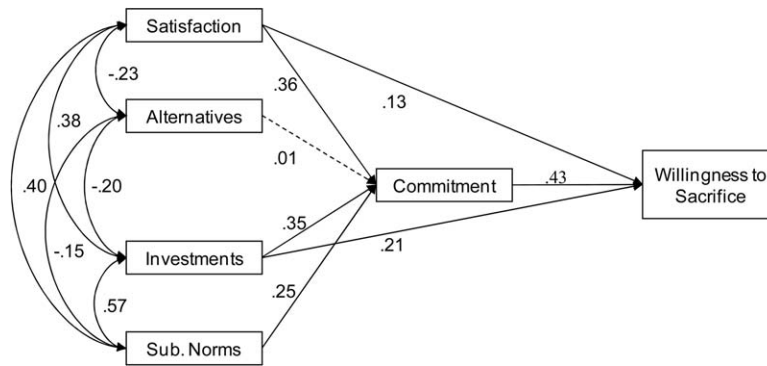
across two samples (student and community) and across three domains (general natural environment, recycling, and alternative transportation).

## Study 1

### Method

#### Participants

Participants included 200 undergraduate students (116 women; three unreported) from Virginia Commonwealth



**Figure 1** Path model predicting willingness to sacrifice for the environment in Study 1,  $\chi^2(2) = 6.76$ ,  $p < .05$ ; CFI = .98; TLI = .93; RMSEA = .11, 90%CI [.03, .20]; and SRMR = .02. Curved lines represent correlations and solid lines represent significant standardized path coefficients.

University who participated in partial fulfillment of a requirement for their introductory psychology course. Participants were 20-year old on average ( $SD = 2.79$ , ages ranged from 18 to 41); 43.5% were freshman, 26.5% were sophomores, 19% were juniors, 7.5% were seniors (3.5% other). Fifty-two percent self-identified as Caucasian (17.5% African American, 17% Asian American, 6% Latino, 5.5% Middle Eastern, and 2.5% other).

### Measures

All measures were administered online and included 9-point response scales (0 = do not agree at all; 8 = agree completely).<sup>2</sup>

#### Commitment to the environment

We used the Davis et al. (2009) 11-item measure of commitment to the environment to assess long-term orientation and psychological attachment to the natural world. We averaged responses to create a composite index (e.g., "I believe that the well-being of the natural environment can affect my own well-being;"  $\alpha = .93$ ;  $M = 5.00$ ,  $SD = 1.56$ ).

<sup>2</sup>To explore our expectation that items for each scale would load on separate factors, we performed a factor analysis using maximum likelihood extraction and an oblimin rotation constrained to six factors. The first factor had an eigenvalue of 15.90, explained 41% of the variance, and included all of the commitment items; the second factor had an eigenvalue of 3.39, explained 9% of the variance, and included all of the subjective norms items; the third factor had an eigenvalue of 3.07, explained 8% of the variance, and included all of the satisfaction items; the fourth factor had an eigenvalue of 2.21, explained 6% of the variance, and included all of the investments items; the fifth factor had an eigenvalue of 1.85, explained 5% of the variance, and included all of the alternatives items; the sixth factor had an eigenvalue of 1.05, explained 4% of the variance, and included all of the willingness to sacrifice items. These results are consistent with our theoretical expectations, and the factor loadings are reported in Table 1.

#### Bases of commitment

We used Davis et al. (2011) scales to measure antecedents of commitment to the environment. Five items measured satisfaction with the environment (e.g., "The natural environment does a good job meeting my needs for activity, relaxation, and adventure;"  $\alpha = .96$ ;  $M = 5.97$ ,  $SD = 1.64$ ), investments in the environment (e.g., "I have put a lot of effort into the well-being of the natural environment;"  $\alpha = .95$ ;  $M = 3.37$ ,  $SD = 1.77$ ), and alternatives to the environment (e.g., "Generally speaking, my alternatives to spending time in the natural environment are appealing;"  $\alpha = .85$ ;  $M = 4.92$ ,  $SD = 1.43$ ). We averaged responses within each 5-item scale to create composite indices. Based on items used in interpersonal relationships research (Etcheverry & Agnew, 2004), we developed a 5-item subjective norms measure to assess beliefs about acceptable environmental behavior (see Appendix). We averaged responses to create a composite index (e.g., "My friends and family think acting in a pro-environmental manner is important;"  $\alpha = .92$ ;  $M = 4.16$ ,  $SD = 1.66$ ).

#### Willingness to sacrifice

We used the Davis et al. (2011) 5-item measure of willingness to sacrifice to assess willingness to give up self-interested needs for the sake of the environment (e.g., "I am willing to give things up that I like doing if they harm the natural environment"). We averaged responses to create a composite index ( $\alpha = .86$ ;  $M = 4.89$ ,  $SD = 1.28$ ).

## Results

#### Subjective norms scale

To explore our expectation that items on the subjective norms scale would be interpretable as a unidimensional scale, we performed a factor analysis using maximum likelihood extraction and an oblique oblimin rotation. All eight items

**Table 3** Effects of Predictor Variables in Studies 1 and 2

Path	Beta	LL	UL
<b>Study 1</b>			
Commitment->Willingness to sacrifice	.43***	.31	.55
Satisfaction->Commitment	.36***	.28	.44
Satisfaction->Commitment->Willingness to sacrifice	.16***	.09	.23
Satisfaction->Willingness to sacrifice	.13*	.03	.24
Investments->Commitment	.35***	.26	.45
Investments->Commitment->Willingness to sacrifice	.15***	.09	.21
Investments->Willingness to sacrifice	.21**	.10	.32
Alternatives->Commitment	.01	-.06	.09
Subjective norms->Commitment	.25***	.16	.34
Subjective norms->Commitment->Willingness to sacrifice	.11**	.05	.17
<b>Study 2</b>			
<b>Environmental behavior</b>			
Commitment->Willingness to sacrifice	.27**	.12	.42
Satisfaction->Commitment	.13***	.07	.20
Satisfaction->Commitment->Willingness to sacrifice	.04*	.01	.06
Satisfaction->Willingness to sacrifice	.06	-.03	.15
Investments->Commitment	.48***	.41	.56
Investments->Commitment->Willingness to sacrifice	.13**	.05	.21
Investments->Willingness to sacrifice	.20**	.08	.32
Alternatives->Commitment	-.02	-.08	.04
Subjective norms->Commitment	.41***	.34	.49
Subjective norms->Commitment->Willingness to sacrifice	.11**	.04	.19
Subjective norms->Willingness to sacrifice	.37***	.26	.48
<b>Recycling</b>			
Commitment->Willingness to sacrifice	.31**	.14	.48
Satisfaction->Commitment	.45***	.37	.53
Satisfaction->Commitment->Willingness to sacrifice	.14*	.05	.23
Satisfaction->Willingness to sacrifice	.07	-.07	.22
Investments->Commitment	.29***	.22	.36
Investments->Commitment->Willingness to sacrifice	.09*	.03	.15
Investments->Willingness to sacrifice	.33***	.21	.44
Alternatives->Commitment	-.09**	-.15	-.04
Alternatives->Commitment->Willingness to sacrifice	-.03	-.06	.01
Alternatives->Willingness to sacrifice	-.23***	-.32	-.15
Subjective norms->Commitment	.22***	.15	.29
Subjective norms->Commitment->Willingness to sacrifice	.07*	.01	.13
<b>Alternative transportation</b>			
Commitment->Willingness to sacrifice	.44***	.24	.64
Satisfaction->Commitment	.18***	.11	.26
Satisfaction->Commitment->Willingness to sacrifice	.08*	.02	.14
Satisfaction->Willingness to sacrifice	.22*	.08	.36
Investments->Commitment	.53***	.44	.61
Investments->Commitment->Willingness to sacrifice	.23***	.11	.35
Investments->Willingness to sacrifice	.08	-.11	.27
Alternatives->Commitment	-.05	-.10	.001
Subjective norms->Commitment	.26***	.17	.35
Subjective norms->Commitment->Willingness to sacrifice	.11*	.04	.19

Note. Confident interval upper (UL) and lower limits (LL) of indirect effects are reflective of a bootstrapping analysis with 2500 iterations. \*\*\* $p < .001$ . \*\* $p < .01$ . \* $p < .05$ . 95%

loaded onto a single factor with an eigenvalue of 5.33 and explained 67% of the variance. To maintain consistency with the length of the Davis et al. (2011) scales, we used the five items with the highest loadings to compose the composite scale (see Table 1 for factor analysis of all Study 1 items).

### Path model

We used mPlus software (Muthen & Muthen, 2009) to test direct and indirect (mediated by commitment) effects of satisfaction, investments, alternatives, subjective norms,

**Table 4** Intercorrelations among Behavior-Specific Measures in Study 2

	1.	2.	3.	4.	5.	6.
1. Satisfaction	–	.72***	–.61***	.75***	.88***	.73***
2. Investments	.75***	–	–.53**	.68***	.81***	.75***
3. Alternatives	–.34***	–.27***	–	–.51***	–.63***	–.65***
4. Subjective norms	.73***	.81***	–.19**	–	.81***	.67***
5. Commitment	.79***	.89***	–.30***	.83***	–	.79***
6. Willingness to sacrifice	.62***	.63***	–.25***	.57***	.68***	–

Note. \*\*\* $p < .001$ . \*\* $p < .01$ ; \* $p < .05$ . Recycling correlations are included above the diagonal, and alternative transportation correlations are below the diagonal.

and commitment to the environment on willingness to sacrifice for the environment. We used the maximum likelihood method of parameter estimation and the full data as inputs. In addition, we allowed satisfaction, investments, alternatives, and subjective norms to correlate (see Table 2 for intercorrelations). Consistent with Davis et al. (2011), our initial model with commitment partially mediating the effects of satisfaction and investments and fully mediating the effect of subjective norms on willingness to sacrifice provided acceptable fit,  $\chi^2(2) = 6.76$ ,  $p < .05$ ; comparative fit index (CFI) = .98; Tucker Lewis Index (TLI) = .93; root mean square error of approximation (RMSEA) = .11, 90% confidence interval (CI) [.03, .20]; and standardized root mean square residual (SRMR) = .02.<sup>3</sup> We then explored the addition of a direct effect between subjective norms and willingness to sacrifice, but this path did not improve the model,  $\Delta\chi^2 = 2.59$ ,  $p = .11$ ; thus, we retained our initial model (see Figure 1).

Consistent with Hypothesis 1, individuals with greater satisfaction with the environment and investments in the environment reported greater commitment to the environment; however, alternatives to the environment were not associated with commitment to the environment. Consistent with Hypothesis 2, individuals with greater subjective norms about the environment also reported greater commitment to the environment. Most importantly and consistent with Hypothesis 3, commitment partially mediated the effects of satisfaction with the environment and investments in the environment on willingness to sacrifice and fully mediated the effects of subjective norms on willingness to sacrifice (see Table 3). Collectively, satisfaction, alternatives, investments, and subjective norms accounted for 58% ( $p < .001$ ) of the variance in commitment to the environment and 45% ( $p < .001$ ) of the variance in willingness to sacrifice.

<sup>3</sup>Adding a direct path from alternatives to the environment to willingness to sacrifice for the environment improved the model,  $\Delta\chi^2(1) = 4.03$ ,  $p = .05$ ,  $\chi^2(1) = 2.73$ ,  $p = .10$ , CFI = .99, RMSEA = .09. However, we chose to report our initial model excluding the path to be consistent with the model reported in Davis et al. (2011).

## Discussion

Working from the framework of interdependence theory (Thibaut & Kelley, 1959) and Rusbult's (1980) commitment model, commitment to the natural environment has been found to be a function of satisfaction with and investments in the environment (Davis et al., 2011). Study 1 tested an expanded model of commitment to the environment that included subjective norms (Dix et al., 2014; Etcheverry & Agnew, 2004). Using data from a sample of 200 undergraduates, we successfully supported the Davis et al. (2011) theoretical model, with commitment predicting willingness to sacrifice for the natural environment and partially mediating the paths from satisfaction and investments to willingness to sacrifice. Also consistent with Davis et al. (2011), alternatives did not predict commitment to the environment. Most importantly, the addition of subjective norms as a predictor of willingness to sacrifice provided a novel, theoretically driven path that was fully mediated by commitment. To date all research on commitment to the environment has utilized undergraduate student samples. Study 2 was designed to replicate the findings of Study 1 in a community sample and examine the generalizability of the commitment to the environment model to specific types of environmental behaviors.

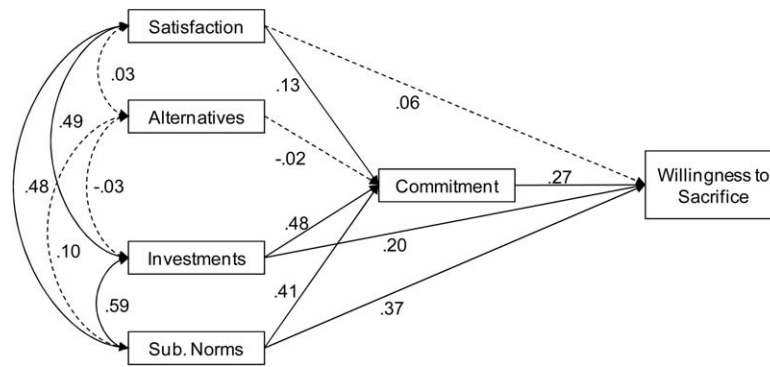
## Study 2

### Method

#### Participants

Participants included 188 individuals (134 women), recruited via word of mouth through community organizations in greater Philadelphia and Indianapolis, who participated in exchange for an entry into a drawing for \$50 prizes. Participants were 29.62-year old on average ( $SD = 8.47$ , ages ranged from 18 to 49). Eighty-seven percent self-identified as Caucasian (9.0% African American, 5.3% Asian American, 3% Latino, 3% Native American, and 1.6% Middle Eastern). Thirty-one percent reported holding a college degree (26.1% some college, 18.1% graduate degree, 14.9% high school





**Figure 2** Path model predicting willingness to sacrifice for the environment in Study 2,  $\chi^2(3) = 3.06$ ,  $p = .08$ ; CFI = 1.00; TLI = .96; RMSEA = .11, 90% CI [.00, .25]; and SRMR = .02. Curved lines represent correlations and solid lines represent significant standardized path coefficients.

diploma, 8.0% some postgraduate education, 1.1% less than high school, and 1% did not report), and 78.7% were used (5.9% self-employed, 5.9% students, 4.2% unemployed, 3.7% retired, 1.1% homemakers, and 0.5% did not report).

## Measures

All measures were administered online and included 7-point response scales (0 = disagree strongly; 6 = agree strongly; see Appendix).

### Commitment to the environment

We used a 3-item version of the Davis et al. (2009) measure of commitment to the environment to assess long-term orientation and psychological attachment to the natural world. We averaged responses to create a composite index ( $\alpha = .88$ ;  $M = 4.70$ ,  $SD = 1.33$ ).

### Bases of commitment

We used shortened 3-item versions of the Davis et al. (2011) scales to measure antecedents of commitment to the environment; in addition, we developed recycling- and alternative transportation-specific versions based on the Davis et al. (2009) and Rusbult et al. (1998) measures of commitment and its antecedents. Three items measured satisfaction with the environment ( $\alpha = .87$ ;  $M = 5.81$ ,  $SD = 1.12$ ), satisfaction with recycling (e.g., "Recycling is satisfying;"  $\alpha = .93$ ;  $M = 5.17$ ,  $SD = 1.47$ ), and satisfaction with alternative transportation (e.g., "Using alternative forms of transportation is often a satisfying experience;"  $\alpha = .93$ ;  $M = 4.13$ ,  $SD = 1.61$ ). Three items measured investments in the environment ( $\alpha = .80$ ;  $M = 4.19$ ,  $SD = 1.27$ ), investments in recycling (e.g., "I have put a lot of time, energy, and effort into recycling;"  $\alpha = .89$ ;  $M = 4.07$ ,  $SD = 1.60$ ), and investments in alternative transportation (e.g., "I have put a lot of time and energy into getting places using alternative forms of transportation;"  $\alpha = .96$ ;  $M = 3.43$ ,  $SD = 1.83$ ). And, three items

measured alternatives to the environment ( $\alpha = .66$ ;  $M = 4.24$ ,  $SD = 1.17$ ), alternatives to recycling (e.g., "It is more appealing to discard waste rather than to recycle waste;"  $\alpha = .77$ ;  $M = 3.18$ ,  $SD = 1.37$ ), and alternatives to alternative transportation (e.g., "I have means of getting places that are more convenient than using alternative forms of transportation;"  $\alpha = .51$ ;  $M = 4.45$ ,  $SD = 1.28$ ).

Based on items used in Study 1, we also used a 3-item version of the subjective norms about the environment measure and developed recycling- and alternative transportation-specific versions. We averaged responses to create composite indices for subjective norms ( $\alpha = .92$ ;  $M = 4.43$ ,  $SD = 1.38$ ), subjective norms about recycling (e.g., "Family members and friends think I should recycle;"  $\alpha = .90$ ;  $M = 4.65$ ,  $SD = 1.43$ ), and subjective norms about alternative transportation (e.g., "People who are important to me think I should use alternative forms of transportation;"  $\alpha = .93$ ;  $M = 3.60$ ,  $SD = 1.63$ ).

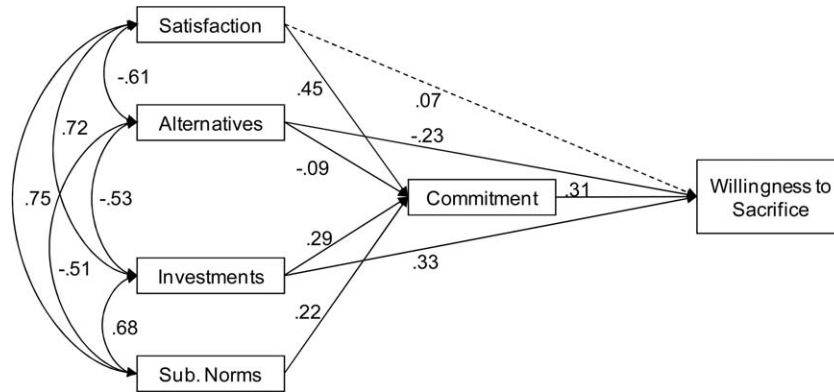
### Willingness to sacrifice

We used the Davis et al. (2011) 5-item measure of willingness to sacrifice and developed recycling- and alternative transportation-specific versions. We averaged responses to create composite indices for willingness to sacrifice ( $\alpha = .95$ ;  $M = 4.79$ ,  $SD = 1.31$ ), willingness to sacrifice for recycling (e.g., "I am willing to take on the planning of a recycling program in my local area;"  $\alpha = .91$ ;  $M = 4.59$ ,  $SD = 1.49$ ), and willingness to sacrifice for alternative transportation (e.g., "I am willing to give up driving to work and use less convenient alternatives instead;"  $\alpha = .81$ ;  $M = 3.92$ ,  $SD = 1.38$ ).

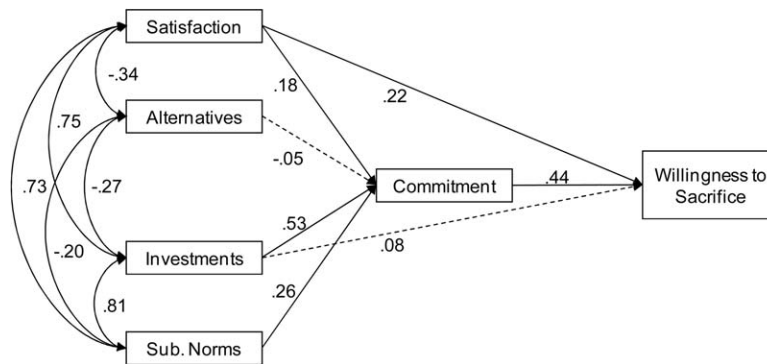
## Results

### General model

We performed a path analysis testing the model from Study 1 (see Table 4 for intercorrelations). However, for this community sample, the initial model provided a poor fit,  $\chi^2(2) = 30.59$ ,  $p < .001$ ; CFI = .94; TLI = .72; RMSEA = .22,



**Figure 3** Path model predicting willingness to sacrifice for recycling in Study 2,  $\chi^2(2) = 1.20$ ,  $p = .27$ ; CFI = 1.00; TLI = 1.00 RMSEA = .03, 90% CI [.00, .20]; and SRMR = .01. Curved lines represent correlations and solid lines represent significant standardized path coefficients.



**Figure 4** Path model predicting willingness to sacrifice for alternative transportation in Study 2,  $\chi^2(2) = .31$ ,  $p = .86$ ; CFI = 1.00; TLI = 1.00; RMSEA = .00, 90% CI [.00, .08]; and SRMR = .00. Curved lines represent correlations and solid lines represent significant standardized path coefficients.

90% CI [.20, .37]; and SRMR = .03. Our theoretical model is consistent with either full or partial mediation. Adding the direct effect between subjective norms and willingness to sacrifice improved the model,  $\Delta\chi^2(1) = 27.53$ ,  $p < .001$ , and provided a good fit,  $\chi^2(3) = 3.06$ ,  $p = .08$ ; CFI = 1.00; TLI = .96; RMSEA = .11, 90% CI [.00, .25]; and SRMR = .02 (see Figure 2).<sup>4</sup> Consistent with Hypothesis 1, individuals with greater satisfaction with the environment and investments in the environment reported greater commitment to the environment; however, alternatives to the environment were not associated with commitment to the environment. Consistent with Hypothesis 2, individuals with greater subjective norms about the environment also reported greater commitment to the environment. Most importantly and consistent with Hypothesis 3, commitment partially medi-

ated the effects of investments in the environment and subjective norms on willingness to sacrifice and fully mediated the effects of satisfaction with the environment on willingness to sacrifice (see Table 3). Collectively, satisfaction, alternatives, investments, and subjective norms accounted for 77% ( $p < .001$ ) of the variance in commitment to the environment and 63% ( $p < .001$ ) of the variance in willingness to sacrifice.

### Recycling model

We performed a path analysis testing the model from Study 1 using recycling-specific measures. The initial model provided acceptable fit,  $\chi^2(2) = 19.86$ ,  $p < .001$ ; CFI = .97; TLI = .87; RMSEA = .22, 90% CI [.14, .31]; and SRMR = .03. Adding the direct effect between subjective norms and willingness to sacrifice did not improve the model,  $\Delta\chi^2(1) = .80$ ,  $p = .37$ . However, adding the direct effect between alternatives and willingness to sacrifice did improve the model,  $\Delta\chi^2(1) = 18.66$ ,  $p < .001$ , and provided excellent fit,  $\chi^2(1) = 1.20$ ,  $p = .27$ ; CFI = 1.00; TLI = 1.00; RMSEA = .03,

<sup>4</sup>Removing the nonsignificant direct path from satisfaction with the environment to willingness to sacrifice for the environment improved the model,  $\chi^2(2) = 4.18$ ,  $p = .12$ , CFI = 1.00, RMSEA = .08. However, we chose to report our initial model including the path to be consistent with the model reported in Davis et al. (2011).

90% CI [.00, .20]; SRMR = .01 (see Figure 3). Consistent with Hypothesis 1, individuals with greater satisfaction with recycling and investments in recycling reported greater commitment to recycling; moreover, those with greater alternatives to recycling reported less commitment to recycling. Consistent with Hypothesis 2, individuals with greater subjective norms about recycling also reported greater commitment to recycling. Most importantly and consistent with Hypothesis 3, commitment partially mediated the effects of investments in recycling on willingness to sacrifice for recycling and fully mediated the effects of satisfaction with recycling and subjective norms about recycling on willingness to sacrifice for recycling; however, commitment did not mediate the effect of alternatives to recycling on willingness to sacrifice for recycling (see Table 3). Collectively, satisfaction, alternatives, investments, and subjective norms accounted for 87% ( $p < .001$ ) of the variance in commitment to recycling and 70% ( $p < .001$ ) of the variance in willingness to sacrifice for recycling.

### **Alternative transportation model**

We performed a path analysis testing the model from Study 1 using alternative transportation-specific measures. The initial model provided an excellent fit,  $\chi^2(2) = .31$ ,  $p = .86$ ; CFI = 1.00; TLI = 1.00; RMSEA = .00, 90% CI [.00, .08]; and SRMR = .00, so we did not test alternative models (see Figure 4). Consistent with Hypothesis 1, individuals with greater satisfaction with alternative transportation and investments in alternative transportation reported greater commitment to alternative transportation; however, alternatives to alternative transportation were not associated with commitment to alternative transportation. Consistent with Hypothesis 2, individuals with greater subjective norms about alternative transportation also reported greater commitment to alternative transportation. Most importantly and consistent with Hypothesis 3, commitment partially mediated the effects of satisfaction with alternative transportation on willingness to sacrifice for alternative transportation and fully mediated the effects of investments in alternative transportation and subjective norms about alternative transportation on willingness to sacrifice for alternative transportation (see Table 3). Collectively, satisfaction, alternatives, investments, and subjective norms accounted for 84% ( $p < .001$ ) of the variance in commitment to alternative transportation and 48% ( $p < .001$ ) of the variance in willingness to sacrifice for alternative transportation.

### **Discussion**

Study 2 tested the expanded model of commitment to the environment developed in Study 1 using a community sample and examined whether a model developed for the

general natural environment applied to domain-specific proenvironmental behaviors. Data from nearly 200 participants supported the structure of the commitment model in a nonstudent sample across three domains (general natural environment, recycling, and alternative transportation), with commitment predicting willingness to sacrifice and partially or fully mediating the effects of satisfaction, investments, and subjective norms on willingness to sacrifice. Across the three domains, there was variation in whether commitment fully or partially mediated specific links between the bases of commitment and willingness to sacrifice. Interestingly, the recycling model revealed significant links from alternatives to commitment and willingness to sacrifice (but without mediation via commitment); there were no significant effects for alternatives in any other model.

### **General discussion**

In previous work, Davis et al. (2011) developed a model of commitment to the natural environment, highlighting the contributions of satisfaction with the environment and investments in the environment in predicting commitment to the environment, defined as psychological attachment and long-term orientation to the natural world. The commitment to the environment model is a powerful predictor of self-reported ecological behavior and willingness to sacrifice for the environment. Exploring additional bases for commitment to the environment could lead to the development of fruitful interventions to increase commitment. In two studies, we tested an expanded version of the model, wherein satisfaction with the environment, investments in the environment, and subjective norms about the environment independently and collectively predicted commitment to the natural environment. Most importantly, commitment to the environment mediated the effects of satisfaction, investments, and subjective norms on willingness to sacrifice for the environment in an undergraduate sample (Study 1) and a community sample (Study 2) as well as across three domains (general natural environment, recycling, and alternative transportation). Moreover, Study 2 provided the first evidence of the utility of the model in predicting specific types of conservation behaviors, suggesting that the commitment to the environment model can be applied to specific domains of interest to conservation researchers. Acting proenvironmentally requires effort and may be costly, such that those taking a self-interested perspective on their relationship with the environment will be unlikely to enact necessary proenvironmental behaviors. However, with heightened commitment comes a long-term orientation to move beyond immediate self-interested motivations and instead think about the future health of the relationship with the natural world.

The addition of subjective norms represents a significant evolution of the commitment to the environment model as it bridges interdependence theory with general models of attitudes and behaviors (e.g., theory of reasoned action [TRA]; Fishbein & Ajzen, 1975). In past work on interpersonal commitment (e.g., Etcheverry & Agnew, 2004), the contribution of subjective norms in predicting commitment was relatively modest in comparison to the effects of satisfaction, alternatives, and investments. In past work on the TRA, the contribution of subjective norms has been mixed. In some contexts such as workplace environmental behavior and support for wind farms, subjective norms has exerted relatively strong effects (Greaves, Zibarras, & Stride, 2013; Read, Brown, Thorsteinsson, Morgan, & Price, 2013); however, across a wide variety of domains, subjective norms tend to exert weaker effects than attitudes and perceived control on behavioral intentions (Armitage & Conner, 2001). In these studies, the contribution of subjective norms to commitment to the environment was on par in relative magnitude with the contributions of satisfaction and investments, and in each of four models tested, commitment to the environment either partially or fully mediated the link between subjective norms and willingness to sacrifice for the environment. These results provide insight into the nature of the link between subjective norms and proenvironmental behavior; namely, that commitment to the environment is an important intermediary process between the two. Close others' opinions about proenvironmental behavior are consequential because of their association with commitment to the environment: To the extent that individuals perceive that others positively evaluate proenvironmental behavior, they feel greater psychological attachment and long-term orientation (i.e., commitment) toward the natural world. The link between subjective norms and proenvironmental behavior is not necessarily direct (e.g., "my friends value proenvironmental behavior, so I should behave proenvironmentally"). Instead, our data suggest that subjective norms are linked to individuals' broader internalized orientation to the natural environment in the form of their commitment level (e.g., "my friends value proenvironmental behavior, so I feel greater attachment and long-term orientation to the natural world"), which in turn predicts their level of proenvironmental behavior. An interesting theoretical implication of this process is that once a commitment has been formed, it is possible that proenvironmental behaviors could arise even in the absence of normative pressure.

Consistent with Davis et al. (2011) and various other non-interpersonal applications of Rusbult's (1980) commitment model (Le & Agnew, 2003), across four models tested, perceptions of alternatives did not predict commitment to the environment within the context of the overall structural

model, suggesting that future work on commitment to the environment could forego further examination of alternatives. However, in three of four cases in Studies 1 and 2, there were negative correlations between alternatives and commitment, and it is possible that the contribution of alternatives to the commitment to the environment model could be significant for environmental behaviors beyond those that we have tested. Future research could seek to identify moderators that determine conditions under which alternatives contribute to the commitment to the environment model. For example, the impact of alternatives could vary depending on the degree to which alternative behaviors are available, socially desirable, or similar to the target behavior in environmental impact. In addition, there was variation across models in whether the other three bases of commitment (satisfaction, investments, and subjective norms) were fully mediated or partially mediated by commitment to the environment in their effects on willingness to sacrifice. Such variations across models depending on specific contexts are similar in nature to those found in theory of planned behavior [TPB] research (e.g., Chan & Bishop, 2013; Greaves et al., 2013).

### Limitations and directions for future research

Although these two studies provided support for a broadened model of commitment to the environment, they were based on cross-sectional correlational data. Past work has validated these causal pathways in the context of romantic relationships (Finkel et al., 2002; Rusbult, 1980) and commitment has been shown to cause increases in proenvironmental attitudes and behaviors (Davis et al., 2009), but no work has fully examined the causal mechanisms involved in enhancing commitment to the environment. In addition, although the present studies and past work have demonstrated theoretical linkages between commitment to the environment and willingness to sacrifice, no work has directly examined the process by which individuals engage in transformation of motivation, moving beyond self-interest to enacting proenvironmental behaviors. Future work also should consider how the model can best be implemented in conducting interventions. Researchers should be designing interventions that encourage satisfaction with the environment, investments in the environment, and social structures that promote subjective norms about proenvironmental behavior. The present work illustrated the contribution of subjective norms (from the TRA) to the commitment to the environment model. Future work could explore the contributions of perceived behavioral control (from the TPB) or more recent additions such as moral norms (Chan & Bishop, 2013) to the commitment to the environment model. In addition, future work could explore the extent to which the TPB concepts of attitudes and perceived behavioral control are distinct from or

overlap with commitment model constructs satisfaction, alternatives, and investments (Ajzen & Fishbein, 2005; Le & Agnew, 2003). Furthermore, future work could bridge theory and research on the person-environment relationship (e.g., commitment to the environment) with conceptualizations of relationship with place by examining whether there is a link between generalized commitment to the natural environment and specific connectedness to place as well as whether commitment to a particular location in the natural environment is analogous to connectedness to place (cf., Beery & Wolf-Watz, 2014). More broadly, it would be useful for future research to examine multiple theoretical approaches simultaneously to determine, for example, whether a person-environment theoretical framework (e.g., commitment to the environment) is superior to other theoretical frameworks in the context of particular domains of proenvironmental behavior. Finally, future work should assess behavioral outcomes of commitment to the environment—in particular, choices such as home location and size, motor vehicles, and home heating and cooling equipment, because these have the largest effects on a household's carbon footprint (Stern, 2011).

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## Conclusion

These studies were the first to highlight the contribution of subjective norms to a model of commitment to the environment, suggesting that individuals will be more committed to the environment to the extent that they believe that close others value proenvironmental behavior. Importantly, this broadened model of commitment to the environment replicated across undergraduate student and community samples and across generalized commitment to the natural world as well as commitment to the specific proenvironmental behaviors of recycling and alternative transportation. Based on these findings, commitment to the environment model can be used in future research to examine generalized commitment to the natural world as well as commitment to specific proenvironmental behaviors. To the extent that individuals feel satisfaction with the environment, invest in the environment, and believe that those close to them care about the environment, they are more likely to feel psychological attachment and long-term orientation to the natural world that leads them to be willing to sacrifice by engaging in pro-environmental behaviors.

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## Appendix

0	1	2	3	4	5	6
Do Not Agree At all			Agree somewhat		Agree Completely	

### Global ecological behavior

#### Satisfaction

1. Spending time in the natural environment is rewarding.
2. I am satisfied when I spend time in the natural environment.
3. Spending time in the natural environment makes me very happy.

#### Alternatives

1. I have other ways of occupying my time besides spending time in the natural environment.
2. Generally speaking, my alternatives to spending time in the natural environment are appealing.
3. My needs for activity, relaxation, and adventure could easily be fulfilled somewhere other than the environment.

#### Investments

1. I feel very involved with the natural environment; like I have put a great deal into it.
2. Overall I have a lot invested in the natural environment.
3. I have put a lot of time, energy, and effort into the well-being of the natural environment.

#### Subjective norms

1. My friends and family think acting in a proenvironmental manner is important.
2. People who influence my decisions think I should act favorably towards the natural environment.

3. Most people who are important to me think that engaging in proenvironmental behavior is desirable.

#### Commitment

1. I feel committed to keeping the best interests of the environment in mind.
2. When I make plans for myself, I take into account how my decisions may affect the environment.
3. I am oriented toward the long-term future of the environment.

### Recycling

#### Satisfaction

1. Recycling is satisfying.
2. I feel really good when I recycle.
3. Recycling can be a rewarding experience.

#### Alternatives

1. Overall, I have other ways of occupying my time besides taking the time to recycle all of my waste.
2. It is more appealing to discard waste rather than to recycle waste.
3. If I were unable to recycle, I would be fine.

#### Investments

1. Overall I have a lot invested in recycling.
2. I feel very involved in recycling efforts; like I have put a great deal into them.
3. I have put a lot of time, energy, and effort into recycling.

**Subjective norms**

1. People whose opinion matters to me think recycling is vital.
2. Family members and friends think I should recycle.
3. Peers who are close to me view recycling as an important cause.

**Commitment**

1. I feel committed to recycling as a way to benefit the environment.
2. I expect that I will always make an effort to recycle.
3. My sustained recycling is necessary for the benefit of the natural environment.

**Transportation****Satisfaction**

1. Utilizing alternative forms of transportation is often a rewarding experience.
2. I feel happy when I use alternative forms of transportation.
3. Using alternative forms transportation is often a satisfying experience.

**Alternatives**

1. I have more convenient means of getting places rather than using alternative transportation.
2. Using alternative transportation prevents me from being productive with my time.
3. Driving or riding in a car is more enjoyable than using alternative forms of transportation.

**Investments**

1. I have put a great deal into using alternative forms of transportation.
2. I have a lot invested in using forms of transportation.
3. I have put a lot of time and energy into getting places using alternative forms of transportation.

**Subjective norms**

1. People who are important to me think I should use alternative forms of transportation.
2. My friends and family think it is important to take alternative forms of transportation
3. People who influence my decisions think I should use alternative forms of transportation.

**Commitment**

1. I am committed to helping the environment using alternative forms of transportation.

2. I always try to use alternative forms of transportation.
3. My using of alternative transportation is vital to the well-being of the environment.

**Sacrifice****Global willingness to sacrifice**

1. I am willing to give things up that I like doing if they harm the natural environment.
2. I am willing to take on responsibilities that will help conserve the natural environment.
3. I am willing to do things for the environment, even if I'm not thanked for my efforts.
4. 4. Even when it is inconvenient to me, I am willing to do what I think is best for the environment.
5. 5. I am willing to go out of my way to do what is best for the environment.

**Recycling**

1. Even when it is inconvenient to me, I am willing to recycle my waste.
2. I am willing to take on the planning of a recycling program in my local area.
3. Even though it takes more time and effort, I find it necessary to recycle.
4. I will go out of my way to collect and recycle used paper and empty bottles.
5. I will save and reuse my shopping bags.
6. I will buy products in reusable containers though they might be more expensive.
7. I will refrain from buying beverages in cans even if it is more economical to do so.

**Alternative transportation**

1. I am willing to give up driving to work and use less convenient alternatives instead.
2. I will take initiative and organize a carpool with my coworkers.
3. For longer journeys (more than 6 hours), I will take an airplane, even if it is less economical.
4. I would be willing to pay more for an energy-efficient vehicle.
5. When I am traveling somewhere with friends, I will go out of my way to offer them a ride so that we don't have to use multiple vehicles.
6. When city driving, I will roll down my windows instead of using the air conditioning to save gasoline.
7. In nearby areas, I will use alternative forms of transportation even though it is more time-consuming.