International Journal of Transpersonal Studies

Volume 30
Iss. 1-2 (2011)

Article 10

1-1-2011

Connectedness and Environmental Behavior: Sense of Interconnectedness and Pro-Environmental Behavior

Robert E. Hoot
Walden University

Harris Friedman
Walden University

Follow this and additional works at: https://digitalcommons.ciis.edu/ijts-transpersonalstudies

 Part of the Philosophy Commons, Psychology Commons, and the Religion Commons

Recommended Citation

Hoot, R. E., & Friedman, H. (2011). Hoot, R. E., & Friedman, H. (2011). Connectedness and environmental behavior: Sense of interconnectedness and pro-environmental behavior. International Journal of Transpersonal Studies, 30(1-2), 89–100.. *International Journal of Transpersonal Studies, 30* (1). Retrieved from https://digitalcommons.ciis.edu/ijts-transpersonalstudies/vol30/iss1/10

This work is licensed under a Creative Commons Attribution-Noncommercial-No Derivative Works 4.0 License.
This Special Topic Article is brought to you for free and open access by International Journal of Transpersonal Studies. It has been accepted for inclusion in International Journal of Transpersonal Studies by an authorized administrator. For more information, please contact the editors.

Connectedness and Environmental Behavior: Sense of Interconnectedness and Pro-Environmental Behavior

Robert E. Hoot[1] *& Harris Friedman*
Walden University
Minneapolis, MN, USA

The expansion of one's sense of identity to include various aspects of the world, both human and non-human, may relate to how one treats the world. This sense of interconnectedness can be domain specific, as through identification with nature and the future, or very general, as through an expanded transpersonal identification with all of reality unlimited by time and space. This study explored the relationship between these two specific and the more general type of interconnectedness on environmental beliefs and behavior. A sample of 210 participants completed a battery of interconnectedness measures, including two specific measures, the Connectedness to Nature Scale (CNS) and Consideration of Future Consequences Scale (CFC), and a transpersonal measure, the Self-Expansiveness Level Form Transpersonal Scale (SELF-TS). Participants also completed a measure of environmental beliefs, the New Ecological Paradigm Scale (NEP), and a self-report measure of their environmental behavior. The CNS, CFC, and SELF-TS significantly intercorrelated, supporting that they measure a common underlying construct: interconnectedness. In addition, the CNS and CFC correlated significantly with both the NEP and environmental behavior, but the SELF-TS did not. Furthermore, the CNS and the CFC, as well as their interaction, predicted environmental behavior in a regression model, while the SELF-TS did not. These results suggest that specific indicators of feeling interconnected with nature and the future are relevant to environmental beliefs and behavior, whereas a broader sense of transpersonal interconnectedness may not relate as well in this specific domain.

Keywords: transpersonal; self-expansiveness; interconnectedness; future orientation; environmental behavior

Anthropogenic environmental changes pose great challenges for humanity's continued adaptation and perhaps even its survival. Most immediately daunting are threats related to climate change, presumably from releases of greenhouse gases and widely expected to result in widespread catastrophic outcomes as from rising sea levels inundating low-lying coastal habitats (Meehl et al., 2007) and degrading coastal ecosystems (United Nations Environment Programme, 2006). Many other environmental challenges are nearly as pressing, such as proliferating carcinogenic pesticides now found in 85% of U.S. freshwater streams (Gilliom et al., 2007), to name just one. Often these threats are seen merely as requiring technological solutions, despite that they are human-caused and rapidly worsening due to human-related factors (e.g., population growth and modernization). Instead, Speth (1992) made recommendations to change how the environment is approached. One of his suggestions is to solve structural problems that affect the environment, such as addressing family planning, the status of women, and care for older citizens as a means of decreasing birth rates. He also emphasized the need to make the environment a personal issue instead of someone else's problem.

Schwartz's (1977) theory of norm-activation provides a possible basis for understanding how pro-environmental behavior can be fostered. It suggested that moral obligations are more readily translated into altruistic behavior, including toward the environment, when a sense of personal involvement is activated (Coke, Batson, & McDavis, 1978). Constructs such as sympathy (Allen & Ferrand, 1999), distress (Carlo,

Allen, & Buhman, 1999), sadness (Maner et al., 2002), and empathy (Archer, Diaz-Loving, Gollwitzer, Davis, & Foushee, 1981) all seem related to increasing personal involvement and might relate to facilitating pro-environmental behavior (e.g., enhanced perspective-taking, as one type of empathy activation, was found to correlate with environmentally-responsible behavior; Coke et al., 1978).

Included among many constructs related to activating personal involvement is a sense of interconnectedness, including with others, nature, and even the entire universe (Davis, Conklin, Smith, & Luce, 1996; Batson et al., 1997; Cialdini, Brown, Lewis, Luce, & Neuberg, 1997; Maner et al., 2002; Schultz, 2000). A sense of social interconnectedness has been used to explain various forms of altruism (e.g., the willingness of research participants to allocate more money to friends and relatives than to more distantly-related people; Aron, Aron, Tudor, & Nelson, 1991). Research participants were also found more willing to give money in response to an appeal for help when a feeling of interconnectedness was manipulated by falsely informing participants that the proposed recipient had brain waves similar to theirs (Maner et al., 2002). Interconnectedness constructs have also been found related to environmental concerns (Schultz, Shriver, Tabanico, & Khazian, 2004), and interventions have been shown to increase participants' sense of interconnectedness to nature (Frantz, Mayer, Norton, & Rock, 2005).

Among the many interconnectedness constructs now emerging is self-expansiveness (Friedman, 1983), which refers to how individuals construct their self-concept through identifying with varying aspects of reality. In this regard, the process of identification relates to activating personal involvement by seeing some aspect of reality as intimately relevant to oneself and even a part of oneself, thus presumably worth protecting. Friedman proposed that the self-concept is inherently malleable, being essentially a social-psychological, rather than physical, fact. Self-concept, from this perspective, could include any aspect of reality that exists in time (including not just the present, but also the past and future), establishing a conceptual basis for an all-inclusive sense of interconnectedness. Friedman also proposed the possibility of a transpersonal level of self-expansiveness, intended to reflect the broadest type of identification: an interconnectedness that radically transcends the conventional sense of the isolated individual, namely a sense of oneness with the universe across space and time. We theorized that such a transpersonal sense of interconnectedness, as well as more specific senses of interconnectedness, activates personal involvement with the world and can serve as a basis for promoting environmentally-responsible behavior.

However, there has also been criticism of the usefulness of interconnectedness as a construct related to environmentally-responsible behavior. Batson et al. (1997) found that measures of oneness, a form of interconnectedness similar to Friedman's (1983) construct of transpersonal self-expansiveness, had no significant explanatory effects on altruism beyond that offered by the more conventional notion of empathy. However, their methods were later criticized by Neuberg et al. (1997), who supported the greater usefulness of interconnectedness constructs as compared to empathy. Cialdini et al. (1997) further supported the value of interconnectedness constructs for understanding altruism by finding that empathy influenced helping behavior by affecting the sense of oneness with a recipient, while attachment to others increased helping behavior due to a sense of oneness as opposed to a sense of empathy. This debate continues (e.g., Batson, 1997), but another line of evidence supports a possible resolution, which is that feelings of distress from perspective-taking affects helping behavior only among people with lower dispositional levels of personal distress (Carlo et al., 1999). To make matters more complex, Schultz and Zelezny (1998) conducted a five-nation study and found that a nature-specific measure of interconnectedness (i.e., self-transcendence) was a good predictor of environmental behavior in every country, but a general measure of self-transcendence was not. It appears that the possible role between a sense of connectedness, including a transpersonal or transcendent sense of oneness, and environmental behavior requires further scrutiny. Conceptually, however, we find it very appealing to speculate that individuals, both the source of so many environmental challenges as well as of possible solutions to these challenges, might be more environmentally responsible in their behavior if they felt more interconnectedness with the environment and the universe as a whole.

Another potentially germane variable related to environmental behavior is future orientation, which can also be seen as a form of interconnectedness across time

(Friedman, 1983). Schwartz (1968) hypothesized that awareness of consequences moderates the relationship between moral norms and behavior; this theory was supported by showing that willingness to help others was influenced by awareness of consequences and a disposition to consider consequences that affect others (Schwartz, 1974). As an alternative to measuring awareness of specific consequences, Strathman, Gleicher, Boninger, and Edwards (1994) proposed the Consideration of Future Consequences (CFC) scale as a dispositional measure of the degree to which people emphasize future versus immediate consequences of actions. Whereas Schwartz's model incorporates awareness of consequences, the CFC incorporates a weighting of one set of consequences over another (i.e., future versus immediate consequences), which seems pertinent to the exchange between immediate benefit of consumerism and long-term protection of the environment.

The CFC has been associated with pro-environmental behavior (Joireman, Van Lange, & Van Vugt, 2004) and has also been found to interact with value orientations (Joireman, Lasane, Bennett, Richards, & Solaimani, 2001). The relationship between future orientation and environmental behavior suggests that the CFC's function fits within the norm-activation model. Joireman et al. (2004) found that research participants with high scores on the CFC were more likely to use public transportation and were more likely to believe that cars harmed the environment. They also found that modeling the interaction of perceived environmental impact with both social value orientation and CFC increased the predictive value of their model, although the effect size was small. Joireman et al. (2001) studied the CFC in relation to Social Value Orientation (SVO; Messick & McClintock, 1968) and found that there was a statistically significant interaction between SVO and CFC in predicting environmental behavior. Congruent with Friedman's (1983) model of self-expansiveness that focuses on the potential of the self-concept to expand both temporally and spatially, the CFC is also seen as a measure related to temporal self-expansiveness into the future and, in that sense, a measure of interconnectedness. Conceptually, we theorize that individuals might be more environmentally responsible if they felt more connected with the future.

Consequently, this main focus of our study is on the relationship between interconnectedness, both broadly in a transpersonal way and more specifically to nature and the future, and environmental behavior. We hypothesized that these forms of interconnectedness are related to each other and to environmental behavior, but we also hypothesized that the transpersonal measure, as a more general approach to interconnectedness, would not relate to environmental behavior as well as a nature-specific measure, in accord with Schultz and Zelezny's (1998) findings.

In addition to a sense of interconnectedness being possibly salient to environmental behaviors, there is a growing research literature related to environmental worldview using Dunlap and Van Liere's (1978) New Environmental Paradigm scale, which has been found to predict environmentally-responsible behavior, such as lower use of phosphate detergents, recycling, and reducing resource utilization. However, some researchers have critiqued the original NEP (see Tarrant & Cordell, 1997) and, to address more current environmental issues and psychometric problems in the original NEP, Dunlap, Van Liere, Mertig, and Jones (2000) revised the instrument, which is now called the New Ecological Paradigm (NEP). Both the original NEP scale and its revised version have been widely used in research. Rauwald and Moore (2002) used a subset of the original and found that it predicted support for protective environmental policies, but it was not as effective in the samples from Trinidad and the Dominican Republic. Schultz and Zelezny (1998) used the revised NEP as a measure of awareness of environmental consequences and found that it was a good predictor of a measure of environmental behavior in the United States and in Nicaragua, but not in Mexico, Peru, or Spain. They also found that the internal consistency was high in their sample from the US, but varied in samples from the other countries.

Mayer and Frantz (2004) hypothesized that the NEP would not predict behavior as accurately as their CNS and provided some evidence that the CNS predicts behavior after controlling for the NEP, while the NEP does not predict environmental behavior after controlling for the CNS. Consequently, as a secondary purpose of our study, we explored this conjecture. Last, we compared the relationship between a sense of interconnectedness and environmental behavior after controlling for environmental worldview as a possible confounding variable.

Method

Participants

Participants were drawn from a convenience sample of patrons at a farmer's market in a northern Florida college town. A non-student sample was chosen because previous studies using non-students as research participants obtained stronger relationships between relevant attitudes and behaviors (e.g. Kraus, 1995). Patrons were approached if they appeared to be over 18 years of age and if they responded to an initial question in English. Those over 18 and willing were asked to participate. The survey results include data from 97 women, 82 men, and 31 who did not specify their gender; their average age was 33.8 years, ranging from 18 to 68.

Measures

Self-Expansiveness Level Form. The Self Expansiveness Level Form (SELF; Friedman, 1983) defines a cartography of time and space constituting all with which an individual could identify. The SELF asks respondents to rate their willingness to identify with items using a 5-point Likert-scale. This study focuses on items in the SELF Transpersonal Scale (SELF-TS), seen as the broadest measure of interconnectivity. Examples of transpersonal items include: "Experiences of all life forms of which I am one" (Friedman, 1983, p. 42), "Future happenings which I will experience" (p. 42), and "The beings who might descend from me in the distant future who may not have human form" (p. 43). In initial research by Friedman (1983), reliability of the SELF-TS was supported by a test-retest correlation of .83 and by a Spearman-Brown Prophecy Formula calculation of internal reliability of .66. In that same research, construct validity was supported by differentiating a known group involving yoga students and members of a transpersonal society from controls, as well as by its correlation with the Mystical Experiences Scale (Hood, 1975) and a factor analysis suggesting three factors, one of which was a transpersonal factor. A number of additional validation studies have been conducted on the SELF-TS, including a recent study providing a comprehensive review of previous validation studies (Pappas & Friedman, 2007). In this research, the SELF-TS is used as a general model for the widest type of interconnectedness, but it should be noted that a more recent variant of this approach, the Nature Inclusive Measure (NIM; St. John & MacDonald, 2007), was developed from the SELF to more specifically measure environmental identification.

Connectedness to Nature Scale. Another recent measure, the Connectedness to Nature Scale (CNS; Mayer & Frantz, 2004), also is closely related conceptually to the construct of self-expansiveness and was found to correlate with environmental behavior (Mayer & Frantz, 2004; Frantz et al., 2005). The 14-item CNS was used as a nature-specific measure of connectedness, but it is also seen as a limited type of the overall construct of self-expansiveness (i.e., this is one domain of self-expansiveness). It contains items about the respondent's feelings of connectedness to nature, which are rated on a 5-point Likert scale from strongly agree to strongly disagree. Example questions include "I often feel a sense of oneness with the natural world around me," and "I think of the natural world as a community to which I belong" (Mayer & Frantz, 2004, p. 513). Mayer and Frantz (2004) found the internal reliability of the CNS to be adequate ($r = .84$, $n = 60$). They also found evidence for construct validity by finding statistically significant correlations between CNS scores and lifestyle scores that measured the amount of contact with nature. They then tested convergent validity and found a moderate correlation with the revised NEP ($r = .35$, $p < .01$).

Future orientation. Future orientation was measured with the Consideration of Future Consequences Scale (CFC; Strathman et al., 1994). The CFC is a 12-item scale that measures a dispositional trait for the degree to which the respondent considers future versus immediate consequences of actions (Strathman et al., 1994). It is scored on a 5-point scale with 1 representing extremely uncharacteristic (of the respondent) and 5 representing extremely characteristic. Data from four samples suggested adequate internal reliability (alpha scores of .800, .816, .860, and .805 from samples of $n = 323$, $n = 379$, $n = 153$, and $n = 138$), and two samples suggest that test-retest reliability is also adequate ($r(166) = .76$, after 2 weeks and $r(322) = .72$, after 5 weeks; Strathman et al., 1994). Strathman et al. (1994) supported the convergent validity of the CFC by showing that it was correlated with delay of gratification (see Klineberg, 1968), locus of control (see Rotter, 1966), and the Stanford Time Perspective by Zimbardo (1990). Strathman et al. (1994) also supported the predictive ability of the CFC by showing that it predicted environmental behavior, health concern, and health behavior. Future consequences also is seen as closely related conceptually to the construct of self-expansiveness, relating to identification with the future.

Environmental beliefs. Environmental beliefs were assessed using the revised NEP by Dunlap et al. (2000). They described the NEP as a measure of ecological worldview, attitudes, beliefs, and values, but Stern, Dietz, and Guagnano (1995) found that the NEP was indistinguishable from a measure of awareness of environmental consequences (as opposed to consideration of consequences). The NEP contains 15 items about beliefs related to the environment. Agreement with the odd-numbered items was coded with a 5 and disagreement was coded with a 1. The even numbered items were reverse scored (see Dunlap et al., 2000). Although the scoring used in this study corresponds to that used in the original NEP, the instructions in the current study were modified to say "please indicate whether you STRONGLY DISAGREE, MILDLY DISAGREE, are UNSURE, MILDLY AGREE or STRONGLY AGREE with it" [upper case used in the original], which is in the reverse order from the original so that the order of the number scale in the current study would correspond with the order used in the other instruments.

Dunlap et al. (2000) relied on the validity of the earlier version of the NEP by Dunlap and Van Liere (1978), but also found that the revised NEP was correlated with a 10-item measure of self-reported environmental behavior. Dunlap and Van Liere (1978) conducted a known-group test of the validity of the original NEP. The higher scores from the environmental group versus the general sample provided support for the NEP's construct validity. Research has supported the predictive validity of the NEP by using it to predict recycling, avoiding environmentally damaging products, and other such behaviors (Dunlap & Van Liere, 1978; Tarrant & Cordell, 1997).

Environmental behavior. The measure of environmental behavior used in this study was a 6-item measure previously used by Joireman et al. (2001). They found that it had adequate internal reliability (alpha = .65). The dichotomously scored questions on the survey pertained to signing petitions for or contributing to environmental causes, product selection based on environmental attributes, voting for political candidates for environmental reasons, membership in environmental groups, and reading publications by environmental groups. One version of the questionnaire includes the 6-item environmental behavior measure first and the other version includes it after the CNS and CFC.

Procedure

A survey approach was used to explore the relationships among environmental behavior, connectedness, future orientation, and environmental beliefs. Participants were asked to complete a questionnaire containing demographic background information and several measures. Two versions of the survey were used to counter-balance for the possibility that there might be effects from asking environmental behavior questions on the measures, and vice versa. One version presented the environmental behavior questions first, while the other presented them later.

Hypotheses

Hypothesis 1: There will be a significant correlation between the SELF-TS and both the CNS and CFC as measures of more specific types of interconnectivity, as well as between the CNS and CFC.

Hypothesis 2: There will be a significant correlation between all 3 measures of connectivity and a measure of environmental behavior.

Hypothesis 3: There will be a significant difference in the ability to predict environmental behavior between an environment-specific measure of connectedness (the CNS) and the broader measure of self-expansiveness (SELF-TS).

Hypothesis 4: There will be a significant correlation between the CNS and environmental behavior after controlling for environmental beliefs.

Hypothesis 5: Future orientation will interact with the CNS in the prediction of environmental behavior.

Results

Although 210 people participated in the survey, some of their responses were incomplete and four participants coded non-standard answers to the behavior questions (those responses were coded as missing values). Consequently, the number of observations varied with each analysis. There were 195 valid observations used for a regression that included environmental behavior, CFC, and CNS; and 157 observations for a regression that added the NEP to the analysis. Of the 210 participants who completed at least one survey page, 165 completed the NEP, which was on the last page of the survey.

There were no statistically significant or any other difference found in the mean of any variable based on survey-question order or for those who completed the entire survey, as compared to only part of it. See Table 1 for a summary of the main findings. Although the exact

Table 1. Correlations

	1	2	3	4	5	6	7	8	9	10
EB	—	.374***	.415***	.484***	.114	.124	.421***	.262***	–.069**	.099
CNS-T		—	.387**	.395***	.336***	.466***	.865***	.170*	–.058	–.129
CFC-T			—	.360***	.259***	.285***	.749***	.081	–.194**	.036
NEP-T				—	.073	.220**	.416***	.008	.044	–.040
SELF					—	.723***	.343***	–.012	–.136	–.231**
SELF-TS						—	.446***	–.006	–.006	–.235**
CFC x CNS-T							—	.167*	–.123	–.034
Age								—	–.022	.218**
Gender									—	–.048
Education										—

EB = environmental behavior; CNS = Connectedness to Nature Scale; CFC = Consideration of Future Consequences; NEP = New Ecological Paradigm; SELF = Self-Expansiveness Level Form; SELF-TS = the Transpersonal Subscale of the SElF; Variable names ending with *–T* have been transformed to reduce skewness and improve normality.

*$p. < .05$ **$p. < .01$ ***$p. < .001$

participation rate of those approached was not recorded, it is estimated that approximately one third of those solicited completed at least part of the survey form.

Gender Effects

There were notable gender effects for only two variables. The mean environmental behavior score for female participants (M = 4.13, n = 97, SD = 1.692) was higher than that for male participants (M = 3.78, n = 76, SD = 1.738), but the difference was not statistically significant. The mean untransformed CFC score for female participants (M = 49.34, n = 97, SD = 5.885, mean per item = 4.11) was higher than that for male participants (M = 46.60, n = 82, SD = 5.813, mean per item = 3.84) and was statistically significant ($t(172) = 3.664$, $p < .001$). The gender difference for CFC is consistent with the results of Petrocelli (2003) whose study of 664 college students found a statistically significant difference between the scores on the CFC for female versus male participants, with female participants scoring higher.

Data Transformations

The distribution of environmental behavior scores exhibited a ceiling effect with the most frequent score being the maximum value of 6 (see Table 2). This distribution was irreparably nonnormal and was not transformed.

The CNS, CFC, and NEP distributions exhibited statistically significant skewness, kurtosis, and lack of normality. Hartwig and Dearing (1979) recommended the use of transformations when the intervals between items on a scale lack lack objective significance. In this study, skewness was not interpreted to mean that the underlying populations were skewed, but that the scales used to tap normally distributed populations did not maintain consistent intervals. Researchers have used transformations, including an x^2 transformation, to correct skewness in the CFC (see Joireman, Anderson, & Strathman, 2003; Joireman et al., 2004). This type of ordinary transformation did not adequately correct the skewness and normality problems in this study, but a power transformation proved effective. The form of the transformation used was

Table 2. Frequency Table Environmental Behavior

Score	Frequency
0	7
1	9
2	35
3	26
4	37
5	43
6	49

$$x_T = \frac{x^{\lambda} - 1}{\lambda} \quad (\lambda \neq 0)$$

This form was inspired by Box and Cox (1964), but the lambda values were set to minimize skewness. The transformations improved skewness, kurtosis, and normality for the CNS and NEP, but did not produce normality in the CFC. Transformation constants (lambda) for the CNS, CFC, and NEP were 3.1, 2.4, and 2.8 respectively. Transformed values for these three variables were used in each analysis unless noted otherwise. The transformed CFC variable lacked normality because of the spikes in the distribution of the original variable, but the overall shape of the transformed distribution appeared normal. Last, although the SELF-TS did not exhibit statistically significant skewness or kurtosis, it did fail tests of normality, but this variable was not transformed because the lack of normality was caused by spikes that were not correctable.

Hypotheses

1. The Pearson correlation between the SELF-TS and the CNS was .466, while for the CFC it was .285 ($p < .001$ for both). The Pearson correlation between the CNS and the CFC was .387 ($p < .001$). These support the hypothesis that these measures are all tapping into similar aspects of interconnectivity.

2. The Pearson correlation between CNS and environmental behavior was statistically significant ($r(202) = .374$, $p < .01$), as was the Pearson correlation between CFC and environmental behavior ($r(195) = .415$, $p < .01$), but the correlation between the SELF-TS and environmental behavior was not ($r(178) = .124$, ns).

3. The difference in correlative strength between the correlations using the CNS and the SELF-TS was tested using Fisher's r to Z transformation (see Blalock, 1979) and found to be statistically significant ($t(381) = 2.604$, $p < .01$).

4. The partial correlation between the CNS and environmental behavior while controlling for the NEP was statistically significant ($r(154) = .228$, $p < .01$) as was the partial correlation between the NEP and environmental behavior while controlling for the CNS ($r(154) = .391$, $p < .001$). Although the NEP partial correlation appeared to be somewhat stronger than that of the CNS, the difference between the two correlations was not statistically significant ($t(309) = 1.59$, ns) at an alpha level of .05.

Because Mayer and Frantz (2004) made claims about partial correlations that corresponded to Baron and Kenny's (1986) description of mediation, results from both studies were examined for mediator status. Although the key criteria for mediation is when a previously significant correlation is no longer significant after controlling for a mediator variable, Baron and Kenny (1986) provided a less formal suggestion for cases in which the partial correlation does not reduce the independent-dependent correlation to zero. That suggestion is that "a significant reduction demonstrates that a given mediator is indeed potent" (Baron & Kenny, 1986, p. 1176). A strict interpretation of this would be that the correlation between independent and dependent variable would drop by a statistically significant amount when the mediator is added to a partial correlation. To test if either the CNS or NEP acted as a mediator for the other variable, the drops in correlation were tested. Table 3 shows that none of the drops in correlation reached statistical significance.

Table 3. Tests of Differences Between Correlations and Partial Correlations[a]

	CNS	CNS[b]	*t*	NEP	NEP[c]	*t*
Ecological behavior[d] (n)	.44** (65)	.42** (65)	0.14	.20* (65)	.15 (65)	0.29
Environmental behavior (n)	.374*** (204)	.228** (156)	1.41	.484*** (160)	.391*** (156)	1.01

CNS = Connectedness to Nature Scale; NEP = New Ecological Paradigm

*$p. < .05$ **$p. < .01$ ***$p. < .001$

a Tests were conducted using Fisher's r to Z transfomation

b Controlling for NEP

c Controlling for CNS

d Ecological behavior from Mayer and Frantz (2004)

5. The Pearson correlation between environmental behavior and the interaction between CFC and CNS was statistically significant ($r(194) = .421$, $p < .001$), but a better measure of the predictive value of the interaction term is how it contributes to a multiple regression that contains the other two variables. The coefficient of the interaction term in such a regression was statistically significant (*beta* = –.585, $p < .05$), but its sign was opposite of expectations (see Table 4).

Regression Models

A planned regression of environmental behavior on CNS, CFC, and the interaction of the two variables was statistically significant ($F(3, 192) = 20.147$, $p < .001$, adjusted $R^2 = .228$) as were the coefficients for CNS (*beta* = .635, $p < .001$), CFC (*beta* = .609, $p < .001$), and the interaction of the two (*beta* = –.585, $p < .001$). Because there was a statistically significant gender effect for CFC, the first regression was run for male and female participants separately. Separate regressions were used instead of a dummy variable to account for the possibility there were nonlinear relationships between gender and the other variables (e.g., a possible gender difference in the interaction term). The coefficient for CFC was statistically significant for both male and female participants. Although the coefficients for CNS and the interaction between CNS and CFC were statistically significant for female participants only, the differences in coefficient values between the male and female participants were not statistically significant. See Table 4 for a summary of regression analyses.

An unplanned regression of CNS, CFC, and NEP on environmental behavior showed that all three variables were statistically significant with NEP being the strongest predictor. The results are displayed in Table 4.

Discussion

Using a convenience sample of patrons of a farmer's market, our results evidence that two specific measures of interconnectedness, which relate to the

Table 4. Regression Analysis for Dependent Variable: Environmental Behavior

	Coefficients		Model Attributes		
	beta	*t*	Adj R^2	*df*	*F*
Model 1			.239	195	20.147***
Constant		–.442			
CNS-T	.635	3.169***			
CFC-T	.609	3.960***			
CFC x CNS-T	–.585	-2.087			
Model 2 (female)			.230	92	10.154***
Constant		–1.112			
CNS-T	1.205	3.681***			
CFC-T	.650	3.090***			
CFC x CNS-T	–1.207	–2.756			
Model 3 (male)			.227	75	8.322***
Constant		–.704			
CNS-T	.621	1.952			
CFC-T	.690	2.904			
CFC x CNS-T	–.583	–1.384			
Model 4			.274	157	20.710***
Constant		1.093			
CNS-T	.158	2.028*			
CFC-T	.199	2.604**			
NEP-T	.332	4.380***			

CNS = Connectedness to Nature Scale; CFC = Consideration of Future Consequences; NEP = New Ecological Paradigm; Variable names ending with *–T* have been transformed to reduce skewness and improve normality.

*$p. < .05$ **$p. < .01$ ***$p. < .001$

larger construct of self-expansiveness, can predict environmental behavior. This understanding fills a gap in the current body of research by providing preliminary evidence that interconnectedness (both with nature and the future) contribute to the prediction of environmental behavior both directly and through their interaction. The finding that a nature-specific measure of connectedness (the CNS) has a stronger correlation with environmental behavior than does a broader measure of connectedness (the SELF-TS) is consistent with the research of Ajzen and Fishbein (1977) who suggested that more specific measures of attitudes would yield higher correlations with behavior than would less specific measures. Our results are also a reminder that improved prediction of environmental behavior might require refinement of other general predictors of environmental behavior, such as a nature-specific measure of future orientation.

Contrary to the past findings of Mayer and Frantz (2004), the CNS was not found to be a better predictor of environmental behavior after controlling for the NEP than the NEP was after controlling for the CNS. Mayer and Frantz (2004) made explicit claims that the CNS would predict behavior better than the NEP and also noted that the correlation between the CNS and environmental behavior while controlling for the NEP was better than the other partial correlation. The data in Table 3 does not provide support of any statistically significant mediator effects of the CNS or NEP in correlations with environmental behavior.

The nominal differences in correlations between the two studies among CNS, NEP, and environmental behavior might be a result of the smaller sample size in the Mayer and Frantz (2004) study or the different measures of environmental behavior. Some items in the current study might have reflected mere support for environmental principles, whereas Mayer and Frantz (2004) measured specific behaviors that might involve some degree of personal sacrifice.

Support was found for the interaction between future orientation and connectedness, but the sign of the coefficient was negative when it was expected to be positive. The coefficient for this variable was expected to be positive based on the theory that people with high connectedness to nature and high future orientation would be strongly motivated to minimize long-term adverse impact on nature. A possible ceiling effect in the environmental behavior data might have affected the results for participants who had very high CNS and very high CFC and did not have the possibility to score a higher environmental behavior score because they already reached the maximum score. If future studies replicate the negative coefficient for the interaction term, it might suggest the counterintuitive condition in which people with very high future orientation and connectedness to nature become concerned about many topics, such that dedication to the environment becomes diffuse and actually decreases. Such a finding would be consistent with the work of Carlo et al. (1999) who found that manipulated levels of oneness increased helping behavior only in those with lower dispositional levels of personal distress. They suggested that high levels of personal distress disrupt the activation of empathy. Future research could be used to explore the interaction of the CNS and CFC while using a more comprehensive measure of environmental behavior and perhaps a measure of dispositional level of personal distress to explore the relationships suggested by Carlo et al. (1999). Future research could also expand on the current study by using a more representative sample of participants.

The difference between a nature-specific measure of connectedness and a broader measure of self-expansiveness in the prediction of environmental behavior was notable and in the predicted direction but was not statistically significant. The results add to the work of Ajzen and Fishbein (1977) whose review of research suggested that measures of attitudes and behaviors that closely correspond to each other are more predictive than measures that are more distantly related. The results are also consistent with Schultz and Zelezny (1998), who found that a nature-specific measure of self-transcendence predicted environmental behavior better than a general measure did.

As humanity faces the onset of likely environmental crises, technological advances and macrosocial interventions can undoubtedly be of great benefit. But increased understanding of how people might experience an increased sense of interconnectedness, such as with both nature and the future, could also facilitate the selection of workable pathways toward environmental sustainability. We believe these types of interconnectedness can be best understood from a transpersonal perspective, congruent with Friedman's (1983) model of self-expansiveness, and that encouraging this perspective could provide an important avenue for not only environmental sustainability but also for the very survival of humanity.

References

Ajzen, I., & Fishbein, M. (1977). Attitude–behavior relations: A theoretical analysis and review of empirical research. *Psychological Bulletin*, *84*(5), 888-918.

Allen, J. B., & Ferrand, J. L. (1999). Environmental locus of control, sympathy, and proenvironmental behavior: A test of Geller's actively caring hypothesis. *Environment and Behavior*, *31*(3), 338-353.

Archer, R. L., Diaz-Loving, R., Gollwitzer, P. M., Davis, M. H., & Foushee, H. C. (1981). The role of dispositional empathy and social evaluation in the empathic mediation of helping. *Journal of Personality and Social Psychology*, *40*(4), 786-796.

Aron, A., Aron, E. N., Tudor, M., & Nelson, G. (1991). Close relationships as including other in the self. *Journal of Personality and Social Psychology*, *60*(2), 241-253.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173-1182.

Batson, C. D. (1997). Self-other merging and the empathy-altruism hypothesis: Reply to Neuberg et al. (1997). *Journal of Personality and Social Psychology*, *73*(3), 517-522.

Batson, C. D., Sager, K., Garst, E., Kang, M., Rubchinsky, K., & Dawson, K. (1997). Is empathy-induced helping due to self-other merging? *Journal of Personality and Social Psychology*, *73*(3), 495-509.

Blalock, H. M. J. (1979). Social statistics (Revised 2nd ed.). New York, NY: McGraw-Hill. Box, G. E. P., & Cox, D. R. (1964). An analysis of transformations. *Journal of the Royal Statistical Society*, *Series B (Methodology)*, *26*(2), 211-252.

Carlo, G., Allen, J. B., & Buhman, D. C. (1999). Facilitating and disinhibiting prosocial behaviors: The nonlinear interaction of trait perspective taking and trait personal distress on volunteering. *Basic and Applied Social Psychology*, *21*(3), 189-197.

Cialdini, R. B., Brown, S. L., Lewis, B. P., Luce, C., & Neuberg, S. L. (1997). Reinterpreting the empathy-altruism relationship: When one into one equals oneness. *Journal of Personality and Social Psychology*, *73*(3), 481-494.

Coke, J. S., Batson, C. D., & McDavis, K. (1978). Empathic mediation of helping: A two-stage model. *Journal of Personality and Social Psychology*, *36*(7), 752-766.

Davis, M. H., Conklin, L., Smith, A., & Luce, C. (1996). Effect of perspective taking on the cognitive representation of persons: A merging of self and other. *Journal of Personality and Social Psychology*, *70*(4), 713-726.

Dunlap, R. E., & Van Liere, K. D. (1978). The "new environmental paradigm." *Journal of Environmental Education*, *9*(4), 10-19.

Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues*, *56*(3), 425-442.

Frantz, C., Mayer, F. S., Norton, C., & Rock, M. (2005). There is no "I" in nature: The influence of self-awareness on connectedness to nature. *Journal of Environmental Psychology*, *25*(4), 427-436.

Friedman, H. (1983). The self-expansiveness level form: A conceptualization and measurement of a transpersonal construct. *Journal of Transpersonal Psychology*, *15*(1), 37-50.

Gilliom, R. J., Barbash, J. E., Crawford, C. G., Hamilton, P. A., Martin, J. D., Nakagaki, N., ... Wolock, D. M. (2007). Pesticides in the nation's streams and ground water, 1992-2001. U.S. Geological Survey circular 1291.

Hartwig, F., & Dearing, B. E. (1979). *Exploratory data analysis*. Beverly Hills, CA: Sage.

Hood, R. (1975). The construction and preliminary validation of a measure of reported mystical experience. *Journal for the Scientific Study of Religion*, *14*(1), 29-41.

Hoot, R. (2009). Transpersonal feelings of environmental interconnectedness and environmental behavior (Unpublished master's thesis, Walden University, Minneapolis, MN).

Joireman, J. A., Anderson, J., & Strathman, A. (2003). The aggression paradox: Understanding links among aggression, sensation seeking, and the consideration of future consequences. *Journal of Personality and Social Psychology*, *84*(6), 1287-1302.

Joireman, J. A., Lasane, T. P., Bennett, J., Richards, D., & Solaimani, S. (2001). Integrating social value orientation and the consideration of future consequences within the extended norm activation model of proenvironmental behaviour. *British Journal of Social Psychology*, *40*(1), 133-155.

Joireman, J. A., Van Lange, P. M., & Van Vugt, M. (2004). Who cares about the environmental impact of cars? Those with an eye toward the future. *Environment and Behavior*, *36*(2), 187-206.

Klineberg, S. L. (1968). Future time perspective and the preference for delayed reward. *Journal of Personality and Social Psychology*, *8*(3 pt. 1), 253-257.

Kraus, S. J. (1995). Attitudes and the prediction of behavior: A meta-analysis of the empirical literature. *Personality and Social Psychology*, *21*(1), 58-75.

Maner, J. K., Luce, C. L., Neuberg, S. L., Cialdini, R. B., Brown, S., & Sagarin, B. J. (2002). The effects of perspective taking on motivations for helping: Still no evidence for altruism. *Personality and Social Psychology Bulletin*, *28*(1), 1601-1610.

Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology*, *24*(4), 503-515.

Meehl, G. A., Stocker, T. F., Collins, W. D., Friedlingstein, P., Gaye, A. T., Gregory, J. M., ... Zhao, Z.-C. (2007). Global climate projections. In S. Solomon et al. (Eds.), Climate change 2007: The physical science basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (chap. 10, pp. 747-846). Cambridge, UK: Cambridge University Press.

Messick, D. M., & McClintock, C. G. (1968). Motivational basis of choice in experimental games. *Journal of Experimental Social Psychology*, *4*(1), 1-25.

Neuberg, S. L., Cialdini, R. B., Brown, S. L., Luce, C., Sagarin, B. J., & Lewis, B. P. (1997). Does empathy lead to anything more than superficial helping? Comments on Batson et al. (1997). *Journal of Personality and Social Psychology*, *73*(3), 510-516.

Pappas, J., & Friedman, H. (2007). The construct of self-expansiveness and the validity of the Transpersonal Scale of the Self-Expansiveness Level Form. *The Humanistic Psychologist*, *35*(4), 323-347.

Petrocelli, J. V. (2003). Factor validation of the Consideration of Future Consequences Scale: Evidence for a short version. *The Journal of Social Psychology*, *143*(4), 405-413.

Rauwald, K. S., & Moore, C. F. (2002). Environmental attitudes as predictors of policy support across three countries. *Environment and Behavior*, *34*(6), 709-739.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs*, *80*(1), 1-28.

Schultz, P. W. (2000). Empathizing with nature: The effects of perspective taking on concern for environmental issues. *Journal of Social Issues*, *56*(3), 391–406.

Schultz, P. W., Shriver, C., Tabanico, J. J., & Khazian, A. M. (2004). Implicit connections with nature. *Journal of Environmental Psychology*, *24*(1), 31-42.

Schultz, P. W., & Zelezny, L. C. (1998). Values and proenvironmental behavior: a five-country survey. (Mexico, Nicaragua, Peru, Spain, and United States). *Journal of Cross-Cultural Psychology*, *29*(4), 540-558.

Schwartz, S. H. (1968). Awareness of consequences and the influence of moral norms on interpersonal behavior. *Sociometry*, *31*(4), 355-369.

Schwartz, S. H. (1974). Awareness of interpersonal consequences, responsibility denial, and volunteering. *Journal of Personality and Social Psychology*, *30*(1), 57-63.

Schwartz, S. H. (1977). Normative influence on altruism. In L. Berkowitz (Ed.), *Advances in experimental social psychology (Vol. 10)*. New York, NY: Academic Press.

Speth, J. G. (1992). The transition to a sustainable society. *Proceedings of the National Academy of Sciences of the United States of America*, *89*, 870-872.

St. John, D., & MacDonald, D. A. (2007). Development and initial validation of a measure of ecopsychological self. *The Journal of Transpersonal Psychology*, *39*(1), 48-67.

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

Strathman, A., Gleicher, F., Boninger, D. S., & Edwards, C. S. (1994). The consideration of future consequences: Weighing immediate and distant outcomes of behavior. *Journal of Personality and Social Psychology*, *66*(4), 742-752.

Tarrant, M. A., & Cordell, H. K. (1997). The effect of respondent characteristics on general environmental attitude-behavior correspondence [Electronic version]. *Environment and Behavior*, *29*(5), 618-637.

United Nations Environment Programme. (2006). Marine and coastal ecosystems and human well-being. Nairobi, Kenya: Author.

Zimbardo, P. G. (1990). *The Stanford Time Perspective Inventory*. Stanford, CA: Stanford University.

Note

1. This paper is partially based on Hoot's (2009) master's thesis.

About the Authors

Harris Friedman, PhD, is a consulting and clinical psychologist. He has taught and held leadership positions at several universities, and recently retired as Research Professor of Psychology at University of Florida and Professor Emeritus at Saybrook University. He continues to supervise dissertations at a number of schools, including Walden and Northcentral, as well as Saybrook Universities. He has over 100 professional publications, mainly in the area of transpersonal psychology and spirituality. He is a Fellow of the American Psychological Association, and serves as Senior Editor of the *International Journal of Transpersonal Studies* and Associate Editor of *The Humanistic Psychologist*. His most recent books, both co-edited with Stanley Krippner in 2010 and published by Praeger, are *Mysterious Minds* and *Debating Psychic Experiences*.

Robert Hoot is a PhD student in Psychology at Walden University, currently studying the perceived moral permissibility of actions that harm nature and how those conceptions of morality relate to connectedness to nature. He can be contacted at robert.hoot@waldenu.edu

About the Journal

The *International Journal of Transpersonal Studies* is a peer-reviewed academic journal in print since 1981. It is published by Floraglades Foundation, and serves as the official publication of the International Transpersonal Association. The journal is available online at www.transpersonalstudies.org, and in print through www.lulu.com (search for IJTS).