

## CORRELATES OF ENVIRONMENTAL BEHAVIORS Bringing Back Social Context

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**ABSTRACT:** Surveys are an efficient and convenient means of collecting data on individuals' environmental concerns and environmental behaviors, two domains between which a tenuous relationship is often observed. One aspect of tenuousness is addressed by identifying distinct subdimensions of self-reported private environmental behaviors. Survey methods more often than not fail to account for the social context within which individuals are environmentally concerned and behave in an environmentally friendly way. The problem of social context is addressed by developing a measure of social networks that includes participation, volunteering, and face-to-face contact with friends in environmental organizations. Evidence is taken from surveys among organized environmentalists and the general population in Norway in 1995 ( $N = 3,111$ ). Social context is the only variable that significantly augments environmental behaviors across all subdimensions. Its effect is comparable to sociodemography, political attitudes, and environmental knowledge and concern combined.

**The field of environmental research** has made some progress in identifying correlates of environmental *concern* (i.e., age, education, and radicalism). But the literature is less consistent in identifying correlates of environmental *behavior*. It has also been shown that environmental concern sometimes fails to predict such behavior.<sup>1</sup> Studies have therefore concluded that



the environmental attitude-behavior correspondence (ABC) is tenuous (e.g., Ajzen & Fishbein, 1977; Axelrod & Lehman, 1993; Diekmann & Preisendorfer, 1998; Kraus, 1995; Newhouse, 1990; Schultz & Oskamp, 1996). If a weak ABC really exists, researchers will unearth a tenuous relationship between attitudes and behaviors regardless of how it is measured. Tenuousness could be reduced, however, if measurement were more precise and detailed.

If a strong ABC exists, but empirical results are weak, three possible explanations may apply. First, researchers might expect too much from statistical estimates. For example, they might underestimate empirical relationships through the correlation coefficient (Achen, 1977; Kraus, 1995; Ozer, 1985; Rosenthal, 1990). For example, Andrews and Withey (1974, pp. 13-16) report that two identical questions on life satisfaction posed at an interval of approximately 10 minutes in the same survey only correlated at .61. Although the correlation entails that 92% of the respondents ticked the same or an adjacent category on the 7-point scale, it nevertheless means that the item at Time 1 statistically explains 37% of the identical item at Time 2. In the context of surveys, therefore, a correlation coefficient of .61 represents an attitudinal tautology.

Second, measurement might be technically incorrect and/or conceptually imprecise. The observed relationship between attitudes and behaviors becomes statistically and empirically stronger when it is correctly measured at the same level of specificity (Ajzen & Fishbein, 1977; Axelrod & Lehman, 1993; Kaiser, Wolfing, & Fuhrer, 1999; Kraus, 1995; Steel, 1996; Vining & Ebreo, 1992); for example, "attitude and intentions to recycle household newspapers were significant predictors of recycling behavior" (Boldero, 1995, p. 440).

Third, social context and external factors might be neglected. Because a number of environmentally friendly activities are performed for rather different reasons within different contexts (Hallin, 1995; Mårtensson & Petterson, 1997), low ABCs may stem from a failure to account for social contexts and potentially influencing factors external to the relationship under study.

The aim of this article is to contribute to the field of environmental behavior studies by exploring social context through Norwegian surveys on en-

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vironmentalism. We examine both general and more specific private behaviors and analyze the extent to which they can be explained. We complement the correlates of environmental and ecological attitudes with sociodemographics, political attitudes, environmental knowledge, and social context. Social context is measured through participation in environmental organizations, frequency of volunteering, and face-to-face contact with friends in the organization. Our measure of social context as participation allows us to distinguish the general public from active as well as inactive members of environmental organizations.

### CORRELATES OF ENVIRONMENTAL BEHAVIOR

It is not implausible to assume that correlates of environmental concern (i.e., low age, political radicalism, and high education, Jones & Dunlap, 1992) are also closely related to environmental behavior. But research has shown that the two sets of correlates are not always identical (e.g., Nord, Luloff, & Bridger, 1998). In a meta-analysis, Hines, Hungerford, and Tomera (1986/1987) showed that verbal commitment was most strongly correlated (i.e., corrected correlation coefficients) with environmental behavior ( $r = .49$ ), followed by attitude ( $r = .35$ ), knowledge ( $r = .30$ ), educational level ( $r = .19$ ), and income ( $r = .16$ ). Age and gender were statistically unrelated to environmental behavior in their analyses. In another meta-analysis (Kraus, 1995), where attitudes and behavior were found to correlate on average at .38 (p. 69), Kraus concluded that ABC will increase when behavior is self-reported and when respondents are nonstudents. ABC has also been shown to improve with level of specificity and when behaviors are easily performed (Stern, 1992). In this article, we select and review four sets of correlates: sociodemographics, political attitudes, environmental attitudes (including environmental knowledge), and social context.

Although some progress has been made in identifying the sociodemographic correlates of environmental concern (e.g., Jones & Dunlap, 1992; Lowe & Rüdig, 1986; Milbrath, 1984; Stern & Dietz, 1994; Van Liere & Dunlap, 1980, 1981), there has been less empirical and theoretical progress in examining the relationship between these correlates and environmental behavior.

The relationship between gender and environmental concern is uncertain (Davidson & Freudenburg, 1996; Mohai, 1992; Stern, Dietz, & Kalof, 1993). Ecofeminists have claimed that women are able to understand relationships in nature better than men by virtue of their role as life givers and their

experience of unification with nature as “an oppressed party in the patriarchal hierarchy of God-man-woman-nature” (Eckersley, 1992; Salleh, 1984). But so far, there is little empirical evidence that environmental concern is consistently more widespread among women than men. As for its effect on behavior, Hines et al. (1986/1987) find no correlation between gender and behavior in their meta-analysis of studies from the period 1971 to 1986, and five studies examined by Schultz, Oskamp, and Mainieri (1995) also fail to show a relationship between gender and recycling behavior. Van Liere and Dunlap (1980) and McStay and Dunlap (1983) found that women were more prone than men to engage in environmental behaviors when these were private, personal, and related to the household. The latter study also found that men were more active in public (e.g., defending an environmentalist perspective on the political scene). In general, there is a weak tendency for women to be more environmentally concerned but environmentally less active than men (Mohai, 1992).

In general terms, young people are more environmentally concerned than older people. This is due to their being less committed to the traditional and material values of economic growth, less integrated into the dominant social order, and thereby less affected by conflicts between environmental concern and economic interests than older people (Jones & Dunlap, 1992; Malkis & Grasmick, 1977). The effect of age on environmental behavior, however, suggests a more complex relationship, as it has not been possible to establish consistent significant correlations between age and environmental behaviors (Dietz, Stern, & Guagnano, 1998; Hines et al., 1986/1987; Schultz et al., 1995; Van Liere & Dunlap, 1980). Scott (1999) found high age to be a significant predictor of household recycling intensity, whereas Hallin (1995) found that high age correlated positively with environmental behavior but negatively with support for the new environmental paradigm. This seemingly contradictory result makes sense once the universal effect of aging is separated from the effect of cohort (i.e., when a person is born). Although older people may have more time for environmental behaviors, the behaviors of the cohort raised during the depression of the 1930s may be rooted in personal experiences of scarcity or childhood socialization of prudent husbanding. These experiences, in turn, may have led to general behaviors of frugality and thrift that are independent of general environmental concern, as phrased in odd metaphors such as *spaceship earth*. The age cohorts born in more recent decades, on the other hand, who experienced that environmental problems are addressed head on, can be deliberately, but not necessarily successfully, taught to behave in an environmentally friendly way within an affluent society (Mårtensson & Petterson, 1997).

Higher education is, in general, positively associated with environmental concern. More highly educated people are more exposed to and able to understand environmental information, thereby cultivating “the ability to think critically, question everyday assumptions [and] form an independent judgment” (Eckersley, 1989, p. 221; see also 1992, p. 63). The empirical literature on the effect of education on behavior is less consistent. Although Hines et al.’s (1986/1987) meta-analysis found those with higher education to be slightly more likely to engage in environment-friendly behavior, Schultz et al. (1995) found a significant correlation in only three out of six studies. Of the three studies examining environmental behavior reviewed by Van Liere and Dunlap (1980), two showed significant positive correlations between these variables.

From an environmental perspective, farming can be seen as an ambiguous activity: “being out in nature” may qualify as environmental behavior whereas an extractive occupation may not. But the appreciative-extractive dichotomy that researchers have found to correlate with rural-urban residence (e.g., Arcury, Johnson, & Scollay, 1986) is countered by a study of Austrian farmers showing a strong relationship between attitude and behavior (Kowalewski, 1994; Sullivan, McCann, de Young, & Erickson, 1996; Vogel, 1996). Our interest in this issue is whether the experience of farm life is conducive to environmentally friendly behavior. Such an approach must also factor in the generational distance from farm life. Similarly, the rural-urban distinction serves as another proxy for extractive-nonextractive occupations (Van Liere & Dunlap, 1980). Rural residents have a more utilitarian approach to nature because their survival depends more directly on it, whereas urban residents’ nonutilitarian approach to nature may be strengthened by the pollution and environmental degradation they face in the cities. Being urban dwellers, however, provides no guarantee that they are trying to do away with pollution and decay. And rural residents, on the other hand, may face nature at their doorsteps, thereby making it easier to exhibit environmentally friendly behavior by some standards (e.g., some surveys include the item “I am often out in nature”). In short, the rural-urban distinction has never been a strong indicator of environmental concern or behavior because it may be too vague and encompassing.

Dependence on the public sector may indicate both employment and being at the receiving end of the welfare system (e.g., retirement and social security). As for those employed in the public sector, environmental policies represent one means of extending the regulatory welfare state of which they are a part and on which they depend (Dunlap, 1975; Eckersley, 1989). The basic assumption about the relationship between income and environmental

behavior is that affluence leads to a postmaterial value shift, of which environmental concern is a component (Inglehart, 1977, 1997). When material well-being is sustained for a number of years, new generations can give priority to postmaterial values such as equality, political participation, and a clean environment. Higher income enables individuals to spend proportionately less on material necessities such as food and shelter.

Two political attitudes have been identified as being conducive to environmental concern. First, because political radicals (or liberals) are less integrated into the "dominant social paradigm," they would be expected to be more willing to support an agenda seeking social and environmental change (Dunlap, 1975; Dunlap, Van Liere, Mertig, Catton, & Howell, 1992; Lowe & Rüdiger, 1986). Those who report a radical political position are therefore also expected to behave in a more environmentally friendly way. Second, cultural analysts argue that environmental concern arises from an egalitarian cultural bias for redistributive concern (Douglas & Wildavsky, 1982; Wildavsky, 1991). O'Riordan (1981) argues that the "classic ecocentric proposal is the self-reliant community" (p. 307) where any authority is challenged and decision making is consensual. Recent studies show that egalitarianism correlates well with environmental concern (see Dake, 1991; Ellis & Thompson, 1997; Grendstad & Selle, 1999). With regard to the participatory aspects of this culture, we also expect egalitarianism to correlate with environmentally friendly behavior.

There exist a number of different scales that on the basis of different assumptions, measure environmental attitudes or concern. Here we limit the analyses to the New Environmental Paradigm Scale (NEP) (Dunlap & Van Liere, 1978) and to an ecocentrism scale (Eckersley, 1992).<sup>2</sup> Support for the new environmental paradigm, as opposed to the dominant social paradigm, implies a belief that the interests of nature should have priority over human interests. This shift in perspective represents the core value of environmentalism. The NEP scale has been used frequently and has proved to be a valid and reliable indicator of environmental concern. Previous research using the NEP scale to examine the attitude-behavior relationship has found the scale to be a significant predictor of recycling behavior (Vining & Ebreo, 1992). But another study questions the NEP Scale's effect on environmental behavior (Scott & Willits, 1994). This study utilizes the revised 15-item version of the New Ecological Paradigm Scale (NEP2). Dunlap and associates (1992) found a positive correlation between support for the NEP2 Scale, environmental policies, and a broader measure of environmental behaviors.

According to Eckersley's (1992) ecocentric perspective, environmental problems stem from humans placing themselves above nature when they should regard themselves as a small part of the entire ecology. From this

perspective, an ecologically more benign environment can be achieved only if humans show respect for the intrinsic value of all living creatures and extend their definition of Self to include nonhuman sentient beings. Eckersley's (1992) version of ecocentrism consists of autopoietic intrinsic value theory (i.e., that anything able to reproduce itself has intrinsic value), transpersonal/deep ecology, and ecofeminism (pp. 49-71). Critics of ecocentrism claim that it is too abstract and that its impractical nature prevents adherents from committing themselves to ecological policies or to environmentally correct behavior (Dobson, 1995; Lynch, 1996; Salleh, 1984). Barry (1994) criticizes ecocentrists for being too concerned with cosmological and metaphysical speculations that offer little practical moral guidance on concrete action: Deep ecology "claims too much and delivers too little" to green politics (p. 381). However, Grendstad and Wollebaek (1998) found a moderate correlation between ecocentrism and environmental behavior ( $r = .22$ ), which suggests that ecocentrism may be less abstract and more frequently associated with environmental behavior than critics have suggested.

Davidson and Freudenberg (1996), in their review of the literature, found so little support for the null hypothesis, in which increased environmental knowledge led to decreased environmental concern, that it could be discarded. Although they failed to find conclusive evidence on the opposite hypothesis, other researchers have found correlations between environmental knowledge and concern (e.g., Arcury et al., 1986). Schann and Holzer (1990, p. 773) assume that if behavior is to have an effect on environmental protection, a certain amount of information is necessary. Hines et al. (1986/1987) report a moderately strong metacorrelation between knowledge and environmental behavior ( $r = .30$ ), thus offering some empirical support to this presumption.

Making a distinction between organized environmentalists and the general population allows us to study the ways in which commitment and social context affect environmental behavior. Furthermore, we expect members in environmental organizations to outperform the general public on environmental concern and behavior (e.g., Ellis & Thompson, 1997; Hines et al., 1986/1987). On one hand, participation in an organization can be viewed as a personal commitment to behaviors that are expressed verbally, and on the other hand, as the issuing of a social permit for others to monitor one's environmental commitment (Cook & Berrenberg, 1981, pp. 87-91). Within these constraints, members can be differentiated according to their intensity of activity, or participation, in the organization. If the environmental behaviors in question are private, it is likely that peers will monitor the claims of behavior and not the behaviors themselves. This may lead other members to eliminate the actual gaps, if any, between public virtues and private vices.

### MEASURING ENVIRONMENTAL BEHAVIOR

The ways in which environmental behaviors are measured (i.e., actual, reported, or intended) have consequences for empirical research. Because it is easier to report environmentally friendly behavior than to practice it, and because it is tempting to retrospectively oversell the commendable, more people will report practicing environmental behavior than actually do so (Schultz & Oskamp, 1996). One consequence of these tendencies is that environmental attitudes correlate better with reported behaviors than with actual behaviors, thereby indicating that the former may be an unreliable measure of the latter (Stern, 1992; Stern & Oskamp, 1987).

Environmental research, unlike political science in general, does not posit a prototypical behavior. This is because individual efforts and social contexts may vary greatly. Recycling, however, may not be too unlikely a candidate. Berger (1997) found that environmentally responsible behaviors are structured in terms of both issues and activities and that recycling is correlated with other environmental behaviors, particularly waste management behaviors and behaviors easily within an individual's control. If recycling constitutes a prototype, and if this behavior also has snowball effects (i.e., additive individual behavior), then it should be a prime target in behavioral policies.

Nevertheless, different kinds of reservation may apply in typifying environmental behaviors for analytical purposes. First, several behaviors may not be correlated at all, even though researchers may refer to all of them as environmental behaviors. The discrepancy between formal classification and subjective, social classification points to graded categories and fuzzy concepts such as "radial categories" (Lakoff, 1987) and "family resemblance" (Wittgenstein, 1968). Second, many behaviors may be institutionalized to an extent that it is less the individual than the institution that is accountable. For instance, recycling is easier if curbsided and institutionalized than if repositories are remotely located (Steel, 1996). Similarly, cutbacks in car use are easier in urban areas because buses are an alternative, in contrast to rural areas where public transportation is often infrequent. Third, one environmental behavior may be correlated with other behaviors, which may, in turn, lead to their being included in broader, composite, behavioral types. Behavioral diversity also suggests that environmental behaviors need not be forced into a single composite dimension (see Bratt, 1999; Karp, 1996). A range of behaviors may therefore form consistent subtypes or subdimensions, the latter of which may be conveniently identified and explained in a survey.



## OBJECTIVE

One advantage of using self-reported behaviors in surveys is that this approach permits the study of a wide range of behaviors. These behaviors can be analyzed to detect behavioral subdimensions. Moreover, multivariate econometric techniques can be used to distinguish between correlates of environmentally friendly behaviors (Axelrod & Lehman, 1993; Davidson & Freudenburg, 1996). Our objective is to assess the effects of correlates of environmentally friendly behavior. We are specifically interested in how social context affects environmental behavior. Thus, we carry out our analyses across three distinct groups: active members of environmental organizations, inactive members of such organizations, and the general public. The analyses are organized in the following way: Analysis 1 compares the levels of general and specific environmental behaviors within each of the groups; Analysis 2 assesses the bivariate relationships between environmental correlates and a general dimension of environmental behavior, especially with a view to ranges, levels, and thresholds of the three groups; Analysis 3 compares how the four sets of correlates explain general environmental behavior;<sup>3</sup> and Analysis 4 examines whether the effects of the four sets of correlates are similar or different across subdimensions of environmental behavior.

## METHOD

### SAMPLING

Self-administered questionnaires were mailed to one sample randomly drawn from the general Norwegian population ( $n = 2,000$ ) and to 12 samples randomly drawn from a dozen environmental organizations in Norway ( $n = 3,686$ ). The 12 organizations are representative of the variations in ideology and strategy in the Norwegian environmental movement: The Norwegian Mountain Touring Association, The Future in Our Hands, Greenpeace Norway, Women and the Environment, The Environmental Home Guard, Bellona, Nature and Youth, NOAH—for Animal Rights, Friends of the Earth—Norway, Green Warriors of Norway, Norwegian Society for Organic Farming, The World Wide Fund for Nature. Technically, the data consist of 13 samples. For the present purposes, members of the organizations are referred to as *organized environmentalists*. The questionnaires were mailed in early May 1995, and the sampling process was closed in late June 1995. Funding and national regulations allowed one reminder (by postcard) and

two follow-up letters to nonrespondents (cover letters with replacement questionnaires). The response rate was 52.4% for the general population and 59.2% for the organized environmentalists (Strømsnes, Grendstad, & Selle, 1996).

## VARIABLES

### Sociodemographic Characteristics

Gender is a dummy variable (1 = female). Age is measured in number of years. Education is number of years exceeding compulsory education (7 years for older and 9 years for younger population). Proximity to farm life was measured using 6 categories running from *grew up and live on farm* (high score) to *great-grandparents grew up on farm* (low score). Urban residence was coded *major city* (high score), *suburb*, *smaller city*, *small town*, and *less densely populated area* (low score). Public sector is a dummy variable combining "employed in any public agency" or receiving social security or pension or being a student. Family, or household, income was measured using 10 categories increasing in blocks of NOK 50,000 beginning with *less than 50,000* and ending with *more than 500,000*.

### Political Attitudes

As an indicator of radicalism (political orientation), respondents placed themselves on a scale running from a *right* position (conservatism) to *left* (radicalism). Egalitarianism combines two variables into a joint measure of economic redistribution. A 5-point Likert-type response scale (*strongly agree* to *strongly disagree* with a midpoint of *both* and a *don't know* option, which was set to missing) was used for both egalitarian items (see Appendix A). For both scales, high scores were associated with radicalism and egalitarianism, respectively.

### Environmental Attitudes and Knowledge

All respondents completed two ecological attitude scales and one knowledge scale. The NEP2 scale consists of 15 items (Dunlap et al., 1992; Grendstad, 1999), whereas the ecocentrism scale consists of 3 items (Grendstad & Wollebaek, 1998). A 5-point Likert-type response scale (*strongly agree* to *strongly disagree* with a midpoint of *both*) was used for both scales. The ecocentrism items also offered a *don't know* option, which was set to

missing. For both scales, high and low scores were associated with pro- and anti-ecological attitudes, respectively. The Compost Knowledge Scale is composed of 10 items representing a specific type of waste. For each type, the respondent must decide whether it can be used in an isolated compost container. High scores are associated with correct answers (see Appendix A).

Some of the above correlates do not have a comparable unit of measurement (i.e., proximity to farm, urban residence, family income, radicalism, egalitarianism, ecocentrism, NEP2, and compost knowledge). They are rescaled so that their ranges run from 0 through 1.

### Participation

To account for the effects of social context, we divided the members of environmental organizations into two groups on the basis of three criteria. The first criterion required that the members participate at least once a month in the activities of the organization from which they received the questionnaire. The second criterion required that respondents volunteer in the work of the organization more than 3 hours a month. The third criterion required that respondents meet other members of the organization on a regular basis. Those who fulfilled at least two of the criteria were referred to as *active* members, whereas those who fulfilled fewer than two criteria were referred to as *inactive* members. Many respondents were members of several organizations and the one through which they received the questionnaire may not have been the one most important to them. Whether the respondents refrained from including activities in other organizations, our criteria err on the side of underestimating the number of individuals in the most tightly woven social context (i.e., active members). On one hand, the three criteria may be too weak because they only ensure that individuals are part of a social network. On the other hand, employing stronger criteria for social context would make it difficult to separate participation from environmental behaviors because they could become related by definition.<sup>4</sup> Finally, we also identified *nonmembers* as a third group, which consists of the general population sample exclusive of those who are members of environmental organizations (i.e.,  $n = 123$ ).

### Environmental Behaviors

The questionnaire included 16 private, individual environmental behaviors, all of which are different from any of the participation criteria referred to above. For each of the 16 behavioral items, the respondents received a score of 1 if the act is *always* performed, a score of 0.5 if the act is performed

*sometimes* and a score of 0 when the act is *never performed*. On all scales, one unit thus corresponds to one environmental act. In addition to a general composite scale (range 0-16), five robust subscales across the three groups were identified using explorative factor analyses: responsible consumerism (0-5), resource conservation (0-4), use of nature (0-2), nontoxic (0-2), and waste handling (0-3; see Table 1). A respondent was excluded from the general scale if she or he had more than four *doesn't apply* responses across the 16 items. The general behavioral scale is the average of at least 12 items multiplied by 16 to facilitate interpretation and comparisons. Respondents were excluded from any of the subscales if they had a *doesn't apply* response to any item going into the subscale.

## ANALYSES

### ANALYSIS 1: PARTICIPATION AND ENVIRONMENTAL BEHAVIORS

There are consistent between-group differences across all specific environmental behaviors (see Table 1). Active members perform private environmental behaviors more frequently than inactive members, who in turn perform such acts more frequently than nonmembers. The differences between active and inactive members are much smaller than the difference between inactive and nonmembers. The high and low scores for each group across the different behaviors also indicate whether the act requires much effort (e.g., "I try to buy fruit and vegetables that are grown without the use of herbicides, pesticides, or chemicals") or relatively little (e.g., "I am often out in nature"). The results suggest that even a modest degree of participation is conducive to environmentally friendly behavior.

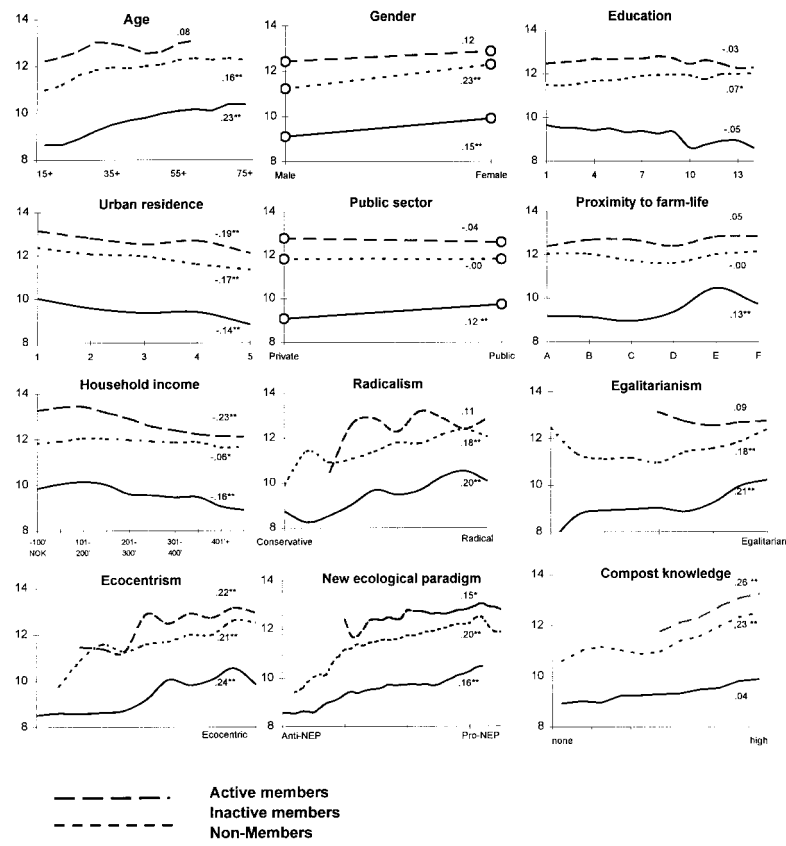
### ANALYSIS 2: PATTERNS OF CORRELATIONS

For each of the 12 correlates, each group is depicted through a line against the general behavioral scale (see Figure 1; see Appendix B for complete subscale correlations). Each of the groups ranges between 8 and 14 environmental acts (depicted on the y axis) for nearly all correlates. Almost consistently, active members have the highest number of environmental behaviors across all but two correlates: only on ecocentrism and radicalism do the levels of behavior of inactive members intercept. The latter group is far closer to the active members than to the nonmembers on the number of acts performed.

**TABLE 1**  
**Private Environmental Behaviors: The Percentage that *Always* Performs**

	<i>Active Members</i>	<i>Inactive Members</i>	<i>Non- members</i>	<i>Total</i>	<i>n</i>
Responsible consumerism ( $\alpha = .64$ )					
I choose products that carry an environmental seal of approval.	70	61	30	53	2,890
I use unbleached paper.	81	74	56	69	2,915
I choose products made of recycled material whenever possible.	82	74	46	66	2,896
I avoid products with a lot of unnecessary packaging.	50	42	31	39	2,851
I avoid chlorine-based cleaning products.	72	64	42	58	2,819
Resource conservation ( $\alpha = .54$ )					
I repair things that are broken rather than buy new.	56	52	40	48	2,900
I avoid disposable products.	59	54	33	48	2,865
I give used clothing and household articles to garage sales, second-hand shops, and so on.	55	53	34	47	2,851
I avoid using a car for environmental reasons.	40	30	15	26	2,632
Use of nature ( $\alpha = .55$ )					
I am often out in nature.	83	79	59	74	2,927
I harvest the fruits of nature.	58	48	37	46	2,838
Antitoxic ( $\alpha = .39$ )					
I avoid toxic products in my garden/yard.	85	82	68	78	2,429
I try to buy fruit and vegetables that are grown without the use of herbicides, pesticides, or chemicals.	35	25	17	24	2,770
Waste handling ( $\alpha = .49$ )					
I make compost out of household waste.	53	38	15	33	2,581
I gather problem waste and take it to special disposal sites.	73	69	41	61	2,822
I sort household waste for recycling.	68	58	30	50	2,705
<i>n</i>	241	1,847	900	2,988	

NOTE: Cronbach's alpha is calculated for each subscale on basis of all respondents ( $N \geq 2,470$ ).



**Figure 1: Levels of Environmental Behavior Across Correlates and Context**

NOTE: The y-axes represent the number of environmental acts. The reported coefficients are zero-order correlations within each group. Within-group behavioral levels are depicted through the lines. The curves have been smoothed.

\* $p \leq .05$  (two-tailed). \*\* $p \leq .01$  (two-tailed).

Some correlates have a fairly monotonic association across their ranges: age (positive), urban residence (negative), family income (negative), NEP2 (positive) and compost knowledge (positive). Women are found to report more environmental behaviors than men. Among the activists, however, gender difference is insignificant. There are distinct threshold associations for nonmembers: Environmental behavior increases sharply when exceeding the middle value on ecocentrism and the medium to high values on egalitarianism.

tarianism and NEP2. There is a threshold effect on compost knowledge for inactive members, whereas active members only hold relatively high scores on this correlate.

Other correlates (i.e., education and proximity to farm life) have unclear or no associations with environmental behavior, contrary to some of our expectations. As for education, its content may counter its duration, whereas proximity to farm life is only related to behavior through the first generation that leaves the farm ("I grew up on a farm but no longer live on a farm"). The results demonstrate that both radicalism and egalitarianism are positively related to environmental behavior. These relationships are stronger for the general population because the high behavioral levels for the active members reduce their measures of association.

### ANALYSIS 3: PREDICTING GENERAL ENVIRONMENTAL BEHAVIOR

Multiple regression measures the causal effects of a range of independent variables simultaneously and controls for spurious relationships among them. In the analyses, nonmembers provide the baseline against which the effects of active and inactive members are compared by means of dummy variables. The unstandardized regression coefficients (*b*) show the changes in the number of environmental acts. Because some correlates' units of measurement run between 0 and 1, their total effects are attributed to this range. The standardized regression coefficients are weighted measures permitting direct comparison of the effects across the correlates. The adjusted explained variance controls for the number of correlates in the analyses. The combination and sequence of different sets of correlates are referred to as models (see Table 2).<sup>5</sup>

Sociodemographic correlates explain 10% of environmental acts (Model 1). When controlling for the other correlates, gender is the strongest predictor: Women perform on average more than one act more than men. Urban residence has a negative effect. Those in the lowest income bracket perform more than one act more than those in the highest bracket. Seven years of education bring about one additional environmental act, whereas an age difference of 50 years produces one additional act. Introducing political attitudes increases the explained variance to 18%: extreme radicals carry out more than two acts more compared to extreme conservatives, whereas egalitarian antagonists are separated by more than one act (Model 2). Model 3 shows that environmental and ecological concern and compost knowledge explain almost as much of environmentally friendly behaviors as do the sociodemographic variables and political attitudes combined. Environmental attitudes and participation combine to explain a quarter of total variance (Model 4).

**TABLE 2**  
**Correlates of General Private Environmental Behaviors: Regression Analyses**

Variable	Model and Range	1		2		3		4		5		6	
		b	$\beta$	b	$\beta$	b	$\beta$	b	$\beta$	b	$\beta$	b	$\beta$
Gender	Woman = 1	1.12***	.22	1.00***	.20					0.83***	.16	0.85***	.17
Age	In years	0.02***	.13	0.03***	.16					0.03***	.15	0.03***	.16
Education	In years	0.14***	.18	0.12***	.15					0.10***	.13	0.04*	.04
Proximity to farm	0-1	0.29	.03	0.19	.02					0.23	.02	0.10	.01
Urban Residence	0-1	-0.81***	-.12	-0.73***	-.11					-0.68***	-.10	-0.86***	-.13
Public sector	= 1	-0.10	-.02	-0.28*	-.05					-0.16	-.03	-0.16	-.03
Family income	0-1	-1.12***	-.13	-0.77***	-.09					-0.72***	-.08	-0.78***	-.09
Radicalism	0-1			2.68***	.23					2.11***	.18	1.37***	.12
Egalitarianism	0-1			1.17***	.10					0.66*	.06	0.65*	.06
Ecocentrism	0-1					2.59***	.19	2.23***	.19	1.61***	.12	1.19***	.09
NEP2	0-1					4.80***	.23	2.29***	.11	3.88***	.19	2.03***	.10
Compost knowledge	0-1					1.96***	.16	1.67***	.13	1.63***	.13	1.47***	.12
Active member	= 1							2.68***	.28			2.57***	.27
Inactive member	= 1							1.96***	.37			1.83***	.34
Constant (nonmember)		9.93***		7.28***		4.37***		5.24***		2.92***		4.24***	
Multiple <i>R</i>			.32		.43		.39		.52		.52		.60
Adjusted <i>R</i> square			.10		.18		.15		.27		.26		.35
Standard error of the estimate			2.44		2.32		2.37		2.21		2.21		2.07

NOTE: NEP2 = New Ecological Paradigm Scale. For the Environmental Behaviors Index range is 0 to 16, Cronbach's alpha = .82. Ordinary least squares regression, listwise deletion of cases (*N* = 1,751).

\**p* ≤ .05 (two-tailed). \*\*\**p* ≤ .001 (two-tailed).



Juxtaposed, the effects of sociodemographics and political variables are comparable to the effects of participation when both are combined with environmental attitudes (i.e., Models 4 and 5).

All correlates combined explain roughly one third of the total variance in environmental behavior (Model 6). Women perform almost one environmental act more than men when controlling for the other variables in the model. Similarly, the difference between the extreme NEP2 positions is almost two acts, whereas most of the social background variables have only small effects.<sup>6</sup> In general, the significant catalysts of general environmental behaviors are gender, age, urban residence (negative), radicalism, ecocentrism, compost knowledge, and participation. Education has only a minor effect, as expected from the bivariate analysis above. Proximity to farm and dependence on the public sector have insignificant effects across all models. The effects of both egalitarianism and radicalism diminish when environmental attitudes are included in the analyses.

#### ANALYSIS 4: PREDICTING SUBDIMENSIONS OF ENVIRONMENTAL BEHAVIOR

The five subdimensions of environmental behaviors, identified in Table 1, are used as dependent variables, whereas all correlates are entered simultaneously (see Table 3).

*Responsible consumerism* is influenced by almost all of the correlates. Only education and proximity to farm life do not give significant contributions. The strongest predictor is participation, followed by gender. The effects of radicalism and compost knowledge are equally strong, albeit weaker than those of gender and participation. *Nontoxic* behavior is significantly influenced by participation as well as family income (negative), urban residence (negative), ecocentrism, and environmental concern (NEP2).

*Waste handling* behavior is influenced by several correlates, among which participation is the strongest by far, followed by urban residence (negative), compost knowledge<sup>7</sup>, gender, and radicalism. *Resource conservation* is also strongly influenced by participation, followed by age, gender, and income (negative). Among environmental attitudes, NEP2 and compost knowledge have sizeable, though weak, effects. *Use of nature* as an environmental behavior is equally explained by participation and residence (negative). In addition, only age has a sizeable and significant effect.

The results show that six correlates have consistent (though sometimes insignificant) positive effects across all subdimensions of environmental behavior: gender, age, ecocentrism, NEP2, compost knowledge, and participation. Radicalism and egalitarianism fail to explain significantly some

**TABLE 3**  
**Correlates of Five Subdimensions of Private Environmental Behaviors: Regression Analyses**

Variable	Range	Responsible Consumerism (range 0-5)		Nontoxic (range 0-2)		Waste Handling (range 0-3)		Resource Conservation (range 0-4)		Use of Nature (range 0-2)	
		b	$\beta$	b	$\beta$	b	$\beta$	b	$\beta$	b	$\beta$
Gender	Woman = 1	0.36***	.19	0.07**	.07	0.15***	.11	0.24***	.15	0.07**	.08
Age	In years	0.005**	.07	0.002	.05	0.005***	.09	0.010***	.16	0.004***	.12
Education	In years	0.01	.02	0.00	.00	0.01	.03	0.01*	.05	0.01	.04
Proximity to farm	0-1	0.02	.01	-0.05	-.03	-0.04	-.01	-0.09	-.03	0.14***	.08
Urban Residence	0-1	-0.12*	-.05	-0.10**	-.07	-0.38***	-.20	0.06	.03	-0.24***	-.21
Public sector	= 1	-0.10*	-.05	-0.01	-.01	-0.05	-.04	0.01	.00	-0.01	-.01
Family income	0-1	-0.25***	-.08	-0.23***	-.13	-0.08	-.03	-0.29***	-.10	0.09*	.06
Radicalism	0-1	0.56**	.13	0.16*	.07	0.40***	.12	0.28**	.08	-0.09	-.04
Egalitarianism	0-1	0.25**	.06	0.16*	.07	-0.06	-.02	0.28**	.08	0.10	.05
Ecocentrism	0-1	0.43***	.08	0.32***	.12	0.16	.04	0.12	.03	0.10	.04
NEP2	0-1	0.58**	.09	0.45***	.11	0.34*	.06	0.64***	.10	0.03	.01
Compost knowledge	0-1	0.55***	.12	0.05	.02	0.55***	.16	0.37***	.09	0.13*	.06
Active member	= 1	0.79***	.22	0.22***	.12	0.69***	.27	0.60***	.20	0.30***	.19
Inactive member	= 1	0.56***	.28	0.17***	.16	0.56***	.37	0.42***	.24	0.18***	.20
Constant (nonmember)		1.45***		0.52***		0.68***		0.66***		1.01***	
Multiple <i>R</i>		.52		.41		.54		.48		.38	
Adjusted <i>R</i> square		.26		.16		.29		.22		.13	
Standard error of the estimate		.83		.46		.60		.73		.42	
<i>n</i>		1,558		1,422		1,538		1,557		1,724	

NOTE: NEP2 = New Ecological Paradigm Scale. Ordinary least squares regression, listwise deletion.

\* $p \leq .05$  (two-tailed), \*\* $p \leq .01$  (two-tailed). \*\*\* $p \leq .001$  (two-tailed).

behavioral subscales (i.e., use of nature and waste handling) and thus do not join the consistent predictors. Urban residence has negative effects, except on resource conservation. The remaining correlates, all of which are sociodemographic indicators (i.e., education, proximity to farm, public sector dependency, and family income) only predict a limited number of behaviors.

## DISCUSSION

The study of environmental concern has reached a level of sophistication that ensures reliable scales. The New Environmental Paradigm Scale (NEP), for example, developed by Dunlap and associates (e.g., Dunlap & Van Liere, 1978), "represents an advanced tool for measuring environmental concern" (Noe & Snow, 1990, p. 26). This and other concepts may be adjusted to fit into the three levels of conceptual generalization: subordinate level, basic level, and superordinate level (Collier & Mahon, 1993). Behavior, on the other hand, operates at a single level of generalization only, which cognitive scientists identify and refer to as the basic level (Lakoff, 1987). This poses an analytical challenge for researchers investigating attitude-behavior correspondence: It is only at the basic level that researchers may find a direct and unambiguous correspondance between a concept and a behavior. It is thus not surprising that the specificity often called for in attitude-behavior research pays off through increased statistical prediction. This outcome, however, inhibits researchers from making generalizations: "If an effect is specified with sufficient precision, the apparent plurality of causes tends to disappear" (Copi & Cohen, 1990, p. 379).

In applying these observations to survey research, one of the problems is that the method often falls short of incorporating the social context within which individuals form their attitudes and concerns and allow them to be manifested through behaviors. Initially, survey researchers must accept the absence of social contexts in surveys and hope that the effects of different contexts cancel each other out, and that they later can be retrieved from the repository of unexplained variance. It may, in part, be the failure to account for social context effects that makes environmental researchers conclude that the relationship between attitude and behavior is tenuous.

The literature on environmental behavior identifies several sets of correlates: sociodemographics, general and specific attitudes, and knowledge (Dietz et al., 1998). Researchers should add to this list the effect of social context, which should then be analyzed in terms of whether and, if so, how it too

is conducive to environmental behavior. The way we measure social context in this article is by way of intensity of social networks within environmental organizations. The two-tiered distinction of social context suggested here also serves as an additional internal control for this effect.

Years of environmental research have also shown that several environmental behaviors are correlated to an extent that analysts can combine the distinct behaviors into composite dimensions. This procedure does not resolve the analytical problem of concept-behavior correspondence, but it opens the avenues for further research. The analyses showed that there was a fairly consistent pattern of effects of the correlates across the behavioral dimensions. This result has two consequences. First, researchers can reliably cluster environmental behaviors into more general categories because environmentally responsible behaviors are structured in terms of both issues and activities, as suggested by Berger (1997). Second, behind different dimensions of environmental behavior, researchers may identify mostly similar correlates, which can then be used to refine and improve theories.

This study confirms that high age is consistently related to environmental behavior. The fact that the effect of old age does not decrease when attitudes and participation are included in the regression (see Table 2) leads us to conclude that the correlation between age and environmental behavior is an effect of generational experiences (i.e., a cohort effect) rather than an age effect. Research on age and environmentalism must therefore take into account that environmental behavior is not necessarily rooted in a corresponding concern, at least not in the way it is often measured in empirical studies. Expressions such as *spaceship earth* may sound odd to the elderly, whereas *I repair things that are broken rather than buy new* may be deeply socialized.

Our findings suggest that women exhibit more environmentally friendly behavior than men. This effect is not restricted to areas directly connected to household tasks, and the effect is not weakened by the introduction of attitudes, knowledge, and participation as explanatory variables. This is in slight contrast to previous results, but the present findings may stem from the fact that more private and household behaviors are included in the present analysis, whereas more public behaviors are included in other studies. Education fails to be a strong predictor of environmental behavior despite the previously known effect of higher education on environmental concern. The effect of education on behavior could be discerned if researchers, in addition to the duration of education, also distinguished between types of education, (e.g., vocational vs. academic). The observed inverted effect of income on environmental behavior casts doubt on the notion that affluence is conducive to environmental behavior. Our study showed insignificant or negative relationships

between income and all dimensions of environmental behavior. Political attitudes, environmental concern, and environmental knowledge were mostly related to environmental behaviors, as expected.

The role of social context, measured through social participation in environmental networks, was more important than any of the other correlates of environmental behavior. Its effect is roughly equal to environmental attitudes or the whole battery of sociodemographics. Although members in environmental organizations are often recruited from and represent the upper strata of the society, more in terms of their cultural than their economic capital (Morrison & Dunlap, 1986; Norris, 1997), the effect of participation on behavior did not take place at the expense of the already weak effect of sociodemographics. Participation, or other measures of social context, should therefore not be neglected in further analyses.

#### APPENDIX A Index Items

	<i>Cronbach's <math>\alpha</math></i>		
	<i>AM</i>	<i>IM</i>	<i>NM</i>
Egalitarianism	.53	.58	.54
1. We must distribute wealth more evenly so that there is more justice in the world.			
2. I am in favor of tax reform that places the largest burden on companies and individuals with a high income.			
Ecocentrism	.42	.41	.49
1. Women, as opposed to men, have an experiential background that creates greater understanding for the relations in nature.			
2. Each human being must increase his or her self-awareness so that she or he may feel at one with all living creatures.			
3. All ecological systems, however small and insignificant, have a right to exist.			
NEP2	.71	.71	.71
1. We are approaching the limit of the number of people the earth can support.			
2. The earth has plenty of natural resources if we just learn to develop them. (r)			
3. The earth is like a spaceship with only limited room and resources.			
4. Humans have the right to modify the natural environment to suit their needs. (r)			

(continued)

## APPENDIX A Continued

	<i>Cronbach's</i>		
	<i>AM</i>	<i>IM</i>	<i>NM</i>
5. Plants and animals have as much right as humans to exist.			
6. Humans were meant to rule over the rest of nature. (r)			
7. When humans interfere with nature it often produces disastrous consequences.			
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations. (r)			
9. The balance of nature is very delicate and easily upset.			
10. Human ingenuity will ensure that we do not make the earth unlivable. (r)			
11. Despite our special abilities, humans are still subject to the laws of nature.			
12. Humans will eventually learn enough about how nature works to be able to control it. (r)			
13. Humans are severely abusing the environment.			
14. The so-called ecological crisis facing humankind has been greatly exaggerated. (r)			
15. If things continue on their present course, we will soon experience a major ecological catastrophe.			
Compost knowledge	.65	.74	.77
Which types of waste on the list below may be used in an isolated compost container? (Check one box only—i.e., yes, no, don't know—for each type of waste):			
milk cartons (no)			
tea bags (yes)			
plastic bottles (no)			
cigarette butts/ashes (no)			
fish remains (yes)			
egg shells (yes)			
Q-tips (no)			
potato peelings (yes)			
paper towels (yes)			
and vacuum cleaner bags (no)			
(Correct answers to all 10 items yield a maximum score of 10.)			

NOTE: AM = active members; IM = inactive members; NM = nonmembers; NEP2 = New Ecological Paradigm Scale; r = reverse coding.

**APPENDIX B**  
**Correlates of Private Environmental Behaviors**

	<i>Responsible Consum- erism</i>	<i>Non- toxic</i>	<i>Waste Handling</i>	<i>Resource Conser- vation</i>	<i>Use of Nature</i>	<i>Environ- mental Behaviors Index</i>
Gender (woman)						
AM	.19**	.14	.07	.07	-.04	.12
IM	.26**	.15**	.14**	.17**	.06**	.23**
NM	.15**	.11**	.10**	.16**	.06	.15**
Age						
AM	-.02	-.11	.02	.03	.18**	.08
IM	.01	.04	.11**	.15**	.18**	.16**
NM	.15**	.04	.15**	.22**	.12**	.23**
Education						
AM	-.08	-.15*	-.01	.04	.15*	-.03
IM	.02	-.05	.02	.11**	.06*	.07**
NM	-.05	-.12**	-.02	-.01	-.03	-.05
Proximity to farm life						
AM	-.09	-.15*	.10	-.03	.29**	.05
IM	-.02	.00	.03	-.08**	.08**	-.00
NM	.07	.05	.06	.07	.21**	.13**
Urban residence						
AM	-.01	-.08	-.26**	.01	-.24**	-.19**
IM	-.10**	-.12**	-.25**	.05	-.22**	-.17**
NM	-.09*	-.09*	-.13**	-.02	-.21**	-.14**
Public sector dependency						
AM	-.01	.01	.03	-.04	-.11	-.04
IM	.01	-.00	-.04	.07**	.01	-.00
NM	.10**	.15**	.07	.10*	.02	.12**
Household income						
AM	-.20**	-.24**	-.14	-.17*	.09	-.23**
IM	-.09**	-.16**	-.01	-.08**	.10**	-.06*
NM	-.14**	-.20**	-.08	-.13**	.03	-.16**
Radicalism						
AM	.12	.20**	.09	.08	-.04	.11
IM	.19**	.17**	.14**	.15**	-.05**	.18**
NM	.21**	.06	.17**	.12**	.07	.20**
Egalitarianism						
AM	.17*	.16*	.13	-.02	-.10	.09
IM	.15**	.17**	.09**	.15**	.02	.18**
NM	.21**	.14**	.13**	.18**	.12**	.21**

(continued)

## APPENDIX B Continued

	<i>Responsible Consum- erism</i>	<i>Non- toxic</i>	<i>Waste Handling</i>	<i>Resource Conser- vation</i>	<i>Use of Nature</i>	<i>Environ- mental Behaviors Index</i>
Ecocentrism						
AM	.27**	.15	.10	.10	.07	.22**
IM	.15**	.22**	.15**	.13**	.09**	.21**
NM	.23**	.20**	.11**	.15**	.11**	.24**
New Ecological Paradigm Scale						
AM	.21**	.06	.06	.11	-.05	.15*
IM	.17**	.17**	.15**	.18**	.00	.20**
NM	.14**	.16**	.06	.15**	.12**	.16**
Compost knowledge						
AM	.24**	.12	.22**	.13	.12	.26**
IM	.20**	.08**	.24**	.15**	.12**	.23**
NM	.04	-.08*	.09*	.04	.05	.04

NOTE: AM = active members; IM = inactive members; NM = nonmembers. The table contains bivariate correlation coefficients using pairwise deletion of missing cases. The different behavior types are additive indexes based on the grouping of questions presented in Table 1.

\* $p \leq .05$  (two-tailed). \*\* $p \leq .01$  (two-tailed).

## NOTES

1. *Environmental behavior* will be used interchangeably with *environmentally friendly behavior*.

2. Other scales are, for example, Environmental Concern (Weigel & Weigel, 1978), Awareness of Consequences (Stern, Dietz, & Kalof, 1993), Normative Beliefs (e.g., Karp, 1996; Schwartz, 1968, 1977), and Biospheric Value Orientation (Stern, Dietz, Kalof, & Guagnano, 1995).

3. Interaction effects are too encompassing to be included here (Ragin, 1987, p. 65).

4. In some other studies, measures of activism and environmental behaviors were combined into a single dependent variable (e.g., Kaiser, 1998; Kaiser, Wolfing, & Fuhrer, 1999; Seguin, Pelletier, & Hunsley, 1998).

5. Figure 1 showed that associations between variables were not uniform for all three groups. Moreover, the analyses are not weighted with respect to the three groups, which would be necessary were one to provide correct predictions for all three populations. To estimate the coefficients for the true structural models, separate regressions for each group would be necessary. The present regression analyses permit a comparison of effects only. The present procedure of listwise deletion of cases is robust compared to the procedure of pairwise deletion of cases (not shown).

6. Evaluating the importance of a variable through regression coefficients only does not give the whole picture because the variance may often be quite small. New Ecological Paradigm



Scale (NEP2) has a large effect across the range of its variation, but because most people have high scores, its strength diminishes when its small variance is accounted for (see Figure 1).

7. The effect of compost knowledge on waste-handling behavior should not be overestimated due to some contamination.

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