Assessing People's General Ecological Behavior: A Cross-Cultural Measure[1]

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The present study aims to further develop the General Ecological Behavior (GEB) scale in order to apply it cross-culturally. The scale is proposed to be relatively open, neither bound to a particular set of ecological behaviors nor to a particular questionnaire response format. Questionnaire data from 686 California students were compared with the original Swiss calibration data. Reliability, internal consistency, and discriminant validity reveal that the GEB could be applied to the California students as well as to the Swiss sample, which consisted of older adults. Because the GEB measure makes use of behavior difficulties—caused by situational influences—the proposed approach also guides the search for political actions that could promote changes in more ecologically behaving societies.

The human impact on the natural environment and, thus, people's ecological behavior,[3] are matters of public concern. Regardless of whether the goal of research is behavior change (e.g., Leeming, Dwyer, Porter, & Cobern, 1993) or the detection of determinants of ecological behavior (e.g., Hines, Hungerford, & Tomera, 1986/1987), the accurate measurement of ecological behavior is a

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[3]*Ecological behavior* means "actions which contribute towards environmental preservation and/or conservation" (Axelrod & Lehman, 1993, p. 153). It includes behaviors such as recycling and composting, energy and water conservation, political activism, consumerism, commitment to environmental organizations, and so forth. We prefer *ecological* to other qualifiers such as *pro-ecological* and *environmentally concerned* because *conservation* (*ecological behavior*) is the psychological index term used (Walker, 1994).

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precondition for positive change. Unfortunately, measurement of ecological behavior across different domains appears to be an insoluble task (Lüdemann, 1993; Schahn & Bohner, 1993; Siegfried, Tedeschi, & Cann, 1982). Problems arise because of situational influences that facilitate as opportunities and constrain as barriers ecological behavior (cf. Becker, Seligman, Fazio, & Darley, 1981; Guagnano, Stern, & Dietz, 1995; Hornik, Cherian, Madansky, & Narayana, 1995; Oskamp et al., 1991; Stutzman & Green, 1982; Taylor & Todd, 1995; Verhallen & Van Raaij, 1981). Consequently, some behaviors appear to require more effort to be carried out than others (cf. Schultz & Oskamp, 1996; Schultz, Oskamp, & Mainieri, 1995). Thus, different ecological behaviors have different difficulties in carrying them out. For example, recycling opportunities determine, at least partially, recycling behavior (e.g., Derksen & Gartrell, 1993; Gamba & Oskamp, 1994; Vining & Ebreo, 1992). If recycling bins are readily accessible, recycling is easy to carry out because there is only marginal effort required. Not surprisingly, the most powerful effects can, apparently, be obtained by increasing the opportunities to perform ecological behaviors (Hamid & Cheng, 1995; Schultz et al., 1995). Concurrently, the amount of difficulties that people are ready to overcome is, presumably, also one of the most valuable empirical indicators of people's motivation to behave ecologically.

Because common behavior measurement approaches do not make systematic use of behavior difficulties in assessing a person's ecological behavior, they fail to acknowledge situational influences on ecological behaviors. Inevitably, such behavior measures turn fairly often out to be multidimensional because of differential behavior difficulties (cf. Schmitt & Borkenau, 1992). Consequently, findings of research from different behavior domains cannot be compared (e.g., Diekmann & Preisendörfer, 1992), and without comparability, the needed scientifically grounded recommendations remain somewhat arbitrary. The same line of argument holds true, regardless of whether the behavior measure is a general or a specific one. Multidimensional recycling behaviors are, most likely, an artificial result of neglected differential behavior difficulties (cf. Guagnano et al., 1995).

Situational influences, and hence behavior difficulties, can be considered by adopting a probabilistic measurement approach (Kaiser, Wölfing, & Fuhrer, 1999). The present paper aims to further develop such a probabilistic ecological behavior measure, the General Ecological Behavior (GEB) scale (originally developed in Kaiser, 1998). The following three research goals are addressed:

Two alternative response formats—a dichotomous response (i.e., Yes/No) and a polytomous, rating scale (i.e., Likert scale)—are compared. If GEB represents a measure of general ecological behavior, it should not be a static, invariable instrument. Strictly speaking, it should not be restricted to one particular set of ecological behaviors, and thus it should be open for the adoptions of behaviors that are not yet included. Specifically, we ask how the GEB scale operates with

new items adapted to new contexts. Concurrently, a GEB measure should also be applicable across different countries to be effective. Hence, specifically, we ask how consistently the GEB scale operates in two different countries: Switzerland and the United States.

The GEB Measure

Situational influences are influences beyond people's control, and they can create difficulties that make some behaviors easier to carry out than others. Not surprisingly, situational influences, and in turn behavior difficulties, affect conduct. For example, energy is conserved (by a reduction in heating) in summer or when the house is well insulated (cf. Verhallen & Van Raaij, 1981). By using different behavior difficulties in the assessment procedure in a systematic manner, a probabilistic model of ecological behavior is proposed.

The original GEB scale assessed ecological behavior by considering the behavior difficulties of 38 different ecological behaviors (e.g., using an oven-cleaning spray to clean an oven). Each behavior has a given difficulty to be carried out, which is an estimate of all the situational constraints beyond people's control. The easier a behavior is to carry out, the fewer constraints have to be assumed and the more likely that anyone would behave accordingly. Thus, behavior difficulties are estimated by considering the number of people who behave in a certain way (e.g., using an oven-cleaning spray). A behavior difficulty relates to the likelihood, therefore, that anyone will behave correspondingly, regardless of the extent of his or her general ecological behavior. In turn, behavior difficulties can be used to measure a person's ecological behavior. The more difficulties a person is ready to overcome, the more ecologically this person generally behaves. Because a probabilistic measurement approach does not require people to behave fully deterministically, people are free to a certain extent to behave inconsistently across different ecological behaviors. Someone, for instance, who behaves ecologically on a very high level across different behaviors may fail to recycle newspapers, even though this behavior is easy to carry out.

Originally, GEB responses were collected using a dichotomous (i.e., Yes/No) response format. Dichotomous response formats not only force people to decide, but they also offer only a limited variety of possible responses. Fortunately, as the Rasch dichotomous model is only one possible Rasch scaling approach (cf. Wright & Masters, 1982), we are not limited to a dichotomous response format. By using a 5-point Likert response format ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), people can choose from a broader variety of responses. Additionally, not forcing people to decide by allowing them to choose a neutral midpoint may allow them to experience the survey with greater comfort, which, in turn, could result in a more reliable GEB measure.

As GEB is intended to represent a general measure of ecological behavior, it should not be restricted to one particular set of ecological behaviors. Concurrently, such a measure should be dynamic rather than static. Of course, one can insist that not fully identical measures of ecological behavior do not assess exactly the same thing. Thus, according to this strict interpretation, two nonidentical measures cannot be compared directly. However, measurement variation can also be regarded as a necessary requirement to assess the relation between scales (e.g., IQ measures) and concepts (e.g., intelligence). Given that the idea of intelligence or the idea of people's general ecological behavior, rather than the measurement procedure used to establish IQ or GEB defines the concept, measurement variation can be used to further define the concept more fully and beyond given measurement procedures.

Because little is known about the generalizability of findings across different ecological behavior domains (cf. Siegfried et al., 1982), which may also be a result of the poor definition of the ecological behavior domain, we should make use of measurement variation as a means to scrutinize the range and thus people's definition of ecological behavior. The general utility of any ecological behavior measure is a second unresolved issue. We need to know more about the applicability of ecological behavior measures across different groups of people, countries, communities, and so forth.

Cross-Cultural Measurement

As situational influences such as political actions affect people's conduct, traditional ecological behavior measures, which fail to consider behavior difficulties systematically, can change from country to country. Thus, an effective measure in one country may prove ineffective in another one (Lévy-Leboyer, Bonnes, Chase, Ferreira-Marques, & Pawlik, 1996). If behavior measures differ too much, however, they become incomparable.[4] As a probabilistic measurement approach makes use of differences in behavior difficulties, we seek to establish a GEB measure that is applicable across countries as well. Moreover, the GEB scale may also be useful as a detection tool for effective situational influences and, hence, potential political actions that affect ecological behaviors. However, both claims require an instrument that is composed of two sets of behaviors: a core set of behaviors with difficulties invariant across different countries; and a set of behaviors that is susceptible to situational influences, which, in turn, results in differential behavior difficulties.

[4]*Changes of measures* should not be confused with *measurement variation*, which was discussed in the last section. The former refers to changes in the dimensionality of measures, whereas the latter means adding items to an existing scale, given the dimensionality of this scale.

A measure like the GEB scale, which assesses behavior difficulties (besides measuring people's ecological behavior), can guide the search for effective situational differences between countries and communities (cf. Kaiser, 1998). For any single behavior, the composite of all situational influences together results in a given behavior difficulty. Hence, any significant difference between such a behavior difficulty across communities or countries results in a search for situational factors that may have caused this difference in the first place.[5] For example, a comparison between two communities reveals different difficulties in people's glass, paper, and can recycling behaviors. Why is recycling easier to carry out in Community A than in Community B? Thus, the GEB measure can be used as a detection tool for situational differences that refer to effective measures (e.g., a recycling program) that are applied by some countries and communities but not by others. The scale can be used to find effective measures that enhance people's performance of certain ecological behaviors. This suggests that measures that make it easier for people to behave ecologically in one community might also be effective in another community. And other communities can adopt measures that are already established in one community, too. Such an approach results in a nonarbitrary adoption process of actions that affect ecological behaviors.

Research Goals

The present study aims to further develop the GEB scale, which is established as a unidimensional behavior measure (Kaiser, 1998), to a more dynamic measurement tool which is applicable across contexts and cultures. Based on a probabilistic measurement approach, the GEB measure makes use of differential behavior difficulties. By using different behavior difficulties in the assessment procedure of people's ecological behavior systematically, GEB should apply across different communities and countries. Especially in this cross-cultural comparison context, however, the GEB scale should not be bound to a restricted set of behaviors that operate in one group or society but not in another. Rather, the GEB scale should be flexible to account for measurement variation when required or necessary.

Within communities and countries, all sorts of situational influences, such as legislation, affect people's behaviors. Hence, a measurement instrument that guides the search for effective situational influences appears promising to further enhance ecological behaviors. As the GEB scale measures behavior difficulties, it points out the consequences of situational influences on people's behaviors,

[5]Traditionally, measurement instruments based on Item Response Theory depend on the invariance of behavior difficulties across, for example, communities or countries (e.g., Wright & Masters, 1982). More recently, however, variation in behavior difficulties became an additional source of information (e.g., Wilson, 1992).

and, at best, it refers to potentially effective measures in one community or country that could also be applied in others.

By changing the response format from a dichotomous to a rating scale format within the questionnaire, respondents can choose from a broader range of responses, including neutral. We hope that this will make the survey more convenient, as well as add some reliability to the GEB scale.

Method

Participants and Procedures

The sample consisted of 488 students at the University of California–Irvine and 198 students at the University of California–Berkeley ($N = 686$). All of the Irvine students were either biology or social ecology majors. Irvine participants filled out their questionnaires during a single class period on a voluntary basis. They did not receive any credit for participating. Their responses were gathered from December 1995 through March 1996. Berkeley students were recruited from the human subject pool of the Department of Psychology ($n = 160$) and from an undergraduate class in cognitive science ($n = 37$). All of these participants received course credit. Additionally, 2 volunteers who helped with data collection also participated as respondents ($n = 199$). One Berkeley student was excluded from further analysis because of his or her missing data rate that reached almost 10%, n(missing) = 8; 9.5%. Responses were collected from January 1996 through March 1996. Berkeley participants filled out their questionnaires during a 1-hr period in a classroom.

Follow-up data collection was done with the Berkeley participants ($n = 199$). The follow-up questionnaire was mailed from March 1996 through May 1996, and 185 (93.0%) completed this second questionnaire. A minimum of 3 weeks and a maximum of 11 weeks separated the two data-collection waves.

Participants' median age was 21.0 years ($M = 21.3$, range = 17 to 50), $n = 285$ (41.6%) of them were male. Marital status for the vast majority was single ($n = 647$, 94.3%); only 3.8% ($n = 26$) were married at the time of the study. Two significant demographic differences between Berkeley and Irvine students were found: Berkeley students were younger (20.8 years) than Irvine participants (21.4 years), $F(1, 676) = 4.2$, $p = .04$, $\eta^2 = 0.6\%$; and there were fewer male students in Berkeley, $\chi^2(1, N = 685) = 5.2$, $p = .021$, $\phi^2 = 0.8\%$. Both differences are, however, rather marginal (i.e., both effect-size measures are smaller than 1% of the proportion of explained variance) and are, in the judgment of the authors, not likely to have intolerable effects.

The Swiss adult sample was comprised of 445 members from two transportation associations that can be differentiated ideologically. One aims to promote a transportation system that has as little negative impact on humans and nature as

possible. The other primarily represents automobile drivers' interests, such as proper road maintenance, allowing higher speed limits on freeways, and fighting gasoline-tax increases. Although the sample is biased toward more ecologically concerned participants (Kaiser, 1998), such a sample bias is of minor importance because the quantification of estimates (i.e., scaling) does not depend on the calibration sample (Wright & Masters, 1982). For the purpose of the present study, it is sufficient that the participants reflect a wide range of diversity as, for instance, in ecological concern and behavior. German was the language used by these participants. Participants' (62.5% male) median age was 45.5 years ($M = 46.6$, range = 20 to 82). Questionnaires were mailed during November 1994, and participants could complete them at their convenience. The response rate was 82.0% (for more details, see Kaiser, Wölfing, et al., 1999).

Measures

The ecological behavior measure consists of 51 behaviors: 38 original items; 2 originally excluded, now modified and reincluded items; and 11 newly developed items (Appendix A). While 43 of these items represent different domains of ecological behavior (ecological garbage removal, water and power conservation, ecologically aware consumer behavior, garbage inhibition, volunteering in nature-protection activities, and ecological automobile use), 8 items represent nonenvironmental prosocial behaviors. Prosocial behaviors were originally included to check on the assumption that ecological behavior represents one branch of prosocial behavior (Kaiser, 1998). The original Yes/No response format was changed to a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). This change in response format of behavior items made a shift from the Rasch dichotomous to the partial-credit model within Item Response theory necessary (cf. Wright & Masters, 1982). Out of all 34,986 (i.e., 51 × 686) responses, 104 (0.30%) were missing. Negatively formulated items were reversed in coding (i.e., a response of 1 was turned to 5, and vice versa).

A follow-up questionnaire was administered to the Berkeley subsample to further explore possible response-format change effects, as well as to get some test–retest reliability data. The same 51 items measuring GEB were used. In this follow-up, the response alternatives were returned to the original Yes/No format. Out of 9,435 (i.e., 51 × 185) responses, 32 were missing (0.34%). Negatively formulated items had to be answered No to contribute to the GEB person score.

Statistics

SAS Release 6.08 (*SAS User's Guide*, 1985) and the JMP program (*JMP User's Guide*, 1989) were used for calculating all basic statistics. All Rasch models were assessed by means of the QUEST program (Adams & Khoo, 1993, 1994).

Results

Reliability Assessment Based on the Partial-Credit Model

When all 51 ecological behaviors and all participants ($N = 686$) were assessed on a GEB scale using the partial-credit model (for Item Response Theory details and formulas, see Wright & Masters, 1982), the scale has an Item Response Theory-based person-reliability of .73 (Cronbach's $\alpha = .72$). Nine items (17.6%) did not fit the 51-item GEB scale (i.e., item misfit; $|t| \geq \pm 1.96$). The overall fit statistics for the 51 items of this scale are as follows: $M(MS) = 1.0$, $SD(MS) = 0.07$, $M(t) = -0.07$, $SD(t) = 1.41$. Ideally, $M(MS)$ and $SD(t)$ should be 1.0, whereas $M(t)$ should be 0. For $SD(MS)$, no general reference value can be given (additional item-specific fit statistics can be found in the Appendix A). According to the GEB measure (i.e., case misfit; $|t| \geq \pm 1.96$), 244 of 686 participants (35.6%) did not fit well; the overall fit statistics for the participants are as follows: $M(MS) = 1.0$, $SD(MS) = 0.39$, $M(t) = -0.20$, $SD(t) = 2.05$.

We reassessed the GEB scale, this time only using the fitting participants of the initial assessment ($n = 442$). Note that dropping respondents is neither required by the measurement approach used nor essential for applying the partial-credit model. It is rather indicated to find out more about potential reasons for the considerable person misfit. All 51 ecological behavior items were reassessed. Most scale qualities—especially the person overall fit statistics—improved. The scale has now a person-reliability of .75 (Cronbach's $\alpha = .74$). This time, only 7 out of 51 items (13.7%) did not fit to the 51-item GEB scale (i.e., item misfit; $|t| \geq \pm 1.96$). The overall fit statistics for the items of this scale are still reasonable: $M(MS) = 1.0$, $SD(MS) = 0.07$, $M(t) = -0.06$, $SD(t) = 1.21$. According to the GEB measure (i.e., case misfit; $|t| \geq \pm 1.96$), 6 of 442 participants (1.4%) did not fit well. The overall fit statistics for the 442 fitting participants are reasonable, too: $M(MS) = 1.0$, $SD(MS) = 0.18$, $M(t) = -0.01$, $SD(t) = 1.01$.

Discriminant Validity

Discriminant validity of the GEB scale arises out of the comparison between behavior difficulties across countries and communities. Two comparisons were made: The behavior difficulty estimates derived from the original Swiss calibration sample were compared with the ones derived from the California study, and the Berkeley behavior difficulty estimates were compared with the ones from Irvine.

Behavior difficulties in California and Switzerland. Behavior difficulties in California (Appendix A) were compared with the ones in Switzerland. Note that the Pearson correlation and the regression for the two samples yields a considerable relation between the difficulties for all of the 38 common behaviors

($r = .51$), $F(1, 36) = 12.7$, $p = .001$, $\eta^2 = 26.1\%$. Only 2 behaviors were detected as outliers (i.e., outside a 95% confidence ellipse) from the bivariate distribution, according to their difficulties: "I put dead batteries in the garbage" (negatively formulated item), and "I bring empty bottles to a recycling bin." Both behaviors were easier to carry out in Switzerland than in California.

Please note that because the GEB scale is calibrated for the Californians and the Swiss independently and because the response format was changed, behavior difficulties cannot be compared directly by means of a significance test. Possible differences in behavior difficulties were detected by means of a regression analysis. As the appropriate difficulty for each behavior falls most likely within the 95% confidence interval, all behaviors located beyond these 95% confidence boundaries were considered different. All behavior difficulties for both samples were independently standardized ($M = 0.0$, $SD = 1.0$) beforehand. In addition to the 2 already mentioned behaviors, 21 more behavior difficulties differed between Switzerland and California.

As situational influences result in differential behavior difficulties, differential difficulties can be used, in turn, to detect effective sociocultural influences on behaviors (Discussion section). Note that country and age effects are confounded in this analysis; 23 behaviors were susceptible to either situational differences between Switzerland and California or to sample differences between California students and Swiss adults (Appendix B). Hence, 15 behaviors yielded comparable behavior difficulties in both samples (i.e., Swiss adults and California students). This core set of behavior difficulties that were invariant across Switzerland and California is presented in Appendix C. This invariant pattern of behaviors (ordered by increasing difficulty) with comparable difficulties across countries provides a description of the hierarchy of behaviors and, thus, can be used to validate the proposed GEB scale.

Behavior difficulties in Irvine and Berkeley. The 51 behavior difficulties are quite comparable within California. Both Pearson correlation and regression analysis yield a strong relation between the behavior difficulties in Irvine and Berkeley ($r = .93$), $F(1, 49) = 320.3$, $p < .0001$, $\eta^2 = 86.7\%$. Moreover, the mean behavior difficulty was almost identical in Berkeley and Irvine, $F(1, 100) = 0.0$, $p = .994$, $\eta^2 = 0.0\%$.[6] According to their difficulties, 3 behaviors were detected as outliers (i.e., outside a 95% confidence ellipse) from the bivariate distribution: "After meals, I dispose of leftovers in the toilet" (negatively formulated item), "When possible, in nearby areas (around 30 km), I use public transportation or ride a bike," and "I walk, ride a bicycle, or take public transportation to work or school." All 3 behaviors were easier to carry out in Berkeley than in Irvine.

[6]Note that the items for both samples are centered at zero. Moreover, this finding remains stable even if only the 38 items with comparable difficulties in Irvine and in Berkeley are included, $F(1, 74) = 0.0$, $p = .992$, $\eta^2 = 0.0$.

According to the statistical comparison of the behavior difficulties (i.e., test of item parameter invariance; Adams & Khoo, 1994) between northern and southern California, 10 additional items differed significantly, $\chi^2(1) > 6.64$, $p < .01$.

Thus, 13 behaviors were susceptible to situational differences between northern and southern California (Appendix D). Both samples (i.e., Irvine and Berkeley students) yielded comparable behavior difficulties in 38 behaviors. This core set of behavior difficulties that were invariant across northern and southern California is presented in Appendix E. These behaviors, ordered by increasing difficulty, provide a description of the hierarchy of behaviors within the GEB scale.

Follow-Up Data

Two research questions can be addressed using our follow-up data set: Does a change in response format and, thus, a model change from Rasch's dichtomous to partial-credit affect the scale qualities of the GEB measure? And What is the test–retest reliability between the two different behavior assessments?

Reliability Assessment Based on the Rasch Dichotomous Model

In a follow-up study, 185 Berkeley students were reassessed using a Yes/No format instead of the Likert response format that was used in the main study. When all 51 ecological behavior items and all participants (n = 185) were assessed as a GEB scale using the Rasch dichotomous model, the scale has an Item Response Theory-based person-reliability of .72 (Cronbach's α = .69). Three items (5.9%) did not fit to the 51-item GEB scale (i.e., item misfit, $|t| \geq \pm 1.96$). Two items were excluded from this estimation because of their overall zero or maximal scale values. The overall fit statistics for the remaining 49 items of this scale are reasonable: $M(MS)$ = 1.0, $SD(MS)$ = 0.07, $M(t)$ = -0.02, $SD(t)$ = 0.99. According to the GEB measure (i.e., case misfit, $|t| \geq \pm 1.96$), 10 of 185 participants (5.4%) did not fit well; the overall fit statistics for the participants are acceptable: $M(MS)$ = 1.0, $SD(MS)$ = 0.17, $M(t)$ = -0.03, $SD(t)$ = 1.05.

Test–Retest Reliability

All but 1 of the 185 participants had two usable data sets; 14 dropped out between the main and the follow-up data collection, and 1 person was excluded because of too many missing values (approximately 10%) in his or her main data set. Each person's GEB estimate based on the Rasch dichotomous model (using the Yes/No response format data) was correlated with the same person's GEB estimate based on the partial-credit model (using the Likert scale response format data). The test–retest reliability of people's GEB (Pearson correlation and

regression analysis) is rather acceptable and closely resembles the Item Response Theory-based person-reliability estimates (rel) in the original Swiss (rel = .71), the main California (rel = .73), and the Berkeley follow-up (rel = .72) study (r = .76), $F(1, 182) = 244.4$, $p < .0001$, $\eta^2 = 57.3\%$.

Ecological Behavior: A Cross-Cultural Comparison

Given that the GEB scale represents a quite reliable and valid measure, one might wonder Who behaves more ecologically: The Californians or the Swiss? Students in Berkeley or students in Irvine? Both effects of participants' origin on GEB were tested with a univariate ANOVA. Post hoc comparisons were carried out with Student's t tests.

Although the Swiss and the Californians were calibrated independently and as the quantification of estimates (i.e., scaling) should not depend on the calibration sample, the GEB estimates can be compared directly. However, note that Berkeley and Irvine students' GEB scores are based on Likert-scale response data, whereas Swiss adults' GEB scores are based on Yes/No response data. Moreover, all GEB scores were established with 38 behaviors and 51 behaviors in Switzerland and California, respectively.

GEB scores were significantly affected by participants' origin, $F(2, 1126) = 943.4$, $p < .001$, $\eta^2 = 62.6\%$. More than 62% of the variance of the mean GEB scores can be attributed to participants' origin. A significant difference was found between California students from Berkeley and Irvine and Swiss adults, $t(1127) = 43.5$, $p < .001$. The mean GEB score of the Swiss participants was significantly higher than that of the California participants: Switzerland, $M = 1.58$, $SD = 0.88$, $N = 443$; Berkeley, $M = 0.04$, $SD = 0.21$, $N = 198$; Irvine, $M = 0.06$, $SD = 0.24$, $N = 488$. Swiss adults apparently behave much more ecologically than do California students. Students from northern (Berkeley) and southern (Irvine) California do not differ regarding the number of ecological behaviors that they perform, $t(684) = 0.7$, $p = .48$.

Discussion

The GEB scale held true as a unidimensional person measure for a California student sample, as it did for the Swiss calibration sample. As such, it turned out to be a cross-culturally applicable general behavior measure. Particularly promising is the scale's potential to detect effective situational influences.

The first major finding (of three such findings) refers to the person measure's applicability across different countries; a finding challenged by others using traditional (i.e., based on factor analysis) behavior measures (cf. Lévy-Leboyer et al., 1996). Based on a probabilistic scaling approach, the GEB measure was found to be a cross-culturally applicable tool. Acceptable and comparable

reliability, internal consistency, and validity indicators could be found in California as well as in the original Swiss context (Kaiser, 1998). The GEB scale turned out to be not limited to a restricted set of behaviors, nor limited to identical situational influences (i.e., invariant behavior difficulties) across cultures or subcultures: The former refers to the scale's flexibility in accounting for measurement variation by including new behaviors when required (Appendix A); the latter relates to differential behavior difficulties between countries (Appendix B) and between communities (Appendix D). Given that cultures and subcultures differ and, thus, situational influences on behaviors vary across countries and communities, a behavior measure must account for culture-dependent situational influences that might affect ecological behaviors differentially. Hence, differential behavior difficulties should be expected, and hence are required to establish the GEB measure as a cross-culturally applicable tool. However, Item Response Theory also requires a core set of behaviors with consistent difficulties across cultures as an indication of cross-cultural construct validity (Wright & Masters, 1982). This construct validity is confirmed by 11 out of 15 behaviors with comparable difficulties in Switzerland and California (Appendix C) either in Berkeley or in Irvine (Appendix E); thus, GEB remains fairly commensurable to Switzerland in California.

Overall, the GEB scale yields acceptable reliability, internal consistency, and validity measures (indicated by two sets of behaviors with and without comparable behavior difficulties). Additionally, the fit statistics for the GEB scale (based on either polytomous, or dichotomous data) were also acceptable, except for a remarkable person misfit for the polytomous data ($n = 244$, 35.6%). Contrary to our expectation, the GEB scales' reliability did not improve by changing the response format from a dichotomous one to a polytomous format. All three Item Response Theory-based person-reliabilities (rel) as well as the test–retest reliability (r) were quite similar, rel (Swiss adults) = .71, rel (California students–polytomous) = .73, rel (Berkeley students–dichotomous) = .72, $r = .76$. At least for a student sample, a polytomous response format apparently did not enhance the predictability of students' GEB composite scores. On the contrary, the polytomous response format might have increased students' unpredictability, which contributed to the considerable person misfit.

Person Misfit

The remarkable person misfit must be seen as the major limitation of the present study. Four reasons can be held accountable for the person misfit: (a) the already-mentioned overly specific response format; (b) a lack of conscientiousness, because of motivational problems; (c) the restricted range of the student responses on the GEB measure; and (d) unsettled lives as the dominant person characteristic of the California student sample.

The proportion of misfitting participants dropped from 35.6% to an acceptable 5.4% solely by returning the polytomous Likert scale (main study) to a dichotomous Yes/No response format (follow-up study). Analogously, when all 51 ecological behaviors and all participants ($N = 686$) were reassessed using the Rasch dichotomous instead of the partial-credit model, the scale has an Item Response Theory-based person-reliability of .72 (Cronbach's $\alpha = .72$). Note that for this analysis the polytomous data were collapsed to dichotomous (*strongly disagree*, *disagree*, and the *neutral* category were collapsed to *disagree*, whereas *strongly agree* and *agree* were collapsed to *agree*). Seven items (13.7%) did not fit the 51-item GEB scale (i.e., item misfit; $|t| \geq \pm 1.96$). The overall fit statistics for the 51 items of this scale are as follows: $M(MS) = 1.0$, $SD(MS) = 0.05$, $M(t) = -0.19$, $SD(t) = 1.41$. According to the GEB measure (i.e., case misfit; $|t| \geq \pm 1.96$), 74 of 686 participants (13.7%) did not fit well. The overall fit statistics for the participants are as follows: $M(MS) = 1.0$, $SD(MS) = 0.24$, $M(t) = -0.09$, $SD(t) = 1.34$. The GEB scale's fit measures remained fairly stable, even though we changed to the Rasch dichotomous model, except for a significant drop of misfitting participants from 244 to 74. Our interpretation of this is that the broader range of response possibilities was overly differential and affected participants' answers negatively by making them more arbitrary, which contributed to the considerable number of poor person estimates. Moreover, these findings give credit to the notion that the use of a neutral response category evidently did not affect our main findings considerably, as it left the fit measures basically unaffected.

Contrary to our expectation, the Likert response format did not improve the GEB scale's reliability. This somewhat counterintuitive finding might be a result of some of the particularities of our student sample that should not be generalized to other samples.

The inspection of the mean item residuals between fitting ($n = 442$) and misfitting ($n = 244$) participants revealed an increased discrepancy in item fit between negatively and positively formulated items. Such a finding indicates that misfitting participants were less conscientious, being less concerned to decode the negative statements. Presumably, this was a result of motivational problems when the participants filled out questionnaires. This lack of conscientiousness, unfortunately, also made answers more arbitrary and, thus, decreased the predictability of some GEB measures, which in turn resulted in some rather poor person estimates.

The considerable person misfit for California participants may also be related to the restricted range of the GEB measure: Swiss participants' GEB scores in the original calibration study ranged from -1.50 through 4.36 logits, which are the basic units of Item Response Theory–based scales (cf. Wright & Masters, 1982). California participants' GEB scores ranged from -0.61 through 0.92 logits. Thus, the adult Swiss had an almost 4 times wider distribution than did the student

Californians. Such a restriction of range made the GEB estimation procedure a more difficult task since even small and random differences could affect a solution, resulting in some rather poor person estimates, not to mention making the reliabilities less than they might have been.

Inaccurate behavior estimates may also be indicative of the circumstances of these fairly young students' lives. Students' median age was 21 years. Most of them were single (94.3%); only 3.7% of them had children. Their behavior patterns might not be differentiated (causing the restricted GEB range) and settled yet. Hence, inaccurate GEB estimates could be related to these unsettled life circumstances. Such a claim refers to a principle unpredictability of unsettled participants, a claim that was supported with another study: The predictability of the interrelations between environmental knowledge, environmental values, responsibility feelings toward the environment, ecological behavior intentions, and ecological behavior was evidentially negatively affected when unsettled students were included (cf. Kaiser, Ranney, Hartig, & Bowler, 1999). Apparently, unsettled lives can also be held accountable for some of the rather poor GEB estimates.

Cross-Cultural Comparisons

The second finding emphasizes the GEB scale as a sensitive person-measure: On the one hand, Swiss adults turned out to be more ecologically well behaved than California students. On the other hand, Berkeley and Irvine students did not differ in their ecological behavior. Obviously, similarities in students' lives transcended any group differences between participants from Irvine and Berkeley. Note that the comparison between Swiss adults and California students should not be taken for granted, as group differences are confounded by age and, presumably, life circumstances: The students' median age was 21 years, as opposed to 45.5 years for the Swiss. However, the clear-cut difference between Swiss adults and California students supports the scale's sensitivity and validity. As a real-group comparison between people from different countries must be based on comparable samples, future research must provide such data. At least the present study contributes to such an enterprise with a reliable, valid, and cross-culturally applicable measure.

The third major finding refers to GEB as a detection tool for potentially effective situational influences. In different cultures (i.e., countries and communities), some of the ecological behaviors that constitute the GEB scale are affected by situational differences; influences that result in differential behavior difficulties (Appendices B and D). Note that the following comparison between California and Switzerland is, as already mentioned, confounded by age; thus, it remains exploratory. Appendix B points to at least four major situational (i.e., environmental and sociocultural) influences on behaviors that might have resulted in

differential difficulties between Swiss adults and California students: (a) money and lifestyle, (b) legislation, (c) climate, and (d) city design.

Swiss adults recycled more, and they obviously cared more about garbage inhibition and garbage removal (Items 9, 12, 13, and 27), whereas California students apparently revealed quite a bit of ecologically aware consumer behavior by buying less sophisticated cleaners (Items 20, 21, 23, and 24). Two reasons may account for these findings. On the one hand, students' lack of money could cause them to not buy all sorts of special-purpose cleaners and might cause them to even reduce washing (Item 16). As they were more affluent, Swiss adults, not surprisingly, contributed financially to charity and environmental organizations more often (Items 2 and 34). On the other hand, differences in lifestyle between older and younger adults could cause most of the differences between Swiss and California participants as well. There are presumably much more important things in students' lives than using proper cleaners, inhibiting and removing garbage, doing laundry on a regular basis (rather than waiting until clothes run short), watching laundry detergent (Item 25), and so forth. Another lifestyle difference can be found in the kitchen sink: In California, there is no need to dispose of leftovers in the toilet (Item 10), as most kitchen sinks have garbage disposals.

Speeding on freeways is less likely in California than in Switzerland because of legislation differences. Speeds over 100 km/h (Item 37) were legal in Switzerland, but not in California at the time of the study. Differences in climate obviously make it easier for Californians to reduce heating in the winter (Item 15), while the Swiss care more about energy loss through open windows (Item 17). As opposed to California cities, Swiss cities do not allow for easy access by automobile (e.g., scarce parking, narrow streets). Moreover, major cities in Switzerland are easily accessible by public transportation. Not surprisingly, therefore, the Swiss use their automobiles less often than do Californians when they go downtown (Item 36).

Besides differences between Switzerland and California, there are also detectable differences between northern and southern California. Appendix D stresses three major environmental and sociocultural differences between Berkeley and Irvine: (a) climate, (b) availability of public transportation, and (c) social policy and social climate.

The differential climate between northern and southern California could have resulted in differences in heating behavior (Item 15) and water consumption (Item 39). Heating in winter may be an issue in northern California but, presumably, is rarely an issue in southern California. Hence, it is easier for people in southern California not to keep the heat on, and they do not need to wear sweaters as they presumably do not use heating anyway. Comparably, as the difference between water temperature and air temperature does not exceed a tolerable range, there is also not much need to let the water run to reach the proper temperature in southern California. However, it could also be that southern Californians are

generally more aware of water's scarcity than are northern Californians, which also causes southern Californians to reduce their water consumption.

Not surprisingly, students use more public transportation in Berkeley than in Irvine (Items 36, 38, and 42). Possibly, the Bay Area Rapid Train (BART) system could have caused this finding, as BART is a very convenient, safe, fairly reasonable, efficient, and reliable public-transportation system for the Bay area (i.e., the San Francisco–Oakland area). Irvine and the Los Angeles area do not match the BART system with anything comparable.

Differences in social policy and social climate between northern and southern California are obvious as well. As a matter of public policy, panhandlers are very rare in Irvine. Not surprisingly, people are more likely to give occasional panhandlers some change (Item 1). In Berkeley, however, panhandlers are omnipresent and, hence, giving money becomes a less common event. Item 4 ("If I were an employer, I would consider hiring a person previously convicted of a crime") reveals Berkeley students as more liberally minded than Irvine students. The social climate of the Bay area could have contributed to such a finding. Berkeley students also find ways to use plastic bags more often than do Irvine students (Items 28 and 29), a finding that could relate to the environmentally concerned social climate among Berkeley students.

Our suggestions should not be taken for granted, nor are they the only possible alternatives. Yet these examples illuminate ways to use the detection tool to search for already effective measures in different cultures and subcultures. Before such a search can guide further societal changes in a more ecologically behaving society, potentially effective measures must be confirmed empirically.

Conclusions

Situational influences affect conduct in such a way that some behaviors become easier to carry out than others. As societies are rather complex aggregates of all sorts of influences, an ecological behavior measure that is cross-culturally applicable must encompass differential behavior difficulties (i.e., situational influences) across countries within its possibilities. A behavior measurement approach within the family of Rasch models uses behavior difficulties systematically and thus acknowledges situational influences on behavior. Based on such an approach, the GEB scale was confirmed as a unidimensional, reliable, and valid measure in California, too. Moreover, the GEB scale turned out to be cross-culturally applicable (i.e., a culturally independent measure). Thus, the scale considered in its generality as a dynamic measure does not appear to be an effective measure solely in one country and ineffective in others (cf. Lévy-Leboyer et al., 1996), nor is it bound to a certain specific realization (i.e., a certain set of behaviors). We found that commensurable, general ecological behavior in different countries and communities was constituted differentially. This finding contributes to the detection of potentially effective situational influences

necessary for a scientifically guided adoption process of sociocultural influences on ecological behavior.

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Appendix A

General Ecological Behavior Scale

Item/behavior	Difficulty	*MS*	*t*
Domain: Prosocial behavior			
1. Sometimes I give change to panhandlers.	0.06	1.01	0.3
2. From time to time I contribute money to charity.	-0.17	0.97	-0.7
3. If an elderly or disabled person enters a crowded bus or subway, I offer him or her my seat.	-0.69	1.01	0.2
4. If I were an employer, I would consider hiring a person previously convicted of a crime.	0.44	0.98	-0.5
5. In fast-food restaurants, I usually leave the tray on the table. (-)	-0.82	1.00	0.1
6. If a friend or relative had to stay in the hospital for a week or two for minor surgery (e.g., appendix, broken leg), I would visit him or her.	-1.06	1.03	0.3
7. Sometimes I ride public transportation without paying a fare. (-)	-0.73	1.09	1.2
8. I would feel uncomfortable if people of a different ethnicity lived in the apartment next door. (-)	-0.83	1.02	0.3
Domain: Ecological garbage removal			
9. I put dead batteries in the garbage. (-)	0.35	0.96	-0.9
10. After meals, I dispose of leftovers in the toilet. (-)	-0.97	1.05	0.4
11. I bring unused medicine back to the pharmacy.	1.10	1.09	0.9
12. I collect and recycle used paper.	-0.25	0.91	-2.2
13. I bring empty bottles to a recycling bin.	-0.32	0.91	-2.1
Domain: Water and power conservation			
14. I prefer to shower rather than take a bath.	-0.71	1.10	1.5
15. In the winter, I keep the heat on so that I do not have to wear a sweater. (-)	-0.22	0.97	-0.7
16. I wait until I have a full load before doing my laundry.	-0.66	1.00	0.0

(*Appendix continues*)

Appendix A (Continues)

Item/behavior	Difficulty	*MS*	*t*
17. In the winter, I leave the windows open for long periods of time to let in fresh air. (-)	0.06	1.12	2.9
18. I wash dirty clothes without prewashing.	-0.40	1.09	1.6
Domain: Ecologically aware consumer behavior			
19. I use fabric softener with my laundry. (-)	0.24	1.05	1.2
20. I use an oven-cleaning spray to clean my oven. (-)	-0.30	1.04	1.0
21. If there are insects in my apartment, I kill them with a chemical insecticide. (-)	-0.11	0.95	-1.4
22. I use a chemical air freshener in my bathroom. (-)	-0.14	0.93	-2.0
23. I use chemical toilet cleaners. (-)	0.23	1.02	0.5
24. I use a cleaner made especially for bathrooms, rather than an all-purpose cleaner. (-)	-0.20	1.02	0.5
25. I use phosphate-free laundry detergent.	0.10	0.92	-1.5
Domain: Garbage inhibition			
26. Sometimes I buy beverages in cans. (-)	0.73	1.05	0.8
27. In supermarkets, I usually buy fruits and vegetables from the open bins. (-)	0.86	1.19	2.9
28. If I am offered a plastic bag in a store, I will always take it. (-)	0.15	0.95	-1.2
29. For shopping, I prefer paper bags to plastic ones.	-0.06	0.99	-0.4
30. I usually buy milk in returnable bottles.	0.78	1.04	0.7
Domain: Volunteering in nature-protection activities			
31. I often talk with friends about problems related to the environment.	0.00	0.86	-3.4
32. I am a member of an environmental organization.	0.59	0.91	-1.6
33. In the past, I have pointed out to someone his or her unecological behavior.	-0.16	0.93	-1.6
34. I sometimes contribute financially to environmental organizations.	0.45	0.86	-3.4
Domain: Ecological automobile use			
35. I do not know whether I can use leaded gas in my automobile. (-)	-0.58	1.07	1.2

(*Appendix continues*)

Appendix A (Continued)

Item/behavior	Difficulty	*MS*	*t*
36. Usually, I do not drive my automobile in the city.	0.65	1.03	0.5
37. I usually drive on freeways at speeds under 60 mph.	0.72	1.07	1.1
38. When possible in nearby areas (around 20 miles), I use public transportation or ride a bike.	0.33	0.92	-2.0
Newly included items			
39. I let the water run for a time to reach the right temperature. (-)	0.38	0.96	-0.9
40. I take my own coffee cup to work or school.	0.35	0.94	-1.4
41. I reuse my shopping bags.	-0.23	0.97	-0.8
42. I walk, ride a bicycle, or take public transportation to work or school.	0.00	1.06	1.8
43. I give way to other drivers, rather than cutting them off.	-0.29	0.95	-1.0
44. I like ordering take-out from restaurants. (-)	0.13	1.02	0.5
45. I use rechargeable batteries.	0.10	1.01	0.3
46. The heater for my house is shut off late at night.	-0.30	1.01	0.3
47. I buy organic vegetables.	0.19	0.97	-0.6
48. If possible, I do not insist on my right of way and make the traffic stop before entering a crosswalk.	-0.19	1.04	0.8
49. I use a compost bin.	0.58	1.02	0.4
Originally excluded and modified items			
50. I unwrap packages in the store.	0.87	1.18	2.5
51. My automobile is as ecologically sound as possible.	-0.04	1.00	0.1

Note. Items 1 through 38 are adapted from Kaiser (1998). They are grouped by 1 prosocial and 6 ecological behavior domains. Three changes in wording were applied to make the scale more generally applicable. The word *Turks* was replaced by the expression *people of a different ethnicity* in Item 8. The expression *100 km/h* (which is equivalent to 62.5 mph) was replaced by *60 mph* in Item 37. The expression *around 30 kilometers* (which is equivalent to 18.75 miles) was replaced by *around 20 miles* in Item 38. (-) indicates negatively formulated items. *Behavior difficulties* are expressed in logits; the more negative a logit value, the easier a behavior. The more positive a logit value is, the more difficult is the particular behavior. Logits are the basic units of Item Response Theory-based scales (cf. Wright & Masters, 1982).

Appendix B

Behaviors With Differential Difficulties in Switzerland and California

	Item	Easier in
1.*	Sometimes I give change to panhandlers.	CAL
5.*	In fast-food restaurants, I usually leave the tray on the table. (-)	CAL
10.	After meals, I dispose of leftovers in the toilet. (-)	CAL
15.	In the winter, I keep the heat on so that I do not have to wear a sweater. (-)	CAL
16.	I wait until I have a full load before doing my laundry.	CAL
20.	I use an oven-cleaning spray to clean my oven. (-)	CAL
21.	If there are insects in my apartment, I kill them with a chemical insecticide. (-)	CAL
23.	I use chemical toilet cleaners. (-)	CAL
24.	I use a cleaner made especially for bathrooms, rather than an all-purpose cleaner. (-)	CAL
28.	If I am offered a plastic bag in a store, I will always take it. (-)	CAL
30.	I usually buy milk in returnable bottles.	CAL
32.	I am a member of an environmental organization.	CAL
37.	I usually drive on freeways at speeds under 60 mph.	CAL
2.*	From time to time I contribute money to charity.	SWI
4.*	If I were an employer, I would consider hiring a person previously convicted of a crime.	SWI
9.	I put dead batteries in the garbage. (-)	SWI
12.	I collect and recycle used paper.	SWI
13.	I bring empty bottles to a recycling bin.	SWI
17.	In the winter, I leave the windows open for long periods of time to let in fresh air. (-)	SWI
25.	I use phosphate-free laundry detergent.	SWI
27.	In supermarkets, I usually buy fruits and vegetables from the open bins. (-)	SWI
34.	I sometimes contribute financially to environmental organizations.	SWI
36.	Usually, I do not drive my automobile in the city.	SWI

Note. CAL = California (N = 686). SWI = Switzerland (N = 443; used in Kaiser, 1998). Asterisk (*) indicates prosocial behaviors. (-) indicates negatively formulated items. Items 1 through 38 represent the original General Ecological Behavior scale items, and Items 39 through 51 represent additionally included items (see Appendix A).

Appendix C

Behaviors With Comparable Difficulties in Switzerland and in California

Item
3.* If an elderly or disabled person enters a crowded bus or subway, I offer him or her my seat.
35. I do not know whether I can use leaded gas in my automobile. (-)
18. I wash dirty clothes without prewashing.
6.* If a friend or relative had to stay in the hospital for a week or two for minor surgery (e.g., appendix, broken leg), I would visit him or her.
7.* Sometimes I ride public transportation without paying a fare. (-)
14. I prefer to shower rather than take a bath.
8.* I would feel uncomfortable if people of a different ethnicity lived in the apartment next door. (-)
22. I use a chemical air freshener in my bathroom. (-)
33. In the past, I have pointed out to someone his or her unecological behavior.
29. For shopping, I prefer paper bags to plastic ones.
26. Sometimes I buy beverages in cans. (-)
31. I often talk with friends about problems related to the environment.
19. I use fabric softener in my laundry. (-)
11. I bring unused medicine back to the pharmacy.
38. When possible in nearby areas (around 20 miles), I use public transportation or ride a bike.

Note. Asterisk (*) indicates prosocial behaviors. (-) indicates negatively formulated items. The 15 behaviors are ordered by their difficulty (from easy to more difficult tasks). Items 1 through 38 represent the original General Ecological Behavior scale items, and Items 39 through 51 represent additionally included items (see Appendix A).

Appendix D

Behaviors With Differential Difficulties in Berkeley and Irvine

	Item	Easier in
4.*	If I were an employer, I would consider hiring a person previously convicted of a crime.	BRK
10.	After meals, I dispose of leftovers in the toilet. (-)	BRK
18.	I wash dirty clothes without prewashing.	BRK
28.	If I am offered a plastic bag in a store, I will always take it. (-)	BRK
29.	For shopping, I prefer paper bags to plastic ones.	BRK
36.	Usually, I do not drive my automobile in the city.	BRK
38.	When possible in nearby areas (around 20 miles), I use public transportation or ride a bike.	BRK
42.	I walk, ride a bicycle, or take public transportation to work or school.	BRK
1.*	Sometimes I give change to panhandlers.	IRV
15.	In the winter, I keep the heat on so that I do not have to wear a sweater. (-)	IRV
16.	I wait until I have a full load before doing my laundry.	IRV
31.	I often talk with friends about problems related to the environment.	IRV
39.	I let the water run for a time to reach the right temperature. (-)	IRV

Note. BRK = Berkeley (n = 198). IRV = Irvine (n = 488). Asterisk (*) indicates prosocial behaviors. (-) indicates negatively formulated items. Items 1 through 38 represent the original General Ecological Behavior items, and Items 39 through 51 represent additionally included items (see Appendix A).

Appendix E

Behaviors With Comparable Difficulties in Irvine and Berkeley

	Item
6.*	If a friend or relative had to stay in the hospital for a week or two for minor surgery (e.g., appendix, broken leg), I would visit him or her.
5.*	In fast-food restaurants, I usually leave the tray on the table. (-)
8.*	I would feel uncomfortable if people of a different ethnicity lived in the apartment next door. (-)
35.	I do not know whether I can use leaded gas in my automobile. (-)
7.*	Sometimes I ride public transportation without paying a fare. (-)
14.	I prefer to shower rather than to take a bath.
43.	I give way to other drivers rather than cutting them off.
13.	I bring empty bottles to a recycling bin.
41.	I reuse my shopping bags.
3.*	If an elderly or disabled person enters a crowded bus or subway, I offer him or her my seat.
12.	I collect and recycle used paper.
20.	I use an oven-cleaning spray to clean my oven. (-)
46.	The heater for my house is shut off late at night.
2.*	From time to time I contribute money to charity.
24.	I use a cleaner made especially for bathrooms, rather than an all-purpose cleaner. (-)
48.	If possible, I do not insist on my right of way and make the traffic stop before entering a crosswalk.
22.	I use a chemical air freshener in my bathroom. (-)
33.	In the past, I have pointed out to someone his or her unecological behavior.
21.	If there are insects in my apartment, I kill them with a chemical insecticide. (-)
25.	I use phosphate-free laundry detergent.
51.	My automobile is as ecologically sound as possible.
17.	In the winter, I leave the windows open for long periods of time to let in fresh air. (-)
44.	I like ordering take-out from restaurants. (-)
45.	I use rechargeable batteries.

(*Appendix continues*)

Appendix E (Continued)

	Item
19.	I use fabric softener with my laundry. (-)
23.	I use chemical toilet cleaners. (-)
47.	I buy organic vegetables.
40.	I take my own coffee cup to work or school.
9.	I put dead batteries in the garbage. (-)
34.	I sometimes contribute financially to environmental organizations.
32.	I am a member of an environmental organization.
49.	I use a compost bin.
37.	I usually drive on freeways at speeds under 60 mph.
50.	I unwrap packages in the store.
26.	Sometimes I buy beverages in cans. (-)
27.	In supermarkets, I usually buy fruits and vegetables from the open bins. (-)
30.	I usually buy milk in returnable bottles.
11.	I bring unused medicine back to the pharmacy.

Note. Asterisk (*) indicates prosocial behaviors. (-) indicates negatively formulated items. The 38 behaviors are ordered by their difficulty (from easy to more difficult tasks). Items 1 through 38 represent the original General Ecological Behavior items, and Items 39 through 51 represent additionally included items (see Appendix A).