

# A Comparison of Three Psychometric Values Measures for Modeling Ecologically Conscious Consumption Behavior

Deborah J. Webb<sup>1</sup>, James H. Murphy<sup>2</sup>, Cheryl O. Brown<sup>1</sup>

<sup>1</sup>Department of Marketing and Real Estate (Webb and Brown), Richards College of Business, University of West Georgia, Carrollton, USA

<sup>2</sup>Department of Economics (Murphy), Richards College of Business, University of West Georgia, Carrollton, USA  
Email: [jmurphy@westga.edu](mailto:jmurphy@westga.edu)

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## Abstract

We model environmentally conscious consumption behavior (ECCB) with three psychometric values constructs: Schwartz's Self-Transcendence Values, Kahle's List of Values, and Richins and Dawson's Materialism. Comparison of competing models and non-nested specification tests lead to a statistically significant model of ECCB which reasonably fits our author-designed and collected survey data. In addition, benevolence and universalism (elements of Schwartz's construct), and acquisition centrality (an element of Materialism) exhibit statistical significance and conform to expectations.

## Keywords

Consumer Behavior, Environment, Psychometrics, Values

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## 1. Introduction

With the advent of reference dependent preferences [1], "arbitrarily coherent" demand [2], and laboratory experiments revealing limited support for the neo-classical, preference-based model of consumer choice [3], researchers might welcome an alternative, stable construct on which to base models of consumer behavior. *Values*—"desirable transsituational goals... that serve as guiding principles in the life of a person..." ([4], p. 21)—offer one such alternative. Values "can motivate action..." ([4], p. 21) and have long been regarded as influencing individual attitudes, beliefs, and behaviors [4] [5] [6].

Environmentally-linked purchase behavior offers an attractive test case for linking values and behaviors. Environmental psychologists have found that

people who “hold collective, society-directed values are more likely to engage in environmentally and socially responsible behaviors” ([7], p. 559). Moreover, values may play a larger role in explaining environmental awareness as socio-demographics tend to be less useful in this context [8].

One measure of environmentally-linked behavior is *Ecologically Conscious Consumption Behavior* (ECCB), which occurs when consumers “purchase products and services which they perceive to have a positive impact on the environment” ([9], p. 222). This note reports the construction and analysis of a consumer survey incorporating ECCB and three values measures: Schwartz’s Self-Transcendence Values [4], [6], Kahle’s List of Values (LOV) [10], and Richins and Dawson’s Materialism [11]. We find that Schwartz’s constructs, both separately and as a group, add explanatory power to a model of ECCB compared to a model based solely on socio-demographics. Neither LOV nor Materialism improves model fit, though one element of Materialism, acquisition centrality, does. These findings: 1) suggest psychometrics can enhance models of environmentally-linked consumer behavior and 2) emphasize the importance of construct selection in a values-based approach to modeling.

Section 2 below develops the constructs we explore and our research hypotheses. Section 3 describes our sample and survey, while Section 4 describes the resulting data. Section 5 reports the statistical analysis. Section 6 concludes.

## 2. Theoretical Background

### 2.1. Ecologically Conscious Consumption Behavior

Roberts [9], [12] suggests separating socially responsive consumption into one category focusing on environmental awareness and another focusing on other aspects of social concern, e.g., donations to charities, hiring of minorities, and other socially conscious activities. We follow this convention and report in this note analysis of environmentally-linked behaviors (ECCB); other socially-oriented behaviors are reported elsewhere.

### 2.2. Self-Transcendence Values

Schwartz [4], [6] posits ten values: self-direction, stimulation, conformity, tradition, security, achievement, power, universalism, benevolence, and hedonism. As other-regarding constructs, benevolence and universalism offer the most promise for enhancing our understanding of ECCB. Schwartz [6] defines benevolence to focus on the welfare of people with whom one frequently interacts—one’s *in-group*. The motivational goal behind *benevolence* is the “preservation and enhancement of the welfare of people with whom one is in frequent personal contact” ([6], p. 39). Schwartz ([6], p. 12) defines *universalism* based on the motivational goal behind its manifestation: “understanding, appreciation, tolerance, and protection for the welfare of *all* people and for nature.”

Schultz and Zelezny [13] examined the relationship between environmental attitudes and Schwartz’s measures, finding that environmental attitudes con-

cerned with the physical environment are positively related to universalism, but *negatively* related to benevolence, reflecting the priority benevolent individuals attach to the ingroup's welfare over that of society at large.

Consequently, we hypothesize:

H<sub>1</sub>: Individuals with high levels of universalism engage in more ECCB, and

H<sub>2</sub>: Individuals with high levels of benevolence engage in less ECCB.

### 2.3. The LOV

Kahle [10] developed a nine item List of Values (LOV)—sense of belonging; excitement; warm relationships; self-fulfillment; being well-respected; fun and enjoyment of life; security; self-respect; and a sense of accomplishment. Items are measured on a nine point scale anchored by Very Unimportant (1) to Very Important (9). Kamakura and Novak [14] classified the LOV into five motivational domains: self-direction (LOV's self-respect and self-fulfillment), achievement (accomplishment, well-respected), enjoyment (fun and enjoyment, excitement, warm relationships), maturity (belonging, warm relationships), and security (security).

As Schwartz [4], [6] merged his maturity value with other values dealing with the welfare of outgroups and nature, we postulate LOV's *maturity* measure bears a similar relationship:

H<sub>3</sub>: Individuals with high levels of maturity engage in more ECCB.

The literature suggests that *security* is related to anthropocentric attitudes [13]. Thus,

H<sub>4</sub>: Individuals with high levels of security engage in less ECCB.

Schwartz and Bilsky ([5], p. 552) describe individuals high in *self-direction* as imaginative, independent, intellectual and logical who “refer to reliance on and gratification from one's independent capacities for decision making, creativity, and action.” The more a consumer's perception of an organization (or product) corresponds to the individual's self-definition, the stronger the consumer-organization identification [15]. Since consumers' comparisons are likely based on human traits such as norms and values, we postulate:

H<sub>5</sub>: Individuals with high levels of self-direction engage in more ECCB.

Kamakura and Novak's [14] *achievement* and *enjoyment* serve individual interests; consequently,

H<sub>6</sub>: Individuals with high levels of achievement engage in less ECCB, and

H<sub>7</sub>: Individuals with high levels of enjoyment engage in less ECCB.

### 2.4. Materialism

Materialism consists of success, acquisition centrality, and pursuit of happiness [11]. *Success* addresses the notion that people often judge their own and others' success by their possessions. *Acquisition centrality* refers to the central position material objects hold in the lives of materialistic people. Pursuing *happiness* through acquiring material objects is a hallmark of materialistic individuals.

Richins and Dawson [11] support the idea that materialists are selfish with

money and possessions. Consequently, we hypothesize:

H<sub>8</sub>: Individuals with high levels of materialism on the success dimension engage in less ECCB,

H<sub>9</sub>: Individuals with high levels of materialism on the acquisition centrality dimension engage in less ECCB, and

H<sub>10</sub>: Individuals with high levels of materialism on the pursuit of happiness dimension engage in less ECCB.

### 3. Survey Development

#### 3.1. Sample

A random sample was drawn from the telephone directory of a large metropolitan area in the Southeastern United States. Potential respondents were pre-called and asked to participate in a study of “Consumer Purchase Behavior.” The addresses of those agreeing to participate were verified and a survey and self-addressed, stamped envelope mailed to them. We mailed 290 surveys; 149 were returned, yielding a 51.38 percent response rate. We deleted surveys with missing variables, leaving 141 observations.

#### 3.2. ECCB

While Roberts [9], [12], [16] and his colleagues [8] examined a range of environmentally and socially-oriented activities using 40 survey items, we focus on environmentally-related purchase behavior. Items that are repetitive, outdated, or reflect behavior motivated by a desire to save money [9] were excluded, leaving 20 items. These were measured on a 7-point scale anchored by “Never True” (1) and “Always True” (7).

#### 3.3. Control Variables

Social desirability was measured by 10 items from the Marlowe-Crowne Social Desirability Scale [17]. These are “true” or “false” items which we summed, with one point per item for the response indicating social desirability. We also measured gender, household income, age, and education.

#### 3.4. Values

The three values constructs were included in the survey. Schwartz’s [6] instrument contains 56 items measuring 10 values. Due to the length of his instrument we measured only universalism and benevolence, those values likely to be associated with ECCB. We used the nine items Schwartz specified for each measure in the order they appeared in the complete instrument [6]. Respondents were instructed to read the entire list of 18 values and to “RATE EACH VALUE according to its DEGREE OF IMPORTANCE TO YOU AS A GUIDING PRINCIPLE IN YOUR LIFE.” We employed Schwartz’s [6] 9-level scale, anchored by “opposed to my values” (–1), “not important” (0), “important” (3), “very important” (6), and “of supreme importance” (7). The same scale was used

to measure the nine values in the LOV [10]. Lastly, Materialism values were constructed from Richins and Dawson's [11] 18-item scale with each item measured on a seven point scale anchored by "Strongly Disagree" (1) and "Strongly Agree" (7).

#### 4. Data

Of the 141 observations in the final dataset, 53 percent of respondents are female; 53 percent have less than a college degree; 25 percent have a college degree; and 21 percent attended graduate school. Age ranges from 19 to 89 years with a mean of 44. Twenty-five respondents (17.7 percent) are between 19 and 29; 32 (22.7 percent) fall between 30 and 39; 35 subjects (24.8 percent) are between 40 and 49; 28 (19.9 percent) are in their 50s; and 21 subjects (14.9 percent) are 60 or older. The median household income range is \$50,000 to \$74,999.

To determine which items from Robert's instrument (described in Section 3.2.1) capture ECCB rather than other societally-oriented behaviors, we used SPSS to perform a principle components factor analysis using oblimin rotation on the 20 items jointly measuring both ECCB and non-environmental, societally-oriented behavior. The scree plot suggested two factors. We dropped one item which loaded on both factors at the 0.40 level and one which did not load at the 0.35 level on either factor. After deleting these two items, we repeated the factor analysis, resulting in two clean factors capturing 65.57 percent of the variance. **Table 1** contains the 11 items measuring ECCB (Variance Extracted = 51.0 percent). Cronbach's alpha ( $\alpha$ ) measures the degree to which multiple survey items

**Table 1.** ECCB scale items and factor loadings.

Item	Loading
I have switched products for ecological reasons.	0.902
I try only to buy products/packaging that can be recycled.	0.868
I normally make a conscious effort to limit my use of products that are made of or use scarce resources.	0.863
Whenever possible, I buy products packaged in reusable containers.	0.791
When I have a choice between two equal products, I always purchase the one that is less harmful to other people and the environment.	0.781
I will not buy products that have excessive packaging.	0.764
I do not buy products in aerosol containers.	0.750
I have purchased products because they cause less pollution.	0.722
I have convinced members of my family or friends not to buy some products that are harmful to the environment.	0.697
I make every effort to buy paper products made from recycled paper.	0.670
If I understand the potential damage to the environment that some products can cause, I do not purchase these products.	0.551
Cronbach's $\alpha$	0.93
Percent of Variance Extracted	51.0

jointly measure a single, latent construct. Alphas of 0.7 or greater are considered acceptable ([18], p. 264-65). The 11 items measuring ECCB meet this threshold ( $\alpha = 0.93$ ); consequently, the variable ECCB reports the mean of each subject's responses to these 11 items.

The measures of Schwartz's Self-Transcendence Values (universalism:  $\alpha = 0.90$  and benevolence:  $\alpha = 0.88$ ) and Richins and Dawson's Materialism (success:  $\alpha = 0.77$ , acquisition centrality:  $\alpha = 0.76$ , and happiness:  $\alpha = 0.81$ ) also meet accepted standards for Cronbach's alpha. The only measure containing three items in the LOV motivational domain is enjoyment, and its alpha is also acceptable (0.78). Three LOV motivational domains contain two correlated items: self-direction (Spearman correlation coefficient ( $r = 0.49$ ,  $p = 0.00$ ), achievement ( $r = 0.55$ ,  $p = 0.00$ ), and maturity ( $r = 0.51$ ,  $p = 0.00$ ). For statistical analysis, values variables contain scale means. We also include gender (a dummy variable with gender = 1 indicating female; gender = 0 indicating male) and age in years in subsequent analysis.

## 5. Regression Analysis

To determine which, if any, of the three values constructs is linked to ECCB, we first estimated a base model by regressing ECCB on a constant, social desirability, gender, and age. These estimates are reported in columns two and three of **Table 2**. Then, we estimated three models which augment the base model with variables representing the Self-Transcendence Values (columns four and five of **Table 2**), the LOV (columns six and seven), and Materialism (columns eight and nine).

**Table 2** includes an incremental  $F$ -statistic (denoted  $\Delta F$ ) and its associated  $p$ -value. This statistic tests the null hypothesis that the *added* variables as a group do not have explanatory power versus the alternative hypothesis that they do. We also report an  $F$ -statistic (denoted  $F$ ) and  $p$ -value testing the statistical significance of the model as a whole (excluding the intercept). To measure model goodness-of-fit, we report the coefficient of determination ( $R^2$ ), adjusted  $R^2$ , and the Akaike Information Criterion (AIC) [19]. To test our research hypotheses, we report the estimated coefficient, standard error,  $t$ -value and two-tailed  $p$ -value for the explanatory variables.

### 5.1. Base Model

**Table 2** columns two and three contain the estimates from regressing ECCB on a constant, social desirability, gender, and age. The goodness of fit measures are  $R^2 = 0.068$ , adjusted  $R^2 = 0.048$ , and AIC = 0.583. The model is significant at the 0.05 level ( $F = 3.34$ ,  $p = 0.021$ ). Aside from the intercept, only gender is significant among the explanatory variables ( $\beta = 0.684$ ,  $t = 3.049$ ,  $p = 0.003$ ).

### 5.2. Self-Transcendence Model

Incorporating universalism and benevolence increases explanatory power, as

**Table 2.** OLS regression results.<sup>a,b,c</sup>

	MODEL									
	Base		Base + Self-Transcendence		Base + LOV		Base + Materialism		Base + Composite	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLE	Est. Coef. (S.E.)	<i>t</i> -value ( <i>p</i> -value)	Est. Coef. (S.E.)	<i>t</i> -value ( <i>p</i> -value)	Est. Coef. (S.E.)	<i>t</i> -value ( <i>p</i> -value)	Est. Coef. (S.E.)	<i>t</i> -value ( <i>p</i> -value)	Est. Coef. (S.E.)	<i>t</i> -value ( <i>p</i> -value)
Constant	2.91 (0.450)	6.461 (0.000)	2.891 (0.637)	4.542 (0.000)	2.771 (0.683)	4.055 (0.000)	3.870 (0.710)	5.452 (0.000)	4.374 (0.828)	5.280 (0.000)
Social Desirability	0.038 (0.053)	0.713 (0.477)	0.025 (0.053)	0.469 (0.640)	0.027 (0.056)	0.480 (0.632)	0.042 (0.054)	0.778 (0.438)	0.031 (0.052)	0.600 (0.549)
Gender	0.684 (0.224)	3.049 (0.003)	0.690 (0.216)	3.200 (0.002)	0.547 (0.258)	2.117 (0.036)	0.732 (0.230)	3.176 (0.002)	0.725 (0.211)	3.432 (0.001)
Age	-0.001 (0.008)	-0.177 (0.860)	-0.008 (0.008)	-1.053 (0.294)	-0.004 (0.009)	-0.421 (0.674)	-0.005 (0.008)	-0.676 (0.500)	-0.013 (0.008)	-1.646 (0.102)
Universalism	-	-	0.504 (0.123)	4.104 (0.000)	-	-	-	-	0.526 (0.120)	4.374 (0.000)
Benevolence	-	-	-0.385 (0.146)	-2.646 (0.009)	-	-	-	-	-0.454 (0.145)	-3.142 (0.002)
Self-direction	-	-	-	-	0.078 (0.166)	0.473 (0.637)	-	-	-	-
Achievement	-	-	-	-	0.006 (0.150)	0.038 (0.970)	-	-	-	-
Enjoyment	-	-	-	-	-0.136 (0.179)	-0.759 (0.449)	-	-	-	-
Maturity	-	-	-	-	0.169 (0.139)	1.210 (0.229)	-	-	-	-
Security	-	-	-	-	-0.050 (0.108)	-0.467 (0.641)	-	-	-	-
Success	-	-	-	-	-	-	0.047 (0.135)	0.352 (0.726)	-	-
Acquisition Centrality	-	-	-	-	-	-	-0.310 (0.145)	-2.137 (0.034)	-0.307 (0.113)	-2.710 (0.008)
Happiness	-	-	-	-	-	-	0.034 (0.102)	0.336 (0.738)	-	-
R <sup>2</sup>		0.068		0.172		0.082		0.104		0.215
Adj. R <sup>2</sup>		0.048		0.141		0.027		0.064		0.180
<i>F</i> ( <i>p</i> -value)		3.34 (0.021)		5.59 (0.000)		1.48 (0.171)		2.59 (0.021)		6.10 (0.000)
$\Delta F$ ( <i>p</i> -value)		-		8.42 (0.000)		0.400 (0.848)		1.78 (0.154)		8.328 (0.000)
AIC		0.583		0.494		0.639		0.587		0.455

<sup>a</sup>Dependent Variable is ECCB. <sup>b</sup>Number of Observations is 141. <sup>c</sup>Regressions were performed with NLOGIT 4.0.

shown in columns four and five of **Table 2**. The test statistic,  $\Delta F = 8.42$  ( $p = 0.000$ ), of the null,  $H_0: \beta_{\text{UNIVERSALISM}} = \beta_{\text{BENEVOLENCE}} = 0$ , against the alternative,  $H_a: \beta_{\text{UNIVERSALISM}} \neq 0 \neq \beta_{\text{BENEVOLENCE}}$ , suggests we reject the null. Thus, Schwartz's constructs jointly yield a statistically significant influence on ECCB. This model is a better fit than the base model: adjusted  $R^2$  is 0.141 for the Self-Transcendence model versus 0.048 for the base model and AIC is 0.494 for the Self-Transcendence model versus 0.583 for the base model.

In addition to the intercept, three independent variables are significant at the 0.01 level: universalism ( $\beta = 0.504$ ,  $t = 4.104$ ,  $p = 0.000$ ), supporting  $H_1$ ; gender ( $\beta = 0.690$ ,  $t = 3.200$ ,  $p = 0.002$ ); and benevolence ( $\beta = -0.385$ ,  $t = -2.646$ ,  $p = 0.009$ ), supporting  $H_2$ . Note that universalism and gender positively influence ECCB, while benevolence negatively affects it (consistent with an ingroup versus outgroup interpretation).

### 5.3. LOV Model

The LOV values are grouped into five motivational domains: maturity, security, self-direction, achievement, and enjoyment. Based on the associated incremental  $F$ -test, we fail to reject the null that the estimated coefficients of the added variables—maturity, security, self-direction, achievement, and enjoyment—jointly equal zero ( $\Delta F = 0.40$ ,  $p = 0.848$ ). In addition, the overall model fails to achieve significance ( $F = 1.48$ ,  $p = 0.171$ ) or improve fit (adjusted  $R^2 = 0.027$  and AIC = 0.639). Of the explanatory variables, only gender is significant ( $\beta = 0.547$ ,  $t = 2.117$ ,  $p = 0.036$ ); consequently, we fail to find support for  $H_3$  through  $H_7$ .

### 5.4. Materialism Model

Lastly, we add the three dimensions of Materialism—success, acquisition centrality, and happiness—to the base model. We fail to reject the null that the coefficients of the added variables jointly equal zero ( $\Delta F = 1.78$ ,  $p = 0.154$ ). Note, however, the model as a whole is significant ( $F = 2.59$ ;  $p = 0.021$ ), largely due to the individual coefficient of acquisition centrality exerting a negative effect on ECCB ( $\beta = -0.310$ ,  $t = -2.137$ ,  $p = 0.034$ ), supporting  $H_9$ , while gender positively affects it ( $\beta = 0.732$ ,  $t = 3.176$ ,  $p = 0.002$ ). We fail to find support for  $H_8$  or  $H_{10}$ .

### 5.5. $J$ -Tests

A non-nested specification test, such as Davidson and MacKinnon's  $J$ -test, represents an alternative strategy to select among competing sets of independent variables [20]. We conducted a series of trials with each values construct serving in turn as base, then added predicted values for the other constructs. The test statistic for model inclusion is the  $t$ -statistic of the added, fitted values.

For the first trial, we re-estimated the Self-Transcendence model including predicted values based on LOV and Materialism. At the 0.05 level, Materialism should be included in the model ( $t = 2.845$ ,  $p = 0.005$ ), but LOV should not ( $t = 1.238$ ,  $p = 0.218$ ). For the second trial, we re-estimated the LOV model including fitted values for Self-Transcendence and Materialism. The results suggest adding



both Self-Transcendence ( $t$ -value = 4.181,  $p = 0.000$ ) and Materialism ( $t = 2.728$ ,  $p = 0.007$ ) to the model. For the last trial, we re-estimated the Materialism model including fitted values for Self-Transcendence and LOV and obtained a similar result: a suggested final model specification incorporating Self-Transcendence ( $t = 4.021$ ,  $p = 0.000$ ), but not LOV ( $t = 0.919$ ,  $p = 0.360$ ). Should only a single construct be required,  $J$ -tests eliminate LOV at levels of significance less than or equal to 0.360. Levels of significance less than or equal to 0.005 are required to exclude Materialism in favor of Self-Transcendence.

### 5.6. Composite Model

At the more typical 0.05 level of significance, the  $J$ -tests suggest including elements of Self-Transcendence and Materialism as explanatory variables. As shown in columns four and five of **Table 2**, both universalism and benevolence are related to ECCB; however, only one Materialism construct, acquisition centrality, proved significant. Consequently, we estimated a composite model, presented in columns 10 and 11 of **Table 2**, regressing ECCB on a constant, social desirability, gender, age, universalism, benevolence, and acquisition centrality. The added variables ( $\Delta F = 8.33$ ,  $p = 0.000$ ) and the overall model ( $F = 6.10$ ,  $p = 0.000$ ) are significant at the 0.01 level; the individual coefficients of gender, universalism, benevolence, and acquisition centrality are also significant at the 0.01 level, yielding further support for  $H_1$ ,  $H_2$ , and  $H_9$ .

## 6. Conclusion

As the composite model indicates, adding universalism, benevolence, and acquisition centrality to the base model improves fit and yields a significant model, demonstrating the potential of a values-based approach to modeling consumer behavior. The composite model is the best fit of the five models presented in **Table 2** ( $R^2 = 0.215$ , adjusted  $R^2 = 0.180$ , and  $AIC = 0.455$ ), and reveals significant estimated coefficients that conform to expectations. We find a positive relationship between ECCB and universalism ( $\beta = 0.526$ ,  $t = 4.374$ ,  $p = 0.000$ , supporting  $H_1$ ) and negative relationships between ECCB and both benevolence ( $\beta = -0.454$ ,  $t = -3.142$ ,  $p = 0.001$ , supporting  $H_2$ ) and acquisition centrality ( $\beta = -0.307$ ,  $t = -2.710$ ,  $p = 0.004$ , supporting  $H_9$ )<sup>1</sup>. A significant model and a reasonable fit from an exploratory study such as this suggests further research may yield an increasingly effective addition to the economist's toolkit for building robust models of consumer behavior.

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<sup>1</sup>Here we adjust the two-tailed  $p$ -values reported in **Table 2** to one-tailed  $p$ -values to account for directionality.

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