A Structural Equation Test of the Value–Attitude–Behavior Hierarchy

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The role of values has received limited empirical attention relative to its potential significance, especially within a causal modeling approach. A series of multivariate and structural equation analyses supported the hypotheses that values have internal and external dimensions that influence attitudes. In turn, attitudes were found to influence behaviors, as the final phase in the value–attitude–behavior hierarchy. These analyses were performed on data derived from a survey about natural food shopping. As hypothesized, we found that people who have more internally oriented and less externally oriented value structures like natural foods more than other people, and these attitudes then lead to behaviors appropriate to the structure. Theoretical implications are discussed.

The pervasive role of values in all aspects of human life (Rokeach, 1973) has motivated empirical investigations in a number of social science disciplines. Values are both a powerful explanation of and influence on human behavior. In spite of the generally accepted importance of the role of values, empirical attention has been limited relative to the potential importance of values. Most past research has concentrated on the effects of single values, thereby neglecting the complex nature of value structures. Furthermore, structural equation models have not been developed to identify how values relate to other constructs, especially attitudes. This study seeks to examine the overall value structure at a higher level, as it relates to nutrition attitudes and nutrition shopping behaviors.

Values, Attitudes, and Behaviors

Rokeach (1973) referred to a value as an enduring belief that a specific mode of conduct or end-state is personally preferable to its opposite. A value system is an enduring organization of beliefs concerning preferred modes of conduct or end-states along an importance continuum. Basically, he conceived of personality as a system of values.

In terms of social adaptation theory (Kahle, 1983; Kahle, Kulka, & Klingel, 1980; Piner & Kahle, 1984), values are a type of social cognition that function to facilitate adaptation to one's environment. Values are similar to attitudes in that both are adaptation abstractions that emerge continuously from the assimilation, accommodation, organization, and integration of environmental information in order to promote interchanges with the environment favorable to the preservation of optimal functioning (Kahle, 1983). Because values are the most abstract of the social cognitions, they reflect the most basic characteristics of adaptation. These abstractions serve as prototypes from which attitudes and behaviors are manufactured. Cognitions, and therefore values, also guide individuals about which situations to enter and about what they do in those situations (Kahle, 1980). Within a given situation, the influence should theoretically flow from abstract values to midrange attitudes to specific behaviors. This sequence can be called the *value → attitude → behavior* hierarchy.

Theoretical arguments suggesting that values have a causal influence on subsequent behaviors have been voiced by many, including Williams (1979). He contends that explicit and fully conceptualized values become criteria for judgment, preferences, and choice. Even when values are implicit and unreflective, they function "as if" they were grounds for behavioral decisions. Moreover, "actual selections of behavior result from concrete motivations in specific situations which are partly determined by prior beliefs and values of the actor" (Williams, 1979, p. 20). Williams's theory, however, excludes attitudes.

Carman (1977) developed a model proposing a causal relationship between terminal and instrumental values and consumption behaviors. Values influence behaviors, such as shopping and media exposure patterns, both directly and indirectly through intervening attitudinal variables (measured as activities, interests, and opinions). This model, too, has yet to be empirically tested.

Not all the theorizing is supportive of the significance of values, however. Skinner (1971), for example, believes values are epiphenomena. They are merely words socializers teach to children and are unrelated to guidance of behavior or attitudes. Furthermore, many psychologists opt to ignore values, because "they seem to have confused *making* value judgements, which is incompatible with scientific objectivity, with studying objec-

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tively *how other people make them*—a phenomenon as amenable to psychological study, in principle, as other forms of human learning and choice" (Levitin, 1973, p. 491, italics as in the original).

To date, most empirical research has presented correlational evidence as support for the relationship between values and attitudinal or behavioral outcomes. The lack of causal analysis is probably more a function of research design and statistical limitations than a function of researchers' theoretical beliefs. Most systems of value measurement rely on nominal or ordinal scales and are not readily amenable to experimentation or structural equation modeling.

In a review of research on values and behaviors, Williams (1979, p. 23) concluded that "evidence that values do influence subsequent behavior is not available in the quantity and with the decisiveness we would prefer, but the total research-based data are nevertheless quite impressive." Differences in values have been shown to relate to significant differences in a variety of attitudinal and behavioral outcomes: occupational choice (Goldsen, Rosenberg, Suchman, & Williams, 1960; Kemp, 1960; Rosenberg, 1957), cigarette smoking (Grube, Weir, Getzlaf, & Rokeach, 1984), cheating on examinations (Hensehl, 1969, 1971), political attitudes and behaviors (Almond & Verba, 1963; Baum, 1968; Levine, 1960; Wickert, 1940a, 1940b), choice of friends (Beech, 1966; Williams, 1959), religion (Feather, 1984), participation in civil rights activities (Rokeach, 1973), automobile purchase (Henry, 1976), church attendance (Rokeach, 1960), choice of leisure activities (Beatty, Kahle, Homer, & Misra, 1985; G. Jackson, 1973), public interracial behavior (Rokeach, 1973), mass media usage (Becker & Connor, 1981), consequences of using media (Ball-Rokeach, Rokeach, & Grube, 1984), and political orientation (Cochrane, Billig, & Hogg, 1979; Searing, 1979). Ample evidence of discriminant validity also exists (e.g., Beatty et al., 1985).

List of Values

The pervasiveness and importance of values in human life may support future empirical efforts, but measurement issues must also be addressed. The most widely known and applied method of measurement may be attributed to Rokeach (1973). His paradigm has been the target of criticisms (e.g., Clawson and Vinson, 1978), which include information loss because of rank orderings, impossibility of ties, difficulty of the lengthy ranking task, and questionable relevance of all the values to daily life.

In an effort to overcome such limitations, an alternative, simplified List of Values (LOV) was developed and tested on a national sample (Kahle, 1983; Veroff, Douvan, & Kulka, 1981). The LOV consists of nine values: a sense of belonging, excitement, fun and enjoyment in life, warm relationships with others, self-fulfillment, being well-respected, a sense of accomplishment, security, and self-respect. A number of these values match up with values from Rokeach's Value Survey (e.g., a sense of accomplishment and self-respect), and several others are similar (e.g., security vs. national security). Several underlying dimensions of the nine values have been identified empirically (Kahle, 1983), including external/internal dimensions (Rotter, 1966) and apersonal/personal dimensions. The LOV was chosen as the value measure for the present study primarily for its parsimony and higher degree of relevance and influence over daily lives (Beatty et al., 1985). Moreover, it is closer to the Rokeach methodology than some of the other available measurement techniques (cf. Kahle, Beatty, & Homer, 1986).

Table 1
Factor Analysis Results

Variable	Factor loadings		
	Factor 1	Factor 2	Factor 3
Self-fulfillment	.70120[a]	.18257	.07820
Excitement	.63496[a]	−.03401	.43412
Sense of accomplishment	.73833[a]	.11273	.15352
Self-respect	.74898[a]	.26598	−.06648
Sense of belonging	−.05017	.81499[a]	.28781
Being well-respected	−.03234	.75894[a]	.39771
Security	.26312	.64061[a]	.13227
Fun and enjoyment	.25095	.05421	.83691[a]
Warm relationships	−.03234	.39771	.75069[a]
Eigenvalue	3.34487	1.35351	1.09356
% variation explained	37.2	15.0	12.1

[a] Designates factor assignment.

Hypotheses

The preceding theoretical arguments and empirical findings imply that values may influence behaviors both directly and indirectly through attitudinal mediators. This implication has not been tested in structural equation modeling research, however. The following hypotheses were derived to guide the research design and analyses of the present study, which was focused on natural food shopping.

Hypothesis 1. The values that constitute the LOV will represent a smaller number of underlying dimensions in this context.

Past research (Kahle, 1983) suggests that the LOV may be reduced to a smaller number of underlying dimensions. Situational factors may cause different dimensions to be important in different contexts. In order to distinguish frequent from infrequent natural food shopping behaviors and favorable from less favorable attitudes toward nutrition, internal and external dimensions should emerge. Natural food shoppers will place more importance on internal values, whereas nonshoppers will be more externally oriented.

Hypothesis 1a. The values that constitute the LOV will possess an internal or external dimension.

Hypothesis 1b. Natural food shoppers will place more importance on internal values, whereas nonshoppers will be more externally oriented.

Kahle (1983) found theoretical and empirical evidence of both internal and external dimensions to values. Internally oriented individuals want more control over all aspects of their lives (including dietary decisions)—a characteristic more typical of natural food shoppers than nonshoppers, who tend to be more externally oriented and therefore are apt to be more passive in their food purchases.

Table 2
Measurement Model Results

Construct/indicator	Standardized factor loading	*SE*	*t*	Reliabilities	Proportion of variance extracted
ξ_1 (Values Factor 1)				.69	.36
Self-fulfillment (X_1)	.672[a]				
Excitement (X_2)	.406	.062	9.726*		
Sense of accomplishment (X_3)	.629	.066	14.106*		
Self-respect (X_4)	.653	.067	14.488*		
ξ_2 (Values Factor 2)				.68	.42
Sense of belonging (X_5)	.550[a]				
Being well-respected (X_6)	.813	.116	12.685*		
Security (X_7)	.541	.089	11.089*		
ξ_3 (Values Factor 3)				.53	.36
Fun and enjoyment (X_8)	.562[a]				
Warm relationships (X_9)	.644	.105	10.317*		
η_1 Nutrition attitudes				.64	.31
Taste of natural food (Y_1)	.452[a]				
Natural food store perceptions (Y_2)	.588	.105	10.655*		
Concern about food additives (Y_3)	.631	.091	10.984*		
Importance of nutrition (Y_4)	.546	.101	9.079*		
η_2 Shopping behaviors				.71	.56
Amount spent (Y_5)	.860[a]				
Shopping frequency (Y_6)	.616	.140	9.946*		

[a] The first λ path for each construct was set to *1;* therefore, no *SEs* or *t* values are given. * $p < .05$.

Hypothesis 2. The value dimensions will influence attitudes toward nutrition.

Attitudes are the product of a variety of factors, including an individual's underlying value structure. The individual values conceivably operate simultaneously to influence attitude formation. This hypothesis is consistent with the perspective of a hierarchy of cognitions in which values are the most general from which more specific cognitions (i.e., attitudes) are derived. In the particular context of this study, the internal values ought to influence attitudes directly, whereas the external dimension will show an inverse relationship. The value dimension may also have a less direct influence on shopping behaviors than on attitudes.

Individuals who rate the internal values of fun and enjoyment in life, self-fulfillment, excitement, a sense of accomplishment, and self-respect more highly will have more favorable attitudes toward nutrition. Internally oriented individuals (Rotter, 1966) seek greater control over all aspects of their lives, including the food they eat. In contrast, those people who rate the external values (sense of belonging, being well-respected, and security) more highly will dislike natural foods. They are more apt to let fate control their lives and to be less concerned with the internal functioning of their body, including controlling the food that they consume.

Hypothesis 3. Attitudes toward nutrition will influence shopping behaviors.

Hypothesis 3a. Individuals with favorable attitudes toward nutrition and natural foods will visit natural food stores more frequently than those with less favorable attitudes.

Hypothesis 3b. Individuals with favorable attitudes toward nutrition and natural foods will spend more money on natural foods than those with less favorable attitudes.

Individuals with favorable attitudes toward nutrition and natural foods will be more apt to seek outlets where natural foods are available. As a result, people so inclined will tend to patronize natural food stores on a regular basis and will spend more money on natural foods than will individuals with less positive attitudes.

Consistent with the theoretical arguments offered for the first two hypotheses, frequent natural food shoppers and large spenders on natural foods will rate the internal values, including sense of accomplishment, self-respect, and fun and enjoyment in life, more highly than the external values. The opposite tendencies will be exhibited by infrequent natural food store patrons, who spend little money on natural foods. Natural food shoppers who desire more control over all aspects of their lives, including the food that they eat, will make the extra effort to purchase the most nutritious food possible.

Method

Setting and Sample

A survey was administered to 831 food shoppers at all major supermarkets and natural food stores in a medium-sized, Northwest city. Of these respondents, 449 (53.9%) were surveyed at supermarkets, and 383 (46.1%) were surveyed at natural food stores. The median age was 34.5 years, with men constituting 45.1% and women constituting 54.9% of the respondents. The majority of the sample (87%) reported having at least some college education, and the median household income was $20,252. Respondents classified themselves as professionals (37.9%), students (25.5%), trade workers (19%), office workers (8.7%), housewives (3.4%), or none of the above (5.6%).

Table 3
Correlation Matrix

Variable	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9
Taste of natural food (Y_1)	—														
Natural food store perceptions (Y_2)	0.394	—													
Concern about food additives (Y_3)	0.237	0.245	—												
Importance of nutrition (Y_4)	0.290	0.363	0.301	—											
Amount spent (Y_5)	0.214	0.244	0.168	0.188	—										
Shopping frequency (Y_6)	0.249	0.297	0.257	0.328	0.530	—									
Self-fulfillment (X_1)	0.126	0.183	0.119	0.163	0.036	0.123	—								
Excitement (X_2)	0.086	0.106	0.034	0.101	−0.009	0.062	0.255	—							
Sense of accomplishment (X_3)	0.071	0.151	0.083	0.099	0.005	0.016	0.434	0.357	—						
Self-respect (X_4)	0.110	0.177	0.063	0.107	0.050	0.088	0.442	0.152	0.415	—					
Sense of belonging (X_5)	0.038	0.059	−0.042	0.025	−0.039	−0.010	0.202	0.122	0.190	0.260	—				
Being well-respected (X_6)	−0.041	0.030	−0.088	−0.060	−0.114	−0.100	0.346	0.199	0.402	0.413	0.450	—			
Security (X_7)	−0.016	0.001	−0.102	−0.085	−0.056	−0.104	0.135	0.095	0.281	0.341	0.310	0.433	—		
Fun and enjoyment (X_8)	0.133	0.199	0.058	0.106	0.076	0.204	0.326	0.492	0.180	0.205	0.261	0.138	0.107	—	
Warm relationships (X_9)	0.172	0.162	0.087	0.146	0.001	0.065	0.394	0.133	0.198	0.346	0.359	0.274	0.191	0.362	—

Instrument

A self-explanatory questionnaire was administered. Respondents completed it at their own pace (approximately 10 min). Whenever necessary, survey administrators assisted the respondents. A number of attitude and behavior questions related to shopping at food stores were asked, including nutrition attitudes, shopping frequency, amount of money spent on food, and attitudes toward natural foods. These were measured on 5-point scales. In addition, each respondent rated each of the LOV values on a 10-point scale in terms of its importance and influence on his or her daily life. A number of demographic items (summarized previously) were also included.

Results and Discussion

In order to determine the underlying dimensions of which the set of values is composed (Hypothesis 1), an exploratory factor analysis was performed. Previous research implied that values may possess distinguishable dimensions that are influenced by the specific situation (Kahle, 1983).

Factor Analysis Results

Three factors (varimax rotation) were extracted that were capable of explaining 64.4% of the variance in the variables. Table 1 displays the factor loadings and their respective eigenvalues and explanatory contribution. These three factors served as input for the final stage of analysis, which examined the relationships among values, nutrition attitudes, and nutrition shopping behaviors.

These results supported Hypothesis 1 and were also consistent with the dimensions identified for a national sample (Kahle, 1983). That research both theoretically and empirically distinguished between internal and external values. Empirical analysis revealed that values were directly related to a measure of locus of control. Factor 2 of this study contained the same subset of values as the empirically determined external dimension (sense of belonging, being well-respected, and security). People who value security lack it because they worry about external events such as crime and unemployment. Furthermore, we extracted two factors from the internal values that relate to Kahle's hypothesis about the role of people in value fulfillment. It appears that Factor 1 (self-fulfillment, excitement, sense of accomplishment, and self-respect) represents more individual values, whereas Factor 3 (fun and enjoyment in life and warm relationships with others) represents more interpersonal values. People who value warm relationships with others are motivated by the internal gratification received from such interactions, which renders this an internally oriented value.

Results of Structural Equation Analyses

In order to test the causal hypotheses, we used LISREL VI (Jöreskog and Sörbom, 1983) because of its ability to test relationships simultaneously and its capacity to incorporate multiple measures of underlying constructs. The Pearson product-moment correlations used in the LISREL analyses were calculated on a pairwise basis (missing values were excluded).

Measurement model results. Standardized factor loadings, reliabilities, and proportions of variance extracted for the con-

Table 4
Causal Model Results

Paths	Standardized path coefficients	t
Exogenous		
γ_{11}	.493	3.196*
γ_{12}	−.571	−5.481*
γ_{13}	.334	2.533*
γ_{21}	−.024	−0.180
γ_{22}	−.138	−1.448
γ_{23}	.072	0.647
ϕ_{12}	.694	9.230
ϕ_{13}	.753	9.143
ϕ_{23}	.520	7.009
Endogenous		
β_{21}	.560	6.089
χ^2	472.00	
df	80	
p	<.001	
Goodness of fit	.931	

$p \leq .05$ level.

structs are presented in Tables 2, 3, and 4. The factor loadings are generally high, statistically significant, and support the exploratory factor analysis. The measurement errors and structural disturbances were used to calculate reliability estimates of the constructs (Werts, Linn, & Jöreskog, 1974) and proportions of extracted variance (Fornell & Larcker, 1981).

Causal equation model results. Figure 1 represents the full recursive structural equation model used to test the causal hypotheses; the resulting standardized path coefficients and t values are summarized in Tables 2, 3, and 4. Nutrition attitudes ($\eta 1$) were measured using four items on 5-point scales. These items were as follows:

- agreement with the statement "natural foods taste bad" (Y_1) (reversed item)
- perception of natural food stores (Y_2)
- concern about food additives in meat (Y_3)
- importance of nutrition to the individual (Y_4).

The shopping behaviors (η_2) included were frequency of shopping at natural food stores (Y_5) and monthly amount spent at natural food stores (Y_6). The three factors identified in the factor analysis formed the measurement portion of the model as represented by the three xis (ξ).

The path coefficients between the indicator variables and their respective underlying constructs are all acceptable, with significant t values implying that they are good indicators of their respective underlying constructs. Any measurement error present in the measurement part of the model tends to inflate the standard errors and subsequently reduce the beta and gamma paths. Because the hypothesized path coefficients are still statistically significant and of acceptable magnitude, the existing measurement error is not sufficient to invalidate the model.

The role of values in the formation and determination of nutrition attitudes was supported by the strong and significant

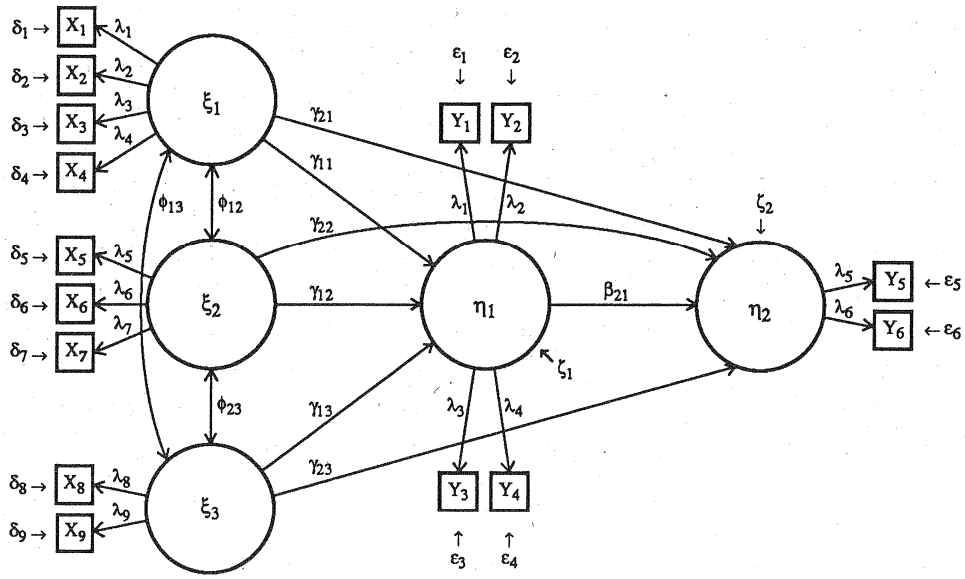

Figure 1. Structural equation model. ($\xi_1 - \xi_3$ = values factors; n_1 = nutrition attitudes; n_2 = shopping behaviors; x_1 = self-fulfillment; x_2 = excitement; x_3 = sense of accomplishment; x_4 = self-respect; x_5 = sense of belonging; x_6 = being well-respected; x_7 = security; x_8 = fun and enjoyment; x_9 = warm relationships; y_1 = taste of natural food; y_2 = natural food store perceptions; y_3 = concern about food additives; y_4 = importance of nutrition; y_5 = dollar amount spent; y_6 = shopping frequency; λ_i = loadings among observed variables and attitudes and behaviors; δ_i, ϵ_i = measurement errors; ζ_i = errors in equations; ϕ_{ij} = correlations among common value factors; β_{21} = relationship between attitude and behavior factors; γ_{ij} = relationships among common values factors and attitude and behavior factors.)

Table 5
Discriminant Analysis Statistics

Variable	Standardized discriminant function coefficients
Nutritional attitudes	
Sense of belonging	−0.05588
Fun and enjoyment in life	0.11704
Warm relationships with others	0.36471
Self-fulfillment	0.44776
Being well-respected	−0.69635
Excitement	0.07193
Sense of accomplishment	0.30210
Security	−0.26257
Self-respect	0.36556
Wilks's λ	0.9152020
Canonical correlation	0.2912010
χ^2	66.414
df	9
p	<0.0001
Shopping frequency	
Sense of belonging	0.25379
Fun and enjoyment in life	0.20525
Warm relationships with others	0.09757
Self-fulfillment	0.38636
Being well-respected	−0.71422
Excitement	0.25452
Sense of accomplishment	0.02286
Security	−0.48500
Self-respect	0.40251
Wilks's λ	0.9523580
Canonical correlation	0.2182705
χ^2	30.924
df	9
p	0.0003
Dollar amount spent	
Sense of belonging	0.23247
Fun and enjoyment in life	−0.43577
Warm relationships with others	−0.09406
Self-fulfillment	−0.44520
Being well-respected	0.45438
Excitement	0.27833
Sense of accomplishment	0.13859
Security	0.40432
Self-respect	−0.47799
Wilks's λ	0.9613901
Canonical correlation	0.1964941
χ^2	28.448
df	9
p	0.0008

path coefficients between ξ_1, ξ_2, ξ_3, and η_1. Similarly, nutrition attitudes showed the predicted relations with shopping behaviors. The nonsignificant path coefficients between the value dimensions and shopping behaviors supported the mediating role of attitudes.

The goodness-of-fit statistics showed an acceptable fit of the data to the model (.931), applying the Bentler and Bonett (1980) heuristic that model fits of less than .90 are inadequate. The large chi-square value is deceptive because of its dependence on sample size. "In very large samples almost any model with positive degrees of freedom is likely to be rejected as providing a statistically unacceptable fit" (Long, 1983, p. 75).

One may wonder whether the causal attribution proposed by this model is better than potential alternative models because only one model has been analyzed. It was pointed out previously (Williams, 1979) that fully conceptualized values become criteria for preferences and choice. This theoretical position suggests a model that excludes the intermediary attitudinal construct. When the appropriate causal paths are fixed (β_{21}, γ_{11}, γ_{12}, and γ_{13}), a difference of chi-square tests reveals that the initial model is a significantly better fit, $\chi^2(80) = 472$, versus $\chi^2(84) = 690.66$. As with the initial model, the paths between the first and third value dimensions are nonsignificant. The path involving the second value factor and shopping behaviors does, however, reach significance, $t(1) = -3.531$. This analysis demonstrates additional support for the mediating role of attitudes between the more abstract values and the more specific behaviors.

An anonymous review offered two alternative hypotheses. Specifically, it was suggested that all the judgments that respondents made (values, attitudes, and behaviors) were reflective of a single factor, such as social liberalism. The factor analyses provided compelling evidence that this was implausible. Furthermore, the LISREL results for the multiconstruct model were supportive of the original hypotheses that values are multidimen-

Table 6
Summary of Means and Standard Deviations for Values of Nutrition Attitude Groups

Values	Less favorable attitudes toward nutrition	Favorable attitudes toward nutrition
Sense of belonging		
M	7.133	7.091
SD	2.157	2.351
Fun and enjoyment in life		
M	7.896	8.184
SD	1.493	1.303
Warm relationships with others		
M	8.458	8.930
SD	1.764	1.556
Self-fulfillment		
M	8.310	8.901
SD	1.740	1.497
Being well-respected		
M	7.716	7.387
SD	1.998	2.101
Excitement		
M	6.862	7.180
SD	2.156	2.101
Sense of accomplishment		
M	8.380	8.742
SD	1.772	1.438
Security		
M	7.951	7.688
SD	2.036	2.101
Self-respect		
M	8.779	9.151
SD	1.578	1.315

Table 7
Summary of Means and Standard Deviations for Values of Natural Food Shoppers and Nonshoppers

Values	Infrequent shoppers	Frequent shoppers
Sense of belonging		
M	7.022	7.088
SD	2.224	2.315
Fun and enjoyment in life		
M	7.955	8.213
SD	1.349	1.308
Warm relationships with others		
M	8.674	8.857
SD	1.604	1.665
Self-fulfillment		
M	8.468	8.780
SD	1.535	1.636
Being well-respected		
M	7.753	7.356
SD	1.853	2.139
Excitement		
M	6.936	7.225
SD	2.007	2.171
Sense of accomplishment		
M	8.558	8.617
SD	1.596	1.564
Security		
M	7.955	7.549
SD	1.971	2.105
Self-respect		
M	8.887	9.059
SD	1.492	1.422

Values	Small spenders	Large spenders
Sense of belonging		
M	7.186	6.922
SD	2.215	2.359
Fun and enjoyment in life		
M	7.965	8.208
SD	1.388	1.396
Warm relationships with others		
M	8.669	8.809
SD	1.581	1.770
Self-fulfillment		
M	8.518	8.801
SD	1.664	1.590
Being well-respected		
M	7.660	7.301
SD	1.962	2.189
Excitement		
M	7.087	7.000
SD	1.932	2.372
Sense of accomplishment		
M	8.598	8.536
SD	1.559	1.667
Security		
M	7.952	7.565
SD	1.948	2.265
Self-respect		
M	8.886	9.069
SD	1.517	1.379

sional and distinct from attitudinal and behavioral judgments. Secondly, it was proposed that attitude and behavior judgments may be equivalent. This possibility was examined using a model that combined the attitudinal and behavioral indicators into a single factor. The model did not fit the data as well as the proposed two-judgment factor model, $\chi^2(84) = 607.42$, and the path between the third value factor and attitude/behavior judgments (γ_{13}) failed to reach statistical significance. A factor analysis of the judgment items revealed two distinct factors, with all measures loading as predicted; thus, the single-judgment hypothesis was rejected.

It may also be argued that the direction of the causal paths may be reversed, suggesting that people "caught" in natural food stores might attempt to answer in socially desirable ways that make them appear to be more internally oriented and to have more positive attitudes toward nutrition. Because the resulting model and the initial model are not nested, it is invalid to apply the traditional difference of a chi-square test.[1] LISREL cannot independently determine the direction of the causal paths of the saturated model that was analyzed. Such determination requires a strong theoretical base, and we believe that we presented sufficient prior research and compelling theory to justify the values → attitudes → behaviors hierarchy.

Multivariate Analyses

We performed discriminant analyses in order to gain a better understanding of the influences of specific values on attitudes toward nutrition and food shopping behaviors. We used these analyses to determine which variables (values) were most important in distinguishing individuals with favorable attitudes toward nutrition from those with less favorable attitudes, frequent from nonfrequent natural food shoppers, and large from small natural food spenders. All nine variables were forced into the discriminant analysis rather than using a stepwise procedure. This test was the most rigorous approach to discriminant analysis and allowed us to assess which variable explained the most significant contribution, controlling for all others.

Attitudes toward nutrition were measured using a scale variable created by summating four individual attitudinal measures (i.e., perceptions of natural food, perceptions of the taste of natural food, importance of nutrition, and concern for food additives), adjusted for the number of items answered. In order to define the three pairs of groups, shopping frequency, amount of purchases, and the attitude scale variable were dichotomized at the median response of the sample.

The basic assumption of discriminant analysis is that the discriminators follow multivariate normal distributions in each group with equal covariance matrixes, but in practice the "discriminant analysis model is surprisingly robust. In other words, the discriminant procedure is found to work well even when its assumptions are not met . . . investigators regularly use discriminator variables which are not normally distributed, even

[1] The reversed model had a lower fit index (.91) and a higher chi-square value, $\chi^2(83) = 584.32$, compared with the initial model, implying that this analysis would not have altered our inferences.

marginally. . . . Even in such cases, discriminant analysis is found to give useful results." (B. B. Jackson, 1983, p. 106).[2]

Discriminant Analysis Results

The discriminant analyses supported the result of overall differences in values profiles (see Tables 5, 6 and 7). Respondents with favorable attitudes toward nutrition were distinguished from those with less favorable attitudes using the set of LOV items, Wilks's $\lambda = .9152020$, $\chi^2(9) = 66.414$, $p < .0001$. As predicted, those with favorable attitudes toward nutrition were more apt to rate fun and enjoyment in life, excitement, warm relationships with others, self-fulfillment, a sense of accomplishment, and self-respect more highly and security and being well-respected less highly than persons with less favorable attitudes. For the shopping frequency grouping, the discriminant analysis also identified values as most important in distinguishing between groups, Wilks's $\lambda = .9532580$, $\chi^2(9) = 30.924$, $p = .0003$. Fun and enjoyment in life, self-fulfillment, excitement, and self-respect were of more importance to frequent natural food shoppers, whereas infrequent shoppers rated security and being well-respected more highly. As expected, the variables (values) were also significant in separating large from small natural food spenders, Wilks's $\lambda = .9613901$, $\chi^2(9) = 28.448$, $p = .0008$. Large spenders tended to value fun and enjoyment in life, self-respect, and self-fulfillment more, and security and being well-respected less, than small spenders. These results were consistent with the proposed theoretical rationale concerning the internal and external dimensions of values.

To summarize, our series of analyses clearly indicated that values have distinct dimensions that are of importance in the formation and development of attitudinal and behavioral tendencies. Values showed a notable influence on attitudes. Consider the three values with the highest loading on each factor: self-respect, sense of belonging, and fun and enjoyment. People who valued the internal, personal value of self-respect tended to want to take care of themselves. These people showed agreement with attitude items such as concern about food additives in meat and the importance of nutrition to the individual. People who selected the external value of sense of belonging tended to conform with the culturally dominant attitude of dislike of natural food stores and natural food, perhaps in order to feel like part of the dominant culture. Finally, for people who valued fun and enjoyment, the attitude about the taste of food, which could provide enjoyment, mediated values and behavior.

Conclusions

Not only have values received an unjustified lack of attention in structural equation research, but also they have typically been analyzed at the univariate level. By disregarding the impact of the interrelationships among the elements of the value structure, the complex role of values in human life remains unclear. The present study sought to unravel some of these issues within the context of natural food shopping.

A factor analysis revealed three underlying dimensions of the nine values constituting the LOV. The dimensions identified were consistent with the hypotheses that values can be categorized as internal or external, that values vary in terms of the importance of others in value fulfillment, and that these dimensions are relevant in the context of natural food shopping behavior.

People who place more importance on internal values tend to want to have as much control as possible over all aspects of their lives. This control would include decisions regarding what food to eat and where to shop. They will be concerned about nutrition and food additives and, as a result, will take the extra effort to purchase what they perceive to be the most nutritious food at natural food stores. Similarly, such individuals will be less apt to permit retailers to convince them to buy less healthy food, a rationale that was supported in this study by natural food shoppers who rated internal values (self-fulfillment, fun and enjoyment in life, sense of accomplishment, and self-respect) more highly than infrequent natural food shoppers. As expected, the external values (sense of belonging, being well-respected, and security) were rated lower by these natural food users. On the other hand, infrequent purchasers of natural foods displayed an external orientation to values and favored the external value dimension.

Perhaps the most notable contributions of these analyses are the findings concerning the interrelationships among values, attitudes, and behaviors. Values were shown to be associated more strongly with nutrition attitudes than with shopping behaviors, supporting the mediating role of attitudes. At the same time, nutrition attitudes significantly influenced natural food shopping behaviors. The structural equation model also provided further support for the previous arguments by producing a negative path coefficient between the external value dimension and nutrition attitudes and a positive path coefficient between the internal value dimension and nutrition attitudes. In light of these relationships, it would appear that knowledge of and appeal to selected value profiles could lead to nutritional attitudes and, ultimately, shopping behaviors desired by propieters of natural food stores.

These relationships among values, attitudes, and behaviors were studied in a very specific context—natural food shopping. Now the challenge is to verify these findings in other situations. Williams (1979) emphasized that hypothesizing an influence of values on social behavior under specified conditions is not to assert that all behavior is merely an expression of values and has no other determinants. It is doubtful that a single factor can even be justified as the determinant of behavior, but knowledge about potential influences on particular categories of behaviors will be useful.

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[2] As true in much social science research, some of the predictor variables deviated slightly from normality. An exponential transformation resolved the normality problems. But because the discriminant analyses were essentially the same and the interpretations were not affected, the original analyses are reported.

References

Almond, G. A., & Verba, S. (1963). *The civic culture,* Princeton, NJ: Princeton University Press.

Ball-Rokeach, S. J., Rokeach, M., & Grube, J. W. (1984). *The great*

American values test: Influencing behavior and belief through television. New York: Free Press.

Baum, R. C. (1968). Values and democracy in empirical Germany. *Sociological Inquiry, 38,* 176–196.

Beatty, S., Kahle, L. R., Homer, P., & Misra, S. (1985). Alternative measurement approaches to consumer values: The List of Values and the Rokeach Value Survey. *Psychology and Marketing, 3,* 181–200.

Becker, B. W., & Connor, P. E. (1981). Personal values of the heavy user of mass media. *Journal of Advertising Research, 21,* 37–43.

Beech, R. P. (1966). Value systems, attitudes, and interpersonal attraction. Unpublished doctoral dissertation, Michigan State University.

Bentler, P., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88,* 588–606.

Carman, J. M. (1977). Values and consumption patterns: A closed loop. In H. K. Hunt (Ed.), *Advances in consumer research* (Vol. 5, pp. 403–407). Ann Arbor, MI: Association for Consumer Research.

Clawson, C. J., & Vinson, D. E. (1978). Human values: An historical and interdisciplinary analysis. In H. K. Hunt (Ed.), *Advances in consumer research* (Vol. 5, pp. 396–402) Ann Arbor, MI: Association for Consumer Research.

Cochrane, R., Billig, M., & Hogg, M. (1979). British politics and the two-value model. In M. Rokeach (Ed.), *Understanding human values: Individual and societal* (pp. 179–191). New York: Free Press.

Feather, N. T. (1984). Protestant ethic, conservatism, and values. *Journal of Personality and Social Psychology, 46,* 1132–1141.

Fornell, C., & Larcker, D. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18,* 39–50.

Goldsen, R. K., Rosenberg, M., Suchman, E. A., & Williams, R. M., Jr. (1960). *What college students think.* New York: Van Nostrand.

Grube, J. W., Weir, I. L., Getzlaf, S., & Rokeach, M. (1984). Own value system, value images, and cigarette smoking. *Personality and Social Psychology Bulletin, 10,* 306–313.

Henry, W. A. (1976). Cultural values do correlate with consumer behavior. *Journal of Marketing Research, 13,* 121–127.

Hensehl, A. M. (1969). *The relationship between values and behavior: An experiment.* Unpublished doctoral dissertation, Cornell University.

Hensehl, A. M. (1971). The relationship between values and behavior: A development hypothesis. *Child Development, 42,* 1997–2007.

Jackson, B. B. (1983). *Multivariate data analysis.* Homewood, IL: Richard D. Irwin.

Jackson, G. (1973). A preliminary bicultural study of value orientations and leisure attitudes. *Journal of Leisure Research, 5,* 10–22.

Jöreskog, K., & Sörbom, D. (1983). *LISREL VI user's guide.* Chicago: National Educational Resources.

Kahle, L. R. (1980). Stimulus condition self-selection by males in the interaction of locus of control and skill–chance situations. *Journal of Personality and Social Psychology, 38,* 50–56.

Kahle, L. R. (Ed.). (1983). *Social values and social change: Adaptation to life in America.* New York: Praeger.

Kahle, L. R., Beatty, S. E., & Homer, P. M. (1986). Alternative measurement approaches to consumer values: The List of Values (LOV) and Values and Lifestyles (VALS). *Journal of Consumer Research, 13,* 405–409.

Kahle, L. R., Kulka, R. A., & Klingel, D. M. (1980). Low adolescent self-esteem leads to multiple interpersonal problems: A test of social adaptation theory. *Journal of Personality and Social Psychology, 39,* 496–502.

Kemp, C. G. (1960). Changes in values in relation to open–closed systems. In M. Rokeach (Ed.), *The open and closed mind.* New York: Basic Books.

Levine, R. A. (1960). The internalization of political values in stateless societies. *Human Organization, 19,* 51–58.

Levitin, T. (1973). Values. In J. P. Robinson & P. R. Shaver (Eds.), *Measures of social psychological attitudes* (pp. 489–585). Ann Arbor, MI: Institute for Social Research.

Long, J. S. (1983). *Covariance structure models: An introduction to LISREL,* Beverly Hills, CA: Sage Publications.

Piner, K. E., & Kahle, L. R. (1984). Adapting to the stigmatizing label of mental illness: Foregone but not forgotten. *Journal of Personality and Social Psychology, 47,* 805–811.

Rokeach, M. (1960). *The open and closed mind.* New York: Basic Books.

Rokeach, M. (1973). *The nature of human values.* New York: Free Press.

Rosenberg, M. (1957). *Occupations and values.* Glencoe, IL: Free Press.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs, 80* (1, Whole No. 609).

Searing, D. (1979). A study of values in the British Commons. In M. Rokeach (Ed.), *Understanding human values: Individual and societal* (pp. 154–178). New York: Free Press.

Skinner, B. F. (1971). *Beyond freedom and dignity.* New York: Knopf.

Veroff, J., Douvan, E., & Kulka, R. A. (1981). *The inner American.* New York: Basic Books.

Werts, C. E., Linn, R. J., & Jöreskog, K. G. (1974). Interclass reliability estimates: Testing structural assumptions. *Educational and Psychological Measurements, 34,* 25–33.

Wickert, F. (1940a). The interrelations of some general and specific preferences. *Journal of Social Psychology, 11,* 275–302.

Wickert, F. (1940b). A test for personal goal-values. *Journal of Social Psychology, 11,* 259–274.

Williams, R. M., Jr. (1959). Friendship and social values in a suburban community. *Pacific Sociological Review, 1,* 3–10.

Williams, R. M., Jr. (1979). Change and stability in values and value systems: A sociological perspective. In M. Rokeach (Ed.), *Understanding human values individual and societal* (pp. 15–46). New York: Free Press.

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