

# SOME PSYCHOLOGICAL ASPECTS OF REDUCED CONSUMPTION BEHAVIOR

## The Role of Intrinsic Satisfaction and Competence Motivation

---

**RAYMOND DE YOUNG** *is an assistant professor of conservation behavior at the University of Michigan. His research centers on the commitment of citizens to environmentally responsible behavior.*

---

**ABSTRACT:** Efforts to promote environmentally appropriate behavior rely on motivation originating from 3 sources: other people, the environment, and one's self. This article examines a particular form of the latter source, intrinsic satisfactions. Nine studies are presented that investigate the multidimensional structure of intrinsic satisfactions and their relationship to reduced consumption behavior. Two categories of intrinsic satisfaction, labeled frugality and participation, are particularly well suited to encouraging such behavior. A third category, competence motivation, is explored in some detail and its dimensional structure is interpreted in terms of 3 dominant themes in the research literature. Connections between intrinsic satisfactions and such concepts as locus of control and altruism are explored, and implications for practitioners are discussed.

**A sustainable planet is not possible** without citizens adopting conserving behavior. A radical but probably necessary form of conservation behavior involves simply consuming less. Milbrath (1993) argued that "it is ridiculous to characterize life with fewer material goods as 'freezing in the dark,' as some environmental critics have painted it." Yet he admits it would be a very different existence: less frenetic although perhaps no less exciting.

It may prove hard for Americans, brought up in a growth-oriented, pro-consumption society, to easily adopt a lifestyle emphasizing reduced consumption. It is important, therefore, that in our efforts to promote such a lifestyle we do not inadvertently make the transition even more difficult. We may wish to

avoid highlighting the difficulties people will experience in making the transition. In particular, it may prove useful to avoid arguing that the major barrier to a reduced consumption lifestyle is the onerous nature of the required behavior itself. For if we start by framing the problem in such a negative way, we may find that citizens avoid considering the behavior altogether. Having created such a situation, the only behavior change approach available to us may be to reward or coerce citizens through some economic or social mechanism.

Fortunately, there exists an alternate way of framing reduced consumption behavior. It involves highlighting the underappreciated intangible but positive payoffs from adopting such behavior. What this article adds to Milbrath's vision is the simple observation that a lifestyle focused on restraining consumption of resources can be highly satisfying. Satisfying not in a spectacular manner but in many subtle ways.

After first discussing three dominant themes in the research on conservation behavior, this article will examine a satisfaction-based approach to promoting reduced consumption behavior. It will discuss:

1. A categorization of the sources of initiation of conservation behavior;
2. The concept of intrinsic satisfactions;
3. The empirical results of nine studies exploring the structure of intrinsic satisfaction; and
4. An expansion of one category of intrinsic motivation: competence motivation.

This article will also explore connections between the categories of intrinsic satisfaction and other concepts in the literature, and conclude by suggesting ways to use this form of motivation to promote a reduced consumption lifestyle.

---

**AUTHOR'S NOTE:** *This article benefited from the thoughtful comments of Stephen Kaplan, Bobbi Low, and Thomas Princen. Thanks also to Dale Jamieson, Klassina VanderWerf and two anonymous reviewers for helpful comments on an earlier version. Correspondence should be addressed to the author at the School of Natural Resources and Environment, University of Michigan, 430 East University Avenue, Ann Arbor, MI 48109-1115.*

### MODELING CONSERVATION BEHAVIOR

There are three recurring themes in the research on promoting conservation behavior. They are classified as being concerned for the environment, for others, and for oneself (see Axelrod, 1994; Merchant, 1992; Stern & Dietz, 1994; Stern, Dietz, & Kalof, 1993). A concern for the environment, what can be referred to as a "world-focused" approach, is characterized as a generalized concern for the biosphere itself. Sometimes referred to as ecocentrism (Devall, 1988; Thompson & Barton, 1994; for a review, see Eckersley, 1992) it is also captured by Dunlap and Van Liere (1978, 1984; Dunlap, Van Liere, Mertig, Catton, & Howell, 1992) in their new environmental paradigm scale. The theoretical work in this area has explored whether environmentalism is, in fact, the emergence of a new worldview (Inglehart, 1977, 1990; Milbrath, 1984). The focus is on whether those who are less concerned with the environment differ fundamentally from those who show concern.

The "pro-social" or altruistic theme is based on concern for the welfare of others. This theme suggests that individuals would be willing to pay for environmental protection only when it would contribute to the well-being of other humans. The theoretical and empirical research on this approach has relied on a subset of the Schwartz moral norm activation model (Schwartz, 1970, 1977). Empirical research suggests that conservation behavior is indirectly influenced by social norms and directly influenced by personal moral norms (Vining & Ebreo, 1992).

The "pro-self" or anthropocentric theme maintains that an individual's concern for the environment is driven by either the physical or material benefits it can provide or an awareness of adverse consequences, for themselves alone (Thompson & Barton, 1994). The field of human behavioral ecology, in a fusion of microeconomics and sociobiology, argues that human resource use follows the same behavioral pattern as other species (Cronk, 1991; Low & Heinen, 1993); that is, humans evolved to effectively extract resources, to pass waste and costs on to others, and to form small groups that exclude others

and neglect their interests. This rational actor focus is on short-term individual or familial gain to the exclusion of long-term societal or environmental benefits.

Stern et al. (1993) have provided an excellent review of these three themes, characterizing them as value orientations (see also Stern and Dietz, 1994). They are not mutually exclusive. In fact, Stern et al. tested a model that integrates all three value orientations. Their model effectively predicted willingness to take political action with regard to the environment. The pro-self orientation was also a reliable predictor of the willingness to pay taxes to protect the environment. Thus there is reason to believe that people's concern for the environment reflects an integration of all three orientations.

#### SOURCES OF PROXIMATE BEHAVIORAL CUES

It is possible to examine these three themes from another perspective. We can categorize the sources of the initiation of behavior. Proximate cues used to change behavior can originate from three sources: from others, from the environment broadly defined, and from the individual (De Young, 1993).

The first source involves behavior that is initiated and/or directed by others through the use of incentives or disincentives. This source is most closely linked with the pro-self theme in that it models humans as rational actors sensitive to extrinsic behavioral cues. Low and Heinen (1993) outlined the essence of this category as follows:

If humans have evolved to use resources in reproductively selfish ways, then the most successful conservation strategies will be those whose benefits to individuals can be made to outweigh costs, through a system of economic or social incentives which confer immediate or very short-term benefits to individuals and/or their families and friends. If this is the case, governments and organizations may find it productive to implement policies that create systems of incentives to conserve; *the more immediate and local the benefit, the more successful should be the outcome* [emphasis in original].

We also see this source in the behavioral approach used by Geller (1987, 1989, 1992; Geller, Winett, & Everett 1982). Specific examples of techniques include the use of monetary incentives (e.g., savings from buying consumables in bulk or concentrated form, energy or water utility rate structures that compensate for reduced consumption, prime parking spots for car and van poolers), social incentives (e.g., community recognition of early adopters of backyard composting), and monetary disincentives (e.g., fines for violating a ban on lawn mowing during an ozone alert, congestion pricing on highways).

The second source involves situations in which the environment supports, initiates, or allows only a particular pattern of behavior. The psychology of behavior settings has shown that even when there is no direct manipulation of a setting (a circumstance better modeled as involving behavior change caused by others), a setting may nonetheless affect one's behavior. Examples include research on the role of social norms in promoting conservation behavior (see, e.g., Stern et al., 1993; Vining & Ebreo, 1992) and structural changes (e.g., designating high-occupancy vehicle lanes on highways, altering elevator travel and/or door-closing time) (Van Houten, Nau, & Merrigan, 1981). This source is linked to two of the themes discussed above. There is a link to the pro-self focus of the rational actor when people are influenced by the inconvenience caused by a structural change. There is also a link to the pro-social theme when people's behavior is influenced by social norms.

These first two sources of interventions suggest that people are affected by extrinsic behavioral cues. The third source involves intrinsically directed behavior. Several separate behavior change techniques have emerged in recent years related to self-initiated and self-maintained conservation behavior. These include the commitment technique (Burn & Oskamp, 1986; Katzev, 1986; Katzev & Pardini, 1987-1988; Wang & Katzev, 1990) and intrinsic satisfaction (De Young, 1985-1986, 1986; De Young & Kaplan, 1985-1986; Lee & De Young, 1994). This source is also linked to several of the themes discussed above. It certainly has aspects of the pro-self theme because it involves positive feelings directly experienced by the individual.

It also has a link to the other two themes in that both pro-social and worldview concerns can be expressed as intrinsic satisfactions. In fact, the preliminary data presented in this article suggest that all three themes are found within the multiple dimensions of intrinsic satisfaction.

One might speculate as to which of these sources of behavioral cues would enable humans to thrive on a risky, finite, and uncertain planet. Each source has its strengths and weaknesses. To the degree one could trust others, one might be safe in following their advice and instructions, and accepting their rewards. Likewise, being attentive to environmental information and constraints may offer an adaptive advantage (see Kaplan, 1983 for a treatment of this issue). Including both choices would be consistent with the view of humans as obedient to external authority, here broadly defined.

However, it might be wise to consider the disadvantages of a system solely tied to the external initiation and direction of behavior. First, the ability to carry out one's own plans, to maintain behavioral continuity, is greatly reduced. If all plans and goals the organism should have could be programmed in advance, then such an issue might not be important. However, the uncertain environmental niche humans find themselves in calls for a more fluid, adjustable scheme for initiating and maintaining behavior. Second, being obedient to external agents could be reframed as being obedient to one's potential competitors. When viewed in this way, it is not particularly adaptive unless one can count on competitors always to act altruistically. This was in the past, and remains, unlikely. It seems useful to include internal signals among those proximate cues to which humans respond.

Thus there are reasons to expect that all three themes (i.e., world focused, pro-social, pro-self) and all three sources of proximate behavioral cues (i.e., from other people, from the environment, from one's self) are available during a person's decision making about a new conservation behavior.<sup>1</sup> This article focuses on the third source of proximate behavioral cues and in particular the role of intrinsic satisfactions.

### INTRINSIC SATISFACTION

Some people characterize the promotion of a reduced consumption lifestyle as that of asking people to give up a modern, generous existence for an austere, bleak but needed substitute. It is in this perspective that the greatest resistance to the widespread adoption of environmentally responsible lifestyles may exist. For it assumes that people will adopt such a pattern of behavior only if they receive tangible compensation. Clive Seligman has captured the essence of this conserve-only-if-compensated argument:

Unless business can make money from environmental products or politicians can get elected on environmental issues, *or individuals can get personal satisfaction from experiencing environmental concern* [emphasis added] then individuals and organizations will simply do what ever competes with environmentalism if they see the payoff as greater. (cited in Geller, 1990)

Deeply embedded in this argument is the notion of a link between individual consumption behavior and personal sense of well-being. The strength and even the existence of such a link are now being seriously questioned (Durning, 1992; Milbrath, 1993; Singer, 1995). Yet even the theoretical possibility of such a link continues to act as a major impediment to the promotion and adoption of a reduced consumption lifestyle. And thus for some, the reasons why people might both willingly and without tangible compensation adopt a simple, reduced consumption lifestyle is a mystery. Yet an answer to this mystery is no more complicated than that reported by Seligman in the italicized portion of the quote above. This is a curiously simple concept based on the observation that people derive enjoyment from ordinary behaviors. Certain behaviors can be the source of direct and personal satisfaction. This perspective on motivation is familiar to us all. A good deal of human behavior is best explained in terms of goals and rewards that arise out of direct participation in an activity (Csikszentmihalyi, 1978; Deci, 1975; Deci & Ryan, 1985; Eckblad, 1981; Lepper & Greene, 1978).

The extension to conservation behavior is straightforward; people might do such behaviors because they enjoy doing them. As Seligman, Becker, and Darley (1981) have suggested, "Individuals can find satisfaction in many of the ways they practice conservation . . . they [become] interested in and challenged by the task of lowering their energy consumption, and [feel] satisfaction not previously present when they did so." Ellis and Gaskell (1978, as reported in Stern & Gardner, 1981) noted that a motive to conserve can come from such an intangible factor as direct participation.

Research has suggested that people's intrinsic motives to conserve can be nurtured and developed (De Young, 1986; Vining & Ebreo, 1989). Vining and Ebreo (1990) noted that an individual's conservation behavior can shift from being initiated and maintained by extrinsic motives toward being influenced by intrinsic motives. Reichel and Geller (1981) suggested the possible result of expecting and valuing conservation behavior; "such norms may even be internalized by individuals so that conserving behaviors become intrinsically reinforced." Such a shift from externally to internally mediated behavior is one plausible explanation for the durability noted by Katzev (1986, 1989) when using the commitment technique to change behavior. Pardini and Katzev (1983-1984) discussed why their use of a mild rather than strong form of external inducement was able to maintain conservation behavior. They felt that the participants in their study, because of their gently induced commitment to try the behavior, may have been led to, "find their own reasons for recycling, to begin to even like doing so, and, as a result, to continue to perform these behaviors on their own."

The issue becomes, then, not one focused solely on devising compensation techniques but one that broadly examines what sorts of intrinsic benefits might be gained from conservation behavior in general and reduced consumption in particular. This article reports on the results of nine studies conducted over 10 years that established the existence and explored the structure of intrinsic satisfactions. The article then establishes that certain categories of intrinsic satisfaction are associated with measures



of conservation behavior. Finally, one category of intrinsic satisfaction, competence motivation, is examined in more detail.

## METHOD

### THE SURVEY INSTRUMENTS

An initial list of intrinsic satisfaction questionnaire items was inspired by the work of Cantril (1966). In a book documenting an international survey of people's concerns and satisfactions, Cantril included a chapter devoted to those issues that did not vary among nations but had universal appeal. The description is fascinating, including satisfaction derived from a sense of order, involvement, and purpose. The items of intrinsic satisfaction also build on the early work on voluntary simplicity and mindful consumption (Elgin, 1981; Gregg, 1974a, 1974b; Leonard-Barton, 1981) and behavioral competence (White, 1959). Almost all of the survey instruments discussed below also measured self-reported conservation behavior. All studies used written questionnaires and made a single contact with the respondents, who were asked to mail back the materials in an enclosed prepaid envelope.

### THE SAMPLES

The study of intrinsic satisfaction has progressed through the series of studies shown in Table 1. The nine studies described below investigated a variety of behaviors and populations. However, each had in common the inclusion of a bank of questionnaire items on intrinsic satisfactions.

#### Study 1

After an exploratory study established the concept of intrinsic satisfaction and suggested that it may be closely linked with conservation behavior (De Young & Kaplan, 1985-1986), a

**TABLE 1**  
**Description of the Studies**

	<i>Study Date</i>	<i>Sample Size</i>	<i>Population Studied</i>	<i>Focus of Study</i>	<i>Reference</i>
Study 1	1983	263	Homeowners	Multimaterial household recycling	De Young (1985-1986)
Study 2	1984	72	Homeowners	Household water conservation	De Young & Robinson (1984)
Study 3	1989	3,705	First-year college students	Recycling in dorms	Goldenhar & Connell (1992-1993) Goldenhar & De Young (1990)
Study 4	1990	159	Food store consumers	Household source reduction	De Young et al. (1993)
Study 5	1991	103	Food store consumers	Household source reduction	De Young et al. (1993)
Study 6	1991	1,788	Taiwanese workers	Office recycling	Lee & De Young (1994) Lee, De Young, & Marans (1995)
Study 7	1992	73	NRDC <sup>a</sup> members	NRDC's "Mothers and Others" program	
Study 8	1993	169	EPA <sup>b</sup> employees	Source reduction	
Study 9	1993	152	College students	General conservation behavior	

a. NRDC = Natural Resources Defense Council.

b. EPA = Environmental Protection Agency.

second study was conducted that developed a bank of questionnaire items measuring intrinsic satisfactions. This second study investigated waste reduction and recycling behavior among randomly selected users of a community curbside collection service and drop-off recycling station in Ann Arbor, Michigan. Out of a total of 959 questionnaires distributed, 263 questionnaires were returned and included in the data analysis (27% return rate). These included 188 respondents from the curbside collection area distribution and 75 respondents from the drop-off recycling station distribution (De Young, 1985-1986).

## Study 2

This study examined water demand management strategies. A total of 120 survey instruments were distributed to randomly

selected private homes in the towns of Kitchener and Waterloo, Ontario, Canada. Survey instruments were also distributed to 52 individuals who attended a symposium on managing household water demand. Of the survey instruments distributed, 39 homeowners (33%) and 33 symposium attendees (63%) responded (De Young & Robinson, 1984).

### **Study 3**

This study involved the entire Class of 1993 of the University of Michigan. These first-year students were surveyed during their orientation session in the summer of 1989 before classes had begun and before the students were introduced to a major new dormitory recycling program. Out of a class size of approximately 4,500, there were 3,705 respondents to the survey (82%). The items of intrinsic satisfaction were included as part of a larger ongoing study that investigated the reasoned action paradigm as it relates to recycling behavior (Goldenhar & Connell, 1992-1993; Goldenhar & De Young, 1990).

### **Study 4**

This study involved an experimental study of source reduction behavior. A short preselection survey instrument was administered to 688 shoppers at a grocery store in the small town of Chelsea, Michigan. This instrument included demographic questions about the shopper's household and asked whether they would be willing to participate in a longer study. Of the 688 shoppers who completed this initial survey instrument, 159 indicated that they would be willing to participate in the longer 13-week study and went on to complete a baseline survey instrument that included the items measuring intrinsic satisfaction (De Young et al., 1993).

### **Study 5**

This study involved a follow-up survey of the participants in Study 4 outlined above. Responses to the follow-up survey

instrument were received from 103 of the original 159 participants (65%) (De Young et al., 1993).

### **Study 6**

This study investigated office and household recycling practices among the employees of 32 different organizations in the Taipei metropolitan area of Taiwan. A total of 2,000 questionnaires were distributed and 1,788 were returned and analyzed (89%). In organizations employing 30 or more employees only a sample were given questionnaires. All workers were given questionnaires in organizations with fewer than 30 employees. Of the 32 Taiwanese organizations studied, 15 had recycling programs in place and 17 did not (Lee & De Young, 1994; Lee, De Young, & Marans, 1995).

### **Study 7**

This study included members of the Natural Resources Defense Council (NRDC) program called *Mothers and Others for a Livable Planet*. Of the 200 members surveyed, 73 usable questionnaires were returned (37%). This study evaluated the effectiveness of the NRDC program and investigated what motivated members to become active in various environmental activities.

### **Study 8**

This study involved all employees at the Office of Solid Waste of the U.S. Environmental Protection Agency. The study focused on issues related to source reduction training, awareness of common solid waste issues, and the definition of source reduction, a term often confused with recycling. Of the 305 employees surveyed, 169 returned usable survey instruments (55%).

## Study 9

This study investigated self-reported conservation behavior among a sample of undergraduate students taking an introductory environmental studies course. As part of a conservation behavior lab exercise, taught by the author, the students were asked to rate banks of questionnaire items measuring conservation attitudes, behavioral intent with regard to recycling, barriers to carrying out their intention, conservation motives, and intrinsic satisfactions.

### DIMENSIONAL ANALYSIS

Dimensional analysis was used in each study to examine the structure of the data. All items used a 5-point Likert-type rating scale. Some individual items were worded in the negative with their data reversed before analysis so that a score of 5 always indicates positive endorsement for an item. The procedure used to identify categories from among the items was a nonmetric factor analysis program (Guttman-Lingoes Smallest Space Analysis III; see Lingoes, 1972). Kaplan (1974) has suggested three criteria useful in interpreting the output from this program. The criteria stipulate that any particular questionnaire item should be included in no more than one category, each category should "hang together" statistically as indicated by Cronbach's coefficient of internal consistency ( $\alpha$ ) (Cronbach, 1951; Nunnally, 1978), and the category should make sense, having a face validity. As research progressed through the studies listed in Table 1, an effort was made at first to reduce the number of items needed to measure the essence of a construct without sacrificing reliability as measured by the  $\alpha$  coefficient. In later studies the structure and content of the categories were explored by adding a number of new items to the survey instruments.

The output of the dimensional analysis program was used to identify highly coherent and stable categories. Following the identification of these categories, scales were constructed for each by calculating a respondent's average rating of the items

that formed each category. This resulted in a single score on each category for each respondent. These scores were used in exploring the relationships among these categories and, in certain of the studies, between these categories and various conservation behavior measures.

The bank of items was introduced with a single stem question similar to: "Please indicate how much satisfaction or enjoyment you get from each of the following items." Respondents were asked to indicate where they fell on a 5-point rating scale ranging from *none* to *a very great deal*. Those items making up the categories of intrinsic satisfaction are reported in Table 2.

### THE CATEGORIES OF INTRINSIC SATISFACTION

One of the most interesting findings to come out of this series of investigations is the coherent, multidimensional nature of the satisfactions people derive from various activities. The respondents in the various studies report deriving not a single, all-inclusive sense of satisfaction but numerous and specific satisfactions.

### THE FRUGALITY CATEGORY

The necessity of being efficient and frugal is at the core of conservation. Frugality is defined as the prudent use of resources and the avoidance of waste. As measured in these studies it is a concept that easily applies to everyday activities. It involves such things as what items one buys, what activities one pursues, and what one does with used or waste materials.

In America, frugality was a distinguishing feature of our early society. The concept received considerable attention during the sixties as a middle-class rejection of the high-consumption and high-waste lifestyle in the developed countries (Henderson, 1978; Inglehart, 1977). The frugality concept has been characterized as a central aspect of a conserver society (Henion & Kinnear, 1979) as well as a goal worthy of national attention (Johnson, 1978, 1985). Although such a value is needed more

*(text continues on page 377)*

**TABLE 2**  
**Satisfaction Categories From Nine Studies of Conservation Behavior**

Category Name and Items Included	Study 1 1983 N = 263	Study 2 1984 N = 72	Study 3 1989 N = 3,705	Study 4 1990 N = 159	Study 5 1991 N = 103	Study 6 1991 N = 1,788	Study 7 1992 N = 73	Study 8 1993 N = 169	Study 9 1993 N = 152
Frugality	3.78	3.77	3.74	4.20	4.12	4.11	4.24	4.05	3.38
M	.81	.79	.72	.67	.73	.53	.72	.56	.64
SD	.87	.86	.78	.80	.89	.82	.79	.71	.63
$\alpha$	X	X	X	X	X	X	X		X
Finding ways to avoid waste	X	X	X	X	X	X	X	X	O
Keeping something running past its normal life	X	X	X	X	X	X	X	X	X
Finding ways to use things over and over	X	X	X	X	X	O	X		X
Repairing rather than throwing things away	X	O		X	X	X	X		O
Saving things I might need someday	X	O			O		O	X	X
Finding ways to do things that do not rely on others <sup>a</sup>	X								
Not pushing resource scarcity onto the future <sup>b</sup>			X						
Consuming a minimum amount of resources		X			X	X		X	X
Finding new ways to save water									
Using less water to do the same things		X							
Using technology to do things more efficiently									X





**TABLE 2 Continued**

Category Name and Items Included	Study 1 1983 N = 263	Study 2 1984 N = 72	Study 3 1989 N = 3,705	Study 4 1990 N = 159	Study 5 1991 N = 103	Study 6 1991 N = 1,788	Study 7 1992 N = 73	Study 8 1993 N = 169	Study 9 1993 N = 152
Luxury									
<i>M</i>	2.97	3.44	3.87				3.24	3.46	2.94
<i>SD</i>	.78	.79	.78				.79	.75	.89
$\alpha$	.83	.72	.73				.70	.69	.87
Having clothing that is in style	X		X				X	X	X
Having many items to choose from when purchasing	X	X	X				X	X	X
Having the luxuries and conveniences of our society	X	X	X				X	X	X
Being a citizen of a country with vast resources	X	O	X				O	X	
Having new items to try, to evaluate, and to buy	X	X					X		X
Using the latest electronic consumer product	X								X
Knowing we are looked on as an affluent society	X								X
Owning new things									X



TABLE 2 Continued

Category Name and Items Included	Study 1 1983 N = 263	Study 2 1984 N = 72	Study 3 1989 N = 3,705	Study 4 1990 N = 159	Study 5 1991 N = 103	Study 6 1991 N = 1,788	Study 7 1992 N = 73	Study 8 1993 N = 169	Study 9 1993 N = 152
Knowing what things I am good at doing				x	O				x
Discovering new things I am good at doing				O	x	O	x	x	x
Knowing the things I am not competent at doing				O					
Possessing many new things						x			
Finding ways to do things that do not rely on others <sup>a</sup>									x
Having better tools for life's tasks								x	

NOTE: Respondents were asked to rate how much satisfaction or enjoyment they receive for the activities represented by the items listed. Nonmetric factor analysis was used to identify the categories. Five-point Likert-type scales were used with higher means denoting higher endorsement for the category. The Xs indicate items loading at criteria set for analyzing factor analysis output (see text). Open circles indicate items included on the survey instrument but not meeting the criteria for inclusion. A blank indicates that an item was not included on the survey instrument. Alpha is Cronbach's coefficient of internal consistency (Nunnally, 1978).  
a. and b. These are the only items to load on different categories in different studies.

urgently now than ever, it need not be readopted solely for its utilitarian nature. The data suggest that frugality is perceived by the respondents as a coherent concept and, on the basis of their endorsement of the category, they value opportunities to act in frugal ways.

#### **THE PARTICIPATION CATEGORY**

The older, nonuniversity respondents have consistently reported deriving personal satisfaction from direct involvement in purposeful activities. The data indicate that respondents welcome participating in a community effort and value opportunities to take action that makes a difference in the long run. This supports the work of Brinkerhoff and Jacob (1984) as well as that of Ellis and Gaskell reported earlier.

A crucial notion here deals with the role people are expected or allowed to play in their own behavior change. When people start the task of changing their behavior with a sense of challenge and purpose, then both the environment and these individuals benefit. The central theme here is one of being needed, of having a chance to make a difference, doing things that will outlast them. It is suggested that when people discern a role for themselves, and become convinced that their contribution is not optional but necessary, then a powerful motive force becomes available (Kaplan, 1990). As Cantril (1966) pointed out, people want to directly experience a sense of their own worth, they want to know that they are making a difference.

#### **THE LUXURY CATEGORY**

Some of the earliest work on conservation behavior seemed to suggest that conservers were an odd lot, somehow unlike other people. And although their lifestyle was held up as a model that we desperately needed others to follow, it was conceded to be austere, perhaps even somber. Not just a few people became convinced that conservation was the behavioral equivalent to freezing in the dark. If one follows this logic out to

its conclusion, then one expects no comfort or amenity to be present in an environmentally responsible lifestyle.

Fortunately, later work suggested that conservers might not possess so unique a motivational pattern as to constitute a fringe group relative to the population at large (De Young & Kaplan, 1985-1986). This suggested the possibility that satisfaction derived from conservation behavior and luxury might coexist. This possibility has been examined by adding to the studies reported here a series of items measuring satisfaction gained from living a material-rich life. These items have repeatedly formed what is called the satisfaction-from-luxury category. Clearly this category focuses on the pleasure gained from having the conveniences of our modern society. It seems to reflect the satisfaction people feel in being members of a thriving, affluent group.

What has remained a hopeful finding is that satisfaction derived from luxury has not proven to be the antithesis of a satisfaction gained from frugality. The earlier logic might speculate on the existence of a strong negative correlation between luxury and the other categories of intrinsic satisfaction, but no such data have emerged from any of the studies. In fact, in the studies that included this category, the luxury category has had generally positive and low correlations with the other categories of intrinsic satisfaction. And, as mentioned below, the satisfaction-from-luxury category has only rarely shown significant relationships with measures of conservation behavior.

#### **THE ALTRUISM CATEGORY**

Among the fascinating findings from work on intrinsic satisfaction has been the emergence of an independent category of items measuring altruism. In the data reported here this category is noted in Study 3. In an effort to better understand the participation category, a series of items were developed that changed the focus from one of helping to bring sense to the world to simply helping others. These items, influenced by the work on volunteer motivation by Pearce (1983, 1987), were included in Study 3 along with several items intended to measure the

participation construct. It is important to note that this study was only one of two involving a sample of college students.

In Study 3 the participation category did not emerge from the dimensional analysis. It seems that participation, as measured in this study, is not a coherent concept in the minds of these young adults. The possibility that the participation construct emerges as part of a developmental change may be worth further investigation.

However, a helping-others category did emerge. This category focuses solely on helping and meeting the expectations and interests of others. It closely parallels the concept of altruism, which, in its most general interpretation, posits that people value and are motivated to act for the welfare of others. That such a concept emerges as a source of personal satisfaction supports the potential usefulness of this approach in promoting reduced consumption behavior. It must be confirmed, however, that this is a coherent concept among the general public.

#### **THE COMPETENCE CATEGORY**

The final category includes satisfaction derived from striving for behavioral competence. Competence was proposed by White (1959) as a fundamental human concern, a tendency in humans to develop the capacity to interact effectively with the environment. In White's conceptualization, competence has both a skill and motivational aspect. What is being measured by this satisfaction category is not the ability to interact effectively (e.g., assessment of specific skills or expertise) but the motive people have for developing and maintaining their competencies.

This construct was first investigated in Study 4 with the inclusion of a number of items intended to measure the motive to be competent at meeting, in general, life's challenges. These items emerged as a coherent category from the dimensional analysis in five of the six studies in which they were included. The study done in Taiwan (Study 6) produced a mixed category with only one of the four competence items included on that survey instrument forming a category with what must be considered an

item measuring acquisitiveness ("Possessing many new things"). Furthermore, the alpha value was the lowest of all the categories reported (0.64), indicating relatively low coherence. There is the possibility of a translation or conceptual mismatch although the other categories did emerge intact.

That humans would be motivated to develop and maintain their behavioral competence may, on first glance, seem an unimpressive finding. It is important to note, however, that in these studies the respondents are reporting that they derive a personal satisfaction from such effort. We might speculate that people find unpleasant, and thus avoid, situations in which they cannot advance their competence. This may add an insight into the conditions under which people will consider adopting a conservation behavior. It may be no more complicated than the fact that certain situations make available procedural information about the new behavior, thus allowing people to fulfill a desire to enhance their competencies (De Young, 1988-1989).

### **VALIDATING THE CATEGORIES**

Although the multidimensional structure of intrinsic satisfaction is itself an interesting finding, it is also important to know how this concept might be used to promote conservation behavior. A series of analyses were done to better understand intrinsic satisfaction, first by examining their interrelationships, second by exploring their association with measures of conservation behavior, and finally by testing whether it is possible to enhance one's sense of intrinsic satisfaction.

### **RELATIONSHIPS AMONG THE CATEGORIES**

Table 3 shows the correlations among the categories for each of the nine studies. Dimensional analysis is used to identify categories of items that measure distinctly separate, independent constructs. This independence is expressed in Table 3 by the relatively low correlations among the various categories.

**TABLE 3**  
**Correlations Among the Categories**

Source	Category	Correlations			
		Frugality	Participation	Luxury	Competence
Study 1 (1983)	Frugality				
	Participation	.51			
	Luxury	.05	-.05		
Study 2 (1984)	Frugality				
	Participation	.50			
Study 3 (1989)	Luxury	.20	.11		
	Frugality				
Study 4 (1990)	Luxury	.28			
	Helping others	.51		.43	
	Frugality				
Study 5 (1991)	Participation	.62			
	Competence	.61	.46		
	Frugality				
Study 6 (1991)	Participation	.55			
	Competence	.58	.50		
	Frugality				
Study 7 (1992)	Participation	.33			
	Frugality				
	Luxury	-.12	-.01		
	Competence	.39	.42	.09	
Study 8 (1993)	Frugality				
	Luxury	.29			
	Competence	.51		.44	
Study 9 (1993)	Frugality				
	Luxury	-.03			
	Competence	.35		.20	
	Helping others	.31		.07	.44

The largest correlation of .62 indicates a shared variance of only 38%. However, there are patterns in these data.

There is a stable and moderately high correlation between the frugality and participation categories. This correlation is at or above about .50, indicating these categories have a common variance of roughly 25%. There is a similar although somewhat more modest pattern of correlations between the competence motivation category on the one hand and the frugality and participation categories on the other. Thus the person who



derives pleasure from discovering ways of being resourceful (i.e., frugality) will also tend to enjoy pursuing activities that make sense in a broader context (i.e., participation). Both of these constructs are associated with a general sense of satisfaction derived from developing and maintaining competence.

In virtually all instances, the satisfaction-from-luxury category has low correlations with each of the other categories. The notable exception is the .43 correlation (18% shared variance) between the helping-others (altruism) and luxury category in Study 3. In this study of university students, respondents who gain pleasure from consumer luxuries also tend to enjoy helping and meeting the expectations of others.

The overall pattern of relationships among the luxury and other categories presents an interesting finding. In haste one might predict that satisfaction gained from luxuries is the polar opposite of the other satisfactions. Yet almost all intercorrelations were positive and relatively low (Table 3). Thus satisfaction derived from consumption of luxury goods may not be the antithesis of satisfaction gained from more conservation-oriented (i.e., frugality) or conservation-compatible (i.e., participation, competence) categories. Hence someone who chooses to actively pursue a conservation-oriented lifestyle need not become a member of a Spartan elite. In fact, these data support the notion that such people could also have aspects of an otherwise mainstream orientation.

#### **RELATIONSHIPS WITH MEASURES OF CONSERVATION ATTITUDES AND BEHAVIOR**

Another means of understanding the concept of intrinsic satisfactions is to examine the degree to which certain categories of intrinsic satisfaction predict an inclination to pursue conservation behavior. Table 4 lists two typical measures of self-reported source reduction and recycling behavior that emerged from factor analysis of a bank of questionnaire items. These measures of conservation behavior were included in Study 1. In addition, measures of conservation attitudes, motives, and behavior were included in almost all of the studies.

**TABLE 4**  
**Conservation Behavior Categories**

<i>Category Name and Items Included</i>	<i>M<sup>a</sup></i>	<i>SD</i>	<i>α</i>
Source reduction	3.58	.72	.84
Reuse unused side of paper			
Look for ways to reuse things			
Save gift-wrapping paper			
"Hand down" clothing in family			
Reuse paper lunch/grocery bags			
Buy things designed/built to last			
Save cardboard boxes for later use			
Recycling	2.91	1.09	.80
Encourage friends and others to recycle			
Recycle nondeposit steel or aluminum cans			
Recycle what curbside program cannot take			
Recycle nondeposit glass jars and bottles			

a. Means based on a 5-point rating scale with higher values denoting higher endorsement for the category.

These are noted in the discussion below. Caution must be taken when interpreting self-report behavior measures as indicators of actual behavior. Because the recycling category and possibly the source reduction category shown in Table 4 are socially acceptable activities, the possibility exists that a social-desirability bias influenced the responses.<sup>2</sup> It may be appropriate to treat these measures as indicators of behavioral intent, a construct antecedent to behavior.

The items of intrinsic satisfaction common to almost all studies (the first three items for frugality, participation, and luxury categories) were used in a reanalysis of data from those studies and are discussed below. The relationships between measures of conservation attitudes, motives, and behavior on the one hand and the categories of intrinsic satisfaction on the other have consistently followed meaningful and potentially useful patterns.

#### **Relationships With the Frugality Category**

Satisfaction derived from the frugal use of resources has consistently demonstrated positive relationships with measures

of conservation behavior. The respondents in Study 1 associated the frugality category with both increased source reduction behavior ( $F = 31.01$ ,  $df = 2,259$ ,  $p < .0001$ ) and recycling of household materials ( $F = 5.37$ ,  $df = 2,254$ ,  $p < .01$ ) as measured by the categories shown in Table 4. Study 2 respondents had a similar positive relationship between two behavior categories, one measuring water conservation, the second measuring willingness to encourage others to conserve, and the frugality category ( $F = 3.27$ ,  $df = 2,63$ ,  $p < .05$  and  $F = 7.24$ ,  $df = 2,65$ ,  $p < .002$ , respectively). Also, in Study 6 conducted in Taiwan, analysis supported a modest linkage between office recycling behavior and the frugality category.<sup>3</sup>

Relationships with measures of conservation attitudes and motivations exist with a similar pattern. The respondents in Study 2 had a significant positive association between a pro-conservation attitude measure and the frugality category ( $F = 4.61$ ,  $df = 2,68$ ,  $p < .02$ ).<sup>4</sup> The frugality category has also demonstrated linkages to measures of intrinsic motivation. In Study 1 the respondents associated frugality with a measure of intrinsic motivation tied specifically to recycling and to a more global measure of this form of motivation ( $F = 32.11$ ,  $df = 2,249$ ,  $p < .0001$  and  $F = 14.36$ ,  $df = 2,244$ ,  $p < .0001$ , respectively).

The general pattern of relationships found in the various studies suggests that a positive attitude and behavior with respect to reducing one's demand for resources is associated with gaining increased personal satisfaction from frugality. Furthermore, as reported in De Young (1985-1986), the frugality category and the participation category (discussed below) both have close associations with measures of an intrinsic motive to conserve in both a global and a conservation behavior specific form. Thus the term *intrinsic satisfaction*.

#### **Relationships With the Participation Category**

The participation category exhibits a pattern similar to frugality. The respondents in Study 1 had a positive association between the participation category and the two measures of conservation behavior ( $F = 7.98$ ,  $df = 2,244$ ,  $p < .0001$  for the

source reduction category and  $F = 7.52$ ,  $df = 2,240$ ,  $p < .001$  for the recycling category shown in Table 4). In addition, Study 2 respondents had a positive relationship between the measure of one's willingness to encourage others to conserve and the participation category ( $F = 3.28$ ,  $df = 2,64$ ,  $p < .05$ ). And in a pattern similar to that reported for the frugality category, the Taiwanese respondents (Study 6) had a weak but positive association between a measure of office recycling behavior and the participation category.<sup>3</sup> These results suggest that respondents view conservation behavior as an opportunity to personally make a lasting difference, something they gain satisfaction from doing. The pattern persists with other conservation-focused measures. For instance, Study 2 respondents reported a positive relationship between the pro-conservation attitude measure and the participation category ( $F = 3.89$ ,  $df = 2,67$ ,  $p < .03$ ).

There is an interesting contrast with regard to measures of motivation. The respondents in Study 1 had a positive relationship between the participation category and both the specific and more global measures of intrinsic motivation ( $F = 49.21$ ,  $df = 2,235$ ,  $p < .0001$  and  $F = 33.20$ ,  $df = 2,231$ ,  $p < .0001$ , respectively). They also had a negative relationship between participation and a measure of extrinsic motivation ( $t = 3.14$ ,  $df = 242$ ,  $p < .002$ ) with those respondents reporting higher scores on the extrinsic-motivation measure having a lower score on participation.<sup>5</sup>

### **Relationships With the Luxury Category**

In general there are no significant relationships between the luxury category and the various measures of conservation behavior. An exception is noted in Study 1 where measures of both source reduction and recycling behavior were associated with the luxury category. These were negative associations ( $F = 3.41$ ,  $df = 2,258$ ,  $p < .04$  and  $F = 9.95$ ,  $df = 2,254$ ,  $p < .0001$ , respectively) with respondents who reported higher levels of these conservation behaviors deriving lower amounts of satisfaction from luxuries.

However, there have been some revealing relationships between the luxury category and various measures of motivation. For instance, in Study 1 the luxury category was positively associated with a measure of extrinsic motivation that focused on recycling ( $t = 3.13$ ,  $df = 255$ ,  $p < .002$ ). A pattern repeated in Study 2 with a more global measure of an extrinsic motive to conserve ( $F = 3.07$ ,  $df = 2,66$ ,  $p < .06$ )

The satisfaction-from-luxury category is clearly a coherent and independent construct in its own right. It is generally not correlated with the other satisfaction categories and is usually found to be, at most, weakly related to measures of conservation behavior. These findings support the notion that there may be little conflict between valuing prosperity and behaving in an ecologically responsible manner.

#### INCREASING INTRINSIC SATISFACTION

There is a challenge involved in using intrinsic satisfaction to promote conservation behavior. As mentioned above, intrinsic satisfaction is associated with intrinsic motivation, if not a measure of it (De Young, 1985-1986). Intrinsic motivation and, by association, intrinsic satisfaction differ from extrinsic motivation in not being easily manipulated. Whereas extrinsic motivation can be influenced by the giving or withholding of a reward or punishment, intrinsic motivation is generally unaffected by such manipulations. Although exceptions have been noted, these are where extrinsic rewards, under certain circumstances, decrease existing intrinsic motivation (Lepper, 1981; Lepper & Greene, 1978).

Thus using intrinsic satisfaction will require special approaches that are necessarily indirect. Because satisfaction is *derived from* actively pursuing a behavior, one must help people to try out the behavior without doing so in such a powerful way as to overshadow the derived satisfaction. Research on increasing the amount of intrinsic satisfaction one derives from an activity is scarce. So is work exploring how to use it to promote conservation behavior. However, given the nature of

this form of motivation, we can speculate as to the types of interventions to use.

These speculations emerge from realizing that the issue here involves the difficulty of getting people to adopt a behavior at which they are not currently experienced. People do this all the time but such situations nonetheless entail uncertainty and risk. Even with the simplest of activities (e.g., backyard composting) we can readily demonstrate our incompetence to the neighbors (e.g., with the foul odor from an anaerobic pile). There is, thus, a conflict—exploration of a new behavior is necessary yet perilous. Thus one intervention strategy would involve reducing the uncertainty. This might be accomplished by providing enough procedural information to make people feel and, in fact, be partially competent at the behavior. In addition, feedback on performance could help people improve their skills. However, it would be important to keep the feedback free of any significant rewards or punishments. Another intervention strategy would involve reducing the risk people take in exploring a new behavior. This might be done by creating a supportive situation in which the cost of failure is kept extremely low. It is necessary for people to understand that the failure of explorations is an acceptable, and even necessary, outcome of the process. In a situation in which failure is tolerated, people might be more willing to try a new behavior, if only tentatively.

A third intervention strategy would involve highlighting the direct, personal benefits that might be derived from doing the behavior. This approach was investigated by a reanalysis of data from an investigation of the conservation behavior of grocery store shoppers (Table 1, Studies 4 and 5). In this investigation, information was used to promote source reduction behavior. The experimental intervention consisted of an educational pamphlet. Information contained in the pamphlet included an explanation of source reduction, practical suggestions on how to reduce waste by changing purchasing and consumption habits, and a separate page of nontoxic alternatives for the homeowner. The pamphlet varied in the rationale presented—environmental, economic, a combination, or none—for adopting

**TABLE 5**  
**Source Reduction Behavior Category**

<i>Stem Question and Items Included</i>	<i>M<sup>a</sup></i>	<i>SD</i>	<i>α</i>
How much change has occurred in your shopping and household habits because of your participation in the study?	2.63	1.14	.95
Save reusable containers			
Use more returnable bottles			
Reduce plastic wrap use			
Reuse aluminum foil			
Buy more durable items			
Buy fewer aerosols			
Not buy overpackaged goods			
Use fewer paper towels			
Buy items packaged in reusable containers			
Buy fewer disposable items			
Buy in bulk			
Reduce toxic cleaner use			
Use nontoxic pesticides			
Use vinegar and baking soda for cleaning			

a. Means based on a 5-point rating scale with higher values denoting higher endorsement.

the suggested behavior; in all other respects the pamphlets were identical. From data collected in pre- and postintervention survey instruments, it was shown that both environmental and economic rationales for practicing source reduction, used alone or in combination, led to significant increases in self-reported source reduction behavior (De Young et al., 1993).<sup>6</sup>

This study was not originally designed to investigate changes in intrinsic satisfaction. However, included among the concepts measured on both the pre- and postintervention survey instruments were the respondents' self-reported intrinsic satisfaction derived from frugality, participation, and competence (see Table 2, Studies 4 and 5). These data provided an opportunity to examine whether reported adoption of a conservation behavior resulted in an increase in intrinsic satisfaction over preintervention baseline levels.

The analysis reported here uses a multi-item measure of self-reported source reduction behavior (Table 5) as the predictor variable in three separate regression analyses, one analysis

**TABLE 6**  
**Regression of Intrinsic-Satisfaction Categories on Source Reduction Behavior**

<i>Predictor Variables</i>	<i>Dependent Variables: Postintervention Categories</i>		
	<i>Frugality</i>	<i>Participation</i>	<i>Competence</i>
Source reduction behavior	.125*	.194**	.019
Preintervention frugality	.677**	—	—
Preintervention participation	—	.543**	—
Preintervention competence	—	—	.910**
Intercept	.970**	1.37**	.321
$R^2$	.483	.406	.812

\* $p < .05$ ; \*\* $p < .005$ .

for each of the categories of intrinsic satisfaction (i.e., frugality, participation, competence). The postintervention categories of intrinsic satisfaction were used, each in turn, as the dependent variable. In each analysis, the score on the relevant preintervention category of intrinsic satisfaction was used in the regression to control for the respondents' initial level on that variable. To conduct these analyses, new categories were created for the frugality and competence categories, using only those items common to both the pre- and postintervention surveys (see first four items for frugality and first three items for competence in Table 2).

The results presented in Table 6 suggest that after the relevant preintervention intrinsic satisfaction is controlled for, the self-reported source reduction behavior is a significant predictor for both frugality and participation. Those respondents who reported more actively pursuing source-reducing behavior also reported deriving more intrinsic satisfaction from frugality and participation.

It is worth noting that this outcome was accomplished with the use of a simple low-cost educational pamphlet. Furthermore, the intervention focused entirely on the target behavior and did not promote or even discuss the concept of intrinsic satisfaction. The possibility exists that an educational intervention that discusses and promotes the concept of intrinsic satisfactions might produce even more powerful effects. Clearly,



regression analysis cannot prove causality. Additional research will be needed to confirm the causal sequence and magnitude of the effect. The most that can be said about these findings is that they are consistent with the notion that one's intrinsic satisfaction can increase as a result of adopting a conservation behavior.

### EXPANDING THE COMPETENCE MOTIVATION CONCEPT

Research over decades has explored whether the public's attitude is alone sufficient to affect their behavior. The findings might be summarized as follows. Although attitudes may have a causal relationship with behavior, their influence is reduced when one assesses the effects of other causal variables on behavior. These other variables include such things as past experience with the behavior, increased familiarity with the situation, competence in carrying out the behavior, and subjective norms (Gray, 1985). Another approach is to note that an attitude can be expressed as a behavior only when the holder of that attitude can, in fact, successfully carry out the behavior. The issue here is the error of assuming that once people know *why* they should conserve, they will also feel they know *how* to proceed. This section expands on this idea by proposing that an underlying yet sometimes overlooked aspect of behavior change efforts is the need people have for, and the satisfaction people derive from, a sense of behavioral competence.

White (1959) proposed competence or "effectance" as a fundamental human concern, a construct that gathers together many diverse human interests, intentions, and activities. He argues convincingly that our concern for competence is strongly linked to evolutionary processes. The sorts of behaviors that are associated with competence motivation all are highly focused activities:

When this particular sort of activity is aroused in the nervous system, (competence) motivation is being aroused, for it is characteristic of this particular sort of activity that it is selective, directed, and persistent, and

that instrumental acts will be learned for the sole reward of engaging in it. (White, 1959)

Leff, Gordon, and Ferguson (1974) suggested that the experimental research of De Charms (1968, 1971) and Brehm (1966; Brehm & Brehm, 1981), as well the reinterpretation of earlier research by White and others, supports the notion that the concern for competence is a major source of human motivation. In introducing competence motivation, White makes strong ties to the personal, intangible aspects of this construct; in essence, competence is intrinsically reinforcing (Wandersman, 1979). With regard to this form of motivation Deci and Porac (1978) have suggested that "there is a high degree of correspondence between one's psychological health or well-being and one's being active in the sense of being intrinsically motivated." Taken together, these researchers are proposing that competence motivation is integral with human well-being.

#### **THE EFFECT OF MISUNDERSTANDING THE IMPORTANCE OF COMPETENCE**

It is interesting to note how, by ignoring the role competence plays in behavior change, efforts to change the public's behavior may only create feelings of helplessness. Consider how, after spending months exploring a conservation behavior (e.g., backyard composting), program planners will agree among themselves that there is nothing very complicated about the activity; people simply have to make time to do it. Such a declaration might begin to carry some weight in those instances when the planners actually experimented with the behavior. Unfortunately, it is just like experts to forget their initial confusion, the early days of fumbling, and the lack of initial guidance on how to proceed. The study of human behavior suggests that such circumstances should not be underrated (Kaplan & Kaplan, 1982). When novices are not sure how to proceed, they are easily overwhelmed. A simple action becomes a major challenge. This situation may go well beyond a simple lack of information, such as exactly how much space to allocate to a

compost bin or what materials it can accept. It involves not even knowing what the right questions to ask are. In such a situation one is essentially incompetent.

This is not a state of affairs that humans find satisfying. In fact, they find it rather upsetting. People are disturbed by the thought of finding themselves caught helpless. When faced with such a situation, people will avoid attempting a behavior regardless of genuine concern, positive attitude, or strong external inducement. And yet, it is wrong to describe such people as unmotivated. They are strongly motivated by a desire to be behaviorally competent. Unfortunately, in this situation, the most reasonable action for people to take might be to avoid doing anything, at least until such time as they can develop a tentative, perhaps only conceptual, familiarity with the behavior. Even more troublesome is the possibility of reinforcing in people the mistaken belief that there is nothing they as individuals can do to make a difference. Imagine what the situation described above might read like in a feasibility study of behavior change. Evaluation reports from the field, documenting the apparent unwillingness of the public to adopt an apparently simple behavior, in spite of the government's best efforts to educate the public about what they must do, might lead to that government deciding to "do" the activity for the public.

#### **EXPLORING THE DIMENSIONS OF COMPETENCE MOTIVATION**

On the basis of the importance of competence in behavior change and the emergence of the competence motivation category in the earlier research (Table 2, Studies 4 through 7) a study was conducted to expand on this construct. A group of graduate and undergraduate students ( $N = 318$ ) were asked to complete a one-page survey instrument. These students rated on a 5-point scale a series of items about the satisfaction derived from various types of competence as well as a number of the frugality and participation items from the earlier studies. The respondent's data were subjected to nonmetric factors from which emerged the categories shown in Table 7.

**TABLE 7**  
**Expanded Competence Categories**

<i>Category Name and Items Included</i>	<i>M<sup>a</sup></i>	<i>SD</i>	<i>α</i>
Satisfaction from problem solving	4.27	.77	.86
Being competent at meeting life's challenges			
Knowing how to complete a task			
Knowing how to solve most problems I face			
Being competent at the things I need to do			
Being able to make effective choices			
Expanding the number of things I am good at doing			
Satisfaction from participation	4.03	.78	.75
Doing things that will matter in the long run			
Being a responsible citizen			
Doing things that help bring order to the world			
Doing things that help make sense out of the world			
Being able to prioritize my goals			
Satisfaction from successful discourse	3.92 <sup>a</sup>	1.00	.57
Being able to initiate conversations			
Being able to keep up my end of a conversation			
Satisfaction from being socially competent	3.87 <sup>a</sup>	.84	.80
Being able to tolerate failure in others			
Knowing when I should just listen to people			
Being able to accept criticism			
Being able to look back at my mistakes with humor			
Knowing when to apologize			
Satisfaction from being resolute	3.85 <sup>a, b</sup>	1.05	.55
Being able to argue effectively			
Being able to tell someone powerful that he or she is wrong			
Satisfaction from frugality (resource competence)	3.77 <sup>b</sup>	.94	.82
Finding ways to use things over and over			
Finding ways to avoid waste			
Repairing things rather than throwing them away			
Keeping things working long past their normal life			
Satisfaction from being obedient	3.73 <sup>b</sup>	1.12	.70
Doing what is expected of me			
Meeting the expectations of others			
Satisfaction from knowing one's own limits	3.38	.95	.76
Learning to avoid situations that I am not good at			
Knowing local places to avoid going			
Knowing which people to avoid			
Knowing what is a temptation for me			
Knowing what battles to fight			
Knowing when to rest			

a. Means based on a 5-point rating scale with higher values denoting higher endorsement for the category. Means sharing superscripts are not significantly different from one another at  $p < .05$ .

What emerges is a partial definition of what it takes to be an effective human being. Even more interesting is that within these categories of intrinsic satisfaction we can see a reflection of all three themes (i.e., worldview, pro-self, pro-social) discussed earlier. This world-self-other organization is expanded on below.

### **Worldview: Participation and Frugality**

Decades ago, Kluckhohn (1953) proposed that a series of "basic human problems" had to be dealt with by each human society. On her short list was the matter of "man's relation to nature." Although there would be different ways to address this concern, all cultures must, she argued, eventually resolve it. The categories of participation and frugality fit this theme well. Both contain the notion of taking care of the place, either at the global or local scale. Frugality involves finding ways to be resource competent. One is focused not on oneself or others but on the resources one uses. Although participation remains separate from the various competence categories, it does contain the theme of being effective at making a difference. The focus here is on being capable of bringing order to chaos. It should be possible to build on the intrinsic satisfaction people gain from being able to do things that have an effect in a larger context and that matter in the long run.

### **Pro-Self: Problem Solving, Being Resolute, and Knowing One's Limits**

A common means of modeling human behavior is to assume that people focus on their own success first and foremost (see Low & Heinen, 1993). Batson (1990) noted that modern psychology has modeled humans as egocentric gain maximizers. He summarizes psychology's account of human behavior in this way, "We may be social in thought and action, but in motivation we are capable of caring only for ourselves." The self-focused categories of intrinsic satisfaction in Table 7 (i.e., problem solving, being resolute, knowing one's own limits) maintain a

focus on one's own problems and concerns although their content is not at the extreme of selfish acquisitive behavior. Instead, they involve taking pleasure from being able to get through one's own tasks, being able to stand up for oneself, and completing tasks despite temptations and personal limitations.

**Pro-Social: Social Competence,  
Discourse, and Obedience**

Batson (1990), although critiquing the egocentric focus of most of contemporary psychology, reported evidence that humans can care for the welfare of others. He argues that this concern is not instrumental, not simply a disguised way of caring about one's own well-being. Rather, it is a genuine altruism, a deeply held concern for the well-being of the other for the other's own sake (Howard, 1993 provided an excellent discussion of this matter).

A concern for the well-being of others is a persistent theme in recent conservation behavior research. This research has modeled conservation behavior as a form of altruistic behavior guided by social and personal norms. Mentioned earlier, this approach is based on the norm-activation model developed by Schwartz (1970, 1977; Stern et al., 1993). Under this model one's behavior is motivated by a pro-social commitment. Such an approach was shown to be useful by Heberlein (1972; Heberlein & Black, 1976), and various subsets of the model have been applied to a number of environmentally responsible behaviors, including recycling of household waste (Guagnano, Stern, & Dietz, 1995; Hopper & Nielsen, 1991; Oskamp et al., 1991; Vining & Ebreo, 1992), reducing yard waste burning (Van Liere & Dunlap, 1978), energy conservation (Black, Stern, & Elsworth, 1985), and political support for environmental policies (Stern, Dietz, & Black, 1985-1986).

The categories that are focused on being socially competent and being obedient fit this concern for the welfare of others quite well. The former category contains the theme of gaining satisfaction from being able to effectively interact with people. The latter deals with satisfaction derived from putting the expectations of

others ahead of your own needs. A third category, successful discourse, involves satisfaction gained from being able to initiate and maintain a discussion. Taken together, these three pro-social categories of intrinsic satisfaction entail being supportive of, and responsive to, the ideas and needs of others.

The eight categories that emerged from this study of competence motivation are consistent with a view of humans as creatures trying to successfully manage the tasks, uncertainties, and distractions of life. More research is needed before these findings could serve as evidence countering the view of humans as rational actors solely focused on maximizing their acquisition of resources. However, a pairwise comparison of the means in Table 7 suggests that problem solving and participation are highly valued concepts. The respondents report deriving satisfaction from being actively engaged and, in fact, enjoy being problem solvers. Both of these categories and the modestly endorsed frugality category fit nicely with the notion of conservation. Perhaps most hopeful is that the respondents report gaining pleasure out of restraining, not increasing, consumption.

## DISCUSSION

There are a number of theoretical connections between intrinsic satisfaction and established concepts in the literature. One such connection is between competence motivation and the concept of locus of control (Rotter, 1990). In this concept a person is described as "internal" when he or she believes that the locus of control over reinforcement is under his or her influence. Such a person believes he or she has the skill and capability to direct his or her own rewards and punishments.<sup>7</sup> Competence measures whether people actually possess particular skills and abilities. And competence motivation is about gaining satisfaction from acquiring or maintaining such capabilities. People scoring high on a measure of competence motivation are indicating that they value being able to influence their own behavior. Framed in this way, competence and com-

petence motivation both sound closely associated with the concept of locus of control. Rotter (1992) also suggested that locus of control operates most strongly in relatively novel situations. We might expect that these are precisely the situations where one's sense of competence and motivation to develop competencies would most powerfully affect one's willingness to adopt a new behavior. Overall, we can speculate that someone with an internal locus of control might also score high on measures of competence motivation. However, locus of control is generally thought of as a stable personality trait applicable to a variety of situations. In contrast, competence and competence motivation are measured with regard to specific behaviors. Thus the association will likely be only modest because it is between measures of a general and a specific construct.

Another connection exists between the intrinsic satisfaction construct and the research on values as operationalized by Rokeach (1968, 1973). Rokeach proposed a 10-level hierarchical belief system. The hierarchy ranges from those issues most central in a person's belief system; moves through beliefs focused on one's own attitudes and behavior as well as the attitudes, values, and behaviors of significant others; and ends with cognitions about the behavior of nonsocial objects. The more central beliefs are argued to influence the development of more peripheral ones. The intrinsic satisfaction construct is closely linked with the sixth level of the Rokeach hierarchy—cognitions about one's own behavior. Gray (1985), in his review of the Rokeach system, mentions this connection, "Reflections about one's past, present, or future behavior include a sense of satisfaction, dissatisfaction, guilt, apathy, and so on, and these reflections all contribute to future specific behavioral intentions." There is also a possible linkage between competence motivation and the first level of the Rokeach hierarchy—cognitions about one's self. This level includes important and durable beliefs about one's traits and abilities. It comprises many traditional personality factors (e.g., locus of control) as well as an assessment of one's capabilities. One's sense of competence is clearly associated with this level, as well as, we might speculate, one's competence motivation.



One final issue involves the relationship between altruism and intrinsic satisfaction. Intrinsic satisfaction, taken as a single concept, might be considered a form of altruistic motivation. If this is true, then it is good news. For Vining, Linn, and Burdge (1992) found altruism an important motive during their comparison of four community solid waste management programs. They reported that environmental altruism was the only category of motivation that was consistently endorsed and active in all four communities studied. The other motives (e.g., monetary incentives, social motives, convenience factors) varied in content and meaning across the communities.

Yet intrinsic satisfaction may be quite separate from altruism. An association between these two concepts might seem natural, but they are likely, in function, quite different. Altruism is the unselfish concern for the welfare of others; acting in the best interest of the general society regardless of personal costs. Environmental altruism focuses on sustaining or restoring the environment for other humans, other generations, and other species. Environmental altruism would have one restraining consumptive behavior mainly for the benefit of others.

The focus of intrinsic satisfaction may, in fact, be orthogonal to altruistic concern. It involves an action carried out for its immediate, personal effect. One is willing to pursue frugality or get actively involved because such acts result in an immediate, personal payoff. This perspective argues that people come to value a conservation behavior for the personal intrinsic satisfaction derived (the proximate trigger), not because this behavior ultimately benefits others or the environment (the ultimate effect). Intrinsic satisfactions are experienced as enjoyable; no moral or normative aspect need be assumed although neither are such aspects precluded from existing simultaneously. Clearly, more research is needed to work through the relationship between intrinsic satisfaction and altruism.

#### **IMPLICATIONS**

Taken together, the findings reported here allow for some tentative suggestions on how to encourage reduced consump-

tion behavior. The first suggestion emerges from the realization that we are not limited to externally mediated behavior change techniques. It may be possible to employ the intangible payoffs that people derive from the very behaviors that we may soon so desperately need them to adopt. Behaviors that focus on being frugal, active, creative, and working to maintain social harmony all seem to contain their own reward. The findings reported here suggest that we explore strategies that emphasize these aspects of conservation behavior.

We can also speculate about the sort of knowledge and learning experiences that would help people to adopt a new conservation behavior. At the most basic level, people need to be made aware of *why* they should adopt a particular behavior. However, the findings reported here suggest it may be important to help people in their efforts to develop knowledge about *how* to change behavior. Problem solving, the most highly endorsed competence category, focused entirely on this issue. An analysis of the content of this and other categories of intrinsic satisfaction suggests that people are concerned with having procedural knowledge (e.g., practical step-by-step guidance).

The importance of procedural knowledge and the impact of procedural ignorance has emerged in previous studies of conservation behavior (Oskamp et al., 1991; Vining & Ebreo, 1990). Gamba and Oskamp (1994) reported that relevant recycling knowledge is the most significant predictor of observed recycling behavior. Simmons and Widmar (1990) reported that a lack of knowledge about waste reduction acted as a barrier to adopting this behavior, even among those individuals who felt a responsibility to act in an environmentally responsible manner. Another study found that procedural knowledge played a significant role in distinguishing recyclers from nonrecyclers (De Young, 1988-1989; see Note 2). Recyclers and nonrecyclers were similar in their reported pro-recycling attitudes, extrinsic motivation, and the degree to which they viewed recycling as a trivial activity. They differed significantly, however, in the degree to which they required additional information about recycling, with the nonrecyclers indicating a lack of procedural knowledge. Other research has suggested that belief

in a goal is not enough to change behavior; people must also have adequate knowledge of appropriate behavior (Cook & Berrenberg, 1981; Weigel & Amsterdam, 1976). Without behavior-relevant knowledge people are not confident enough to act (Ehrlich, 1969) and confusion about how to proceed can cause people to give up on a problem (Halford & Sheehan, 1991).

The possible role procedural knowledge plays in behavior change becomes clear when one fully appreciates the challenge people face. Whenever one promotes a new behavior, one is asking people to start something at which they are currently incompetent. When viewed in this way it seems quite natural for people to be resistant to change. And yet people seem to be desiring the impossible. They want to be at least partially competent at a new behavior before ever starting it. However irrational this may sound, it does explain why behavior is so difficult to change and why familiarity and prior experience are such effective predictors of future behavior (Macey & Brown, 1983).<sup>8</sup>

The issue being suggested here is not that people lack the capacity to pursue a new behavior. Rather, for a variety of reasons, people lack functional knowledge on how to proceed (Kaplan, 1990). Thus it may be appropriate to view the challenge as one of helping people to develop procedural knowledge about reduced consumption behavior. This suggests an approach to promoting behavior change that starts by allowing people to explore, tentatively, the new behavior. By providing the time and space to make mistakes, perhaps in private, without great costs, people can develop familiarity and partial competence. Fortunately, as the findings here suggest, people are inclined to take an active role in this endeavor.

Finally, the durability of Katzev's (1986, 1989) commitment strategy may emerge from enabling just such tentative explorations and the familiarity that may result. The minimum justification principle (Lepper, 1981) provides a straightforward motivational explanation for the effectiveness of the commitment strategy, yet it is more of a descriptive explanation. An explanation based on familiarity and competence may explain

the mechanism at work; the development of procedural knowledge and clarity in a low-risk, supportive situation.

The speculations presented here should be treated as preliminary. Additional empirical research is needed to determine how central the competence motive is to the adoption of conservation behavior, to replicate these same findings while controlling for any social desirability effect, and to resolve the causality between conservation behavior and intrinsic satisfaction. Further work is also needed to determine how best to use intrinsic satisfactions in behavior change efforts. Nonetheless, these findings are hopeful. They suggest a straightforward approach to promoting a reduced consumption lifestyle. Perhaps we should build on the possibility that such a lifestyle will have its own rewards. As Johnson (1978, 1985) pointed out, far from being a great sacrifice, living lightly on the planet could increase our quality of life and sense of well-being.

## NOTES

1. Stern, Dietz, and Kalof (1993) argued that all three themes (value orientations) are simultaneously active in people's assessment of a particular behavior. They argue convincingly that their finding that only a single theme reliably predicted their "willingness-to-pay" measure was due to the "focus effect" (see Cialdini, Kallgren, & Reno, 1991; Cialdini, Reno, & Kallgren, 1990; Irwin, Slovic, Lichtenstein, & McClelland, 1993). However, if attention shifts to the actor rather than the behavior, a variety of patterns might be plausible. Just as non-Western cultures may have value orientations different from, or in addition to, the three discussed here, so might we speculate there to be differences among groups of individuals within one culture. Some individuals might be naturally sensitive to a particular theme or combination of themes. Likewise, different people might be or become sensitive to different sources of behavioral cues, perhaps as a result of recent or past experience. De Young and Kaplan (1985-1986) reported just such multifaceted patterns of motives underlying conservation behaviors. The *availability* of all three themes and all three sources of proximate behavioral cues does not necessarily lead to the conclusion that there is but one acceptable combination.

2. With the exception of Studies 4 and 5 (see Note 6 below), the measures of conservation behavior reported here were based on self-report. In all survey research, one must be concerned whether self-reported measures are valid indicators of the construct being discussed. This applies to all constructs: behavior, motivation, attitudes, values, and so on. One of the major threats to self-report data is the possibility that responses are influenced by what the respondents perceive as socially desirable. Because recycling and possibly source reduction (see below) are socially acceptable

behavior, this bias could be present in these data. For this reason, and in the absence of measures of actual behavior data to establish the internal validity of the self-report, the findings reported should be treated with caution. Nonetheless, there are reasons for being fairly confident that actual conservation behavior is being measured. The first comes from a review of the factor analysis results in the various studies cited. The statistically separate categories of behavior that emerged are possible evidence against the argument that a single construct (e.g., social desirability) is underlying the responses. If the self-report items were designed to measure different types of conservation behavior (as was the case in the studies being discussed) and if a single construct were driving the self-report responses, then the factor analysis would likely identify a single, robust dimension. In this case the category of self-report items might best be named "socially desirable behavior." However, in the study cited, two behavior categories emerged from the factor analysis. Furthermore, these categories have a low correlation ( $r = .34$ , indicating a shared variance of only 12%), suggesting that the categories are measuring distinctly different constructs. Another way to explore the degree to which a social desirability bias is affecting these data is to examine the means and content of the categories, as well as the social context of the study. Study 1 was conducted in 1983 well before source reduction was a major policy issue. The community being studied, after debating the issue of recycling and assessing citizen support, had significantly expanded its curbside recycling program. If the self-report responses were being affected by a social desirability bias, then the mean score on the recycling measure might be expected to be greater than the mean score on the source reduction measure. Just the opposite was found. The respondents reported a significantly higher mean on the, then less topical, source reduction measure ( $t = 10.11$ ,  $df = 256$ ,  $p < .001$ ), suggesting that a social desirability bias was not a salient factor. Finally, a study exploring the difference between recyclers and nonrecyclers in this same community collected both direct observation and self-report data on behavior (De Young, 1988-1989). The self-report data were confirmed by the direct observation data with only a few exceptions. The exceptions are fascinating, mostly involving nonrecyclers. The on-site interview and survey results revealed that citizens made an effort to minimize the number of stops the recycling truck had to make. Some would store recyclables in their garage until there was enough to justify a pickup. Others combined their recyclables with those of their neighbor. Of course, these and other actions taken by the respondents caused their behavior to be miscoded by a seemingly objective behavior measure.

3. A path analysis conducted on the data from Study 6 proved statistically significant for the two relationships examined. This analysis identified a modest positive causal linkage between office recycling behavior and the frugality category (path coefficient = 0.16). A weak positive causal linkage was also identified between office recycling behavior and the participation category (path coefficient = 0.13). Although these path coefficients are statistically significant (at  $p < .01$ ), their magnitude is small enough to warrant extreme caution in using them to support the causal direction. At best, these findings must be considered only a preliminary indication that satisfactions are derived from (not antecedent to) conservation behavior (Lee & De Young, 1994).

4. The pro-conservation attitude measure emerged from factor analysis of the survey data and was composed of four items: I am bothered to see water go to waste, we must teach ourselves how to use water more wisely, conserving water is necessary and essential, and conservation should be an integral part of our culture. The measure had an alpha value of .81 (see De Young & Robinson, 1984).

5. Without additional research we can only speculate as to the meaning of this latter finding. However, it is worth noting that the content of the participation category suggests a future focus, a concern about making an impact in the long run. One might even suggest that the respondents are deriving satisfaction from going beyond what is normal or expected from each of us. As suggested by Katz and Kahn (1978), extrinsic motivation tends not to promote such unusual effort. Of course, the findings reported here suggest something beyond just a failure of extrinsic motives to encourage exceptional effort. The data report a negative relationship. Thus we might further speculate that people driven by, or focused on, extrinsic motives also tend not to derive as much intrinsic satisfaction from participation. Only additional research could tell if this is an instance of the overjustification effect (Katzew, 1986; Lepper, 1981; Lepper & Greene, 1978). This hypothesis holds that the use of extrinsic incentives can reduce interest in a behavior when the initial internal interest in a behavior is high (here suggested by the modestly high mean scores on the participation category) and the reward is perceived as more than adequate justification for the behavior.

6. Studies 4 and 5 used both self-report measures of behavior and itemized receipts of all purchases entering the participating households during the 13-week study period. The itemized receipts were used to quantify the source reduction behavior on the basis of purchasing decisions. The receipt data tended to corroborate the self-reported behavior data. However, participants indicated that they frequently lost or forgot to save receipts and often shopped at stores that provided nonitemized receipts. The usable data received from itemized receipts accounted for less than half of all purchasing decisions made by the participants, thus limiting the usefulness of this behavior measure (De Young et al., 1993).

7. Guagnano (in press) has investigated a three-dimensional version of locus of control developed by Levenson (1974) and found that it improves the ability to state the conditions under which an individual will take environmentally appropriate action. An internal locus of control predicts an increased willingness to adopt environmentally appropriate action, whereas a strong belief in the power of others or chance is reported to lower the likelihood of such action.

8. Kaplan (1991) has contrasted this knowledge-based approach to behavior change with the rational actor model. He has argued that when a person's clarity about an action increases, so does his or her willingness to take that action. What is particularly insightful about his model of behavior change is how it explicitly deals with the issue of ignorance and its effect on decision making. What one does not know looms just as large as what one knows when contemplating the adoption of a new behavior.

## REFERENCES

- Axelrod, L. J. (1994). Balancing personal needs with environmental preservation: Identifying the values that guide decisions in ecological dilemmas. *Journal of Social Issues, 50*, 85-104.
- Batson, C. D. (1990). How social an animal?: The human capacity for caring. *American Psychologist, 45*, 336-346.
- Black, J. S., Stern, P. C., & Elsworth, J. T. (1985). Personal and contextual influences on household energy adaptations. *Journal of Applied Psychology, 70*, 3-21.

- Brehm, J. W. (1966). *A theory of psychological reactance*. New York: Academic Press.
- Brehm, S., & Brehm, J. W. (1981). *Psychological reactance: A theory of freedom and control*. New York: Academic Press.
- Brinkerhoff, M. B., & Jacob, J. C. (1984). Alternative technology and quality of life: An exploratory survey of British Columbia smallholders. *Social Indicators Research*, *14*, 177-194.
- Burn, S. M., & Oskamp, S. (1986). Increasing community recycling with persuasive communication and public commitment. *Journal of Applied Social Psychology*, *16*, 29-41.
- Cantril, H. (1966). The human design. In H. Cantril (Ed.), *The pattern of human concerns*. New Brunswick, NJ: Rutgers University Press.
- Cialdini, R. B., Kallgren, C. A., & Reno, R. R. (1991). A focus theory of normative conduct: A theoretical refinement and reevaluation of the role of norms in human behavior. *Advances in Experimental Social Psychology*, *24*, 201-234.
- Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, *58*, 1015-1026.
- Cook, S., & Berrenberg, J. (1981). Approaches to encouraging conservation behavior: A review and conceptual framework. *Journal of Social Issues*, *37*, 73-107.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*, 297-335.
- Cronk, L. (1991). Human behavioral ecology. *Annual Review of Anthropology*, *20*, 25-53.
- Csikszentmihalyi, M. (1978). Intrinsic rewards and emergent motivation. In M. R. Lepper & D. Greene (Eds.), *The hidden costs of reward: New perspectives on the psychology of human motivation*. Hillsdale, NJ: Lawrence Erlbaum.
- De Charms, R. (1968). *Personal causation: The internal affective determinants of behavior*. New York: Academic Press.
- De Charms, R. (1971). From pawns to origins: Toward self-motivation. In G. S. Lesser (Ed.), *Psychology and educational practice*. Glenview, IL: Scott, Foresman.
- Deci, E. L. (1975). *Intrinsic motivation*. New York: Plenum.
- Deci, E. L., & Porac, J. (1978). Cognitive evaluation theory and the study of human motivation. In M. R. Lepper & D. Greene (Eds.), *The hidden costs of reward*. Hillsdale, NJ: Lawrence Erlbaum.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Devall, B. (1988). *Simple in means, rich in ends: Practicing deep ecology*. Salt Lake City, UT: Gibbs M. Smith.
- De Young, R. (1985-1986). Encouraging environmentally appropriate behavior: The role of intrinsic motivation. *Journal of Environmental Systems*, *15*, 281-292.
- De Young, R. (1986). Some psychological aspects of recycling: The structure of conservation satisfactions. *Environment and Behavior*, *18*, 435-449.
- De Young, R. (1988-1989). Exploring the difference between recyclers and non-recyclers: The role of information. *Journal of Environmental Systems*, *18*, 341-351.
- De Young, R. (1993). Changing behavior and making it stick: The conceptualization and management of conservation behavior. *Environment and Behavior*, *25*, 485-505.
- De Young, R., Duncan, A., Frank, J., Gill, N., Rothman, S., Shenot, J., Shotkin, A., & Zweizig, M. (1993). Promoting source reduction behavior: The role of motivational information. *Environment and Behavior*, *25*, 70-85.

- De Young, R., & Kaplan, S. (1985-1986). Conservation behavior and the structure of satisfactions. *Journal of Environmental Systems*, 15, 233-242.
- De Young, R., & Robinson, J. (1984). Some perspectives on managing water demand: Public and expert views. *Canadian Journal of Water Resources*, 9, 9-18.
- Dunlap, R. E., & Van Liere, K. D. (1978). The new environmental paradigm: A proposed measuring instrument and preliminary results. *Journal of Environmental Education*, 9, 10-19.
- Dunlap, R. E., & Van Liere, K. D. (1984). Commitment to the dominant social paradigm and concern for environmental quality: An empirical examination. *Social Science Quarterly*, 65, 1013-1028.
- Dunlap, R. E., Van Liere, K. D., Mertig, A. G., Catton, W. R., & Howell, R. E. (1992, August). *Measuring endorsement of an ecological worldview: A revised NEP scale*. Paper presented at the annual meeting of the Rural Sociological Society, State College, PA.
- Durning, A. T. (1992). *How much is enough: The consumer society and the future of the Earth*. New York: Norton.
- Eckblad, G. (1981). *Scheme theory: A conceptual framework for cognitive-motivational processes*. New York: Academic Press.
- Eckersley, R. (1992). *Environmentalism and political theory: Toward an ecocentric approach*. Albany: State University of New York Press.
- Ehrlich, H. (1969). Attitudes, behavior and the intervening variables. *The American Sociologist*, 4, 29-34.
- Elgin, D. (1981). *Voluntary simplicity: Toward a way of life that is outwardly simple, inwardly rich*. New York: William Morrow.
- Gamba, R. J., & Oskamp, S. (1994). Factors influencing community residents' participation in commingled curbside recycling programs. *Environment and Behavior*, 26, 587-612.
- Geller, E. S. (1987). Applied behavior analysis and environmental psychology: From strange bedfellows to a productive marriage. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology*, New York: Wiley.
- Geller, E. S. (1989). Applied behavior analysis and social marketing: An integration for environmental preservation. *Journal of Social Issues*, 45, 17-36.
- Geller, E. S. (1990). Behavior analysis and environmental protection: Where have all the flowers gone? *Journal of Applied Behavior Analysis*, 23, 269-273.
- Geller, E. S. (1992). Solving environmental problems: A behavior change perspective. In S. Staub & P. Green (Eds.), *Psychology and social responsibility: Facing global challenges*. New York: University Press.
- Geller, E. S., Winett, R. A., & Everett, P. B. (1982). *Preserving the environment: New strategies for behavioral change*. New York: Pergamon.
- Goldenhar, L. M., & Connell, C. M. (1992-1993). Understanding and predicting recycling behavior: An application of the theory of reasoned action. *Journal of Environmental Systems*, 22, 91-103.
- Goldenhar, L. M., & De Young, R. (1990). The association between educational and feedback interventions and recycling attitudes and beliefs: The future generation. In *First United States Conference on Municipal Solid Waste Management: Solutions for the 90s*. Washington, DC: U.S. Environmental Protection Agency.
- Gray, D. B. (1985). *Ecological beliefs and behaviors: Assessment and change*. Westport, CT: Greenwood.
- Gregg, R. (1974a, September 4). Voluntary simplicity: Part I. *Manas*, 27.



- Gregg, R. (1974b, September 11). Voluntary simplicity Part II. *Manas*, 27.
- Guagnano, G. A. (in press). Locus of control, altruism and agentic disposition. *Population and Environment*.
- Guagnano, G. A., Stern, P. C., & Dietz, T. (1995). Influences on attitude-behavior relationships: A natural experiment with curbside recycling. *Environment and Behavior*, 27, 699-718.
- Halford, G. S., & Sheehan, P. W. (1991). Human response to environmental changes. *International Journal of Psychology*, 26, 599-611.
- Heberlein, T. A. (1972). The land ethic realized: Some social psychological explanations for changing environmental attitudes. *Journal of Social Issues*, 28, 79-87.
- Heberlein, T. A., & Black, J. S. (1976). Attitudinal specificity and the prediction of behavior in a field setting. *Journal of Personality and Social Psychology*, 33, 474-479.
- Henderson, C. (1978). The frugality phenomenon. *Bulletin of the Atomic Scientists*, 34, 24-27.
- Henion, K. E., & Kinnear, T. C. (Eds.). (1979). *The conserver society*. Chicago, IL: American Marketing Association.
- Hopper, J. R., & Nielsen, J. M. (1991). Recycling as altruistic behavior: Normative and behavioral strategies to expand participation in a community recycling program. *Environment and Behavior*, 23, 195-220.
- Howard, G. S. (1993). On certain blindnesses in human beings: Psychology and world overpopulation. *The Counseling Psychologist*, 21, 560-581.
- Inglehart, R. (1977). *The silent revolution*. Princeton, NJ: Princeton University Press.
- Inglehart, R. (1990). *Culture shift in advanced industrial society*. Princeton, NJ: Princeton University Press.
- Irwin, J. R., Slovic, P., Lichtenstein, S., & McClelland, G. H. (1993). Preference reversals and the measurement of environmental values. *Journal of Risk and Uncertainty*, 6, 5-18.
- Johnson, W. (1978). *Muddling toward frugality*. Boulder, CO: Shambhala.
- Johnson, W. (1985). *The future is not what it used to be: Returning to traditional values in an age of scarcity*. New York: Dodd, Mead.
- Kaplan, R. (1974). A strategy for dimensional analyses. In D. H. Carson (Ed.), *Man-environment interactions: Evaluation and applications* (Proceedings of Environmental Design Research Association Conference No. 5). Oklahoma City, OK: Environmental Design Research Association.
- Kaplan, S. (1983). A model of person-environment compatibility. *Environment and Behavior*, 15, 311-332.
- Kaplan, S. (1990). Being needed, adaptive muddling and human-environment relationships. In R. I. Selby, K. H. Anthony, J. Choi, & B. Orland (Eds.), *EDRA 21*. Oklahoma City: Environmental Design Research Association.
- Kaplan, S. (1991). Beyond rationality: Clarity-based decision making. In T. Gärling & G. W. Evans (Eds.), *Environment, cognition, and action: An integrated approach*. New York: Oxford University Press.
- Kaplan, S., & Kaplan, R. (1982). *Cognition and environment: Functioning in an uncertain world*. New York: Praeger.
- Katz, D., & Kahn, R. (1978). *The social psychology of organizations*. New York: Wiley.
- Katzev, R. D. (1986). The impact of commitment in promoting consumer energy conservation. In E. Monnier, G. Gaskell, P. Ester, B. Joerges, B. Lapillonne, C. Midden, & L. Puiseux (Eds.), *Consumer behavior and energy policy: An international perspective*. New York: Praeger.

- Katzev, R. D. (1989, February). *How to motivate recycling: Applying minimal justification techniques*. Paper presented at the winter workshop of the Association for Conservation Information, Arlington, VA.
- Katzev, R. D., & Pardini, A. U. (1987-1988). The comparative effectiveness of rewards and commitment approaches in motivating community recycling. *Journal of Environmental Systems, 17*, 93-113.
- Kluckhohn, F. R. (1953). Dominant and variant value orientations. In C. Kluckhohn & H. A. Murray (Eds.), *Personality in nature, society, and culture*. New York: Alfred A. Knopf.
- Lee, Y., & De Young, R. (1994). Intrinsic satisfaction derived from office recycling behavior: A case study in Taiwan. *Social Indicators Research, 31*, 63-76.
- Lee, Y., De Young, R., & Marans, R. W. (1995). Factors influencing office recycling behavior: A case study in Taiwan. *Environment and Behavior, 27*.
- Leff, H. L., Gordon, L. R., & Ferguson, J. G. (1974). Cognitive set and environmental awareness. *Environment and Behavior, 6*, 395-447.
- Leonard-Barton, D. (1981). Voluntary simplicity lifestyles and energy conservation. *Journal of Consumer Research, 8*, 243-252.
- Lepper, M. R. (1981). Intrinsic and extrinsic motivation in children: Detrimental effects of superfluous social controls. In W. Collins (Ed.), *Aspects of the development of competence: The Minnesota Symposium on Child Psychology* (Vol. 14, pp. 155-160). Minneapolis: University of Minnesota Press.
- Lepper, M. R., & Greene, D. (Eds.). (1978). *The hidden costs of rewards: New perspectives on the psychology of human motivation*. Hillsdale, NJ: Lawrence Erlbaum.
- Levenson, H. M. (1974). Activism and powerful others: Distinctions within the concept of internal-external control. *Journal of Personality Assessment, 38*, 377-383.
- Lingoes, J. C. (1972). A general survey of the Guttman-Lingoes non-metric program series. In R. N. Shepard, A. K. Romney, & S. B. Nerlove (Eds.), *Multidimensional scaling* (Vol. 1). New York: Seminar.
- Low, B. S., & Heinen, J. T. (1993). Population, resources, and environment: Implications of human behavioral ecology for conservation. *Population and Environment, 15*, 7-41.
- Macey, S. M., & Brown, M. A. (1983). Residential energy conservation: The role of past experience in repetitive household behavior. *Environment and Behavior, 15*, 123-141.
- Merchant, C. (1992). *Radical ecology: The search for a livable world*. New York: Routledge.
- Milbrath, L. (1984). *Environmentalists: Vanguard for a new society*. Albany: State University of New York Press.
- Milbrath, L. (1993). Redefining the good life in a sustainable society. *Environmental Value, 2*, 261-269.
- Nunnally, J. C. (1978). *Psychometric theory*. New York: McGraw-Hill.
- Oskamp, S., Harrington, M. J., Edwards, T. C., Sherwood, D. L., Okuda, S. M., & Swanson, D. C. (1991). Factors influencing household recycling behavior. *Environment and Behavior, 23*, 494-519.
- Pardini, A. U., & Katzev, R. D. (1983-1984). The effects of strength of commitment on newspaper recycling. *Journal of Environmental Systems, 13*, 245-254.

- Pearce, J. L. (1983). Job attitude and motivation differences between volunteers and employees from comparable organizations. *Journal of Applied Psychology, 68*, 646-652.
- Pearce, J. L. (1987). Making sense of volunteer motivation: The sufficiency of justification hypothesis. In R. M. Steers & L. W. Porter (Eds.), *Motivation and work behavior*. New York: McGraw-Hill.
- Reichel, D. A., & Geller, E. S. (1981). Applications of behavioral analysis for conserving transportation energy. In A. Baum & J. E. Singer (Eds.), *Advances in environmental psychology* (Vol. 3). Hillsdale, NJ: Lawrence Erlbaum.
- Rokeach, M. (1968). *Beliefs, attitudes, and values*. San Francisco, CA: Jossey-Bass.
- Rokeach, M. (1973). *The nature of human values*. New York: Free Press.
- Rotter, J. B. (1990). Internal versus external control of reinforcement: A case history of a variable. *American Psychologist, 45*, 489-493.
- Rotter, J. B. (1992). Cognates of personal control: Locus of control, self-efficacy, and exploratory style (Comment). *Applied and Preventive Psychology, 1*, 127-129.
- Schwartz, S. H. (1970). Moral decision making and behavior. In J. Macauley & L. Berkowitz (Eds.), *Altruism and helping behavior*. New York: Academic Press.
- Schwartz, S. H. (1977). Normative influences on altruism. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 10). New York: Academic Press.
- Seligman, C., Becker, L., & Darley, J. (1981). Encouraging residential energy conservation through feedback. In A. Baum & J. E. Singer (Eds.), *Advances in environmental psychology* (Vol. 3). Hillsdale, NJ: Lawrence Erlbaum.
- Simmons, D., & Widmar, R. (1990). Motivations and barriers to recycling: Toward a strategy for public education. *Journal of Environmental Education, 22*, 13-18.
- Singer, P. (1995). *How are we to live?: Ethics in an age of self-interest*. Amherst, NY: Prometheus Books.
- Stem, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues, 50*, 65-84.
- Stem, P. C., Dietz, T., & Black, J. S. (1985-1986). Support for environmental protection: The role of moral norms. *Population and Environment, 8*, 204-222.
- Stem, P. C., Dietz, T., & Kalof, L. (1993). Value orientations, gender, and environmental concern. *Environment and Behavior, 25*, 322-348.
- Stem, P. C., & Gardner, G. T. (1981). Psychological research and energy policy. *American Psychologist, 36*, 329-342.
- Thompson, S.C.G., & Barton, M. A. (1994). Ecocentric and anthropocentric attitudes toward the environment. *Journal of Environmental Psychology, 14*, 149-157.
- Van Houten, R., Nau, P. A., & Merrigan, M. (1981). Reducing elevator energy use: A comparison of posted feedback and reduced elevator convenience. *Journal of Applied Behavior Analysis, 14*, 377-387.
- Van Liere, K. D., & Dunlap, R. E. (1978). Moral norms and environmental behavior: An application of Schwartz's norm-activation model to yard burning. *Journal of Applied Social Psychology, 8*, 174-188.
- Vining, J., & Ebreo, A. (1989). An evaluation of the public response to a community recycling education program. *Society and Natural Resources, 2*, 23-36.
- Vining, J., & Ebreo, A. (1990). What makes a recycler?: A comparison of recyclers and non-recyclers. *Environment and Behavior, 22*, 55-73.
- Vining, J., & Ebreo, A. (1992). Predicting recycling behavior from global and specific environmental attitudes and changes in recycling opportunities. *Journal of Applied Social Psychology, 22*, 1580-1607.

- Vining, J., Linn, N., & Burdge, R. J. (1992). Why recycle?: A comparison of recycling motivations in four communities. *Environmental Management, 16*, 785-797.
- Wandersman, A. (1979). User participation: A study of types of participation, effects, mediators, and individual differences. *Environment and Behavior, 11*, 185-208.
- Wang, T. H., & Katzev, R. D. (1990). Group commitment and resource conservation: Two field experiments on promoting recycling. *Journal of Applied Social Psychology, 20*, 265-275.
- Weigel, R., & Amsterdam, J. (1976). The effects of behavior relevant information of attitude-behavior consistency. *Journal of Social Psychology, 98*, 247-251.
- White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review, 66*, 313-324.