

SOME PSYCHOLOGICAL ASPECTS OF RECYCLING

The Structure of Conservation Satisfaction

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ABSTRACT: This article focuses on satisfactions derived from the recycling of household solid waste materials. Data from 107 respondents to a mail-back questionnaire were subjected to dimensional analysis and analysis of variance. The results indicate that people derive a series of separate and distinct satisfactions from both recycling and reusing materials. The satisfactions were quite specific, involving, for example, frugality and participation. These findings suggest that our understanding of why people bother to conserve resources may be improved by investigating the personal satisfactions derived from conservation activities.

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Americans discard three to five pounds of trash every day, amounting to some three tons per year for the average household. In 1971 over 125 million tons of solid waste were discarded; by 1980 this figure had reached almost 150 million tons; and projections indicate that by 1990 it will top 200 million tons. Even more incredible than the amount of waste generated is the anticipated rate of growth. Since the 1920s the amount of solid waste has increased about five times as rapidly as the population (Melosi, 1981). By any standard this is an unjustified amount of waste. To cope with this problem, we spend an enormous amount of money. Solid waste management represents a major tax burden for almost every urban area. In many cities it is surpassed only by costs for schools and roads. Americans spent one billion dollars in 1960 to collect and dispose of wastes. By 1980 this had risen to over four billion dollars, and by the end of 1985 the figure was expected to reach six billion dollars (Purcell, 1980).

What these costs do not reflect is that the current disposal practice of land filling is quickly becoming a politically unacceptable option. Siting new landfills and expanding old ones have become an almost impossible task. Nothing can get the public aroused quite as effectively as mentioning that a sanitary landfill may be sited near their backyards. And yet there are no new solid waste management strategies ready to replace sanitary land filling. In fact, many of the primitive methods, especially open dumping, still dominate in many rural communities. One option receiving attention during the past decade was at-source separation and recycling of household waste—a low technology strategy for reducing the need for new landfills. Although recycling offers a technically feasible and often cost-effective solution to the solid waste management problem, its rate of adoption has been disappointing. As a result, motivational aspects of conservation have been explored in an effort to learn how to encourage more people to recycle.

MOTIVATION

A large number of studies addressed to the issue of conserving resources have applied a behavioral framework that tends to promote the use of external justification for behavior (Katzev and Johnson, 1983). Geller and associates (1982: 151) suggest that "indeed, most of the behavioral studies have demonstrated that a cost-effective recycling program requires some sort of incentive to encourage participation." Much behavioral research on conservation and just about all recycling programs have emphasized the use of extrinsic incentives.

EXTRINSIC INCENTIVES

The use of extrinsic incentives can include both the purchase of source-separated materials from the public (e.g., the purchase of used aluminum beverage containers by aluminum manufacturers) and the provision of rewards for undertaking the behavior. Jacobs and Bailey (1982-1983) reported on the effectiveness of a monetary reward in increasing participation in a residential newspaper recycling program. And Luyben and Cummings (1981-1982) found that the combination of a prompt, lottery, and contest was more effective in promoting beverage container recycling than a baseline treatment using only the prompt and convenient recycling containers. Of course, extrinsic incentives are not limited to money. Cook and Berrenberg (1981) report on the use of such extrinsic incentives and disincentives as increased or decreased comfort or convenience, and social approval or disapproval (see also Nielsen and Ellington, 1983).

Extrinsic incentives generally are successful at promoting a desired behavior. However, they are not without their limitations. For instance, studies have found that the desired behavior is usually maintained only as long as the incentive is in effect (Katzev and Johnson, 1983). In their

study of paper recycling, Witmer and Geller (1976) reported that after removal of the extrinsic incentives, there was an immediate return to baseline levels. Clearly, difficulties can sometimes arise when using extrinsic incentives to promote *long-term, enduring* changes in behavior. These difficulties can be further complicated by occasional failures in cost effectiveness.

Whereas several studies have suggested that monetary incentives are a cost-effective way of encouraging households to recycle (see Cone and Hayes, 1980; Geller et al., 1982), other studies have failed to demonstrate this claim. In a thorough cost-benefit analysis of a residential recycling program, Jacobs and Bailey (1982-1983) found that none of their four strategies to increase participation (prompting, payment for material, a lottery, or increased frequency of collection) produced enough revenues from the sale of collected materials to pay for the cost of the strategies. Another study found that the strategies that produced the greatest degree of participation were not always cost-effective (Jacobs et al., 1984). Similar findings can be noted in energy conservation research where the value of the incentives has sometimes exceeded the value of the energy saved (McClelland and Canter, 1981; Newsom and Makranczy, 1978).

SATISFACTIONS AND INTRINSIC MOTIVATION

A possible alternative to the use of extrinsic incentives is to consider the role of intrinsic motivation. Research on motivation has revealed that a good deal of human behavior is not explained in terms of anticipated goals or extrinsic rewards, but rather in terms of goals and rewards that arise out of active participation in an ongoing activity (see Deci, 1975; Deci and Ryan, 1985; Eckblad, 1981; Lepper and Greene, 1978). In a recent study of newspaper recycling, Pardini and Katzev (1983-1984: 251) speculated about why their use of a moderate form of external inducement

(participants were asked either to give a verbal commitment to recycle or to sign a legally nonbinding commitment statement) was able to maintain recycling behavior when “virtually all attempts to sustain recycling behavior under incentive-based programs have traditionally been characterized by an abrupt cessation of recycling once the external incentive is withdrawn.” They suggest that the participants, by virtue of their commitment to carry out 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” (p. 253). In another study of resource conservation, De Young (1985-1986) has reported a close association between derived satisfactions and intrinsic motivation. The study reported here explores the structure of satisfactions people derive from behaving in an environmentally responsible manner.

METHODS

PARTICIPANTS AND SETTING

For over 7 years, Ann Arbor, Michigan, has had a monthly curbside collection program. This curbside collection service, referred to as Recycle Ann Arbor, has gone through several expansions of its service area and is currently available citywide. This study focused on three adjacent but demographically distinct areas of Ann Arbor consisting mostly of single family homes. Recycle Ann Arbor had indicated that these areas would be included in their next stage of expansion several months before this study began. The residents of these three service areas were surveyed before they had gained any firsthand experience with curbside recycling. The intent was to assess satisfactions derived from recycling activities that the residents were already

carrying out (i.e., activities less convenient and less visible than the curbside collection service).

In all, 300 questionnaires were distributed to randomly selected, single-family homes, 100 in each area. Of the questionnaires, 112 were returned, although 5 of these were incomplete. Thus the 107 questionnaires included in the data analysis represent a return rate of 35.7%. This is a low but reasonable return rate given the mail-back, no follow-up nature of the data collection procedure (Kerlinger, 1973).

The community studied is a university town (about half of Ann Arbor's 100,000 population is associated with the university—students, faculty, or staff), and the residents tend to have more formal education and more residential stability than the national average (based on findings of the 1980 census and a 1980 Ann Arbor City Planning Department Household Survey). In these and certain other respects, the sample may not be fully representative of the general public. Based on the demographic data from the survey, approximately 69% of the respondents were women. About 12% of the sample were under 30 years old, 58% were in their 30s or 40s, 14% were in their 50s, and 16% were 60 or older. Over 75% of the sample had at least a bachelor's degree. With respect to income, about 23% reported earning less than \$20,000, about 60% reported incomes of between \$20,000 and \$50,000, and 17% reported making over \$50,000. The respondents were mainly long-time residents with over 45% having lived in Ann Arbor for more than 20 years. The average household size was reported as 2.9 people and a vast majority (81%) described their households as "more than one person where all are related."

THE SURVEY INSTRUMENT

The survey instrument included a two-page questionnaire and a postage-paid return envelope. A short introduction to the survey was given at the top of the questionnaire and

respondents were provided with a phone number to call if they had any questions.¹

The questionnaire focused on satisfactions and conservation behaviors. All items other than a series of background questions used a 5-point rating scale. The 18 satisfaction items covered satisfaction gained from avoiding waste, recycling, repairing, and saving things. Also included were questions on satisfaction from becoming more self-sufficient, having a chance to participate, being a member of an affluent society, and so forth. Included among the 21 behavior items were such activities as recycling, reusing, and saving material. Additional items dealt with the purchase of secondhand goods, making things for the family, and so on. A number of the behavior items were drawn from a Leonard-Barton (1981) study of voluntary simplicity behavior.

DATA ANALYSIS PROCEDURE

The data analysis procedure involved two separate steps. First, the two distinct sets of questionnaire items (satisfactions and behaviors) were processed through dimensional analysis and stable categories were identified. In the second step, the relationships among the sets of categories were investigated.

Categories were identified using both a nonmetric factor analysis program (Guttman-Lingoes Smallest Space Analysis III; see Lingoes, 1972) and the ICLUST Hierarchical Cluster Analysis program developed by Kulik and associates (1970). The rationale for using these techniques and their advantages are discussed in Kaplan (1972, 1975a). Coming to terms with the output of two different algorithms requires guidelines for how one settles on categories. Kaplan (1975b) addresses these issues, listing three criteria that have been followed in this study. Briefly, the criteria specify that: (1) any particular item should be included in no more than one category; (2) each category should "hang together" statistically (Cronbach's coefficient of internal consistency [α];² see Cronbach, 1951; Nunnally, 1978);

and (3) the categories should be meaningful to the researcher. If the categories are not interpretable, it may well be an indication that the constructs in the study were not well measured.

After running the SSA-III and ICLUST programs on each set of questionnaire items, the results of both programs were compared and final categories selected. In general, the ICLUST results were used to get a rough idea of the contents of categories, with the SSA-III results being used in the final selection of categories. To achieve these objectives and to enhance consistency, the following series of guidelines was established:

- (1) In ICLUST, select clusters of items with alpha values of at least 0.60 and an average correlation among items of at least 0.40.
- (2) In SSA-III, select all categories with roots (eigenvalues) of at least 1.0.
- (3) Choose items for each category that have loadings of at least 0.40 and that do not load above this level on any other category.

By this procedure, four satisfaction categories and two behavior categories were identified. Following the identification of the categories, scales were constructed for each by calculating the average of the ratings given by each respondent to all the separate items within each category. This resulted in a single score on each category for each respondent.

RESULTS AND DISCUSSION

The four satisfaction scales, along with the specific items included in each, are presented in Table 1. The low intercorrelations among these scales (between $-.01$ and $.37$) indicate that they reflected relatively independent aspects of satisfaction.

The satisfaction from Frugality—defined as the careful use of resources and the avoidance of waste—can easily be

applied to daily living, involving such things as what items we purchase, what activities we undertake, and how we dispose of our wastes. In America, frugality and hard work have been hallmarks of our culture since our colonial days. Whereas we are regularly reminded that such simple values build character, the respondents seem to go beyond the utilitarian nature of frugality to suggest it also provides reward and fulfillment.

Self-sufficiency and self-reliance are concepts that have grown as people have come to view the economy as precarious and large systems as vulnerable (Nicholls, 1981). Nicholls views the movement toward self-sufficiency as a matter of necessity for many. Whether it is a necessity or a matter of voluntary choice, the respondents indicated that finding ways to manage for one's self can be a satisfying activity.

The idea that humans did not evolve as passive beings, willing to accept solutions from kindly others, but rather as active, knowledge-generating and knowledge-utilizing creatures has gained wide support (Kaplan and Kaplan, 1982). The sense of being needed, of having a chance to influence how things are decided, is not a luxury but a necessary part of our psychological well-being. The chance for Partici-

TABLE 1
Satisfaction Scales

	MEAN	S.D.	ALPHA (a)
SATISFACTION FROM FRUGALITY: Finding ways to avoid waste Repairing things rather than discarding Saving items I may need someday	3.86	.91	.78
SATISFACTION FROM SELF-SUFFICIENCY: Finding new ways to become self-sufficient Rediscovering ways people used to do things	3.73	1.03	.76
SATISFACTION FROM PARTICIPATION: A chance to do things that make a difference Participation in activities involving the community Participation in bringing sense/order to world	3.54	.91	.74
SATISFACTION FROM LUXURIES: Being a citizen of the richest country Having luxuries of civilized society	3.69	.98	.58

a. Cronbach's coefficient alpha (1951).

pation, to be involved, is viewed by the respondents as satisfying.

A final category emerged from the dimensional analysis that will be referred to as satisfaction from Luxuries. Focusing on the pleasure gained from having the conveniences of our modern society, this category would seem to reflect the satisfaction people feel in being members of the affluent and participating in the good life. In one sense satisfaction gained from Luxuries might be considered the direct opposite of the other satisfactions. Yet all four satisfaction scales have similar mean scores. The Luxuries scale is uncorrelated with each of the other scales and thus not the antithesis of satisfaction from Frugality, Self-sufficiency, or Participation.

The two behavior scales are described in Table 2. The correlation between these behavior scales is .29, supporting their relative independence. Recycling and reusing activities, although both forms of ecologically responsible behavior, are interesting in their differences. Recycling involves a link between the household and the community because it involves a community-scale organization—if only to store the collected materials prior to sale. In contrast, reusing is centered within the household, involving a form of direct at-the-source recycling. Some people support reuse over recycling because recycling requires manufacturing energies and produces wastes of its own, whereas reuse does not (Purcell, 1980).

Although recycling has no direct effect on a household's purchase of new goods, reusing behavior can reduce marketplace consumption. For this reason reuse is considered a component of source-reduction—a reduction in the total amount of waste materials leaving the home either as trash or recyclables. Melosi (1981) reports that the Environmental Protection Agency considers source-reduction to be a radical concept and quotes a glass industry spokesman as saying source-reduction is an obstruction to progress. The American life-style has been characterized as one of

TABLE 2
Behavior Scales

	MEAN	S. D.	ALPHA
RECYCLER: Contribute to ecologically oriented group Use Ecology Center recycling station Recycle newspaper Recycle glass jars and bottles	3.05	1.16	.74
REUSER: Reuse old cloth as rags or drop cloth Save food containers to store things in Save wood, glass, etc. from household projects Reuse aluminum foil in the kitchen	3.93	.80	.64

conspicuous consumption; yet the respondents report a significantly higher mean score on the Reuser scale than on the Recycler scale ($t = 7.52$, $df = 105$, $p < .001$).

RELATIONSHIP BETWEEN BEHAVIOR AND SATISFACTION SCALES

In an effort to understand the data better, relationships between the satisfaction scales and behavior scales were analyzed. In preparation for performing these analyses, scores for each behavior scale were divided into a number of distinct categories. When the distribution of values displayed sufficient variance, three levels of a behavior scale were created (high, medium, and low scores on that scale) and analysis of variance was used to investigate relationships between that behavior scale and the satisfaction scales. In cases in which there was insufficient variance, the Student t-test was performed using two categories. In dividing the scores on a scale into subcategories, an attempt was made to include roughly equal numbers of respondents per subgroup.³

None of the items in the satisfaction scales makes direct mention of the word "recycling" (see Table 1). Nevertheless, one might expect the various kinds of satisfaction to be related meaningfully to conservation behavior in general. Each aspect has a distinct focus: Satisfaction

gained from Frugality is not an activity-neutral satisfaction, but a satisfaction derived from the prudent use of resources. One would expect behaviors that avoid waste and involve the efficient use of resources to show a positive relationship with the satisfaction from the Frugality scale. Analysis of the relationships did, in fact, show that both the Recycler and the Reuser scales were positively associated with satisfaction from Frugality ($F = 6.44$, $df = 2$, 104 , $p < .005$ and $F = 15.37$, $df = 2$, 104 , $p < .0001$, respectively).

A relationship between the Recycler and Participation scales also existed ($F = 4.51$, $df = 2$, 102 , $p < .02$). Source-separation recycling is an activity that demands a good deal of involvement on the part of the individual. With regard to this required involvement, recycling is sometimes portrayed as a primitive, time-consuming, and inconvenient behavior—hardly an appropriate behavior for a technologically advanced society. Yet, people gain satisfaction from acting in ways that make a difference and from helping to bring order to the world. And these are satisfactions that can be derived from a conservation behavior such as recycling. For some people, the possibility of deriving such satisfactions may be a more salient aspect of recycling than its inconvenience.

CONCLUSION

Prior research has taught us very little about the sources of satisfaction gained during people's daily pursuits. A major finding of the research reported here is the structure of satisfactions derived from everyday activities. These satisfactions are distinct and specific: Frugality—the avoidance of wasteful practices; Participation in activities that can make a difference in the long run; and Luxuries—having access to the material benefits afforded by our society.

That people would relate satisfaction derived from frugal activities with recycling and reusing behavior seems an innocent and perhaps obvious finding. Yet on reflection this suggests that people might carry out conservation behavior not for the promise of a tangible external reward but for the personal satisfaction they derive from the activity.

Although the satisfaction from Luxuries was a coherent and independent component of satisfaction, it was generally uncorrelated with the other satisfaction scales. In other words, it is not contradictory to derive satisfaction both from Frugality and Luxuries. This suggests the possibility that environmentally appropriate behavior may be made to appeal to a broad cross-section of Americans rather than just to people of a Spartan nature.

People seem able to derive considerable satisfaction from the very activities that others try so hard to encourage them to do. This finding is heartening. The idea of getting by with less can easily be characterized as a form of sacrifice. Yet the study reported here suggests that conservation can also be perceived as contributing to one's sense of satisfaction.

NOTES

1. A copy of the questionnaire is available by writing to the author at 170 Dana Building, School of Natural Resources, University of Michigan, Ann Arbor, MI 48109-1115.

2. The coefficient alpha reflects the degree to which a collection of items "hangs together." Because items that group together can be thought of as alternate measures of some abstract construct, the alpha value can be thought of as a rough measure of construct validity (Nunnally, 1978).

3. The self-report data collection procedure was the source of both the independent and the dependent variables. The logic of the assumed causal relationship between behaviors and satisfactions is based on conservation behaviors being antecedents to any *derived* satisfactions.

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