

CONSERVATION-WISE CONSUMERS: RECYCLING AND HOUSEHOLD SHOPPING AS ECOLOGICAL BEHAVIOR*

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ABSTRACT

This study examines environmentally-responsible consumerism, its relation to self-reported recycling behavior, and the influence of experience with solid waste management issues and of the sociopolitical environment surrounding waste management on consumers' beliefs. A mail survey of 654 randomly selected adults living in rural and urban communities in central Illinois assessed their participation in recycling programs and reactions to attributes of consumer products said to have favorable environmental consequences. Respondents rated the importance of fourteen product attributes. These ratings were then correlated with the respondents' self-reported recycling behaviors. The results showed the public does attend to the environmental consequences of its purchases. Recycling behaviors and environmentally-responsible consumerism were related, although weakly, and seem to be connected to the public's view of the conservation of natural resources. Contrary to expectations, the reactions of rural and urban residents did not differ, indicating that the recycling experiences and solid waste management policy experiences of these residents did not influence their reactions.

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For quite some time, researchers have examined the role of individuals in the conservation of natural resources. Curtailment of the amount of solid waste disposed in the nation's landfills, preservation of water quality, reduction of energy consumption, and encouragement of frugal lifestyles are examples of areas in which psychological insight into the nature of individual behavior is potentially useful. Unfortunately, environmental problems have often been conceptualized by "hard" scientists such as chemists and biologists as technical problems requiring technical solutions, while the social and psychological aspects of these problems have been largely overlooked.

Psychological theory and methods can contribute to knowledge in these topic areas by elucidating the factors that facilitate behaviors of persons who are seen as having a vital impact on the environmental problem. Stern and Oskamp [1] describe the major types of persons and actions that are instrumental in the formulation of psychological solutions to environmental problems. The major categories of actors include policymakers, intermediaries such as engineers who develop the practical means by which policies are carried out, producers of goods and services, and individual consumers. In terms of ameliorative actions, Stern and Oskamp propose that preventive measures are more economical and timely than curative ones. For example, solid waste is likely to be reduced more by the marketing of products in returnable or reusable containers than by reprocessing recyclable containers. Preventive measures such as this illustrate the importance of individual consumer choices as well as the role of business and industry. Few researchers to date, however, have examined consumer household behavior (other than recycling) and its relation to solid waste management. The number of studies that have examined the associations between environmentally-responsible consumption behavior and other household conservation behaviors practiced in a household is even smaller.

In the present research we examine possible linkages between household recycling, community solid waste infrastructure, and one aspect of environmentally-responsible consumer behavior. Within the confines of this research, environmentally-responsible consumer behavior is defined as actions consumers take that result in the purchase and use of goods thought to have beneficial or less harmful effects on the environment than other comparable products. Of particular interest to us were the relationships between the availability of recycling opportunities in the community, awareness of issues related to environmentally-responsible consumerism, and consumers' beliefs about environment-related attributes of products.

Management of solid waste has increasingly become difficult as citizen opposition to landfilling and incineration has mounted. In response to the public's concerns about these technical solutions to the solid waste problem many communities are exploring the hierarchy of alternatives presented by the United States Environmental Protection Agency (EPA). Given that past research [2] has indicated a connection between recycling and source reduction, we elected to

incorporate these alternatives in the present study. In addition, recycling and source reduction occupy different places in the EPA's solid waste management hierarchy.

Landfilling and incineration occupy lower places on the hierarchy of alternatives. As mentioned above, these technology-based solutions to solid waste management are the least desired by the general public. The second-ranking alternative, recycling, has come to be widely accepted by the public; even without added financial incentives people continue participating in recycling programs. The effectiveness of recycling is limited, however, by the availability of markets for recyclable materials. Ironically, the success of recycling programs is linked to the demise and financial instability of these programs. Dramatic increases in the volume of materials recycled results in a saturated market, which in turn leads to lower prices for the materials. Recycling also is constrained by the technology that is available for reprocessing materials into a new or reusable form. Materials that are not recyclable still enter the waste stream.

Source reduction, the highest alternative in the hierarchy, refers to any means by which the total amount of waste generated is decreased (i.e., materials are prevented from entering the waste stream altogether). Examples of source reduction are the marketing of products without excessive packaging and the provision of goods in bulk quantities.

Recycling and source reduction have some common characteristics. Both are dependent on the behavior of individual consumers. Consumers decide whether or not to participate in recycling programs and what materials they are willing to store and prepare for recycling. Consumers decide whether or not they will purchase products that conserve resources in some way, or if they will buy products sold in large quantities rather than buying smaller portions. Both recycling and source reduction as solid waste management alternatives are not as dependent upon technology, and thus do not engender the same sort of objections in members of the general public that incineration and landfilling do.

Despite these commonalities it would be erroneous to assume that the factors that facilitate individual participation in recycling activities would be similar to those factors that promote environmentally-responsible consumerism. Previous comparative research on conservation behaviors has generally revealed that various conservation behaviors have different antecedents, and that researchers should attend to these specific antecedents when the goal of their research is to recommend policy, design model programs or improve existing programs.

Our purpose in the present research was to explore the possible connections between recycling behavior and environmentally-responsible consumer behavior. In particular we were interested in examining consumers' beliefs about the environmentally-related attributes of consumer goods. We investigated two mechanisms through which consumer beliefs might be influenced. First, we investigated the role of experience with solid waste issues as means of affecting consumer beliefs, and second we explored the influence of the political

environment in which consumers make their individual decisions on the same phenomena.

CONSERVATION BEHAVIOR AND EXPERIENCE WITH SOLID WASTE ISSUES

The role of direct and indirect experience with recycling, environmentally-responsible purchasing, and other issues related to solid waste management cannot be understated. Direct experience is gained through individual performance of a behavior or class of behaviors, while indirect or vicarious experience can be gained through observation of others' behavior or through other means of gaining knowledge (e.g., media).

There is a body of literature on the relationship between the initial performance of specific behaviors and their continued performance over time. Research embodying the behavioral analysis paradigm has indicated that novel behaviors can be elicited when favorable conditions exist. Research along slightly different lines has shown, however, that behaviors are difficult to maintain when the favorable conditions are removed. The provision of monetary incentives and the presence of behavioral prompts are two of the factors found to facilitate conservation behavior. Research conducted in various conservation domains, such as energy conservation (e.g., Ester and Winnett [3]), litter control (e.g., Geller [4]), and water conservation (Geller et al. [5]) has shown that, in general, information in the form of prompts and other short messages has limited impact on individual behavior, unless the information is made salient and is quite specific to the desired behavior. Although prompts often result in immediate increases in conservation behavior, they are not useful in maintaining long-term behavioral changes; behaviors return to their baseline level once the prompts no longer exist.

Other research involving the provision of information, following persuasive communication and educational paradigms, has demonstrated the practicality of indirect informational influences on individual conservation behavior. Methods explored within these paradigms are viewed as indirect because they exert influence on behavior through their effects on intervening psychological variables such as beliefs and attitudes rather than by directly affecting behavior.

The connection between adequate knowledge and awareness and the performance of environmentally-responsible behavior has been confirmed by several studies, conducted in different conservation domains. Heslop, Moran, and Cousineau, in a study of energy conservation, found that consumption was related to the amount of information people had about the different ways to save household energy [6]. In research more pertinent to the topic at hand, knowledge of the logistics of recycling has been shown to be a major predictor of people's participation in recycling programs [7-10]. In a previous study, a recycling educational campaign was shown to have a significant influence on people's knowledge, motives, and behavior [11]. Burns and Oskamp showed that participation in

a recycling program increased when residents received a flyer that encouraged them to recycle by listing the advantages of this behavior [12].

Other research supports the idea that behavior can be influenced through social means. Hopper and Nielsen, for instance, found that personal contact with another person had an added effect on recycling behavior above that predicted by provision of information alone [13]. This latter result suggests that the sources from which people receive information about conservation-related behaviors are important not only as mere transmitters of information, but as sources of reinforcement for socially approved behaviors as well.

Studies of recycling behavior as a subcategory of conservation behavior have shown that participation in recycling can be influenced by techniques directly and indirectly targeting the behavior of individuals. These techniques range from the provision of information to the modeling of the target behavior to the application of monetary rewards. The experience gained from direct performance of recycling activities and the observation of other persons conducting such activities is not the only means by which behaviors can be influenced; people can receive information and direction from the sociopolitical environment in which they live.

CONSERVATION BEHAVIOR AND THE SURROUNDING POLITICAL ENVIRONMENT

In this section we discuss how the political environment surrounding consumers can affect their preferences and choices. Stern and Oskamp argue that enormous potential for resource conservation exists outside of the realm of the individual actor [1]. Public policies can restrict the development and implementation of government programs, the development of technologies by engineers, scientists, and other intermediaries, and the marketing of goods by businesses. However, few psychological studies of the effects of public policy and government-level actions on environmentally-related consumer behavior have been made.

Psychological research on the role of public policy can contribute to resource conservation in many ways. For example, results from psychological studies can be used to suggest the best ways to disseminate information to the public or to suggest whether or not incentives should be given to consumers who engage in conservation behavior.

The present study examines the role of solid waste management policies, as represented in the community's solid waste infrastructure, on the public's beliefs about environmental consumerism. Although members of the public can hold favorable attitudes toward the environment, environmental consumerism, or specific pro-environmental actions, that alone is not enough to motivate people to engage in activity that is consistent with these attitudes. People also need to have opportunities to engage in appropriate behavior and to be aware that these opportunities exist.

The existing community management infrastructure for solid waste also influences people's motivation to recycle and undertake other forms of conservation behavior. The amount of time, effort, and money that a governing body spends deliberating upon and carrying out solid waste plans can be one sign of the priority the community accords to solid waste management. More expedient, perhaps shorter-term, alternatives may be offered as solutions to the solid waste problem in instances where solid waste is not considered to be a serious problem. This attitude is easily communicated to residents of the community, who in turn may also decide that they do not need to make efforts to curtail waste on an individual basis, inasmuch as their local government does not view waste as a problem of immediate concern.

In many ways, the solid waste management policies that are adopted and implemented serve a symbolic function, in that they are the means by which local government entities embody and communicate their views of the public's role in waste management. To illustrate, compare the use of technological solutions to waste management (e.g., waste recovery stations) with industrial solutions (e.g., regulating business practices) and personal solutions (e.g., mandatory curbside recycling programs). A community that adopts personal solutions over technological and industrial solutions is stating that the public should have a clear role in the reduction of waste, while a community that adopts technological solutions over the others is stating that regulating the behavior of individuals and the operations of private businesses are comparatively ineffective means of reducing waste. In communities where personal solutions are not considered to be viable alternatives and this belief is evident in the implementation of policies, members of the public can quickly conclude that their direct involvement is not valued, and hence may be less motivated to act in environmentally-responsible ways.

Evidence for or against these assertions is limited. In a study of motivational differences in four communities varying in the type of recycling opportunities that were available to residents, Vining, Linn, and Burdge found that these differences in solid waste infrastructure were not useful in predicting variations in motivation exhibited by residents of the different communities [14]. This study did lend partial support to our assertion that available opportunities affect motivation, in that the actual motivational structure of the residents in each community differed.

ENVIRONMENTALLY-RESPONSIBLE CONSUMER BEHAVIOR

There is a dearth of research connecting community solid waste infrastructure with consumer willingness to engage in source reduction behavior. Source reduction as a whole has not yet received extensive attention in the psychological research literature. The majority of studies that exist focus on a limited set of consumer opinions and behaviors (e.g., reactions to "bottle" bills) or on describing

the relationship between a small number of source reduction behaviors and equally small numbers of recycling or other conservation behavior.

Tracy and Oskamp, for example, studied obtained correlations between fifteen different ecologically responsible behaviors, of which three pertained to consumer behavior and three pertained to recycling [2]. They found a good degree of internal consistency among the consumer behaviors and the recycling behaviors, indicating that these behaviors can be combined into separate conceptual categories. Their results also showed that no single general conservation construct sufficiently summarized all of the categories. Tracy and Oskamp did find that some of the consumer behaviors were related to glass recycling, lending some support to the idea that recycling and environmentally responsible consumer behaviors are related in some way.

While useful, studies such as Tracy and Oskamp do not yield much information as to the interrelatedness of several source reduction behaviors or the relation of these behaviors to a large set of recycling behaviors [2]. In fact, these authors and others note that generalization about conservation behavior from the examination of a single behavior or single set of behaviors is misleading. Additional work needs to focus on detailed descriptions of subcategories of behavior.

As stated earlier, another area in which the current literature on environmentally responsible consumer behavior is lacking is investigation of the role of the socio-political environment on people's knowledge, opinions, and behavior. The literature on bottle bills represents one area in which the relation between solid waste policy and the environmental consequences of source reduction behavior have been described. These bills consist of state and local ordinances that require soda and beer containers be returned to supermarkets and other places of purchase for a deposit. Soda and beer containers consist of glass/plastic bottles or aluminum/bimetal cans, which are recyclable or reusable. Overall, evaluation studies of bottle bills reveal that this type of legislation has beneficial effects not only for the environment but also increases employment in the community where the law is enacted (e.g., [15]).

The purchase of beverages that are packaged in recyclable or reusable containers is only one form of environmental consumerism. It appears however, that the public is not as knowledgeable about these forms of environmentally-responsible consumer behavior as it is about the logistics of recycling and energy conservation. As a result of extensive educational efforts and public information campaigns in national and local media, most people are familiar with household recycling; they know what materials are recyclable, how to prepare and store them, and where to take them. By comparison, even though ecological marketing is not a new phenomenon, people are less familiar with the details of environmentally-responsible consumption, perhaps due to the vast array of products that currently are on the market. It has been noted elsewhere that consumers seem ready and willing to purchase products that are thought to be ecologically sound [16]. Yet, even though people say that they are willing to

become environmentally concerned consumers, they often do not shop in an environmentally responsible manner.

In a recent survey of households, Linn, Vining, and Feeley found that while 90 percent of their respondents said they recycled at home, only 60 percent said that they buy products that benefit the environment [17]. Clearly, the respondents in this study felt some concern for the environment, and that concern was reflected in their readiness to prepare and store recyclable materials. Why was it then that their positive attitudes toward the environment were not also reflected in their purchasing behavior? Other information collected in the study provides a possible explanation; consumers do not know how to shop in an environmentally responsible way. When asked to name some examples of environmentally friendly and unfriendly products, few of Linn et al.'s respondents could do so, thus indicating that people might not be well-informed about the environmental implications of different product attributes or about the attributes of specific products. Alternatively, environment-related product attributes may not be salient to consumers when they are making their purchase selections, or perhaps these attributes are not important to consumers. The present study investigates the latter possibility by examining the importance consumers place on various product attributes.

The present study was also designed to describe in more detail the relationship between self-reported recycling behavior and environmentally responsible consumer behavior. Intuitively, one might expect these behaviors to represent different subcategories of a larger behavioral category of ecological behaviors. However, past research indicates that subcategories of ecological behavior do not necessarily exhibit high degrees of interrelatedness and that a single underlying dimension of "conservationism" does not exist [2]. Tracy and Oskamp found that behaviors within the recycling and consuming subcategories were significantly correlated with each other, lending credence to the existence of these subcategories. In addition, they found that one recycling behavior, saving glass containers, was significantly correlated with avoiding purchase of aerosol containers and buying low-phosphate detergent. We decided to include a larger number of concepts in the present study to further explore the relationships between these behavioral subcategories.

RESEARCH OVERVIEW

We capitalized upon existing differences in the availability of recycling opportunities and exposure to issues related to environmentally-concerned consumption to study the effects of experience with solid waste, recycling, and source reduction issues on the perceived importance of environment-related product attributes. The naturally occurring differences were ascertained by obtaining two samples of households, one consisting of primarily urban residents of a medium-sized Midwestern community and another consisting of mostly rural residents of the surrounding area. Urban residents in the sample differed from the rural residents in

that they had better access to convenient recycling services, primarily due to the existence of curbside recycling programs. Table 1 summarizes the differences in recycling opportunities between the cities and the outlying areas. As can be seen in Table 1, rural residents had limited opportunities to recycle. The smaller size of these communities and the accompanying small tax base made curbside programs economically less feasible. The primary recycling opportunity offered to rural residents consisted of the Hometown recycling program, a series of local, mobile dropoff sites located in some of the communities. Materials collected through this program were transported by truck every few weeks to a not-for-profit organization that processed and then marketed recyclable materials and operated programs designed to educate citizens about recycling and other forms of source reduction.

In addition, urban residents could be considered to have greater exposure to issues related to environmentally-responsible consumer behavior, due to a product tagging program implemented in a local chain of supermarkets. None of the stores in the same supermarket chain that were located in the rural areas participated in this project. Three distinctive, colorful tags were developed to label products that are 1) recyclable in the community, 2) minimally packaged, and 3) an alternative to toxic chemicals. The tags were displayed on the supermarket shelves underneath the appropriate products and near the price information. The purpose of the pilot tagging program was to alert consumers of these three product attributes, all of which benefit the environment in some way. There are disagreements about what constitutes minimal packaging, and about the relative environmental benefits and harms of different packages and products; however, these disputes lie beyond the scope of the present study.

In addition to the product tags themselves, other means for educating the public about environmentally-responsible consumption were pursued. Public awareness

Table 1. Recycling Opportunities in the Cities of Champaign and Urbana and Other Areas of Champaign County

Recycling Opportunity	Place of Residence	
	Champaign-Urbana	Champaign County
Curbside program	Free, voluntary	Not available
Centralized buy-back location	Community Recycling Center	None
Dropoff locations sites	Three supermarket locations	Hometown recycling
Salvage locations	Six businesses	None
Other	University of Illinois, local businesses	Local businesses

was raised through an advertising campaign, which consisted of advertisements in the local newspaper, informational brochures about the meaning of the individual tags, and large designs that were displayed in the store windows in such a way that incoming customers would see them. In addition, an in-store educational intervention that described the tagging program and displayed some representative products was placed in the stores. Due to these reasons, urban residents were considered to have more extensive exposure to the issues related to environmentally-responsible consumption than rural residents who most likely shopped at local supermarkets that did not provide this type of product-specific information. These natural circumstances resulted in a setting in which the effects of differences in the availability of recycling opportunities and exposure to information concerning the environmental characteristics of consumer products could be investigated.

Purpose of the Study

The present study examined the relationship between two categories of environmentally-responsible household behavior, recycling and the purchase of products that have been identified as benefiting the environment. Although these two behaviors have the same end result (conservation of natural resources), the behaviors occur at different times in the product "life cycle." In contrast to recycling, which requires consumer decisions and actions after consumption, product purchase requires choices before the product is consumed. The former behavior requires consumers to choose between alternatives for disposal of a product (i.e., recycle or discard), while the latter behavior requires consumers to choose between alternative products or classes of products (e.g., single-serving or single use vs. bulk quantity).

Although consumers use other criteria such as price, brand name, and product quality in their purchase decisions, it is important to understand consumer perceptions of the importance of environmentally-related attributes of products. As information in this area is still somewhat sparse, we decided to focus attention on environmental purchasing criteria alone, in order to examine the importance of various environmentally-related attributes amongst themselves.

The major purposes of our research were to: 1) investigate the relative importance of various environment-related product attributes, 2) examine the impact of experience with solid waste issues and local political environments on people's reactions to environmentally-responsible consumption, and 3) describe the type of relationship, if any, that exists between self-reported recycling behavior and respondents' reactions to environment-related product attributes.

We extended Linn et al.'s research by expanding the list of environmentally-related attributes from three to fourteen [17]. Based on the research previously mentioned we expected the following results. We expected that consumers who had more exposure to issues related to environmentally-responsible consumption

and who lived in areas in which more ways to recycle exist would be more concerned about the product attributes than other consumers. We also expected that respondents' self-reported recycling behavior would be more strongly associated with product attributes that relate to source reduction or recycling than with attributes that relate to other aspects of environmental consumerism.

METHOD

Setting

A mail survey of the opinions and self-reported recycling behaviors of residents of Champaign County, Illinois was conducted in the summer of 1992. Champaign County consists of twenty-four municipalities, the largest of which are Champaign (pop. 63,502), Urbana (pop. 36,344), and Rantoul (pop. 17,212). The remaining municipalities consist of smaller villages which have populations less than 3,500. The twin cities were selected as the site of the urban sample due to the population relative to the other communities in the county. The presence of a large research university within their borders contributes to a large private business sector, comprised of persons employed in professional, technical, clerical, and service occupations.

The twin cities developed their voluntary curbside recycling programs in the latter part of 1986. Both programs are provided free to persons living in single family dwellings, duplexes, and fourplexes in the city limits. Newspaper, clear and colored glass, aluminum and tin/bimetal cans are accepted in both programs, while plastic milk jugs and detergent containers are accepted in Champaign's program.

Other communities in Champaign County were chosen due to the roles these communities played in the county's solid waste management plans at the time of the survey. Due to economies of scale, these smaller communities were unable to provide curbside recycling to their residents. At the time of the survey the Community Recycling Center (CRC), a not for profit organization whose sole purpose is the reduction of solid waste through recycling and source reduction, served as the major provider of recycling services in these communities. The CRC administered the Hometown Recycling Program for persons living outside of Champaign-Urbana. At that time, this program operated in six rural villages: Homer, Ogden, Philo, Sidney, St. Joseph, and Tolono. Residents brought glass, cans, newspaper, and plastic to a dropoff location in each village. The large recycling bins located at these sites were portable; when it was time for them to be emptied, the bins were towed by a CRC truck to the main CRC processing facility, located in Champaign.

Sampling Procedure

Seven hundred and four households were randomly selected from the most recently published telephone directory for Champaign County. A list of 504 names and addresses of Champaign and Urbana residents was generated for the urban sample, while a list of 200 names was generated for the rural sample. A quota sample of residents of Homer and Philo was obtained so that the final research sample would include county residents who were potentially affected by the siting of a new county landfill and who resided in townships served by the Hometown Recycling Program.

A packet of materials including a cover letter, a questionnaire, and a postage-paid return envelope were mailed to households in the summer of 1992. Reminder postcards were mailed approximately a week after the initial mailing. Non-respondents were mailed a duplicate copy of the materials the following week.

The overall response rate, including the fifty questionnaires that were returned to the researchers unopened was 50.4 percent with 355 out of 704 households replying. Deletion of the unopened questionnaires resulted in an effective sample size of 654 leading to a corrected response rate of 54.3 percent. These response rates are within the range that is normally acceptable for mail surveys.

Questionnaire Materials

Product Attributes

We developed a list of fourteen product attributes that have implications for the environment, in terms of product use, product packaging, and product development or composition. Respondents were asked to rate the importance of each product attribute in the context of shopping they do for themselves and their households. Respondents rated the importance of each attribute on a five-point scale that ranged from one (not important) to five (extremely important).

Recycling Behavior

Respondents also gave self-reports of their recycling behavior. Participants were labeled as "recyclers" for the purpose of this study if they indicated that they had participated in any recycling program during the past year. Recyclers indicated the amount (none, some, or almost all) of materials they had recycled during this time. The list included materials that were acceptable in the curbside programs and the CRC operated dropoff locations, in addition to others.

Socio-demographic Variables

The last section of the questionnaire collected data on respondents' demographic characteristics, such as age, sex, and occupation.

RESULTS

Preliminary Analysis

Some preliminary analyses were conducted before the analyses that were designed to answer our research questions. The first of these preliminary analyses investigated whether or not differences on the measures of interest existed within the urban sample, while the second analysis addressed the same concern for the rural sample.

Differences between Champaign and Urbana

Despite their separate local governments, the cities of Champaign and Urbana have similar environments and recycling infrastructures. Both cities implemented their curbside recycling programs at approximately the same time and have similar local regulations on the business operations of waste haulers. In addition, both cities have dropoff collection sites, and are served by the Community Recycling Center. As a preliminary step, we conducted analyses designed to investigate whether the information derived from residents of the twin cities was similar enough to be combined into one data set representing urban residents.

The results of several one-way multivariate analyses of variance indicated that residents of Champaign and Urbana did not differ in terms of their ratings of the product attributes, while results of several chi-square analyses indicated that their recycling participation rates did not differ. Respondents also indicated the types of recycling programs in which they had participated during the past year, and compared their present recycling activities with their past and future, anticipated activities. Results of chi-square analyses indicated that the respondents from the twin cities did not differ in terms of their reported participation in drop-off locations. However, more Urbana than Champaign residents indicated that they recycled at locations other than drop-off sites or at their curbside $\chi^2(3) = 9.39, p < .03$. This pattern of results, depicted in Table 2, can be explained by the fact that more materials are accepted in the Champaign curbside program; Urbana residents may be recycling the same materials by depositing them elsewhere.

In general, few differences between respondents from the city of Champaign and Urbana were found. For this reason, aggregation of the information obtained from residents of the two cities was deemed possible to form an urban subsample.

Differences between Other Communities in the County

As noted earlier, none of the small townships in the outlying areas was served by curbside collection programs, but six of these communities were served by the CRC's Hometown Recycling Program. As a second preliminary step, we conducted analyses designed to investigate whether the information derived from residents in these six communities differed from that obtained from residents of communities not served by this program.

Table 2. Percentage of Urban Respondents Participating
Non-Curbside Programs

Waste Reduction Activity	Champaign (Percent)	Urbana (Percent)
Sites other than drop-offs	9.4	18.9
Reuse products	3.1	.9
Unspecified	0.0	2.7
No participation in other forms	87.4	77.5

The results of several one-way multivariate analyses of variance indicated that residents of the rural communities did not differ in terms of their ratings of the product attributes, while results of several chi-square analyses indicated that their recycling participation rates did not differ.

Respondents also indicated the types of recycling programs in which they had participated during the past year, and compared their present recycling activities with their past and future, anticipated activities. Results of chi-square analyses on these variables also indicated that no differences between the communities existed. Because no differences between residents of the different rural communities were found, the data were combined to form one data set representing rural residents.

Differences due to Respondent's Type of Housing

We assumed that persons who lived in single family housing would show differences from those who live in other types of housing (e.g., apartments, mobile homes). At the time the survey was conducted only four large apartment complexes had access to centralized collection of recyclables, while all single family housing units within the Champaign and Urbana city limits had access to curbside recycling.

While a one-way multivariate analysis of variance, comparing single-family dwellings to all other types of housing, revealed that housing had no effect on respondents' ratings of the product attributes (Wilks lambda = .93, $F(18,245) = 1.06$, ns), other analyses showed that housing affected respondents' satisfaction with recycling experiences during the past year, level of participation in various recycling activities, and the type and amount of materials they had recycled. Taken as a whole, these differences were considered important enough to merit examination of the respondents living in single family dwellings separately from those who live in other types of housing. Due to the preponderance of responses from county residents who live in single family dwellings (88.8% vs. 56.9% in the

urban sample), for the purpose of this article we included information only from those residents who lived in single family housing units.¹

Ratings of Individual Product Attributes

Our first research question concerned the relative importance of the various product attributes to consumers. The average ratings for each attribute, arranged in rank order, for both samples of respondents are presented in Table 3. As can be seen, the most important product attribute was related to human safety; both urban and rural residents thought that a product should be less hazardous or less toxic. The two least important product attributes had to do with animal use; both groups of respondents thought that product derivation from animals and animal-testing were relatively unimportant in comparison to other listed ecological concerns. Note that the attributes that are ranked most highly in importance are characteristics that have general implications for the environment (e.g., energy-conserving). The second most important group of product attributes represent characteristics that are related to the resources used in the product (e.g., reusable,

Table 3. Average Importance Ratings of Product Attributes, Adjusted for Respondents' Years of Education

Product Attribute	Sample	
	Urban	Rural
Less hazardous or less toxic	3.89	3.64
Energy-conserving	3.63	3.46
Biodegradable	3.58	3.34
Made from recyclable materials	3.33	3.18
Limited amount of packaging used	3.39	3.10
Made by companies that support the environment	3.15	3.10
Reusable	3.25	2.94
Refillable	31.7	2.88
Packaged in recyclable materials	3.08	2.80
Packaged in reusable containers	3.01	2.88
Grown without pesticides	2.96	2.77
Packaged in returnable bottles	2.78	2.69
Not tested on animals	2.45	2.37
Not derived from animal products	2.45	2.20

Note: Response scale 1 = not important, 5 = extremely important.

¹ Further information concerning these analyses can be obtained from the authors.

limited amount of packaging). The third most important group consists of qualities that are related to the composition of the packaging of products (e.g., packaged in returnable bottles).

A one way multivariate analysis of covariance, with educational level as the covariate, was performed to determine if respondents' ratings of the importance of these product attributes was related to their place of residence. Due to our focus on the role of recycling opportunities we included educational level as a covariate to statistically control for variables that are related to respondents' socioeconomic status. Generally, analysis of the ratings obtained from the two samples revealed that no statistically significant differences in importance ratings existed; urban and rural residents rate these items in a similar manner. Thus it appears that, at least within the specific context of this study, the presence of several alternative means for recycling had no effect on respondents' ratings of environment-related product attributes.

Development of Product Attribute Categories

Since the product attributes we provided respondents were too extensive to deal with in terms of further analyses, we decided to determine whether some sort of underlying structure could explain the relationships between the items. We thus subjected the data to a principle factor analysis with varimax rotation. This analysis yielded a two factor solution, and accounted for 65.7 percent of the variance in respondents' ratings. The items comprising each of the factors and the item loadings are presented in Table 4.

We labeled the first scale "Resource Conservation" because the majority of items on this scale were related to consumption of natural resources either by the product itself or its packaging. We called the second scale "Kind to Nature" because the items on this scale were related to the product's effect on animals. Further analyses of the product attribute items were conducted on composite scales which were developed by assuming unit weighting and then averaging the items that loaded highly on each factor. We checked the soundness of these composites by calculating the internal consistency reliability, measured by Cronbach's alpha coefficient, for each composite scale. The alpha value for the Resource Conservation scale was .95, while the alpha value for the Kind to Nature scale was .82. Both values indicate acceptable reliability.

Environmentally Concerned Consumption and Recycling

We first determined whether any differences in self-reported recycling existed between urban and rural respondents. A chi-square test performed on the frequencies of persons who reported that they had recycled within the past year indicated that the two groups of respondents did not differ, $\chi^2(1) = 1.20$, ns. A second chi-square test performed on the frequencies of persons who reported that they had recycled at any time in the past also showed that the two samples were similar,

Table 4. Factor Loadings on the Orthogonal Factors for the Product Attributes

Product Attribute	Factor	
	I Resource Conservation	II Kind to Nature
Reusable	.82	.21
Refillable	.80	.18
Made from recyclable materials	.79	.33
Packaged in reusable containers	.77	.22
Biodegradable	.77	.28
Packaged in recyclable materials	.76	.31
Limited amount of packaging used	.75	.24
Less hazardous or toxic	.72	.41
Packaged in returnable bottles	.64	.27
Energy-conserving	.64	.48
Made by companies that support the environment	.64	.54
Not derived from animal products	.16	.87
Not tested on animals	.24	.76
Grown without pesticides	.41	.59

$\chi^2(1) = .08$, ns. In both instances, over 90 percent of the residents in both subsamples reported that they had recycled.

Two-way multivariate analyses of covariance were then performed to determine if respondents' scores on the product attribute categories were related to the availability of recycling opportunities and their self-reported recycling behavior. In these analyses rural-urban residence was used as a proxy for recycling opportunities and self-reported recycling behavior as an indicator of experience with recycling issues. These two variables served as predictors of the respondents' scores on the Resource Conservation and Kindness to Nature scales. The results of these analyses are presented in Table 5.

The first analysis revealed that no interaction existed between residence and recycling within the past year (Wilks lambda = .99, $F(2,216) = .77$, ns) and that, as previously shown, no main effect for residence existed (Wilks lambda = .98, $F(2,216) = 1.91$, ns). In addition, no main effect for recycling in the past year was obtained (Wilks lambda = .99, $F(2,216) = .10$, ns). The second analysis, which incorporated residence and recycling at any time in the past as predictors, revealed that no interaction existed between these variables (Wilks lambda = .99, $F(2,216) = .08$, ns) and that the two samples did not differ from each other (Wilks

Table 5. Average Importance Ratings of Product Attribute Categories of Urban and Rural Recyclers and Non-Recyclers, Adjusted for Respondents' Years of Education

Product Attribute	Did Not Recycle in Past Year	Recycled in Past Year
Resource Conservation		
Rural	2.55	3.20
Urban	2.71	3.35
Kind to nature		
Rural	2.50	2.62
Urban	2.67	2.72
	Never Recycled	Recycled at Some Time
Resource Conservation		
Rural	2.80	3.18
Urban	3.64	3.30
Kind to nature		
Rural	2.57	2.61
Urban	3.67	2.68

lambda = .99, $F(2,216) = .84$, ns). Recycling at any time in the past did, however, affect ratings of the product attributes (Wilks lambda, .97, $F(2,216) = 3.18$, $p < .05$). Results of the univariate tests showed that recyclers more than non-recyclers thought that the conservation-related attributes were important, $F(1,217) = 5.58$, $p < .02$.

A second method was devised to explore the relationships between respondents' attention to environment-related product attributes and their self-reported recycling behavior. We first computed a self-report recycling behavior index similar to that originated by Vining and Ebreo to represent the amount of recycling behavior [14]. This index was obtained by averaging respondents' answers to the question concerning the frequency with which they recycled glass, newspaper, aluminum cans, tin cans, and plastic. These items were selected as they represent the materials that are easily recyclable by residents of Champaign-Urbana and the outlying county areas. The numerical values obtained were then correlated with the two product attribute subscales. This analysis indicated that self-reported recycling behavior was weakly but positively related to the importance of qualities pertaining to resource conservation ($r = .23$, $p < .001$) but unrelated to qualities pertaining to kindness to nature ($r = -.04$, ns). Thus, our results indicate that persons who recycle are also more likely to be concerned with the

environment-related attributes of the products they purchase, and vice-versa. This result also lends some support to the idea that consumers see recycling behavior as being related to the conservation of natural resources such as energy, water, and timber, but less related to the preservation of wildlife.

A similar result was obtained when we examined the relationships between respondents' satisfaction with their recycling experiences and their ratings of the product attributes. In this case, greater satisfaction with their experiences was weakly associated with the importance of resource conservation-related product attributes ($r = .17, p < .02$) but unrelated to the importance of nature-related product attributes ($r = .12, ns$).

While obtaining correlations between the product attribute categories and respondents' overall recycling behavior is useful, it does not provide information about the relationship between specific recycling behaviors and product characteristics. Such information would help determine the degree to which recycling and source reduction are compensatory or complimentary categories of behavior. To this end, we obtained correlations between the product attribute categories and the frequency of recycling each of the materials. The results of this analysis, depicted in Table 6, indicate that the recycling of paper products (i.e., newspaper, cardboard, magazines, and office paper), tin and bimetal cans, and yardwaste is moderately correlated with the importance of product attributes pertaining to resource conservation. Thus, it appears that source reduction is complementary to people's views of recycling these materials as a means of conserving natural

Table 6. Zero Order Correlations between Individual Product Attribute Ratings and Self-Reported Recycling Behavior

Recycled Material	Category	
	Conservation	Kind to Nature
Glass	.18	-.05
Newspaper	.22*	.04
Cardboard	.28*	.12
Magazines	.24*	.20
Office paper	.26*	.02
Aluminum cans	.10	-.03
Tin/bimetal cans	.24*	.03
Plastic	.26	.05
Yard waste	.23*	.11
Motor oil	.08	-.04

* $p < .001$

resources. Interestingly enough, two of the remaining items (aluminum cans and motor oil), which also represent materials that are developed from natural sources were not related to resource conservation. The result related to plastics recycling can be explained by the notion that a majority of persons may view plastic as a man-made rather than naturally-occurring material.

DISCUSSION

Contrary to our expectations, the relative importance of the product attributes did not differ between residents of urban and rural communities. On the surface, this result suggests that differences in the types of recycling opportunities available to urban and rural respondents did not affect their reactions to environmentally responsible consumption.

The possibility exists, however, that the presumed differences in exposure to information did not actually exist in reality. Although an educational intervention in the form of a display was only exhibited at various times in the Champaign-Urbana stores of a local supermarket chain, it is possible that the display did not make as large of an impression upon consumers as it was intended to have. Research conducted on the efficacy of the intervention implies that this was indeed the case. In fact, Linn et al. concluded that consumers had received information about environment-related product attributes from other sources than the product tags [17]. Given this observation, it is possible that the amount of information about environment-related product attributes was actually the same for both city and county residents. Although some promotional materials were confined to the stores in which the tagging program existed, other promotional material contained in the local newspaper could be considered to have been distributed among both city and county residents equally, as the paper itself is circulated countywide.

The fact that fewer recycling opportunities in the county areas did not result in increased consumer attention to environment-related attributes of purchased goods is curious. We proposed that inconveniences involved in recycling would be compensated for in other conservation-related behavior, in this case, consumer behavior. Thus we expected residents of the county to give higher ratings to the product attributes than resident of the two cities. This was not the case, as city and county residents rated the product attributes similarly.

Four major issues (the siting of a new county landfill, the development of a waste transfer/resource station, flow control and other regulations related to the day-to-day operations of local waste haulers, and continued cooperation of local governments within the auspices of the Intergovernmental Solid Waste Disposal Association (ISWDA)) were debated publicly during the time the survey was conducted. The proposed dissolution of the ISWDA gave birth to a

high degree of uncertainty and anxiety about the ISWDA's projects and the state of solid waste planning in the county. Respondents may have been alerted to the need to take action on a personal and/or household level rather than wait for a governmental response, given this state of affairs. Attention to the environment-related attributes of consumer goods might have been the same among these two groups of respondents due to heightened awareness of solid waste issues brought about by increased publicity and public controversy focused on these issues.

The weak relationship between respondents' self-reported recycling behavior and the ratings of the product attributes was also surprising. One might argue that recycling and environmentally-responsible consumption are very different forms of conservation behavior, and that it is unlikely that the antecedents of one form of behavior should be related to the other behavior. This proposition has been supported by the work of Oskamp et al. which shows that the predictors of recycling in curbside programs are different than those that can be used to predict recycling through other means [18].

Evidence that recycling behavior and environmentally-responsible consumption might represent a class of behaviors that can be entitled "waste reduction" is provided by the existence of a positive relationship between the amount of material respondents reported recycling and the conservation-related attribute ratings. This result further substantiates the idea that consumers value resource conservation differently than they value wildlife preservation.

One of the most interesting findings concerned the relationship between the single indicators of recycling behavior and the product attribute categories. Apparently, certain aspects of recycling behavior and consumer source reduction behavior (in the form of product choice) are complementary aspects of natural resource conservation. Puzzlingly, some of the materials that one might think consumers would view as being "natural" were not related to the resource conservation attributes. In addition respondents viewed plastic, the single synthetic recyclable material, differently than the other materials. Further research might investigate in more detail the consequences of viewing materials as being natural or synthetic.

Taken as a whole, we view our findings as a useful first step in understanding the psychology of the environmentally-responsible consumer. Clearly, these consumers can be distinguished from other consumers and they perform behaviors other than consumption (e.g., recycling) in what is thought to be an ecologically-responsible manner. Still, environmentally-conscious consumption does not seem to be a salient behavior for most consumers, and it would be to our collective benefit to discover means by which existing pro-environmental attitudes and conservation-related behaviors can be used to encourage this new activity.

REFERENCES

1. P. C. Stern and S. Oskamp, Managing Scarce Environmental Resources, in *Handbook of Environmental Psychology*, I. Altman and D. Stokols (eds.), pp. 1044-1088, Wiley, New York, 1987.
2. A. P. Tracy and S. Oskamp, Relationships among Ecologically Responsible Behaviors, *Journal of Environmental Systems*, 13, pp. 115-126, 1983-84.
3. P. A. Ester and R. A. Winett, Toward More Effective Antecedent Strategies for Environmental Programs, *Journal of Environmental Systems*, 11, pp. 201-221, 1982.
4. E. S. Geller, Applications of Behavioral Analysis for Litter Control, in *Behavioral Community Psychology: Progress and Prospects*, D. Glenwick and L. Jason (eds.), Praeger, New York, 1980.
5. E. S. Geller, J. B. Erickson, and B. A. Buttram, Attempts to Promote Residential Water Conservation with Educational Behavioral and Engineering Strategies, *Population and Environment: Behavior and Social Issues*, 6, pp. 96-112, 1983.
6. L. A. Heslop, L. Moran, and A. Cousineau, "Consciousness" in Energy Conservation Behavior: An Exploratory Study, *Journal of Consumer Research*, 8, pp. 299-305, 1981.
7. R. DeYoung, Exploring the Difference between Recyclers and Non-recyclers: The Role of Information, *Journal of Environmental Systems*, 18, pp. 341-351, 1988-89.
8. F. M. Lansana, Distinguishing Potential Recyclers from Non-recyclers: A Basis for Developing Recycling Strategies, *Journal of Environmental Education*, 23, pp. 16-23, 1992.
9. D. Simmons and R. Widmar, Motivations and Barriers to Recycling: Toward a Strategy for Public Education, *Journal of Environmental Education*, 22, pp. 13-18, 1991.
10. J. Vining and A. Ebreo, What Makes a Recycler? A Comparison of Recyclers and Non-recyclers, *Environment and Behavior*, 22, pp. 55-73, 1990.
11. J. Vining and A. Ebreo, An Evaluation of the Public Response to a Community Recycling Education Program, *Society and Natural Resources*, 2, pp. 23-36, 1989.
12. S. M. Burns and S. Oskamp, Increasing Community Recycling with Persuasive Communication and Public Commitment, *Journal of Applied Social Psychology*, 16, pp. 29-41, 1986.
13. J. R. Hopper and J. M. Nielsen, Recycling as Altruistic Behavior: Normative and Behavioral Strategies to Expand Participation in a Community Recycling Program, *Environment and Behavior*, 23, pp. 195-220, 1991.
14. J. Vining, N. Linn, and R. J. Burdge, Why Recycle? A Comparison of Recycling Motivation in Four Communities, *Environmental Management*, 16, pp. 785-797, 1992.
15. D. Rose, National Beverage Container Deposit Legislation: A Cost-benefit Analysis, *Journal of Environmental Systems*, 12, pp. 71-84, 1982-83.
16. C. H. Schwepker, Jr. and T. B. Cornwell, An Examination of Ecologically Concerned Consumers and Their Intention to Purchase Ecologically Packaged Products, *Journal of Public Policy and Marketing*, 10, pp. 77-101, 1991.

17. N. Linn, J. Vining and P. A. Feeley, Toward a Sustainable Society: Waste Minimization Through Environmentally-conscious Consuming, manuscript submitted for publication, 1993.
18. S. Oskamp, M. J. Harrington, T. C. Edwards, D. L. Sherwood, S. M. Okuda, and D. C. Shanson, Factors Influencing Household Recycling Behavior, *Environment and Behavior*, 22, pp. 767-786, 1991.

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