

The Determinants of Consumers' Purchase Decisions for Recycled Products: An Application of Acquisition-Transaction Utility Theory

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ABSTRACT

This study investigated the determinants of consumers' purchase probabilities toward eleven recycled products based on Thaler's (1983, 1985) *acquisition-transaction utility theory*, which suggested that consumers' purchase probabilities depended on the received value compared to the purchased cost. Consumers' psychological benefit from the purchase was added as part of the purchase utility in this study. The results showed that consumers who perceived more purchase utility from the purchase were more likely to buy the product. Purchase involvement was also positively related to the purchase probability. These results provided a consumers' viewpoint to aid in the development of marketing strategies for recycled products.

An environmental consciousness has been growing steadily over the past few years in the United States. The Roper Organization (1990) reports that public concern about environmental issues has grown faster than concern about any other national problem. According to the Capital Research Center in Washington, DC, the top ten environmental organizations in the United States have annual membership of almost eight million (Environmental Protection Agency 1991).

Manufacturers and marketers have responded to this environmental trend. The introduction of new "green" and "environmentally friendly" products has grown by more than 100% per year since 1985 (*Green Introductions* 1990). "Green" and "environmentally friendly" products are defined as those labeled or advertised with at least one of the following characteristics: 1) reducing water and air pollution, 2) reducing waste, 3) avoiding cruelty to animals, and 4) made of recycled material (Dagnoli 1991; *Green Introductions* 1990). However, the environmental consciousness-raising trend cannot ensure the success of the green market because consumers' purchase behaviors and attitudes have not changed as quickly as their environmental awareness (Larson 1990).

Promoting recycled products is the most difficult among those green products. Consumers have a common belief that recycled materials are inferior to virgin materials (Kashmanian et al. 1990). Recycled products are also believed to be more costly than virgin products, although these perceptions are oftentimes mistaken (Cude 1993). It has been a challenge to manufacturers and retailers to overcome these perceptions and educate consumers on the need of purchasing products and packaging made with recycled materials (Kashmanian et al. 1990).

The purpose of this study is to investigate the determinants of consumers' purchase probabilities on recycled products. Since consumers have different purchase involvement for different products (Zaichkowsky 1985), eleven representative recycled products are selected to test consumers' purchase decisions including purchase involvement.

To address these purposes, consumers' purchase behaviors are considered to be based on the *utility theory* (Thaler 1983). The theory assumes that consumers always try to maximize their purchase utility, which is the benefit received from the purchased good and the price when they make purchase decisions (Thaler 1985).

Consumers receive both quality benefits and psychological benefits by paying money and other cost, such as time and effort, for each purchase transaction (Lichtenstein, Netemeyer and Burton

1990). The quality benefit is the received quality from a product itself or life improvement through using a product. On the other hand, the psychological benefit is a positive feeling about the purchase, for example, self-image built from buying a special product or a feeling of getting a "deal" due to a low price.

Since consumers always try to maximize their purchase utility, it is assumed that if consumers choose to buy recycled products, they should perceive more purchase utility from the purchase of recycled products than from the purchase of ordinary ones. In other words, the sources of the extra utility of buying recycled products are the determinants of consumers' purchase decisions of recycled products.

CONCEPTUAL FRAMEWORK

While considerable research on the determinants of consumers' purchase decisions has been done, there was no such research especially focusing on the purchase of recycled products. The *acquisition-transaction utility theory* (Thaler 1983) was employed as a paradigm for examining the relationship between the purchase utility and the purchase decision of recycled products. However, because recycled products have a special attribute namely that they are made with recycled materials and good for the environment, the construction of this theory used in previous studies could not completely present the purchase utility of recycled products and had to be modified to provide a conceptual framework for this study.

Acquisition-Transaction Utility Theory

Thaler (1983, 1985) proposed that the total utility of a purchase was the sum of *acquisition utility* and *transaction utility*. According to Thaler's definition (1985), acquisition utility reflected the economic gain or loss from a purchase. It depended on the value of the good received compared to the cost (Thaler 1985). So, acquisition utility was a function of the utility of the purchased good determined by the inherent need-satisfying properties of the product (Lichtenstein et al. 1990; Thaler 1983). Lichtenstein et al. (1990) suggested that acquisition utility could be estimated by the utility of purchased good minus purchase price (shown as Equation [1]).

$$\text{Acquisition Utility} = \text{Utility of Purchased Good} - \text{Purchase Price} \quad [1]$$

There was an argument associated with the psychological part of acquisition utility. In previous studies, acquisition utility captured the results only from the "economic" point of view (Dickson and Sawyer. 1990; Lichtenstein et al. 1990; Thaler 1983), such as received quality of the product, but without the psychological part of acquisition utility. However, acquisition utility was defined as a function of the utility of the purchase good determined by the inherent need-satisfying properties of the products (Lichtenstein et al. 1990; Thaler 1983). Also, Thaler (1983) indicated that consumers' value of acquisition utility depended on their desire for the product. A recycled product has some unique attributes that it is made from recycled materials and good for the environment. Lancaster's (1966) *goods characteristics model* suggested that the attributes of goods could change consumers' purchase utilities and

purchase decisions. For instance, a psychological feeling of contributing to the environment may be more significant than satisfaction with the product itself when consumers buy a recycled product. Therefore, the purchase utility related to recycled products' special attributes should be incorporated in the acquisition utility as the psychological utility. In this study, both received quality of the recycled product and psychological benefits from buying recycled products were included in the decision model as explanatory variables.

There were some studies suggesting several factors which associated with consumers' psychological feelings and contributed to their purchase behaviors for environmentally friendly products. Roper's (1990) survey concluded that environmental consciousness was associated with being a "green" consumer. Cude (1992) indicated that the high concern about the environmental issue and the positive attitude toward the green products could motivate behavior changes. Hence, the psychological benefit from buying recycled products was proposed to be based on consumers' environmental concern, attitude toward environmentally friendly products, and their feelings when purchasing recycled products.

Therefore, the utility of purchase good was captured as psychological benefit and believed quality by the consumer. This concept is illustrated as Equation [2].

$$\begin{aligned} \text{Acquisition Utility} &= \text{Utility of Purchased Good} - \text{Purchase Price} \\ &= (\text{Believed Quality} + \text{Psychological Benefit}) - \text{Purchase Price} \end{aligned} \quad [2]$$

The second element of Thaler's theory, transaction utility, is the perceived merits of the "deal" (Thaler 1985). It is not only formed by the actual value of paying the price, but related to the expected price. For example, when consumers believe that a recycled product is more expensive than an ordinary one, they will expect the price of the recycled one to be higher than the price of the ordinary one, and tend not to buy the recycled product. However, once consumers find out the price of the recycled product is the same or even less than the price of the ordinary one with the same quality, they will feel that there is a "deal" for buying the recycled one and receive greater transaction utility from the purchase. Thaler (1983, 1985) suggested that transaction utility was a function of the difference between the purchase price and the expected price. During the purchase decision, the price that consumers expect to pay performed as an internal reference price (Dickson and Sawyer 1990; Lichtenstein and Bearden 1989; Lichtenstein et al. 1990; Monroe 1973). Lichtenstein et al. (1990) used Equation [3] to illustrate the definition of transaction utility.

$$\text{Transaction utility} = \text{Internal Reference Price} - \text{Purchase Price} \quad [3]$$

The idea of the internal reference price implied the psychological part of the transaction utility. In this study, the price of an ordinary product was proposed as an internal reference price for a recycled product because consumers tended to compare a recycled product with an ordinary one. Therefore, the price difference of a recycled product from an ordinary one was hypothesized to have a positive relationship with transaction utility, as well as the probability to buy the recycled one.

Lichtenstein et al. (1990) used Equation [4] to explain the definition of total purchase utility. The purchase price can be held constant as to know the difference between consumers' purchase utility, because a product's actual price is not decided by consumers

and the prices for the same product are usually similar. Equation [5] presents the concept that total purchase utility is the function of believed quality, psychological benefit, and expected price, with the purchase price held constant in the present study. Consumers' purchase probability is, then, the function of their total purchase utility.

$$\begin{aligned} \text{Total Purchase Utility} &= \text{Acquisition Utility} + \text{Transaction Utility} \\ &= \text{Utility of Purchased Good} - \text{Purchase Price} \\ &\quad + (\text{Internal Reference Price} - \text{Purchase Price}) \end{aligned} \quad [4]$$

$$\begin{aligned} \text{Purchase Probability} &= f(\text{Total Purchase Utility}) \\ &= f(\text{Believed Quality, Psychological Benefit,} \\ &\quad \text{Expected Price}) \\ &\quad [\text{with the purchase price held constant}] \end{aligned} \quad [5]$$

Based on Thaler's *acquisition-transaction utility theory*, the first hypothesis was developed: consumers who perceived more total purchase utility from the purchase of a particular recycled product were more likely to buy this particular recycled product. More purchase utility could be obtained either from *acquisition utility* (i.e., the received quality plus the psychological benefit minus the purchase price) or from *transaction utility* (i.e., the expected price minus the purchase price).

Purchase Involvement

Consumers' purchase decisions on recycled products in general might be different from decisions on a particular recycled product because consumers could be involved with products in different degrees due to product attributes (Cohen 1983; Zaichkowsky 1985). Also, Lancaster (1966) indicated that the attributes of goods could change consumers' purchase utilities and purchase decisions. Therefore, consumers' purchase decisions on particular recycled products with different attributes were investigated in this study.

When examining particular products or purchase decisions, many researchers suggested that low versus high involvement states were important (Clarke and Belk 1978; Cohen 1983; Zaichkowsky 1985). "Involvement" was defined as the importance of the product to the individual and to the individual's self-concept, values, and ego (Beatty, Kahle and Homer 1988; Zaichkowsky 1985). Involvement with purchases could lead consumers to search for more information and spend more time searching for the right selection (Clarke and Belk 1978). Consequently, purchase involvement was included in the study and was hypothesized to have a positive relationship with purchase behavior.

Two major factors were considered related to consumers' involvement of recycled products: 1) price (high or low), and 2) parts (the product itself or the package made of recycled materials). Hence, eleven recycled products were chosen according to these factors (shown in Table 1) by the panel of professors in consumer research and experts in material sciences. These representative products also included various categories of recycled products: paper, plastic, glass, metal, wool, and synthetic fiber. These eleven recycled products and packages were generally called "recycled products" in this study.

Zaichkowsky's (1985) Personal Involvement Inventory (PII) was employed to measure consumers' involvement or interest in the eleven recycled products in a pre-test. There were three reasons to select PII. First, the definition of involvement used in the PII scales was: "a person's perceived relevance of the object based on

TABLE 1
Tested Products and PII Scores

Made with Recycled Materials	Price	Parts	Categories	PII
Recycled-Paper Notebook	low	product	paper	106.74
Recycled Toilet Paper	low	product	paper	85.72
Recycled Baby Wipes	low	product	paper	84.02
Recycled Paper Coffee Filter	low	product	paper	91.40
Recycled Microwave Container	low	product	plastic	99.14
Recycled Trash Bag	low	product	plastic	109.84
Hamburger with Recycled Carton	low	package	paper	107.84
Cola in Recycled Pop Top Can	low	package	metal	109.16
Recycled Wool Sweater	high	product	wool	74.80
Recycled Polyester Area Rug	high	product	synthetic fiber	72.14
Perfume in Recycled Glass	high	package	glass	99.78

inherent needs, values, and interests" (Zaichkowsky 1985, p.342), which was consistent with the purpose of this study. Second, PII scales could be adopted to examine consumers' involvement with products, advertisements, or purchase decisions. In this study, purchase decisions were the basic concern. Third, the construct of the PII scale could focus on the product level to determine high or low involvement products (Zaichkowsky 1985).

PII scales were multi-item measures which had higher reliability than single-item measures (Zaichkowsky 1985). The reliability of the scale over time had a test-retest correlation of 0.90. Other internal scale reliabilities were an item-to-total score correlation of 0.50 or more, and a Cronbach alpha level of 0.95. The criterion-related validity and the construct validity (e.g., the test of the scale to theoretical propositions) were significant at the $\alpha=.01$ level. PII score was ranged from a low of 20 to a high of 140, with a theoretical mean 80 (Zaichkowsky 1985).

Subjects in the pre-test included a convenience sample of 50 college students. Because the same recycled products and purchase decisions were used in the survey of the main study, subjects of this phase had to be different from respondents of the main study to avoid possible bias. The average PII score of each product is listed in Table 1. These scores were employed later as a variable "purchase involvement."

EMPIRICAL TESTS

Subjects

Data for the main study were collected from two Midwest cities. One was regularly used to test-market products. Its demographic characteristics are representative in particular categories: household size, age of household head, and annual family income. (Indiana City 1988). Five hundred random subjects were selected according to the city telephone directory. The other city was a college town. This group of subjects was 165 randomly selected residents and university students based on the resident and student telephone directories.

The instrument and the follow-up reminder postcard were mailed to each subject's address in Fall, 1992. The survey resulted in a total of 139 (21%) returns. Within them, 137 surveys were completed and used for the analysis, 59 cases from the representative city and 78 cases from the college-town. The proportion of the college-town sample had more students. However, no significant difference in their environmental concerns or purchase behaviors was found between the samples from the two cities.

Instruments

The entire questionnaire used for this study included three sections, each of which were developed from the instruments used

in previous studies. The first and second sections came from the first two segments of the "Enviroshopping" questionnaire, as developed by the Extension Service, U.S. Department of Agriculture and the University of Florida (1991). The objective of these two sections was to assess consumers' degree of environmental responsibility concerning purchasing decisions and attitudes in general. There were four batteries of questions, which represented four concepts: reduce, recycled, reuse and reject, in each of these two segments. Reliability coefficients are 0.69, 0.86, 0.81 and 0.83 in the first segment, and 0.51, 0.79, 0.81, and 0.77 in the second segment for reduce, recycle, reuse and reject, respectively (The Extension Service 1991).

The third section was based on the related items in the instrument used in the Roper report (1990) to estimate consumers' purchase experience, believed quality and expected price of the eleven representative recycled products (as shown in Table 1). Respondents were asked to compare the quality and estimate the prices of recycled and virgin products.

Operational Definitions of Variables and Analysis

The dependent variable (Y) was consumers' actual purchase experiences of the eleven recycled products: have bought=1 and never bought=0. The independent variables were the psychological benefit (PSYCH), the believed quality (QUAL), the expected price difference (PRICE), and purchase involvement (PI) of each recycled product. The psychological benefit from the purchase of recycled products covered consumers' attitude and feeling about buying recycled products. The believed quality was based on the comparison of each pair of the recycled and ordinary products. The expected price difference was the percentage price difference of the recycled product from the ordinary one. Purchase involvement of each product, which was based on the product level, was captured in the pre-test by the PII scales.

Since the dependent variable, purchase experience for each recycled product, was a dichotomous categorical variable (i.e., have bought or have not bought), the multivariate logistic regression was considered an appropriate technique for this study. Equation [6] illustrates the concept of the logistic regression in this study (Aldrich and Nelson 1984).

$$Y_{ij} = \{0, 1\}, \quad 1 = \text{have bought}, \quad 0 = \text{have not bought}$$

$$P(Y_{ij} = 1) = \frac{\exp(\beta_0 + \beta_1 \text{PSYCH}_{ij} + \beta_2 \text{QUAL}_{ij} + \beta_3 \text{PRICE}_{ij} + \beta_4 \text{PI}_{ij})}{1 + \exp(\beta_0 + \beta_1 \text{PSYCH}_{ij} + \beta_2 \text{QUAL}_{ij} + \beta_3 \text{PRICE}_{ij} + \beta_4 \text{PI}_{ij})} \quad (6)$$

where i represents subjects and j denotes the eleven recycled products.

TABLE 2
The Logistic Regression Analysis for the Purchase Decision of the Eleven Recycled Products

Variable	Estimated Coefficient	Chi-Square
Intercept	-10.76**	164.12**
Psychological Benefit	0.38**	4.51*
Believed Quality		15.00**
higher	0.35	15.38**
same	—	—
lower	-0.18	2.69
Expected Price	0.83	4.04*
Purchase Involvement	0.09	221.86**
Likelihood Ratio		Chi-Square = 1254.98

Note: ** denotes significant at the $\alpha = .01$ level.
* denotes significant at the $\alpha = .05$ level.

FINDINGS

Descriptive Results

Around two-fifths of the respondents (38%) answered that they seldom purchased products or packages made of recycled materials; one-third (32.4%) said sometimes. Only 5.1% of all respondents indicated that they always bought recycled products as available, and 0.7% have even paid more to buy those products for the sake of the environment.

Respondents' average attitudes toward recycled products and environmental issues were positive (mean=2.78; ranged 1 to 4), that most respondents agreed they should pay more attention to the environment, as well as make more effort to search for and to buy recycled products. Most respondents (89.1%) usually felt that they were saving the environment when they purchased some recycled products. Also, most believed that the quality (78.7%) and the price (67.4%) of a recycled product should be the same as an ordinary one. Only seven subjects believed that the quality of a recycled product should be higher than an ordinary one; and three subjects expected the price of a recycled product should be higher.

Purchase of Recycled Products

Consumers' purchase experiences varied with different recycled products. The most frequently bought products were hamburgers with recycled cartons (75.91%), recycled paper notebooks (72.26%), cola in recycled cans (62.04%), and recycled plastic trash bags (57.66%). Recycled products that few respondents bought were recycled polyester area rugs (5.11%), recycled baby wipes (5.15%), and recycled wool sweaters (9.49%).

The Determinants of Purchasing the Eleven Recycled Products

The results of the logistic regression for Equation [6] showed that the model fitted well (illustrated in Table 2). "Psychological benefit" from buying the recycled products was positively related to the probability of purchasing the products, with significance at the $\alpha = .05$ level. "Believed quality" was also positively associated with the purchase behavior ($\alpha = .01$). Especially, respondents who believed that the recycled products were superior to the ordinary ones in quality, were more likely to buy the recycled products than those who believed that the products were the same in quality ($\alpha = .01$). Expected price difference was positively significant at the $\alpha = .05$ level. This positive relationship meant that if consumers

expected a higher price for a recycled product compared with the ordinary one, they were more likely to buy the recycled product. The three utility variables were all consistent with the proposed relationship, which illustrated the function of the acquisition-transaction theory. "Purchase involvement" was also positively related to the purchase probability, with significance at the $\alpha = .01$ level. This result supported the importance of the purchase involvement.

CONCLUSIONS AND IMPLICATIONS

The empirical findings of this study suggest that consumers' purchase behavior of recycled products can be explained well by Thaler's *acquisition-transaction utility theory* (1983 and 1985) if the psychological benefit is included as one kind of utility. The two components of the *acquisition-transaction utility theory* are fully supported by significant results of the psychological benefit, believed quality, and expected price. In addition, the product category itself provides different levels of involvement that is associated with consumers' purchase probabilities too.

Buying and using recycled products can stimulate the market of recycled materials, which is good for the environment. The results of this study suggest that consumers' willingness to buy recycled products can be motivated by emphasizing the importance of environmental issues, positive attitudes toward recycled products, and the feeling of contribution to the environment from the purchase of recycled products. According to the findings in this study, manufacturers, retailers, and marketers should promote recycled products by advertising the benefit to the environment through the purchase. By the influence of this kind of advertising, consumers would perceive more psychological benefits and may be more likely to buy recycled products.

Consumers also consider the price and quality of the recycled products. The price effect is actually from the perceived price difference between the recycled product and the ordinary one. This perceived difference, but not actual difference, affects consumers' willingness to buy the recycled products because the actual price is held constant in this study.

The quality of recycled products is another consideration to consumers. Recycled baby wipes and toilet paper are low-priced items, but consumers are not willing to buy these two products because of the believed poor quality of these products. So, manufacturers and marketers should emphasize and ensure that the

quality of the recycled product is at least the same as the ordinary one. In addition, manufacturers should introduce more recycled packages that do not change the quality of the product itself.

Another implication is that manufacturers can use consumers' purchase involvement of recycled products to help determine if the product will succeed in the real market. Those recycled products, which can induce consumers' high purchase involvement, have more probability to succeed in the market, such as recycled plastic trash bags, cola in recycled cans, hamburgers with recycled paper cartons, and recycled paper notebooks.

The major limitation of the present study is the low response rate. This causes the difficulty in generalizing the results to non-respondents due to the possible self-selected bias.

This study is a special application of Thaler's *acquisition-transaction utility theory* by testing consumers' purchase behavior toward a particular category of products: recycled products. In this study, the psychological benefit of acquisition utility is further underlined, which was lacking in previous studies. It is suggested that researchers can use this study as a framework to examine the purchase utility of other "green" or "environmentally friendly" products. These terms are frequently used to describe the products in advertising and on labels without knowing why they can stimulate consumers' purchase behaviors. This study introduces a new direction of study for explaining how these terms can effect consumers' perceived psychological benefits of total purchase utility.

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