

# Differential Importance of Ecolabel Criteria to Consumers

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## *Problem Statement*

Present consumption patterns are not sustainable on a global level. Therefore, curtailment of the use of natural resources in human societies is necessary (Ryan, 1995). Proper ecolabeling could potentially reduce environmental impacts of consumption but without consumer interest, these programs are doomed to fail (EPA, 1993a, 1994).

Labeling is an educational tool that also helps consumers identify environmentally preferable products (EPA, 1993a). However, in addition to choosing labeling solely to address environmental impacts, it is also necessary to focus the labels to address what is important to consumers. When choosing what products should be awarded a label it is important to decide what issues should be addressed. Labeling programs select these issues and use criteria to determine the performance for the chosen products and to shape the focus of the label. For example, the Environmental Protection Agency's Energy Star sets standards for energy efficiency, and the Food Alliance's stamp of approval focuses on sustainable agriculture (Kane and Ennis, 2003).

Attitude is the consumer's liking, endorsement or preference for product attributes. It summarizes the criteria that consumers use to make decisions regarding what products to buy (Kinnear and Taylor, 1996). Attitude is an important aspect of purchasing decisions that can be used to predict shopping behavior (Fishbein and Ajzen, 1975). Therefore, it is important for both the food industry and ecolabelers to determine consumers' attitudes to find out what criteria they want. Research is needed to determine if and how information about products' environmental impact corresponds to what consumers want (Palm and Windahl, 1998).

In the research reported here, the importance of ecolabel criteria to respondents was measured using a written questionnaire administered to 340 adults. The purpose was to establish a framework within which differential importance of ecolabel criteria could be determined. Consequently, this study tested the dif-

ferential importance of a set of thirteen criteria for ecolabels on products to consumers.

The first objective was to determine the differential importance of information regarding thirteen selected ecolabel criteria. The second objective was to measure the relation of social structural variables (age, gender, ethnicity, formal education, and household income and composition) to the importance of ecolabel criteria to consumers. This study aimed to test the hypotheses:

H<sub>1</sub>: Consumers differentially endorse criteria for ecolabels; and

H<sub>2</sub>: Socio-demographic factors affect the importance of information on criteria for ecolabels to consumers.

Research regarding ecolabels may help guide future environmental labeling efforts to change consumer and producer attitudes and behavior, thus reducing environmental burdens of consumption. Consumer demands for ecolabeled products have increased, but consumer attitudes toward label criteria have not been established in prior research (Arda, 1995; EPA, 1993a). The findings from this and succeeding studies may be used for establishing labels that are successful regarding consumers' confidence in and endorsement of them. This study found that these patterns exist, and that some consumers find certain ecolabel criteria more important than others. The primary purpose of this study was to provide insight into the socio-demographic triggers to criteria endorsement, and to develop a framework for testing these. The study should therefore be considered a pilot effort for exploring the use of this methodology.

## *Background*

The ecosystem of the Earth is finite and non-expanding. With a growing population, the boundaries to the ecosystem are limiting (Daly, 1998). The need to slow population growth has been recognized for a long time (e.g., Malthus, 1798), but not until

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quite recently has the need to limit consumption been acknowledged (Daly, 1998).

Ecolabels are intended to provide consumers with information and assessments not otherwise apparent, to guide them in making purchasing decisions based on the environmental impacts of products. Ecolabels also serve as consumer protection tools by providing environmental information not readily available or not supplied by the marketer (EPA, 1993a).

Ecolabels generally have three objectives:

- to prevent misleading environmental advertising
- to raise awareness and to encourage consumers to base purchasing decisions to a greater extent on environmental attributes by providing necessary information
- to provide market-based incentives for manufacturers to lessen the environmental impacts of their products and production processes (EPA, 1993a).

The main purpose of ecolabels is to alleviate the environmental burdens of human consumption, thus slowing the depletion of the natural environment (EPA, 1994).

Environmental Certification Programs (ECPs) are third-party, positive or neutral ecolabeling programs that strive to make credible, unbiased, and independent judgments about environmental product attributes. As voluntary programs, ECPs are positive selling arguments or neutral disclosures of environmental impacts (EPA, 1993a). ECPs include three types of certification: 1) Seal-of-approval, 2) Report card, and 3) Single-attribute certification (EPA, 1993a). Most existing national and international ECPs are seal-of-approval programs. These ecolabels generally assess products based on a lifecycle assessment (LCA) or an abbreviated LCA (EPA, 1993a).

ECPs are intended to convey information about multiple environmental attributes of products (EPA, 1993a). Several ECPs continuously raise the standards to promote environmental improvements, and to ensure that only a few products on the market meet the certification requirements (EPA, 1993a). Positive product labeling programs provide manufacturers with a market-based incentive to create products with environmental or social benefits. Often operated by a neutral third-party, these labeling programs set crite-

ria and standards, and award a seal-of-approval for use in advertising (EPA, 1994).

### Criteria for ecolabels

ECPs base the selection of products on a specific set of criteria for assessment. The criteria are developed for each product category, after which products in the same category are judged against the same set of criteria. The foremost difference among existing ECPs is how product categories and criteria are defined (EPA, 1994). Criteria-setting is typically concerned mainly with environmental policy goals, consumer awareness of environmental issues, and economic effects on industry, but determination of criteria for seals-of-approval must be based on a lifecycle review of product category.

The decision-making groups sometimes have representatives from major stakeholder groups such as environmental and consumer groups, government, and business and trade representatives. External technical advice is commonly sought from the government or standard-setting organizations. Criteria are sometimes based on LCAs in which potentially significant environmental impacts are identified. Criteria levels (i.e., standards) are established to reduce the impacts considered most significant, and to address the environmental impacts of the specific product categories. The standards for an ECP are usually elevated to provide incentives for continuous improvement (EPA, 1994).

Ecolabeling programs are developing around the world, yet they are increasingly being criticized by industry. The criticism has mainly been focused on the policy level and on the abuse of ecolabels as protectionist trade barriers. Ambiguity as to the development of criteria and standards has also been identified as a concern (Salzman, 1997; EPA 1994).

Most existing ecolabeling programs (e.g., Green Seal, USA; Environmental Choice, Canada; Bra Miljöval, Sweden; The White Swan, Nordic countries) do not incorporate consumer acceptance of label criteria, which could influence their success in the market (EPA, 1994). However, a public or internal review is usually conducted that incorporates the opinions of a review group. After principal environmental impacts have been determined, standards are set to address these impacts. The standards are set sufficiently high that only a few products on the market can meet them, in order to encourage increased product performance. After the criteria have been chosen, a review is conducted to increase public acceptance of

the label (EPA, 1993a). However, exceptions may exist in labeling programs not reviewed for this research.

Because of the lack of existing research on the topic, a set of criteria, plausibly part of existing ecolabels, was developed for the purpose of testing in this research. The criteria were consistent with two frameworks, Life Cycle Assessment (LCA) and The Natural Step (TNS). LCA is frequently used for the purpose of ecolabeling (EPA, 1992). TNS is more unconventional but is increasingly being accepted as a framework for sustainable development (Natrass and Altomare, 1999). For the purpose of testing, these criteria provided bases for criteria selection.

Criteria were extracted from existing programs and grouped according to impact categories associated with TNS and LCA. Both the LCA and TNS frameworks endorse sustainability, not only environment-related issues. These frameworks were chosen in this study as bases for criteria development to facilitate a more broad-based sustainability label. Endorsement of sustainability criteria was tested in this study by using a questionnaire to determine the importance of these criteria to consumers. Ecolabeling efforts have come about because of increased consumer demand for this type of information. Thus, criteria selection ought to be based on the importance of the criteria to consumers in order to sustain consumer interest in ecolabels.

Efforts to reduce the environmental impact of industrial activities have long been focused on production; the immediate impact of consumption and consumer lifestyles has been considered a less significant problem. Uusitalo (1986) identified two reasons for this: consumers perceive themselves as being dependent on the producers and the consumption alternatives, and consumers feel powerless in influencing decisions regarding industrial activity. In addition, very little knowledge concerning the role of consumers in environmental implications is available or widespread. The significance of consumer decisions is perceived to be less than that of macrolevel factors such as the rapid industrial, economic and population growth (Uusitalo, 1986). Despite this, new approaches to creating sustainable production and consumption processes require redirection of the thinking of all actors in the market. Thus, the role of consumer attitudes cannot be neglected.

## **Consumer attitude**

Consumer attitude is the subject's enduring perceptual, knowledge-based, evaluative, and action-oriented processes regarding a product or its attributes (Kinnear and Taylor, 1996). Attitude measurement may be used to evaluate the effectiveness of a marketing program, or could serve as support in developing these (EPA, 1993a). Measuring consumers' attitudes is central to many marketing situations; attitudinal data are usually the basis for market segmentation strategies. Determining the attitudes of different market segments towards a product or product attributes may also be essential for targeting consumer education.

This study is concerned with the importance that consumers attach to different environmental attributes associated with a product label, in this study referred to as ecolabel criteria. Attitude is expressed by the consumer as liking, endorsement of, or preference for a product or its attributes. Attitude is an important aspect of purchasing decisions and consumer preference for a product (Kinnear and Taylor, 1996). A relationship exists between consumer attitudes and behavior, which may make it possible to predict consumer endorsement of a product based on attitudes (Fishbein and Ajzen, 1975). Similarly, attitudes should be plausible indicators of endorsement of environmental attributes of a product. Different product attributes have different importance to consumers (Hawkins et al., 2001). The consumer's overall attitude towards a product is determined by the perceived performance of the product with regard to each attribute and the importance attached to each. On this basis, it is essential to provide information about product attributes because they play an integral role in attitude formation.

## **Influence of social variables on consumer attitudes**

It has been emphasized that the findings of studies about the relationship between socio-demographic as well as other variables and environmentally conscious consumption should be used in targeting efforts of education related to the impacts of consumer decisions on the environment (Balderjahn, 1988). In the neoclassical view, patterns of consumption are assumed to originate from socio-demographic variables such as household income and composition (Schor, 1999). From a social science perspective, social economic class is also a predictor of consumption patterns; consumers with similar

background express similar consumption patterns. These similarities are present also in situations when no functional needs and considerations apply (Schor, 1999).

The Consumer Labeling Initiative, CLI, is a descriptive survey study performed by the EPA in which consumer preferences for format of ecolabels were examined (EPA, 2000). Socio-demographic factors (age, gender, and presence of children in the household) have been used in previous studies to investigate whether significant differences exist among various groups of interviewees, such as education and income groups (EPA, 2000; Berger, 1997). In the CLI, it was determined that presence of children in the household was significant for whether consumers read the label. In this study, it is hypothesized that environmentally concerned consumers are younger, better educated, with a higher income than the average consumer, and more often female with young children in the household.

These socio-demographic variables have been studied in other contexts concerning consumer attitudes (Balderjahn, 1988; EPA, 2000; Nesmith and Wright, 1997). Balderjahn hypothesized that consumers belonging to the upper social class (highly educated with higher incomes) generally are more ecologically concerned in their shopping behavior than other consumers. However, socio-demographic variables were shown to have little effect on ecologically responsible shopping behavior, except education, which had a relatively high predictive power but was not statistically significant. Male consumers generally were almost twice as concerned about the environment as female consumers if they also express a positive attitude towards environmentally conscious living.

By contrast, Nesmith and Wright (1997) determined that women are more ecologically responsible shoppers than men. Thus, Nesmith and Wright's results contradict those of Balderjahn (1988). This could be due in part to the difference in geographical location (Balderjahn in Germany, Nesmith and Wright in Canada), as well as difference in time (1988, 1997). In general, however, social structural variables have not been shown to be reliable predictors of ecologically responsible shopping behavior (Balderjahn, 1988; Uusitalo, 1986; EPA, 1994; EPA, 2000). However, these variables have not been tested as predictors of ecolabel criteria endorsement. Additionally, Balderjahn (1988) suggested testing in different geographical locations. In this study,

variables previously determined to be unsuccessful as predictors of ecologically responsible shopping behavior were incorporated to determine if socio-demographic variables may be used to predict ecologically responsible shopping behavior as expressed by ecolabel endorsement in the United States.

### **Methods**

A descriptive survey was used in this study to determine consumer endorsement of ecolabel criteria. This method has been used to examine consumer endorsement of different aspects of ecolabels (EPA, 2000), as well as for testing other aspects of ecologically responsible shopping attitudes (Balderjahn, 1988). The first hypothesis ( $H_1$ ) in this research predicted that consumers differentially endorse ecolabels. Some criteria were included because they are currently used in existing ecolabels. Additionally, the criteria were chosen to fit under the impact categories derived from the two frameworks utilized in this study: TNS and LCA. Product categories tested in this research were chosen according to previous research (Palm and Windahl, 1998; EPA, 2000).

Socio-demographic variables have been tested, but generally showed to not be reliable predictors of ecologically responsible shopping behavior (EPA, 2000; Berger, 1997; Balderjahn, 1988; Uusitalo, 1986; EPA, 1993a, 1994). However, socio-demographic variables have not been tested as predictors of ecologically responsible shopping behavior expressed through ecolabel criteria endorsement. For this reason, socio-demographic variables were tested in this research to predict ecologically responsible shopping behavior as expressed by ecolabel endorsement in the United States. Therefore, the second hypothesis ( $H_2$ ) predicted that socio-demographic variables affect the importance of ecolabel criteria to consumers. Socio-demographic variables included age, gender, ethnicity, formal education, and household income and composition. Ecolabel endorsement is assumed to be an indicator of ecologically responsible shopping behavior, although it is recognized that this may not be true in all cases. However, all other predictors of ecologically responsible shopping behavior fall outside the realm of this research.

### **Sample location and population**

The research was conducted in Muncie, Indiana. Muncie has long been used to study consumer attitudes. What came to be known as the Middletown studies were initiated in 1924, and since then, Muncie

has become one of the most studied communities in the United States (Hoover, 1990). Muncie was first chosen by accident, but was later chosen for further studies due to its high number of native-born White Americans. It was thought to be “as representative as possible of contemporary America, and... at the same time compact and homogenous enough to be manageable” (Hoover, 1990, p. 5). Additionally, Muncie was at the time not dominated by one industry, nor connected to a university. The first Middletown studies produced a work that because of its detail and literary style is regarded as one of the most significant books in recent American history: *Middletown in Transition: A Study in Cultural Conflicts* (Lynd and Lynd, 1937). Because of the great detail in which the studies were conducted, Muncie has since frequently been chosen for marketing and attitudinal studies.

The population of interest for this study includes adults at least 16 years old who visited the Bureau of Motor Vehicles (License Branch) on South Madison Street in Muncie, Indiana, during the survey period (July 16-23, 2001). The respondents selected represented an appropriate sample population using limited time, as well as adequate demographic and socio-economic representation, because nearly the entire population of Muncie must visit one of the License Branches in order to renew driver’s licenses, register their vehicles, and register to vote. Only one central License Branch is present in Muncie. However, one smaller branch is located north of Muncie, exclusion of which may contribute to a slight unrepresentativeness of the sample. However, this study only seeks to test a methodology for further research.

### **Procedure**

Importance of ecolabel criteria to respondents was measured through a questionnaire distributed by the Principal Investigator to respondents as they entered the License Branch. Data were collected on six consecutive business days from 9:00 AM to 5:00 PM. After the questionnaires were completed, they were collected and numbered in order of collection. A total of 340 respondents completed the questionnaire. No count of respondents declining to participate in the survey was made. Of the 340 respondents, 179 (53%) completed all questions. Unmarked questions were labeled “no data,” and the remainder of the questions was used in the analysis.

Two different parts of the survey instrument were distinguished. In the first part, respondents were

asked to judge the importance of ecolabel criteria in five product categories: Food, Clothing, Household Chemicals, Electrical Appliances, and Packaging. The second part elicited responses concerning socio-demographic variables of the respondents (age, gender, ethnicity, formal education, combined household income, and age of children in the household). In these questions, several categories were provided, and if the answer did not fit in any of the choices, the respondent selected “other”. The socio-demographic questions were measured categorical and qualitative data.

Respondents completed the first part of the questionnaire by indicating the best response from three possible categories: “Information important for me to have on a label”, “Information unimportant for me to have on a label”, or “I don’t know”. For some of the socio-demographics variables, a range of response choices was provided. For example, there were seven possible answers for level of education, from less than high school through Ph.D./professional. Categorical data were used for the socio-demographic variables age, gender, ethnicity, education, income, and household composition.

### **Statistical treatment**

Chi-square tests were used to test the following relationships:

- endorsement of the presented set of ecolabel criteria in the five product categories versus respondent’s gender
- endorsement of ecolabel criteria versus presence of children in respondent’s household
- endorsement of ecolabel criteria versus respondent’s self-declared environmentalism.

Analysis of variance was used to determine variation of consumer endorsement of ecolabel criteria with respect to the respondent’s age, ethnicity, income, education, and self-declared political orientation.

### **Results**

The criteria tested in this study were provided as hypothetical criteria for a hypothetical ecolabel, however plausible. The criteria tested in this research were:

- Presence of toxins in product
- Presence of artificial substances in product

- Atmospheric effects from manufacturing
- Transportation distance of product
- Resources consumed in manufacturing
- Waste generation as a result of manufacturing
- Use of nonrenewable resources in product
- Amount of energy consumed in manufacturing
- Water pollution as a result of manufacturing
- Geographical origin of product
- Geographical origin of raw material for product
- Product locally produced
- Child labor in manufacturing

Respondents differentially endorsed the presented criteria. Five criteria were utilized in all product categories (child labor, water pollution, atmospheric effects, waste generation, and energy consumption). Of these five, child labor was the most frequently endorsed criterion. This criterion is related to the social welfare impact category as associated with the TNS and LCA frameworks, and may indicate that social welfare issues are considered important to many respondents. The other four criteria are related to environmental health.

Existing ecolabeling schemes do not incorporate consumer endorsement of criteria. Rather, ecolabeling schemes choose criteria according to perceived environmental impacts of specific product categories. To determine consumer preferences for one or more criteria may be helpful in the development and reformulation of ecolabeling schemes. Considering consumer demands constitutes the basis for successful marketing activity.

Regarding all tested criteria (some of which were not utilized in all product categories), the following statements can be made. Based on their levels of endorsement relative to other criteria, energy consumption and transportation distance were unimportant to respondents. Resource consumption and non-renewable resource consumption were also generally unimportant to respondents, as well as the criteria locally produced and waste generation, which were somewhat more frequently endorsed. Water pollution and atmospheric effects were somewhat important to respondents, while presence of toxins, child labor, and principal material were important to consumers in all product categories when present.

These results may indicate that consumers in this sample population are not aware of the interconnection between certain criteria, such as transportation distance and energy consumption with locally produced and atmospheric effects. They may also indicate that respondents are not frequently exposed to such concepts or thinking. However, respondents may simply not care about the impacts of the consumer products they purchase. These causes and relationships need further investigation.

### **Social variables**

In other research, environmental attitudes were shown to differ across a number of socio-demographic variables. It could be argued, then, that attitudes held by people will influence their shopping behavior. Therefore, in this study, it was expected that a relationship would be found between the social variables and endorsement of ecolabel criteria. Several statistically significant relationships were found (Table 1).

Table 1. Interactions between respondent characteristics and ecolabel criteria endorsement.

Interaction	Significance
Age * criteria endorsement	NS
Gender * criteria endorsement	
<i>Food</i>	0.033
<i>Household chemicals</i>	0.030
<i>Electrical appliances</i>	0.034
<i>Packaging</i>	0.000
Ethnicity * criteria endorsement	
<i>Food</i>	0.001
<i>Household chemicals</i>	0.003
Education * criteria endorsement	NS
Income * criteria endorsement	
<i>Electrical appliances</i>	0.042
<i>Packaging</i>	0.018
Children * criteria endorsement	NS
<i>NS = Not Significant</i>	

Age was recoded to determine differences between younger and older respondents' endorsement of ecolabel criteria. Respondents in the age category 40+ generally seemed to endorse ecolabel criteria more than younger respondents. However, no statistically significant difference was noted between younger and older respondents in ecolabel criteria endorsement.

In this study, women expressed a higher endorsement of ecolabel criteria than men. African-American respondents expressed a statistically significantly higher ecolabel criteria endorsement than White American/Non-Hispanic respondents for the product categories food and household chemicals.

No statistically significant differences were found between education groups and ecolabel criteria endorsement. However, a statistically significant difference was found between the <\$9,999 income group and the \$70,000-\$89,999 group for the product categories electrical appliances and packaging, with the lowest income group expressing the highest ecolabel criteria endorsement. In addition, the lowest income group tended to have a higher endorsement of ecolabel criteria for the clothing category. Except for the highest income group, all other income groups followed the same pattern: the lowest income group represented the highest endorsement of ecolabel criteria, after which ecolabel criteria endorsement

becomes lower as the respondent's reported income increases. However, this relationship is not statistically significant for income groups other than the lowest and the second highest. No statistically significant difference was found between respondents with children present in the household and those without children present in the household, for any product category (see Table 1 for statistical significance).

### ***Differential Importance of Ecolabel Criteria to Consumers***

The purpose of this study was to test a method for determining the importance of ecolabel criteria to consumers. Two main objectives of the study were to examine the differential endorsement of ecolabel criteria, and to examine socio-demographic variables as predictors of differential endorsement of ecolabel criteria. This study was thus intended to provide insights as to consumer attitudes towards ecolabels so that standards for policies regarding ecolabels may be developed in order to decrease the environmental impacts of consumption.

It is recommended that ecolabeling schemes take into consideration the differential importance that consumers place on ecolabel criteria. For example, comprehensive studies examining consumer preferences in ecolabels and the importance they place on different criteria are needed, so that this information could be incorporated when into setting criteria for ecolabels. Based on the reported research, more comprehensive studies utilizing a more extensive set of criteria and product categories could be conducted, potentially also in different geographical and political settings. Particularly, it may be beneficial to incorporate aspects of sustainability other than environmental criteria, because social welfare and equity issues were found to be potentially the most important aspects of sustainability for the respondents in this research. This may have several benefits. Primarily, a label incorporating social welfare criteria may be more appealing to consumers than a strictly environmental label.

It may be generalized that overall, respondents in the study desired information about environmental impacts of the products they purchase. The population sampled was from Muncie, Indiana, which may be considered fairly socio-demographically representative of the broader American public. Thus, it can be extrapolated that American consumers in general are likely to desire environmental information in the

form of labels. However, the country has subpopulations that differ socio-demographically from the sample. Different communities may require differential targeting of ecolabeling and environmental education efforts. Already, some groups are socio-demographically responsive to green marketing. If ecolabels are developed only to meet their needs or desires, the benefits of ecolabeling may not reach all socio-demographic groups of American society.

In pursuit of the goals of ecolabeling, ecolabels should be available to all consumers, and not deemed a luxury, in order to guide real environmental improvements. Ecolabeling is a rapidly growing green marketing activity with considerable potential to alleviate the environmental impacts of consumption. A main objective of ecolabeling is to raise awareness about potential environmental impacts caused by products. By providing information regarding environmental attributes in the form of ecolabels, environmental attributes may be incorporated in consumer decision-making. Hence, public awareness can be increased about environmental impact of consumption. In order to make real environmental improvements, marketers and policymakers must strive to convey the message that in an effort to decrease environmental burdens of consumption, individual efforts matter.

For future research, it may be beneficial to utilize several sampling locations and then compare the results in different cultural and social settings. A larger sample size and extended sampling time may also be beneficial to increase the opportunities to make generalized conclusions about the broader American public. This study should be considered a pilot project for developing a framework within which criteria importance can be tested. It is suggested that other criteria, product categories and sample populations be used in future research, to more accurately capture the attitudes of the average American consumer. Ecolabel endorsement is assumed to be an indicator of ecologically responsible shopping behavior. However, all other predictors of ecologically responsible shopping behavior fall outside the realm of this research. Therefore, it is suggested that other predictors of ecologically responsible shopping behavior be tested in future research.

There is a clear lack of literature relative to socio-demographic influences on ecolabel criteria endorsement. Socio-economic and demographic differences have been discussed briefly in previous literature relative to environmental attitudes and envi-

ronmentally concerned shopping behavior. However, no studies have been conducted regarding this aspect of ecolabeling. Future research is needed to explore the relationship between gender, ethnicity, household income, and respondent education and ecolabel criteria importance to consumers. Since ethnicity, income, and education are still closely related in America, determining the relationships between them and ecolabel criteria endorsement may be worthwhile for ecolabel development purposes. Studying the relationships between ecolabel criteria importance and social structural variables further may provide insight regarding the complex patterns of consumer behavior.

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