Evaluating Consumer Response to Environmental Labels on Packaging Using Eye-Tracking

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ABSTRACT

Labeling is one way consumers evaluate products for purchase. Environmental labeling is used to provide environmental information to the consumer. If a person is familiar with a particular labeling process they may be more inclined to consume such product. This study used the Tobii© T60 eye-tracking system to determine differences in gaze durations and time to first fixation between the Forest Stewardship Council (FSC) label and an unsubstantiated label. Labels were placed on two different products (toilet paper and paper plates) and four locations (top-right corner, bottom-right corner, top-left corner, and bottom-left corner). Additionally, after the participants viewed the images they were asked to complete the six-question GREEN Consumer Values scale and then asked to sort eighteen different images based on label type and price. Participants did not differentiate between the two labels. Labels placed in the bottom-right corner received the least amount of attention (as measured by fixation duration) when compared to labels placed in the other three corners. Eye-tracking data was then split at the median and two groups were created: low label fixators versus high label fixators. High label fixators scored overall higher on the GREEN Consumer Values scale than low label fixators. Participants sorted the 18 products based on price, putting the lowest-labeled product first 84% of the time. Future studies could include looking at other environmental labels and broader populations.

Table of Contents

List of Figures

List of Tables

1.0 – Introduction

The typical consumer in a big box store is bombarded with over 40,000 products available for purchase (Botti and Iyengar 2006). In this environment, consumers must make effective, economical and often quick purchase decisions. One of the biggest determinants in a purchase decision in-store is product packaging (Prendergast and Pitt 1996). Packaging allows a product to stand out, display a message and persuade the consumer (Prendergast and Pitt 1996). The messaging presented on a package is particularly important in a world that is demanding more environmentally friendly products (Kumar and Ghodeswar 2015).

Gurau and Ranchhod (2005) define an environmentally friendly product as one that is "free of toxins and produced in a way that did not harm the environment". Environmental labeling is one way to notify consumers that they are purchasing an environmentally friendly product. Environmental labeling is defined by the United States Environmental Protection Agency (US EPA 1998) as "making environmental information available to the appropriate consumers". Third-party verified environmental labels are a way in which conscientious consumers can separate fact from fiction (US EPA 1998). When a consumer begins their search for needed products there are products with environmental labels and products without such labels. However, there is a high amount of uncertainty as to the value of environmentally labeled products and if consumers are willing to purchase these products (Kim and Choi 2009). Effective label design and placement on packaging is potentially a key component of the full sustainability cycle, yet we know little about adults' use of label information in consumer choices.

This study examined college students' perceptual awareness and response to one particular environmental label, the Forest Stewardship Council (FSC). The Forest Stewardship Council (FSC) sets parameters for sustainable forest management and accredits and audits third party certification agencies (Fernandez and Guzman 2005). The resulting label reflects this certification and brings knowledge to consumers that the forest product they are interested in purchasing has been sourced with environmental responsibility (as measured by the FSC criteria). A company must go through a rigorous process in order to have its products certified by the FSC (Cauley et al. 2001). In theory, FSC certification is beneficial to the environment but its impact is compromised if consumers are unaware of this label and the certification process. If the consumer is unaware of the particular certification process for a label they may fall victim to "green-washing", which is defined as "disinformation disseminated by an organization so as to present an environmentally responsible public image" (Davidsen 2011). Due to the high demand of environmentally friendly products companies have found that they can use terms that are legally uncontrolled such as *organic, natural, eco-friendly* (Davidsen 2011).

The existing literature provides evidence to suggest that many consumers have no knowledge regarding what the FSC label stands for and it is unknown if this third-party verified label is more meaningful to the consumer than an unsubstantiated label. As a first step in examining this consumer-oriented aspect of choice behavior, this study looked at scanning patterns of students at Virginia Tech in regards to environmental label focus, processing, and evaluation. This study utilized eye-tracking technology and the GREEN

Consumer Values marketing scale while taking into account different pricing strategies of the given products.

This study used a research oriented eye-tracking system to test consumer response to the FSC label on packaging. Eye tracking offers insight into a consumer' visual attention span and processing strategy (Graham, Orquin and Visschers 2012). Eye-tracking is a quantitative method for studying the visual impact of labeling because it provides data on such metrics as time to first fixation on label components, amount of time devoted to processing labels as compared to other aspects of packaging, and which label placement is most effective. In addition to eye tracking, the GREEN Consumer Values Scale was administered to participants to gage their environmental purchasing behavior and awareness. Lastly, participants were asked to complete a physical sort of items (i.e., combinations of product, labeling, and price) to determine purchase intention.

1.1 - Problem Statement

The main problem is that resources are expended everyday on certification processes so that products can display certain environmental labels; however, there is little knowledge as to what extent such labels impact purchase behavior, what the most effective product placement may be for maximum impact, or how consumers evaluate labels in relation to price level in their purchasing decisions. While there are an increasing number of environmental labels applied to products in the marketplace, few studies have attempted to determine if consumers are noticing these labels and if they are more inclined to purchase a product with such labeling. Furthermore, it is unknown if a product with a label that indicates a rigorous certification process versus an

unsubstantiated label appeals to the consumer more, less, or the same (i.e., do consumers differentiate real from unsubstantiated labels).

This study looked at the Forest Stewardship Council (FSC) label as well as an unsubstantiated label. The consumers in this study were 18-23 year old students at Virginia Tech. A review of existing literature failed to identify any studies that investigated people in this age group and their knowledge of the FSC label. There is also very limited research on college students in the United States and their environmental values in regards to purchase decisions. It is imperative to understand how students are viewing environmental problems and if they believe their purchase behaviors play a role in these issues. College students are the future consumers of the United States and in a few short years will be making much larger purchase decisions effecting and driving our economy. Their values could heavily drive companies to produce more environmentally friendly products or they may not place any value on environmentally products and drive companies the opposite way.

The Forest Stewardship Council (FSC) certification process is essential in protecting our forests and correctly harvesting forest products (Cauley et al. 2001). It is critical because if trees are not harvested in a sustainable manner one of our most valuables could be depleted. If education on environmental labeling can come into play earlier, then these students will be able to make much more informed purchases. Environmental labels are important because they provide consumers with information they may not know about the product that they would have to spend time researching if the product did not display a label (US EPA 1998). Arguably the greatest benefit of environmental labeling is it allows consumers to vote in the marketplace. That is, if they

purchase products with environmental labels they are making a statement to other companies that they value goods that do not harm (or minimize harm) the environment and potentially shift the market (US EPA 1998).

1.2 – Objectives

The overall objective of this research was to better understand consumer response to combinations of environmental labels and price on consumer paper products.

The research seeks to:

- Determine whether consumers differentiate between substantiated and unsubstantiated environment claims on package labels;
- Investigate the effects of price and environmental labeling on purchase intention;
- Determine the role of environmental orientation on evaluation of environmental labels and purchase intention.

2.0 - Review of Literature

This literature review is written in four categories: environmental labeling, purchase behavior of environmentally friendly products, eye-tracking experiments within the labeling and marketing field, and literature utilizing the GREEN consumer values scale.

2.1 - Environmental Labeling

The demand for environmental labeling has been steadily increasing (US EPA 1998). There are two different categories of environmental labels, first-party verified and third-party verified (US EPA 1998). First-party verified labels confirm their environmental standards by the makers of the product and often are used to promote their product as being environmentally friendly (US EPA 1998). First-party verified labels provide no real validation that the product is not harming the environment (US EPA 1998). Third-party environmental labeling programs are performed by outside, independent, usually not-for-profit organizations that verify the product is meeting certain environmental criteria (US EPA 1998).

Brands and labels can provide consumers with quality assurance (Sammer and Wustenhagen 2006). Sammer and Wustenhagen (2006) looked at energy labels (along with other aspects of a product such as price and brand) and the effect labels have on consumer purchase behavior. Consumers were found to have an elevated level of responsiveness to an energy label (Sammer and Wustenhagen 2006). This study found that there is "a positive effect of the label in making the energy issue meaningful for them" (Sammer and Wustenhagen 2006). This provides evidence that environmentally friendly labeling may persuade a consumer in regards to their purchase decision.

Horne (2009) looked at limits to labels and how this plays a role in consumption. One finding in this study is that consumers are drawn to simple environmental labels because they believe they understand them better and can make a better purchase decision; however, some of the simple labels can "undermine efficacy of environmental claims" (Horne 2009). This is unfortunately evident with products that place the key phrase "*All-Natural*" within their labeling (Davidsen 2011). There is no federal regulation on this phrase and companies can place this on their products without substantiation. There is a significant problem in the amount of information being thrust at the consumer regarding product labeling and it is "becoming indecipherable" (Horne 2009). Horne concludes that environmental labels are not enough and stronger governmental regulation and input is necessary for the future (2009).

The Forest Stewardship Council labeling has faced many challenges as well as many competing labels (Gulbrandsen 2005). The main problem with competing environmental labeling in the same field is customer confusion. Over twenty years ago third-party forest certification began and now two main certification bodies are in the forefront, the Forest Stewardship Council (FSC) and the Sustainability Forestry Initiative (SFI) (Fernholz et al. 2015). One of the main differences between the two groups is that SFI only certifies forests in the United States and Canada whereas FSC certifies forests globally (Fernholz et al. 2015). Another difference is that SFI is much more flexible towards the individual company's needs and critics have argued that this makes the SFI label not as stringent and not as environmentally friendly (Gulbrandsen 2005).

Rather than investigating potential differences in consumer responses to the SFI versus the FSC label, this study examines a broader question; does consumer response to

the established FSC label differ from the response to an unsubstantiated label. Consequently, I contrasted a validated environmental label (the FSC label (Figure 1)) with an unsubstantiated environmental label (Figure 2) developed for the sole purpose of this research.

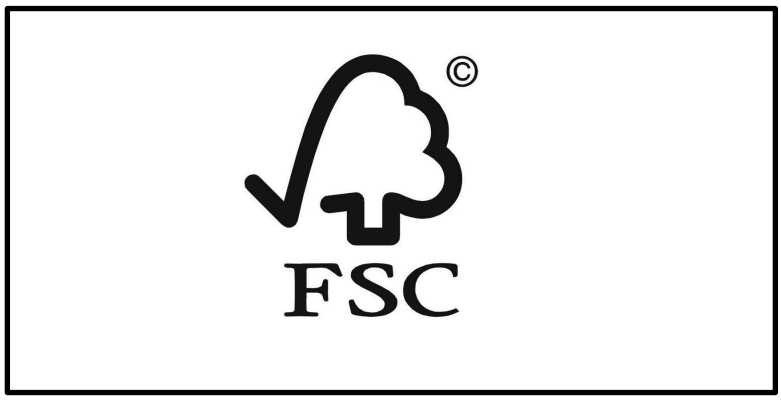

Figure 1: Substantiated Forest Stewardship Council Label

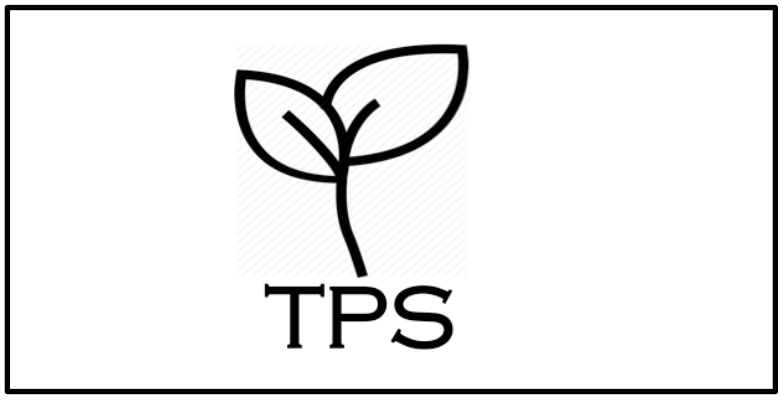

Figure 2: Unsubstantiated Label Developed for Research

These labels are similar in design however the unsubstantiated (TPS) label has no connection to environmental impacts. Consumers could potentially have a heightened consciousness toward environmental labels and this could be based on a salient design and/or high community approval value or other unknown factors (Sammer and Wustenhagen 2006). Most consumers are not educated on the environmental labels before they are out shopping, making informed decisions difficult. The research conducted for this thesis will look at the FSC label as well as an unsubstantiated label. If

the subjects have no prior knowledge on either of these labels they may not have a preference and only make a decision based on price.

2.2 - Purchase Behavior of 'Environmentally Friendly' Products

The emotional state of a consumer is important when they are in a store and making purchase decisions (Sherman et al. 1997). When the consumer is in a store that makes them feel happy (generally this is accomplished through upbeat music and bright colors) they are more likely to purchase items they did not necessarily go into the store to purchase (Sherman et al. 1997). Sherman (1997) relates such purchases to eye-catching displays in stores as well as unique product design, which entice the consumer and increases the probability of purchase.

Kumar and Ghodeswar (2015) look at the factors affecting consumers green product purchase decisions. There are two main reasons why a customer might buy an environmentally friendly good: perceived intrinsic value (individual impact) or perceived extrinsic value (broader impact on civilization) (Kumar and Ghodeswar 2015). Intrinsic value is defined as a self-invested interest in protecting the environment while extrinsic value is defined as more of a social image or product characteristics as a whole (Kumar and Ghodeswar 2015). Kumar and Ghodeswar (2015) found that those who connect with the environment on either a personal level or see it as a larger societal issue are more likely to purchase the environmentally friendly merchandise.

In a study looking at dolphin-safe labeling it was found that consumers do respond to environmental labels (Teisl, Roe and Hicks 2001). The results in this study indicated that when consumers felt emotionally tied to the idea that they were harming dolphins by purchasing tuna, they were much more likely to purchase the dolphin safe

tuna (Teisl, Roe and Hicks 2001). There also was an educational aspect to this dolphin-safe labeling that made a huge impact on the purchase decision (Teisl, Roe and Hicks 2001). When customers are educated on an issue they are going to make a more informed decision and the chances of them choosing the more environmentally friendly option increase (Teisl, Roe and Hicks 2001).

According to a study done in conjunction at Purdue University and the University of Melbourne (Cason and Gangadharan 2002), when consumers are unable to determine the environmentally quality of a good in the marketplace they may not be willing to pay a higher price for that good. In this study, undergraduate students were separated into two groups: buyers and sellers, in order to create an imitation marketplace and determine if market performance increases due to unverifiable or verifiable quality claims. These authors concluded that consumers are willing to pay more for a verified environmentally friendly product but when this is unclear they are not willing to pay more (Cason and Gangadharan 2002).

One of the most relevant studies to the research conducted in this experiment was done in Denmark between the years of 1997 and 2001. This study looked at the Nordic Swan environmental label on toilet paper, paper towels, and detergents (Bjørner, Hansen and Russell 2004). Different brands of toilet paper, paper towels, and detergents would display this environmental label at different times and data was gathered on purchase patterns when the product was presenting the label versus when it did not show the label (Bjørner, Hansen and Russell 2004). This study is similar to the research conducted in this experiment in that it involved labeling of paper products. One notable difference, however, was that the label used in this experiment was exclusive to forest products. The

Nordic Swan is not limited to a particular group of products but is rather all encompassing and evaluates a product's impact on the environment throughout the whole life cycle (Bjørner, Hansen and Russell 2004). The second difference was that brand was an influence in this experiment. Since Bjørner, Hansen and Russell's (2004) study this took place in the actual marketplace there were limitations as to what brands displayed the Nordic Swan. These authors found that consumers in Denmark had a marginal willingness to pay for swan-labeled toilet paper and detergents. This willingness to pay ranged from 13-18% of the price (Bjørner, Hansen and Russell 2004). There was no effect on purchase of paper towels but this is believed to be because most consumers in Denmark do not use paper towels often, but instead rely on dish clothes and reusable options (Bjørner, Hansen and Russell 2004).

Laroche et al. (2001) found that "80 percent of consumers who are likely to spend more for green products say they refuse to buy products from companies accused of being polluters." This paper gave examples of Walmart and Proctor and Gamble as being in the media for polluting and making false environmental claims (Laroche et al. 2001). The authors used a series of survey questions to gauge environmental knowledge and purchase behavior of green products, which found that 13.1 percent of respondents indicated a willingness to pay a higher price for green products (Laroche et al. 2001). This is a small percentage of consumers who are actually willing to pay more for environmentally friendly products. The study surveyed residents in a large city and was not limited to a certain age range or demographic.

Green consumerism is highly depended on the consumer being able to trust the labeling (Sønderskov and Daugbjerg 2011). Green consumerism can be defined as

making purchase decisions based on environmental impact. The consumer must be confident that the label that is on the product is reliable and worth the additional cost (Sønderskov and Daugbjerg 2011). This study looked at the organic label in particular and found that citizens who trusted in their governmental institutions were more likely to rely on labeling versus those who distrusted these institutions (Sønderskov and Daugbjerg 2011). These findings carried over to labels that were third-party verified as well. If the consumer is distrusting of governmental institutions they are still going to be distrusting of labeling even by third-party entities (Sønderskov and Daugbjerg 2011).

If a consumer feels emotionally and/or philosophically invested in an issue they may be more likely to purchase a product that exemplifies those values (Teisl et al. 2001). In the current experiment, the FSC label was examined which certifies that the trees used were harvested in a sustainable manner. If consumers were to feel more emotionally connected to trees and understood the reality of deforestation more clearly, perhaps they would be more inclined to purchase a product with the FSC label. In this research many students have never seen the FSC label and therefore will not have any background knowledge on the label or the process of certification. This may result in not feeling a connectedness and not willing to pay a price premium for such a product.

2.3 - Eye Tracking

Duchowski (2007 pg.3) demonstrates the importance of eye tracking by stating,

> "If we can track someone's eye movements, we can follow along the path of attention deployed by the observer. This may give us some insight into what the observer found interesting."

Eye tracking provides data that is simply meaningful. The Tobii© eye tracker uses two different methods to establish eye position: bright pupil eye tracking and light pupil eye tracking (Tobii© User Manual 2011). Bright pupil eye tracking is where "an illuminator is placed close to the optical axis of the imaging device, and causes the pupil to appear lit up" whereas dark pupil eye tracking is the opposite "the illuminator is placed away from the optical axis causing the pupil to appear black" (Tobii© User Manual 2011).

Few published studies exist regarding eye tracking and environmental labeling. The closest literature available to environmental labeling was a study looking at nutritional labeling. However, there is significant literature available in regards to general marketing research utilizing the power of eye tracking.

Eye tracking can be found widespread in marketing research (Gofman et al. 2009). This study looked at the packaging of boxed wine, and found that participants' engaged with pictures the most (as opposed to text) and that gender played a role as well (Gofman et al. 2009). That is, females were more responsive to the visual packaging elements than their male counterparts. Overall this study is interesting because it suggests that consumers are more likely to spend time on a product that is visually pleasing (Gofman et al. 2009).

In a study using eye-tracking to determine whether in-store shelf organization works it was found that different shelf-facings (where products are placed on shelves) is effective in gaining more visual attention (Chandon, Hutchinson, Bradlow and Young 2009). In this study it was found that products placed on the top and middle shelves had a much higher chance of being looked at then the products on the lower shelves (Chandon, Hutchinson, Bradlow and Young, 2009). This highlights the point of placement. Placement is important in eye-tracking studies and plays a role in fixation duration time.

Graham and Jeffery (2012) investigated nutritional labels using eye tracking. They found that consumers spend more time looking at the nutrition labels of the food they are actually going to purchase versus just browsing (Graham and Jeffery 2012). Participants self-reported whether they read nutritional labels often and their self-reporting was consistent with their eye tracking data (Graham and Jeffery 2012). In my research I asked participants to self-report their environmental values using a given scale as well as view products with environmental labels with the intent to purchase. Self-reporting can be difficult to validate because people are not always honest with their evaluations of themselves and their beliefs. Graham and Jeffery (2012) affirm with the use of eye tracking that in regards to nutritional labels participants did self-report genuinely.

A study done at Clemson University investigated caption placement using eye tracking technology (Ouzts et al. 2013). Participants looked at four different captioning styles on a video clip, these data were then analyzed by determining the amount of time spent reading the different types of captions (Ouzts et al. 2013). There was a significant

difference between the four different styles and it was concluded that captioning styles play a significant role in viewing strategies (Ouzts et al. 2013).

The FSC label is a highly visual element so it may draw the consumer in more than text alone. However, the unsubstantiated label also is visually pleasing as well so perhaps participants will only be drawn in because of the imaging and not any prior knowledge of the labels. Participants also may also be drawn to the label they find to be more aesthetically pleasing.

2.4 - GREEN Consumer Values Scale

The GREEN Consumer Values Scale was published in the *Journal of Consumer Psychology* (Haws et al. 2013). Haws et al. (2013) define their scale as "the tendency to express the value of environmental protection through one's purchases and consumption behaviors." This validated marketing scale is used to capture an individuals' purchase decision in regards to environmentally friendly products (Haws et al 2013). Since this is a relatively new marketing scale there are only a few published paper citing this instrument.

One of the most thorough studies utilizing the GREEN Consumer Values Scale is a study looking at the potential installation of solar power systems (SPS) and how potential customers environmental values relate to purchase intention (Chen 2014). Chen hypothesizes that "people with a higher environmental value [i.e., score on the GREEN scale] will show a higher SPS install intention". Participants were college students as well as faculty and staff at a University in Taiwan (Chen 2014). Environmental value was determined through the use of the GREEN Consumer Values Scale and "showed a positive significant direct effect on SPS install intention (γ=0.78,

t-value=18.68)" (Chen 2014).

In a study looking at recycling and increased resource consumption the GREEN Consumer Values Scale was administered to participants (Catlin and Wang 2012). This study found that in certain circumstances the option to recycle could actually increase the consumption of resources by the individual (Catlin and Wang 2012). This result stems from the individual not directly paying for the item; the example in the study was paper towels in a public restroom. This experiment was different in that each participant was directly making a purchase decision. They are simulating spending their own money on the product so they may be more likely to make a decision based on cost. Catlin and Wang (2012) found that the GREEN Consumer Values Scale had no relationship to the amount of paper used so they excluded this measure from further analysis. In order to determine this result Catlin and Wang used Analysis of Covariance, which is a general linear model that blends ANOVA and regression (2012). There was no other discussion on the scores calculated.

Gottschalk and Kirn (2013) investigated 'cloud computing' as a more energy efficient information technology infrastructure in order to determine if consumers valued this new infrastructure and its environmentally friendly nature. To determine environmental awareness the GREEN Consumer Values Scale was administered to participants; however, there was no further discussion on the results of this given scale and no indication of why they chose not to report the results (Gottschalk and Kirn 2013).

Out of the few studies published utilizing the GREEN Consumer Values Scale not a single one mentions their results from the scale. Instead the studies report that that they are not including the outcomes in their analyses. This limits the literature review for this

section as well as does not provide any type of methodology for data gathered from this scale.

3.0 - Methods

3.1 - Participants

The population of interest for this research was college students. This population was chosen because of the lack of information in the marketplace on their purchase preferences in regards to environmental labeling and for convenience. In addition, this population is the future consumer base and may be more aware of environmental responsibility (Straughan and Roberts 1999). The sample frame for this research was college students at Virginia Tech. The sample included 79 undergraduate students at Virginia Tech whose age ranged from 18-23 years (n = 26 males, n = 53 females). The sample was drawn from three groups: students enrolled in Biology Lab (BIOL 1006), Sustainable Biomaterials course (SBIO 2614), and in the Psychology SONA Experiment Management System were offered extra credit for participation. Participants had varied backgrounds and represented all the 8 colleges at Virginia Tech.

3.2 - Materials and Equipment

Eye-Tracking Device and Procedures

The device used for both the preliminary testing and the final experiment was a Tobii© T60 eye tracker that has a two-camera system and records dual eye movements through bright and dark pupil eye tracking (Tobii© User Manual 2011). The Tobii© T60 Eye Tracker consists of a 17" Thin Film Transistor (TFT) monitor, which was connected to a Dell desktop computer and monitor.

The Tobii© T60 has a sampling data-rate of 60 Hz; that is, 60 gaze data points per second are collected for each eye (Tobii© User Manual 2011). The Tobii© T60 has a built-in server, which controls all events being presented to the participant.

The eye tracker was arm-mounted and positioned approximately 65 cm (25.6 inches) from the participant's eyes (Tobii© User Manual 2011).

The consumer typically does not randomly scan different points of a package; rather their eye is drawn to an area of interest (AOI) (Gofman et al. 2009). Eye tracking quantifies the areas with the most gazes (fixations) and the areas attracting the most attention. It is impractical to evaluate metrics for each pixel so AOIs are drawn around the particular item of interest. Areas of interest (AOIs) were drawn on particular areas of the images of packages (specifically around the labels) and this was used to determine the amount of time the participant spent on the labels than the other portions of the package.

Using Studio Professional software (v 3.1) fixation duration was calculated as the average total amount of time the participant fixated within a particular AOI during each trial. Fixation count was also calculated as the average total number of times the participant fixated within an AOI during each trial. Fixation duration is when the eyes are foveated on a certain location for a brief period of time (Gofman et al. 2009). The average fixation lasts for 200-300 milliseconds (Gofman et al. 2009).

GREEN Consumer Values Scale

The GREEN Consumer Values Scale was utilized in this study (Haws et al. 2013). This scale was used because it is closely aligned to the research questions. Also it was simple to answer and did not take participants long to complete. This six-question scale evaluates the "tendency to express the value of environmental protection through one's purchases and consumption behaviors (Haws et al 2013)." Participants respond to the 6 questions by rating themselves on a 7-point Likert scale from (1) meaning to strongly disagree to (7) meaning to strongly agree.

According to the authors of the scale, the scores demonstrate that "stronger green consumption values increase preference for environmentally friendly products through more favorable evaluations of the non-environmental attributes of these products (Haws et al 2013)." This scale developed by Kelly Haws, Karen Winterich and Rebecca Naylor makes the following statements:

1. *It is important to me that the products I use do not harm the environment.*
2. *I consider the potential environmental impact of my actions when making many of my decisions.*
3. *My purchase habits are affected by my concern for our environment.*
4. *I am concerned about wasting the resources of our planet.*
5. *I would describe myself as environmentally responsible.*
6. *I am willing to be inconvenienced in order to take actions that are more environmentally friendly.*

Purchase Preference of Labeled Products

Participants were shown nine images of toilet paper and nine images of paper plates to physically sort. Label location did not change but remained constantly in the right-hand corner except when the label was not present at all. A price was listed below the images. Paper plates were given a starting price of $7.97, which is comparable to the pricing in a supermarket in Blacksburg, Virginia. This price was then increased and decreased by 10% (i.e., sometimes the environmentally friendly option was more expensive and sometimes it was the less expensive option).

3.3 - Procedure

Participants who volunteered to be a part of this study first signed an informed consent form (see Appendix A) and were given an opportunity to ask questions about the research project. They also had the right to withdraw from the experiment at any time. This experiment was conducted in the following order:

1. Eye-Tracking Procedure
2. Purchase Preference of Labeled Products
3. GREEN Consumer Values Scale
4. Questionnaire

Eye-Tracking

Calibration Procedure

Calibration is necessary before proceeding with any eye-tracking tests. Each participant was calibrated using a five-point calibration sequence that comes preset with the Tobii© software. The calibration can be started once the participant is looking directly at the screen. During calibration, a small forthcoming circle appears successively at five points on the screen: the four corners and center. The participant is instructed to simply watch the circle. After termination, the eye tracking system presents gaze information superimposed on each of these positions, and the experimenter can either accept the calibration results (i.e., most of the foveation occurs in the center of each circle), or they can select any and all points for re-calibration. All participants were successfully calibrated.

Testing

A preliminary test was conducted with 29 participants. In this preliminary test participants were asked to view images displayed on the Tobii© T60 eye-tracker of both toilet paper and paper plates. The first image shown was a side-by-side comparison of either paper plates or toilet paper with no pricing. Participants were given directions to consider the products for purchase. The product either displayed the FSC label, the unsubstantiated label, or had no label present. The labels were displayed in different corners of the product, top-right, top-left, bottom-right, and bottom-left (Figure 3).

Figure 3: Side-by-Side Comparison of Products Shown on Eye Tracker

After the side-by-side comparison image was shown the same two products were displayed again but with pricing underneath. Participants were given instructions to "look" at the product they would purchase. The Tobii© T60 was able to record these data. The price associated with the products changed for each product comparison. For example, paper plates were given a starting price of $7.97, which is comparable to the pricing in a supermarket in Blacksburg, Virginia. This price was then increased and

decreased by 10%. Sometimes the environmentally friendly option was more expensive and sometimes it was the less expensive option (Figure 4).

Figure 4: Side-by-Side Comparison of Products Shown on Eye-Tracker with Pricing

After the preliminary data was collected the experiment was modified to shorten the eye-tracking procedure. The preliminary procedure took a much greater amount of time and participant fatigue impacted the validity of the data. Fifty additional participants (n=16 males, n=34 females) were tested in the modified eye-tracking procedure, viewing 24 images displayed on the Tobii© T60 eye-tracker. Participants were given one instruction at the beginning of the presentation: "*Evaluate the following products for purchase*". Twelve images were of toilet paper and 12 images of paper plates were each shown for 3 seconds. These images were randomized using a random number generator table and 4 different presentation versions were created: 13 participants viewed version one, 12 participants viewed version two, 13 participants viewed version three, and 12 participants viewed version four. These images contained either the FSC label, or an

unsubstantiated label created for the research, or had no label present. Both the FSC label and the unsubstantiated label were displayed in the corners of the product, top-right, top-left, bottom-right, and bottom-left. The FSC label was shown 4 times on the paper plate and 4 times on the toilet paper randomly throughout the presentation for a total of 24 seconds. The unsubstantiated label was shown 4 times on the paper plate and 4 times on the toilet paper randomly throughout the presentation for a total of 24 seconds. The paper plate and toilet paper with no label present were shown 4 times each randomly throughout the presentation for a total of 24 seconds. For an example of the image with the unsubstantiated label present (Figure 5).

Figure 5: Example of toilet paper (displaying the FSC label) and paper plates (displaying the unsubstantiated label). Respondents were shown twelve variations for each product.

Purchase Preference of Labeled Products

Once the participants finished viewing the 24 images on the Tobii© T60 eye-tracker they were then asked to do a physical sorting activity. Fifty participants were asked to sort 18 images. This sorting activity required each participant to sort 9 images of toilet paper and 9 images of paper plates separately from most likely to purchase to

least likely to purchase. Label location did not change but remained constantly in the right-hand corner except when the label was not present at all. A price was listed below the images. For example, paper plates were given a starting price of $7.97, which is comparable to the pricing to bulk pricing of this item in a supermarket in Blacksburg, Virginia. This price was then increased and decreased by 10%. Sometimes the environmentally friendly option was more expensive and sometimes it was the less expensive option. The mean time spent on the sorting was 4.5 minutes. For an example of the images sorted see Appendix B**.**

GREEN Consumer Values Scale

The GREEN Consumer Values Scale was administered to 79 participants. This step was always completed after the eye-tracking data was collected. It was important that the participant did not understand why they were viewing images of paper plates and toilet paper and administering the scale beforehand may have biased the response.
The GREEN Consumer Values Scale is made up of 6 different questions. Participants ranked themselves on a 7-point Likert scale with one meaning to strongly disagree and seven meaning to strongly agree (Figure 6).

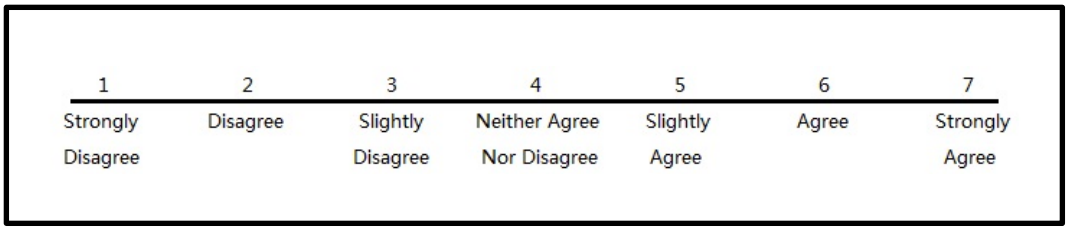

Figure 6: Green Consumer Values 7-Point Likert Scale

Questionnaire

The final step in the procedure was a three-question questionnaire. Fifty participants completed this step. The questionnaire asked if they knew what either environmental symbol means as well their college major. See Figure 7 for an example of this questionnaire.

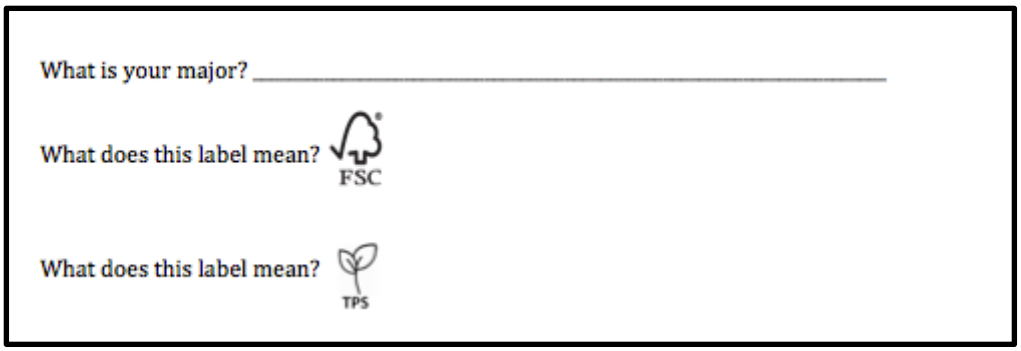

Figure 7: Questionnaire Given at the End of Experiment

4.0 – Results

4.1 - Eye-Tracking

The final sample consisted of 50 participants who viewed 24 images on the Tobii© T60. Fixation duration and time to first fixation were analyzed by product type (toilet paper or paper plates), label placement (top-right corner, top-left corner, bottom-right corner, and bottom-left corner), and label type (FSC or unsubstantiated).

Fixation Duration

A fixation is where the participant places attention. Fixation duration is defined as "the amount of time a fixation lasts" which is reported in this data in seconds (Tobii© User Manual 2011). Rectangular areas of interest (AOIs) were drawn on both the FSC label and the unsubstantiated label. To facilitate statistical analysis through Tobii© Studio AOIs are necessary as it is impractical to evaluate metrics at the pixel level. AOIs were drawn around the labels and then used to determine the amount of time the participant spent on the labels than the other portions of the package. These AOIs used in this study were drawn as the same height and width as the labels (Figure 8).

Figure 8: Still Frame of the Areas Of Interest (AOI) around the FSC label and the Unsubstantiated Label

Fixation duration was calculated as the amount of time (summed) in seconds participants spent looking at either the FSC label or the unsubstantiated label. Both the FSC label and the unsubstantiated label were shown throughout the presentation for a total of 24 seconds each. Each image was shown for 3 seconds before changing to the next.

The mean fixation duration (averaged across participants) was calculated for the symbols on the paper plates (*Mean(FSC Label)*=2.88 seconds, *SE*=0.28) as well as the mean fixation duration for the symbols on the toilet paper (*Mean(FSC Label)*=3.23 seconds, *SE*=0.30). A two-sample paired t-test was conducted on the mean fixation duration to measure if there was significance between the amounts of time spent on the labels on the toilet paper versus the paper plates. There was no significant difference between the two products ($t(48)=1.30$, $p>0.20$). Given this information it is concluded that there is no significant difference between product type and subsequent analyses were collapsed into one variable for product type for analysis of fixation duration.

The amount of time each participant spent looking at both the FSC label as well as the unsubstantiated label was calculated using fixation duration. The mean fixation

duration for the FSC label was calculated (*Mean(FSC Label)*=6.78 seconds, *Standard Error*=0.57). The mean fixation duration for the unsubstantiated label was calculated (*Mean(Unsubstantiated Label)*=6.18 seconds, *Standard Error*=0.53).

The mean fixation duration was calculated for each label placement (top-right, top-left, bottom-right, bottom-left) for both the FSC label as well as the unsubstantiated label. *See Table 1.*

Table 1: Mean Fixation Duration for Label Placement

Position on Product:	Top-Right	Bottom-Right	Top-Left	Bottom-Left
Mean Fixation Duration	1.89 seconds	1.46 seconds	1.81 seconds	1.90 seconds
Std. Error of Mean	0.18	0.12	0.18	0.16

A two-way by four-way repeated-measures within-subjects ANOVA was conducted on the total fixation duration to determine if there was a significant difference between the amounts of time spent on the two labels (unsubstantiated label versus FSC label) in the various placement positions (top-right, top-left, bottom-right, bottom-left). There was a significant difference in fixation duration ($F(3,93)=4.27$, $p<.01$). Two-sample t-tests were conducted between the placements of the labels in order to determine significance as well as between the two labels (FSC and unsubstantiated). A two-sample paired t-test was conducted on the mean fixation duration to measure if there was significance between the amounts of time spent on the FSC label and the unsubstantiated label. There was no significant difference between the unsubstantiated label and the FSC label ($t(48)=1.61$, $p>0.10$). Given this information it is concluded that there is no

significant difference between label type and analyses were collapsed into one variable for label type.

There was a significant difference found between the amount of time spent on the bottom-right placement and the top-right placement ($t(44)=2.53, p<.02$). Also, there was a significant difference found between the amount of time spent on the bottom-right and the bottom-left ($t(47)=3.89, p<.01$). *See Table 2.*

Table 2: Paired Samples Test for Fixation Duration of Label Placement

T-Test Results:	t	df	Sig. (2-tailed)
Pair 1 – Top-Left & Top-Right	-.496	43	.622
Pair 2 – Bottom-Right & Bottom-Left	-3.89	47	.000
Pair 3 – Top-Left & Bottom-Left	-.924	46	.360
Pair 4 – Top-Right & Bottom-Right	2.53	44	.015

Time to First Fixation

The time to first fixation is a measurement of the amount of time it takes the participant to fixate on an area of interest (Tobii© User Manual 2011). This measurement starts as soon as the image with the area of interest is displayed (Tobii© User Manual 2011). AOIs were drawn on particular areas of the images of packages (specifically around the labels) and this was used to determine the amount of time the participant spent on the labels versus the other portions of the package. These AOIs were drawn as the same height and width as the labels (Figure 6). Both the FSC label and the unsubstantiated label were shown throughout the presentation for a total of 24 seconds each, with each image being shown for 3 seconds.

The mean time to first fixation for the FSC label was calculated (*Mean(FSC Label)*=0.22 seconds, *SE*=0.04). The mean time to first fixation for the unsubstantiated label was calculated (*Mean(Unsubstantiated Label)*=0.27 seconds, *SE*=0.06). There was no difference found between the mean time to first fixation for the unsubstantiated label versus the FSC label ($t(48)=0.68$, $p>0.50$).

The mean time to first fixation was calculated for each label placement (top-right, top-left, bottom-right, bottom-left) for both the FSC label as well as the unsubstantiated label. *See Table 3.*

Table 3: Mean Time to First Fixation for Label Placement

Position on Product	Top-Right	Bottom-Right	Top-Left	Bottom-Left
Mean Time to First Fixation	.40 seconds	.64 seconds	.46 seconds	.26 seconds
Std. Error of Mean	.07	.08	.09	.05

Two-sample t-tests were conducted between the placements of the labels in order to determine significance. There was a significant difference found for the time to first fixation between the bottom-right and bottom-left, top-left and bottom-left, as well as the top-right and bottom-right. *See Table 4.*

Table 4: Paired Samples Test for Time to First Fixation for Label Placement

T-Test Results	t	df	Sig. (2-tailed)
Pair 1 – Top-Left & Top-Right	.160	43	.874
Pair 2 – Bottom-Right & Bottom-Left	5.26	47	.000
Pair 3 – Top-Left & Bottom-Left	2.15	46	.037
Pair 4 – Top-Right & Bottom-Right	-2.34	44	.024

Summary of Findings

There was no significant difference found between label types (FSC and unsubstantiated) or between products (toilet paper and paper plates). Label placement was significant in both the findings for fixation duration and time to first fixation. *See Table 5.*

Table 5: Summary of Findings for Label Placement

Position on Product	Top-Right	Bottom-Right	Top-Left	Bottom-Left
Mean Fixation Duration	1.89 seconds	1.46 seconds	1.81 seconds	1.90 seconds
Mean Time to First Fixation	.40 seconds	.64 seconds	.46 seconds	.26 seconds

4.2 – Purchase Preference of Labeled Products

Fifty participants sorted 18 images, 9 images of toilet paper and 9 images of paper plates. They were asked to rank them separately by product from most likely to purchase to least likely to purchase. There were 3 different pricing categories (low, medium, high) and each category had a product with the unsubstantiated label, the FSC label, and no label at all. See ***Appendix B*** for all product images**.**

There is 22% (2 out of 9) chance that a participant will place a low-priced labeled product first for both the paper plates and toilet paper. For both the paper plates and toilet paper 84% of participants placed the lowest cost, labeled product first, see *Table 6*. This result is significant and much higher than chance. For individual sorting data see ***Appendix C.***

Table 6: Which Product Participants Picked First (Most Likely to Purchase)

Pricing and Labeling Category:	Low Price- Labeled	Medium Price - Labeled	High Price - Labeled	Low Price – Not Labeled	Medium Price – Not Labeled	High Price – Not Labeled
Toilet Paper	42	0	0	8	0	0
Paper Plates	42	1	1	6	0	0

4.3 - GREEN Consumer Values Scale

Seventy-nine participants completed the GREEN Consumer Values Scale. The scale is six questions and their score could range from 1-7. The resulting scores were all between 3 and 7 (*Mean*=5.33, *Standard Error*= .109). In order to determine the participant's score on the scale the numbers for each question were totaled and then the total was divided by six. The mean score for all of the respondents for each question was determined and is listed in *Table 7*.

Table 7: Mean Scores For All Respondents & Standard Error of Mean

Scale Statement:	It is important to me that the products I use do not harm the environment.	I consider the potential environmental impact of my actions when making many of my decisions.	My purchase habits are affected by my concern for our environment.	I am concerned about wasting the resources of our planet.	I would describe myself as environmentally responsible	I am willing to be inconvenienced in order to take actions that are more environmentally friendly.	Score on Scale
Mean	5.59	5.24	4.87	5.87	5.20	5.23	5.33
Std. Error of Mean	0.12	0.13	0.15	0.12	0.13	0.14	0.11

The frequency distribution of scores on GREEN Consumer Values Scale is displayed in Figure 9.

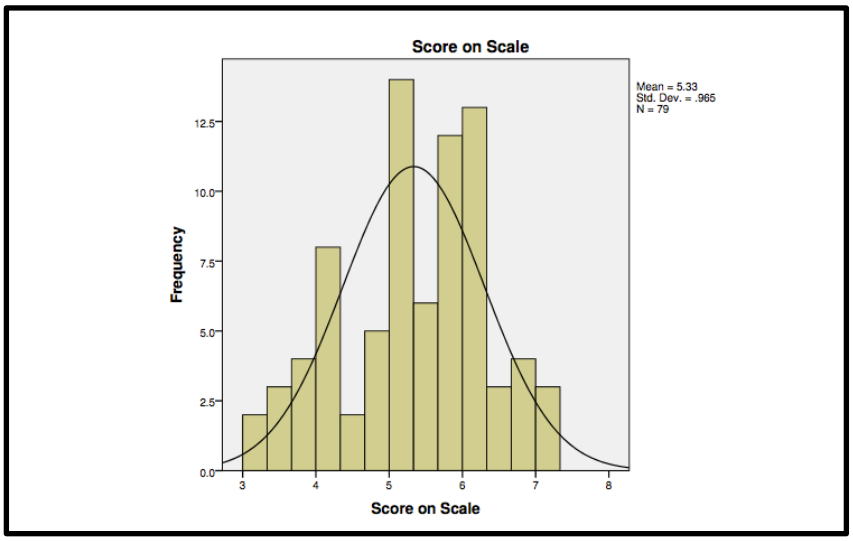

Figure 9: Frequency distribution of scores on GREEN Consumer Values Scale. These scores are normal at p<.10 using the Shapiro-Wilk W Test.

Out of six questions the one that had the highest mean score (*Mean*=5.87, *SE =0.12*) stated: "I am concerned about wasting the resources of our planet". The question with the lowest mean score (*Mean*=4.87, *SE=0.15*) stated: "My purchase habits are affected by my concern for our environment". These scores were significantly different (t(49)=6.08, p<.01). For all participant scores see ***Appendix D.***

4.4 - Questionnaire

Fifty participants completed the questionnaire that asked them two questions: what is your major and do they know the meaning of either label (***Figure 5)***. Out of 50 participants only 2 participants were able to correctly name the 'Forest Stewardship Council' in their answer (4%).

Twenty-five participants responded that they "had no idea" as to the meaning of either label (50%). Twenty-three participants responded that they believed the labels had something to do with being "environmentally friendly" (46%). For analysis, the two individuals that named the 'Forest Stewardship Council' were placed in the environmentally friendly category. The descriptive statistics for this split grouping is given in *Table 8*.

Table 8: Descriptive statistics for questionnaire split group between 25 participants who responded that they "had no idea" as to the meaning of either label (50%) and 25 participants who responded that they believed the labels had something to do with being "environmentally friendly".

Questionnaire Environmentally Friendly (Yes or No):	N	Minimum	Maximum	Mean	Standard Deviation
Yes	25	3.17	7.00	5.57	0.92
No	25	3.50	7	5.49	1.10

A one-way ANOVA was used to determine whether there are any significant differences between the means of these two groups (environmentally friendly versus no idea) and there was not a significant difference found ($F(1,49)=0.09$, $p>.05$).

4.5 Comparative Analysis

Based on the fixation duration data for time spent looking at labels 2 groups were created using the median split. These two groups were low label fixators (spent a shorter amount of time looking at the labels) and high label fixators (spent a longer amount of time looking at the labels).

These groups were then compared to the scores on the GREEN Consumer Values Scores. Participants grouped in the high label fixators scored themselves higher on question 5: "I would describe myself as environmentally responsible". This was a significant difference ($t(48)=2.30$, $p<.03$). This research is exploratory so I am choosing to report the significance for question 6: "I am willing to be inconvenienced in order to take actions that are more environmentally friendly" and the overall score on the scale. Participants scored themselves higher on question 6 and spent longer looking at labels ($t(48)=1.78$, $p<.09$). In addition, high label fixators scored overall higher on the scale than low label fixators ($t(48)=1.80$, $p<.09$).

5.0 - Conclusions

Overall this research met the objectives set forth:

Determine whether consumers differentiate between substantiated and unsubstantiated environment claims on package labels.

It was found that consumers do not differentiate between substantiated and unsubstantiated environment claims on package labels. Half of the participants (50%) responded that they believed the labels were environmentally related but they were unable to identify the differences between the two labels. Analysis of the eye-tracking data revealed no significant difference in the amount of time participants looked at either label further supporting that participants could not differentiate between the two labels.

Investigate the effects of price and environmental labeling on purchase intention.

Participants made purchase decisions based on price. There was an interaction between labeled and price. Participants placed the labeled, low-price item first (84% of the time). Participants looked at labels and chose the labeled product when it was economical.

Determine the role of environmental orientation on evaluation of environmental labels and purchase intention.

Participants that spent time looking at the labels (label lookers, high fixation duration) had a higher score on the Green Consumer Values Scale versus (low label lookers, low fixation duration) had lower scores on Green Consumer Values Scale.

6.0 – Discussion and Implications

6.1 – Eye Tracking

There was no significant difference found between label types (FSC and unsubstantiated) or between products (toilet paper and paper plates). Label placement was significant in both the findings for fixation duration and time to first fixation.

Fixation duration as well as the time to first fixation data was significantly different for some of the label placements. Fixation duration (time in seconds) was significantly lower for the bottom-right corner labels (*Mean(Bottom-Right*)= 1.46 seconds*, Standard Error of Mean*=0.12) . The time to first fixation was significantly higher than the other label placements (*Mean(Bottom-Right*)=.64 seconds, *Standard Error of Mean*=.08). The quickest time to first fixation was in the bottom-left corner (*Mean*=.26 seconds, *Standard Error of Mean*=.05) followed by the top-right and then the top-left. Overall it is recommended that labels should not be placed in the bottom-right corner. It could also be suggested that the bottom-left corner is the best place for label placement because the participants found the labels placed in those locations the quickest.

6.2 – Purchase Preference of Labeled Products

Participants were asked to sort eighteen images (9 of paper plates and 9 of toilet paper). Participants chose the lowest price labeled product. They had a desire to purchase the labeled product but only if it was the lower priced option as well. There were three pricing categories (low, medium, high) and three label categories (FSC, unsubstantiated, no label). Participants placed the low cost-labeled products first and second (84% of the time), and the third was the unlabeled item (low cost). Participants were not willing to rank all of the labeled products from 1-6 and place the non-labeled products from 7-9 but

instead they sorted by price. The prices of the medium-priced products were only 10% greater (high-priced another 10%) but participants were not willing to pay 10% more for the labeled product. There was a preference for labeled products but only if it is the least expensive option. These findings suggest that participants were aware of labels and would rather have the labeled product but are not necessarily willing to pay more for labeled products.

6.3 – GREEN Consumer Values Scale

The eye tracking data for fixation duration was split at the median into two groups. These two groups were identified as high label fixators versus low label fixators. The mean GREEN Consumer Values score for both groups were compared. Overall, there was a significant difference between the scores of the high label fixators versus the low label fixators at the alpha(α)=.10 significance level. Participants who spent a longer time looking at the environmental labels ranked themselves higher on the GREEN Consumer Values scale. This six-question scale evaluates the "tendency to express the value of environmental protection through one's purchases and consumption behaviors (Haws et al. 2013)." High label fixators were not able to tell the difference between the two labels but knew that they were important and perhaps somehow environmentally related.

The GREEN Consumer Values scores were compared to the answers on the questionnaire. Two groups were created: participants who knew the labels had something to do with the environment and the other group did not have any idea the meaning behind the labels. The mean GREEN Consumer Values scores of the two groups were compared. There was no significant difference found between these two groups. This is inline with

the other findings; all the participants were just as likely or unlikely to know about the symbol. Their scale scores did not have any effect on whether or not they could define the labels.

6.4 – Questionnaire

The questionnaire asked participants if they knew the meanings of the FSC label or the unsubstantiated label. Twenty-three participants identified the labels as having something to do with the environment, while twenty-five participants reported they did not know the meaning at all. Two participants correctly defined the Forest Stewardship Council label.

The eye-tracking data gathered was inline with the questionnaire participants filled out at the end of the experiment. Participants were not able to distinguish between the two labels (4% of participants correctly named the Forest Stewardship Council label). The time spent looking at these two distinctive labels was not significantly different because participants could not differentiate between the two. Participants were not able to identify either label when given the questionnaire and they had no idea that one was a third party verified environmental label while the other was an unsubstantiated label. They did not discriminate between the two labels in the amount of time they spent looking at the labels or in the time to first fixation.

6.5 – Limitations

There are several limitations of this study. The first is the population. This study looked at undergraduate students at Virginia Tech. Future studies could look at other age groups, ethnic groups, geographic regions, socio-economic groups, etc. The results may be dramatically different for a group living in poverty that purchases toilet paper only

because it is a necessity versus a very environmentally aware group living in, for example, California. In addition it would be very interesting to be able to conduct a similar study with a larger sample size.

There is very little research on the overall effectiveness of environmental labeling and much more needs to be examined. Further studies utilizing eye-tracking technology could really benefit environmental labeling groups that are trying to determine if their brand image is recognizable. The Forest Stewardship Council just announced that they will be changing their logo to an image that they hope will be more appealing to consumers. A future study looking at both (the old and the new) labels would be helpful to their organization.

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Appendices

Appendix A
Informed Consent Form

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Informed Consent for Participants in Research Projects Involving Human Subject

Title:
Adult Consumers' Eye Scanning of Ecological Packaging Labels

Investigators:
Robert Bush, Ph.D. (rbush@vt.edu) -540-231-8834
Robin Panneton, Ph.D. (cooperr@vt.edu)
Stephanie Smith (ssteph5@vt.edu) - 804-366-2739

I. Purpose of this Research/Project

The purpose of the research is to understand consumers purchase decisions. The results of this research will be used in Master Thesis. Approximately 50 students will be participating in this study with the ages ranging from 18-25.

II. Procedures

Data will be gathered using a six-question marketing scale, electronic eye-tracking, and sorting of 18 images. The participant will be shown a series of image (24) and will be asked to look at each of these. This will take five to ten minutes.

Then the participant will be asked to sort through 18 images and place them in order of most likely to purchase to least likely to purchase. This will take five to ten minutes.

Lastly, participants will be asked to respond to six questions using a 1-7 scale. This should take approximately 5 minutes.

III. Risks

There are no apparent risks to the participant in this study.

IV. Benefits

Although there are no direct benefits to the participant, the data will help to understand consumer responses to products.

V. Extent of Anonymity and Confidentiality

All of the information gathered in this study will be confidential.

However, the results of this project may be used for scientific and/or educational purposes, presented at scientific meetings, and/or published in a scientific journal.

The Virginia Tech (VT) Institutional Review Board (IRB) may view the study's data for auditing purposes. The IRB is responsible for the oversight of the protection of human subjects involved in research.

VI. Compensation

Students will receive 1 extra credit point if they are using the SONA system.

Students will receive extra credit if they are a student in Dr. Bush's Forest Products Marketing course.

VII. Freedom to Withdraw

It is important for you to know that you are free to withdraw from this study at any time without penalty. You are free to not answer a question or not respond to what is being asked of you without penalty.

Please note that there may be circumstances under which the investigator may determine that a subject should not continue as a subject.

Should you withdraw or otherwise discontinue participation, you will be compensated for your participation in accordance with the Compensation section of this document.

VIII. Questions or Concerns

Should you have any questions about this study, you may contact one of the research investigators whose contact information is included at the beginning of this document.

Should you have any questions or concerns about the study's conduct or your rights as a research subject, or need to report a research-related injury or event, you may contact the VT IRB Chair, Dr. David M. Moore at moored@vt.edu or (540) 231-4991.

IX. Subject's Consent

I have read the Consent Form and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent:

_____ Date_____
Subject signature

_____
Subject printed name

Appendix B

Purchase Preference of Label Products: Images Sorted

1

$8.77

2

$7.97

3

$7.17

4

$7.17

5

$7.97

6

$8.77

7

$7.17

8

$7.97

9

$8.77

1

$10.28

2

$11.31

3

$9.25

4

$10.28

5

$11.31

6

$9.25

7

$10.28

8

$11.31

9

$9.25

Appendix C

Purchase Preference of Label Products: Participant Sorting Data

Participant ID:	Order								
	Most Likely to Purchase								Least Likely to Purchase
N1	9	3	6	7	1	4	8	2	5
N2	3	6	9	1	4	7	2	5	8
N3	3	6	9	1	4	7	2	5	8
N4	3	6	9	1	4	7	2	5	8
N5	3	6	9	1	4	7	5	2	8
N6	6	3	9	4	1	7	5	2	8
N7	3	6	9	4	1	5	7	2	8
N8	3	6	9	1	4	7	2	5	8
N9	6	4	3	1	9	5	2	7	8
N10	3	6	9	1	4	7	2	5	8
N11	3	6	9	4	1	7	2	5	8
N12	3	6	9	1	4	7	2	5	8
N13	3	6	9	4	1	7	5	2	8
N14	3	1	2	6	4	5	9	7	8
N15	3	6	9	1	4	7	2	5	8
N16	9	6	3	7	4	1	8	5	2
N17	6	3	9	4	2	1	7	5	8
N18	9	6	3	7	4	1	8	5	2
N19	6	3	9	4	1	7	5	2	8
N20	3	6	9	1	4	7	2	5	8
N21	6	3	9	1	4	7	2	5	8
N22	3	6	9	1	4	7	2	5	8
N23	6	3	9	4	1	7	5	2	8
N24	3	6	9	7	1	4	5	8	2
N25	3	6	9	1	4	7	2	5	8
N26	6	4	5	3	1	2	9	7	8
N27	6	9	3	4	7	1	5	8	2
N28	3	6	9	1	4	7	2	5	8
N29	6	9	3	4	7	1	5	8	2
N30	3	6	9	7	1	4	2	5	8
N31	6	3	9	1	4	7	2	5	8
N32	9	6	3	1	4	7	2	5	8
N33	3	6	9	1	4	7	2	5	8
N34	3	6	9	1	4	7	5	2	8
N35	9	6	3	7	1	4	5	2	8
N36	6	3	9	4	1	5	2	7	8
N37	9	3	6	7	1	4	8	2	5
N38	3	6	9	1	4	7	2	5	8
N39	3	6	9	1	4	7	2	5	8
N40	3	6	9	1	4	7	2	5	8
N41	6	3	9	4	1	7	8	5	2
N42	6	3	9	1	4	7	2	5	8
N43	6	3	9	4	1	7	5	2	8
N44	3	6	9	1	4	7	2	5	8
N45	6	3	4	1	5	2	9	7	8
N46	6	3	9	4	1	7	5	2	8
N47	9	6	3	7	4	1	8	5	2
N48	3	6	9	1	4	7	2	5	8
N49	6	9	3	4	7	1	5	8	2
N50	9	7	8	5	4	1	2	6	3

Appendix D

GREEN Consumer Values Scale Scores: Participant Data

GREEN Consumer Values Questions

Participant ID:	1: It is important to me that the products I use do not harm the enviroment.	2: I consider the potential environmental impact of my actions when making many of my decisions.	3: My purchase habits are affected by my concern for our environment.	4: I am concerned about wasting the resources of our planet.	5: I would describe myself as environmentally responsible.	6: I am willing to be inconvenienced in order to take actions that are more environmentally friendly.	Score
S1	7	6	6	7	6	7	6.50
S2	5	4	4	5	4	4	4.33
S3	4	3	3	4	5	3	3.67
S4	5	5	4	5	5	4	4.67
S5	5	5	6	6	6	5	5.50
S6	5	4	3	6	4	5	4.50
S7	6	5	4	6	6	6	5.50
S8	4	6	5	4	4	5	4.67
S9	4	5	4	5	4	6	4.67
S10	3	4	2	5	3	4	3.50
S11	5	5	2	4	4	3	3.83
S12	6	6	5	7	5	5	5.67
S13	7	6	6	7	7	6	6.50
S14	3	3	3	4	4	3	3.33
S15	6	5	5	6	6	6	5.67
S16	6	4	4	7	5	7	5.50
S17	6	6	5	6	5	4	5.33
S18	6	6	6	6	6	7	6.17
S19	7	6	6	4	5	3	5.17
S20	6	5	5	6	5	6	5.50
S21	4	3	3	4	3	4	3.50
S22	5	3	3	6	3	6	4.33
S23	5	3	3	6	5	4	4.33
S24	6	6	5	6	6	6	5.83
S25	6	6	5	6	5	6	5.67
S26	5	5	4	6	5	5	5.00
S27	6	4	4	5	5	6	5.00
S28	6	6	6	6	5	6	5.83
S29	6	5	4	7	6	3	5.17
N1	7	7	7	7	7	7	7.00
N2	7	6	5	7	6	6	6.17
N3	6	6	7	6	6	5	6.00
N4	7	6	6	7	6	6	6.33
N5	7	7	7	7	7	6	6.83
N6	5	5	6	6	6	5	5.50
N7	6	7	6	7	6	6	6.33
N8	7	7	7	7	7	7	7.00
N9	6	6	6	6	6	6	6.00
N10	6	7	6	7	7	7	6.67
N11	5	6	5	7	5	6	5.67
N12	7	7	7	7	7	6	6.83
N13	5	5	5	7	6	4	5.33
N14	7	7	7	7	7	7	7.00
N15	6	6	5	5	5	7	5.67
N16	6	4	5	5	5	5	5.00

N17	5	5	3	5	4	4	4.33
N18	6	5	4	5	5	4	4.83
N19	6	5	5	7	6	6	5.83
N20	6	5	5	7	6	6	5.83
N21	7	6	5	7	6	6	6.17
N22	4	5	4	6	3	4	4.33
N23	5	5	5	6	5	4	5.00
N24	4	6	6	7	4	5	5.33
N25	5	6	5	7	5	5	5.50
N26	7	7	7	7	6	7	6.83
N27	6	6	5	7	6	6	6.00
N28	7	6	6	7	6	6	6.33
N29	5	3	5	5	5	4	4.50
N30	6	6	6	6	6	5	5.83
N31	5	4	5	6	6	6	5.33
N32	5	2	4	3	4	3	3.50
N33	5	4	4	4	2	4	3.83
N34	3	6	2	5	5	2	3.83
N35	6	6	6	6	5	5	5.67
N36	7	6	6	6	5	6	6.00
N37	5	4	3	4	3	6	4.17
N38	7	6	6	6	6	5	6.00
N39	6	5	4	6	7	6	5.67
N40	3	3	3	3	2	5	3.17
N41	6	5	4	7	5	5	5.33
N42	5	5	3	5	4	4	4.33
N43	6	6	6	6	6	7	6.17
N44	5	5	5	5	4	5	4.83
N45	6	5	5	6	5	5	5.33
N46	5	5	5	6	5	6	5.33
N47	5	5	4	5	4	3	4.33
N48	5	5	4	5	6	5	5.00
N49	6	6	7	7	6	6	6.33
N50	7	6	6	7	7	6	6.50
Average Score for Each Question:	5.59	5.24	4.87	5.87	5.20	5.23	5.34