THE AFFECT OF KNOWLEDGE ON CONSUMER WILLINGNESS TO
PURCHASE SUSTAINABLE APPAREL AND TEXTILES

A thesis submitted in partial fulfillment of the requirements
For the degree of Master of Science in
Family and Consumer Sciences

By

Alona Tevel

May 2013
The thesis of Alona Tevel is approved:

_____________________________  ________________
Tom Cai, Ph.D.  Date

_____________________________  ________________
Hira Cho, Ph.D.  Date

_____________________________  ________________
Wei Cao, Ph.D., Chair  Date

California State University, Northridge
I would like to express my sincere appreciation to the many people who made this thesis research possible. My committee members, Dr. Wei Cao, Dr. Tom Cai, and Dr. Hira Cho, have been a very important part of the success of this project. Special thanks go to my advisor and committee chair, Dr. Wei Cao, who have been guiding me throughout this entire process and have made it possible. I thank Dr. Cao for being a supporter and a mentor from the beginning of this process. Her enormous help, guidance, encouragement, willingness to collaborate, and friendship allowed me to get through my master program. Thank you to Dr. Cai for the valuable statistical knowledge and advice, thank you for always having your door open for me. Thank you to Dr. Cho for the critical feedback and suggestions, which have helped made this study professional and extensive.

My parents, Ofer and Rivka Tevel, who always believe in me and support whichever path I chose to take. You have been my biggest source of motivation to complete this study and pursue my academic goals.

Finally, I would like to thank my loving husband, Moshe Agive, and my little baby girl Michaela, who have thought me that everything is possible. They are the daily source of inspiration for me and the constant encouragement needed to continue making progress in life. Without them, I would have not completed this beautiful journey.
# TABLE OF CONTENTS

SIGNATURE PAGE ........................................................................................................ ii

ACKNOWLEDGMENTS ................................................................................................... iii

LIST OF FIGURES ......................................................................................................... vi

LIST OF TABLES ........................................................................................................... vii

ABSTRACT .................................................................................................................. viii

CHAPTER 1: INTRODUCTION .....................................................................................1
   Background .................................................................................................................1
   Statement of Problem ..............................................................................................4
   Research Objectives .................................................................................................4
   Hypotheses ................................................................................................................5
   Hypotheses concerning Environmental Concern, Attitudes, Knowledge ....5
   Hypotheses concerning Education ........................................................................6
   Hypotheses concerning Students’ Major .................................................................6
   Limitations ..............................................................................................................6
   Definitions ............................................................................................................ 6

CHAPTER 2: LITERATURE REVIEW ........................................................................10
   Background .............................................................................................................10
   Historical Perspective ............................................................................................10
   Sustainability ........................................................................................................11
   The sustainable Consumer .....................................................................................13
   Environmentally-Friendly Behaviors ..................................................................16
   The Apparel Industry ............................................................................................21
   The Role of Knowledge .........................................................................................28
   Willingness to Purchase .......................................................................................36
   Theoretical Framework .........................................................................................42
   Conceptual Model .................................................................................................44

CHAPTER 3: METHODOLOGY ................................................................................46
   Research Design ....................................................................................................46
   Instrument Development .......................................................................................48
   Survey Development .............................................................................................48
   Educational Workshop Development ..................................................................50
   Instrument Validity ...............................................................................................51
   Instrument Reliability .........................................................................................52
   Variables ..............................................................................................................53
   Independent Variables .........................................................................................54
CHAPTER 4: RESULTS AND DISCUSSION ................................................................. 62
  Response Rate .............................................................................................. 62
  Respondent Demographics ......................................................................... 62
  Reliability Analysis ................................................................................... 64
  Descriptive Statistics ................................................................................. 65
  t-Test Statistics ......................................................................................... 66
  Correlation Statistics .................................................................................. 68
  Repeated Measure ANOVA Statistics ......................................................... 70
  Summary of Results ................................................................................... 78
  Discussion of Results .................................................................................. 81

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS ............ 86
  Summary of Research ................................................................................ 86
  Conclusions ............................................................................................... 87
  Recommendations for Future Research ..................................................... 90

REFERENCES ................................................................................................. 92

APPENDIX A: QUESTIONNAIRE ................................................................... 97

APPENDIX B: HUMAN SUBJECTS PROPOSAL .......................................... 104

APPENDIX C: CODING GUIDE ...................................................................... 107
LIST OF FIGURES

Figure 2-1: Theory of Planned Behavior Model................................................................. 43

Figure 2-2: Conceptual Model; Affect of Environmental Concern, Attitudes and Knowledge on Willingness to Purchase................................................................. 45
LIST OF TABLES

Table 3-1: Items Used to Measure Environmental Concern............................................ 54
Table 3-2: Items Used to Measure Attitudes........................................................................ 55
Table 3-3: Items Used to Measure knowledge.................................................................. 56
Table 3-4: Items Used to Measure Students’ Major............................................................ 57
Table 3-5: Items Used to Measure Willingness To Purchase.............................................. 58
Table 3-6: Number of Respondents, FCS department, CSUN........................................... 59
Table 4-1: Overall Demographics Characteristics............................................................... 63
Table 4-2: Reliability Analysis............................................................................................ 65
Table 4-3: Descriptive Statistics; Frequency Table: Scale Scores...................................... 66
Table 4-4: Independent-Samples t-Tests: Pretest-Posttest.................................................... 67
Table 4-5: Independent-Samples t-Tests............................................................................. 68
Table 4-6: Pretest Correlation......................................................................................... 69
Table 4-7: Posttest Correlation......................................................................................... 69
Table 4-8: Descriptive Statistics; Pretest-Posttest Knowledge............................................ 71
Table 4-9: Multivariate Tests; Knowledge....................................................................... 72
Table 4-10: Tests of Within-Subjects Effects; Knowledge.................................................. 73
Table 4-11: Tests of Between-Subjects Effects; Knowledge................................................ 73
Table 4-12: Estimated Marginal Means; Knowledge.......................................................... 74
Table 4-13: Descriptive Statistics; Pretest-Posttest WTP.................................................... 75
Table 4-14: Multivariate Tests; WTP................................................................................. 76
Table 4-15: Tests of Within-Subjects Effects; WTP.......................................................... 77
Table 4-16: Tests of Between-Subjects Effects; WTP....................................................... 77
Table 4-17: Estimated Marginal Means; WTP................................................................. 78
Table 4-18: Summary of Hypotheses and Results of Testing............................................. 81
ABSTRACT

THE AFFECT OF KNOWLEDGE ON CONSUMER
WILLINGNESS TO PURCHASE SUSTAINABLE APPAREL AND TEXTILE

By

Alona Tevel

Master of Science in

Family and Consumer Sciences

The purpose of this study was to examine the role of knowledge in consumer willingness to purchase sustainable apparel and textile products. The objectives for this study were to understand how environmental concern, attitudes, and knowledge are related to consumer willingness to purchase sustainable apparel and textiles, when knowledge being the main variable studied. The study aimed to determine whether education would be part of helping consumers become more knowledgeable with the issue of sustainable apparel and textiles. Lastly, it was designed to evaluate the differences between Apparel Design and Merchandising (ADM) students, who potentially have better knowledge of the issue in question, and Non-ADM students who represent the average consumer, and determine the two groups’ differences in willingness to purchase sustainable apparel and textile based on their knowledge.
Data were collected using a survey of Family and Consumer Sciences’ students at California State University, Northridge. The research design included a pretest questionnaire examining all related issues, followed by an educational workshop on sustainable apparel and textiles, intended to enhance knowledge level among students, and a posttest questionnaire measuring the new level of knowledge and willingness to purchase sustainable apparel and textiles. The relationship between knowledge and willingness to purchase was tested using correlation analysis. The differences in knowledge and willingness to purchase between the two groups were tested using t-test analysis. Repeated measure analysis was used to determine the interaction between students major and education workshop.

The major findings of this study reveal (a) that the results rejected the hypothesis that “there is no impact of environmental concern on students’ willingness to purchase sustainable apparel and textile products”, due to finding significant correlations between environmental concern and WTP. (b) The results rejected the hypothesis that “there is no impact of attitudes on students’ willingness to purchase sustainable apparel and textile products”, due to finding significant correlations between attitudes and WTP. (c) The results failed to reject the hypothesis that “there is no impact of knowledge on students’ willingness to purchase sustainable apparel and textile products”, as no significant correlation was found between knowledge and WTP scores.

Findings of this study (d) rejected the hypothesis, “education plays no role in improving students' knowledge of sustainable apparel and textile”, as significantly increased knowledge scores were found over time, after completion of the educational workshop on sustainable apparel issues.
Also (e), the hypothesis, “there is no difference in knowledge levels between ADM students and Non-Major students before educational workshop” was rejected. ADM students exhibited higher initial knowledge level. Results failed to reject (f) the hypothesis that ”there is no difference in knowledge levels between ADM students and Non-Major students after educational workshop”. The gap in knowledge between the groups decreased after participating in the workshop. Results failed to reject (g) the final two hypotheses, “there is no difference in willingness to purchase sustainable apparel and textiles between ADM students and Non-Major students before educational workshop”, and “there is no difference in willingness to purchase sustainable apparel and textiles between ADM students and Non-Major students after educational workshop”. WTP scores did not different based on students major or workshop.
CHAPTER 1: INTRODUCTION

Background

Sustainability is a growing phenomenon in the apparel industry. Manufacturers, wholesalers, and retailers are in constant search for ways to become more "green" and efficient in the production and selling processes of apparel and textiles. As consumer awareness and demand for sustainable apparel and textile products increase along the years, more companies in the fashion industry are trying to alter their performances and appeal to the growing needs of the market.

Many terms used for describing sustainable apparel and textile products; eco fashions, green textiles, environmentally friendly materials, all have been widely circulated in public media. However, the definition and understanding of these terms are slightly vague. Sustainability is defined as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987). This is true in various aspects of our everyday lives; environmental, social, and economical. Sustainability can also be seen as a synergy between business and the environment. Public as well as private organizations are joining forces to emphasis the importance of sustainability and educate the public about this growing phenomenon, which will in turn, hopefully become more active towards a sustainable behavior.

The issue of sustainability in the fashion industry has been growing dramatically over the last decade. Organizations such as the Sustainable Apparel Coalition are founded in order to educate consumer about the harmful effects of apparel production processes on earth. Their goal is described as “working to reduce the environmental and
social impacts of apparel and footwear products around the world” (sustainable apparel coalition). Major retailers such as Gap, Nike, Patagonia, Target, and Wal-Mart are shifting the ways clothing are manufactured and processed, and focusing on establishing a more sustainable operation in regards to issues such as pesticides and chemicals use, water contamination, and fair trade.

The study of consumer behavior and sustainable apparel and textiles is somewhat limited. Lack of research in the field prevents apparel and textiles companies to truly understand the needs of the market, and therefore affect their performance in the industry. Better knowledge of the environmental impact of textiles and apparel production processes leads to increased concern for the environment, which in turn, leads to environmentally friendly consumption behavior (Brosdahl & Carpenter, 2010). Therefore, to understand consumer knowledge level and acceptance of environmentally friendly clothing is essential for the textiles and apparel manufacturers and retailers. Educating consumers continuously and having them attain enough information about sustainable apparel and textiles is a key issue in promoting and selling sustainable textiles and apparel products.

The goal of this research is understanding the factors affecting consumer (students) willingness to purchase sustainable apparel and textiles, with knowledge being the main factor at question. While previous studies indicate high correlation between environmental concerns and willingness to purchase, as well as positive correlation between attitudes and willingness to purchase; the relationship between consumer knowledge and willingness to purchase has not been clear.
Consumer understanding of sustainable textiles and apparel and their intention to purchase these products should be further investigated. The link between the two variables failed to illustrate consistent results. Kim and Damhorst (1998) found that environmental apparel consumption knowledge does not appear to lead to environmentally responsible apparel consumption behavior. Brosdahl and Carpenter (2010), who examined the influence of knowledge and concern on actual consumption behavior, could not support the hypothesis that “knowledge of the environmental impact of textile and apparel production will positively influence environmentally friendly consumption behavior”. Later study conducted by Kim (2010), however, supported the assumption that “knowledge acts as a constraint against consumers engaging in pro-environmental behaviors”. Results indicated that limited knowledge serves as a constraint to eco-conscious apparel acquisitions.

It is the goal of this study to reveal more clear findings and allowing better understanding of the relationship between consumer knowledge and shopping intentions in the sustainable fashion market. Findings from the current research aim to shed some light on how consumer think and behave and whether there is a gap between their knowledge levels and intention patterns. Also, it is intending to benefit companies and retailers who are endeavoring a green campaign to be better positioned themselves in the competitive global market by satisfying customers’ needs and preferences in sustainable apparel and textiles.
Statement of Problem

The purpose of this study was to further understanding of consumer willingness to purchase sustainable apparel and textiles, while focusing on investigating the importance of knowledge in consumer willingness to purchase sustainable apparel and textiles. The study aims to answer the following questions;

1. Is there a correlation between students’ environmental concern and willingness to purchase?
2. Is there a correlation between students’ attitudes and willingness to purchase?
3. Is there a correlation between students’ knowledge and willingness to purchase?
4. What is the importance of education in enhancing students’ knowledge of sustainable apparel and textiles?
5. Is there a difference in knowledge levels between Apparel Design and Merchandising students and non-major students?
6. Is there a difference in willingness to purchase between Apparel Design and Merchandising students and non-major students?

Research Objectives

In order to achieve the purpose of this study, three research objectives were determined.

Research Objectives;
1. To determine the relationship between consumer environmental concerns, attitudes, and knowledge and their willingness to purchase sustainable apparel and textiles.

2. To investigate whether education plays a role in enhancing consumer/students knowledge of sustainable apparel and textiles, and therefore increases their willingness to purchase sustainable apparel and textile products.

3. Assess whether there is a difference in knowledge levels and willingness to purchase sustainable apparel and textiles between Apparel Design and Merchandising students vs. Non-Major students, before and after the implementation of an educational workshop.

**Hypotheses**

Based on the purpose of the study, hypotheses can be formed for the proposed study. The hypotheses have been grouped based on research objectives and variables.

(1) Hypotheses concerning Environmental Concerns, Attitudes, and Knowledge

H1: There is no correlation between consumer environmental concerns and willingness to purchase sustainable apparel and textiles.

H2: There is no correlation between consumer attitudes and willingness to purchase sustainable apparel and textiles.

H3: There is no correlation between consumer knowledge and willingness to purchase sustainable apparel and textiles.
(2) Hypotheses concerning Education

H4: Education plays no role in enhancing students’ knowledge of sustainable apparel and textiles

(3) Hypotheses concerning Students’ Major

H5: There is no difference in knowledge levels between ADM students and Non-Major students before educational workshop.

H6: There is no difference in knowledge levels between ADM students and Non-Major students after educational workshop.

H7: There is no difference in willingness to purchase sustainable apparel and textiles between ADM students and Non-Major students before educational workshop.

H8: There is no difference in willingness to purchase sustainable apparel and textiles between ADM students and Non-Major students after educational workshop.

Limitations

The scope of study is limited to the sample population of students at Family and Consumer Sciences department at California State University, Northridge. Another limitation relates to the data collection. Data was collected in two different classrooms at Northridge campus. Data was gathered through a survey instrument given to each student. It should be noted that class members in attendance the day of the survey participated; students who were absent might have produced different results. Also, the majority of the population surveyed was female.

Definitions

Attitudes: “Attitudes guide perception, information processing and behaviors. Attitudes determine for each individual what he will see and hear, what he will think and what he will do. They are our methods for finding our way about in an ambiguous universe” (Ajzen, 1983).
**Consumer Behavior:** "The full range of decisions and activities involve in evaluating, acquiring, using, and disposing of goods and services" (Sandhusen, 2000, p.217).

**Consumer Knowledge:** “There are two knowledge contrasts that have been distinguished. The first is Objective Knowledge; accurate information about the product class stored in long-term memory. The second is Self Assessed Knowledge or Subjective knowledge; people's perceptions on what or how much they know about a product class” (Park and Mothersbaugh, 1994, p.71).

**Environmental Concern:** “An effective environmental attitude” (Schultz et al, 2004).

**Environmentally Friendly Clothing (EFC):** Clothing that is made with environmentally safe materials, such as organically grown cotton and wool, and is made with pollution preventing production methods, such as use of water based inks on prints and safe finishes.

**Environmental Knowledge:** “Factual information that individuals have about the environment, the ecology of the planet, and the influence of human actions on the environment/ecology” (Arcury & Johnson, 1987).

**Ethical Fashion:** " Fashionable clothes that incorporate fair trade principles with sweatshop free labor conditions while not harming the environment or workers by using biodegradable and organic cotton" (Joergens, 2006).

**Organic Cotton:** “Cotton which had been grown according to strict uniform standards, while avoiding the use of chemical pesticides, insecticides, fungicides, and defoliants, focusing on building healthy soil and plants through crop rotation and natural
fertilizers such as compost and cow manure, and protecting crops through the use of beneficial insects and trap crops” (Speer, 2005, p.36). In the U.S. marketplace, all organic cotton fibers must be certified organic in-field by an approved third-party certifying organization accredited by the U.S. Department of Agriculture” (Speer, 2005, p.36).

**Product Involvement:** “Product involvement is related to consumers’ level of interest in a particular product” (Solomon & Rabolt, 2004, p.121).

**Sustainability:** Mihelecic, et al (2003) defined sustainability as “the design of human and industrial systems to ensure that humankind’s use of natural resources and cycles do not lead to diminished quality of life due either to losses in future economic opportunities or to adverse impacts on social conditions, human health and the environment”(p.5315).

**Sustainable Apparel and Textiles:** According to the Sustainable Apparel Coalition, sustainable textiles and apparel are such clothing or other fashion items that are produced while reducing the harmful effects on the environment and with regards to the following matters; water use and quality, energy/greenhouse gas, waste, social/labor.

**Sustainable Development:** “Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987).

**Sustainable Product:** A product that “continues, possibly with design modifications, to meet the needs of its producers, distributors, and customers” (Fiksel, 2003).

**Willingness to Purchase:** Plassman, et al (2007) described WTP as "an essential component of every market transaction” in which the subject is determining "whether the
proposed trade is beneficial”. WTP in this research depicts the students/consumers' interest to the trade.
CHAPTER 2: LITERATURE REVIEW

Background

The review of literature related to consumer knowledge and purchasing behavior of sustainable apparel/textile products, ranges across many disciplines. First, a small segment of the extensive literature on environmentally related consumer behavior was examined, to identify variables commonly measured in relation to environmental behavior in general. These variables include knowledge, attitudes, perceptions and values. Next, literature focuses on sustainable apparel and textile was examined to evaluate the various factors affecting consumer’s purchasing behavior of apparel and textile products. Similar variables were detected when evaluating the shopping behavior of environmentally friendly clothing.

Past studies of consumer knowledge and awareness of sustainable apparel and textile were examined to identify common trends in the industry. The investigation of these studies allows the researcher to suggest future measurements that can be taken to educate consumer about the growing phenomenon of sustainability in the fashion industry, increase levels of knowledge among the general consumer, and affect willingness to purchase and pay for such products. Finally, an exploration of the evaluative criteria associated with apparel purchases was conducted to help draw a link between the behavioral variables and consumer preferences for sustainable apparel/textile attributes.

Historical Perspective

Sustainable apparel and textile or environmentally friendly clothing is not necessarily a new concept. However, current trends in the fashion industry have increased
awareness levels among fashion buyers and have made the issue more relevant. The concept of sustainability can be traced back many years ago as society searched for ways for preserving and conserving the environment. With globalization and the technological advances of the 21st century, this concept has become more familiar to the general public. As a result, sustainable textile and apparel was made more available and accessible. Textile companies are now able to develop materials that are less harmful to the environment and use natural and organic fabrics, without compromising the quality of the final product.

**Sustainability**

During the 1970s, the concern with environmental and ethical issues came to public awareness and later gained acceptance in subsequent decades (Anderson and Cunningham, 1972; Doane, 2001; Sanne, 2002). Pressure groups and other environmental organizations have made great impact in raising such issues and informing the public about environmental concerns. Definitions of, and approaches to sustainability vary depending on the view and interest of the definer, however, all emphasis social, economical, and environmental concerns. The most updated definition of sustainability is from the report of the World Commission on Environment and Development; Sustainable development is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission, 1987).

Sustainable practices are related to sustainable production as well as sustainable consumption. Sustainable consumption was among the first theme to emerge from this eco-revolution (Jackson, 2004). Sustainable consumption is defined as "consumption that supports the ability of current and future generations to meet their material and other
needs, without causing irreversible damage to the environment or loss of function in natural systems" (OCSC, 2000, cited in Jackson, 2004). Sustainable production is fairly younger and a more complex issue. It involves the creation of goods and services using processes and systems that are non-polluting, conserving of energy and natural resources, economically viable, safe and healthful for workers, communities, and consumers, and socially and creatively rewarding for all working people (Jackson, 2004).

Sustainable production and consumption are inextricably interwoven. It was best described by Robins and Roberts (1997) as "the emphasis of sustainable production is on the supply side of the equation, focusing on improving environmental performance in key economic sectors, such as agriculture, energy, industry, tourism and transport. Sustainable consumption addresses the demand side, looking at how the goods and services required to meet basic needs and improve quality of life - such as food and health, shelter, clothing, leisure and mobility - can be delivered in ways that reduce the burden on the Earth's carrying capacity."

Sustainable practices are broad and can be traced down to many aspects of our everyday life. Sustainability is mostly related to the agriculture and food industries. Today's consumer is highly concerned about health issues and environmental impacts of chemical use for food production and therefore makes conscious decisions when shopping for food. The consumer is looking for natural or organic groceries that are healthier and better for our bodies. Places like Trader Joe’s or Whole Foods or even the local farmers’ market have become very popular as they offer a variety of organic products and food items.
The Sustainable Consumer

Sustainability, as mentioned, varies in its definitions and practices. Professionals have been studied consumers’ sustainable practices with the intention of identifying the sustainable consumer. In order to create a profile of the green consumer, three questions need to be answered; who buys, when and why? Researchers have identified three sets of variables that appear to be influential in classifying the green consumer. These focus around environmental and social values, socio-demographic variables and psychological factors (Gilg et al., 2004).

Environmental values and concern is relatively a recent area of research in sustainable consumption. It is suggested that high levels of environmental activism are strongly linked to values that considered the natural environment to be of great importance in someone’s life. Thogersen and Olander (2002) have found that sustainable consumption is influenced by individual’s value priorities, and that sustainable consumer is more likely to hold altruistic, non-material values. Sustainable consumers hold different social and environmental values than those who are considered non-environmentalists. A range of studies found that green consumers tend to hold more pro-environmental and pro-social values. Data from a 2004 research made by Gilg et al., demonstrates that “committed environmentalists valued wealth, personal influence and power, emphasizing equality with nature and a need to work with the environment rather than relying on technological solutions”.

When looking on the socio-demographic variables, the common assumption is that sustainable consumers are young, female, well educated, liberal and wealthy. This stereotypical view can be supported by different studies that have examined the impact of
age, gender, education, political affiliation and long working hours. Such researches suggest that those in older age groups, who are female, well educated, have a good income and are politically liberal, are more likely to engage in green consumption. Males are often perceived as less environmentally active. The older people groups are more likely to save and therefore age has a positive impact on green consumption. The general belief that higher income earning individuals are more likely to engage in sustainable activities is not sufficiently supported. And therefore higher income cannot be interpreted as a factor increasing sustainable behavior. When analyzing political attitudes, liberal individuals are more likely to support environmentalism and are more dedicated to green consumption.

Gilg et al. (2004) have identified various psychological factors, personal attitudes held by the individual, which are related to sustainable behavior. Perceived consumer effectiveness, which examines the extent to which an individual can have an impact on the environment, is higher among sustainable consumer. They depict higher self-efficacy, a person’s ability to engage in green consumption. They also carry advanced social responsibility, being morally responsible to take part in social activities and therefore becoming more sustainable. And finally demonstrate more effectively the interaction of the effects of the price, quality and brand loyalty.

Higher levels of these factors found among the sustainable consumer and therefore indicate that those individuals believe that one’s environmental actions will have a positive outcome, which in turn, their behavior can make a change. The psychological effect greatly related to consumer behavior; individuals are more likely to
purchase sustainable products if they perceive that what they are buying is actually going
to impact the environment and influence future policy (Gilg, et.al, 2004).

The research by Gilg et al. (2004) has clearly shown that specific demographic
groups, with particular behavioral qualities and attitudes, are engaging in a varied ways in
eco-friendly behavior. The sustainable lifestyle is holistic and incorporating purchase-
related and habitual elements that go beyond conventional behavioral boundaries. It also
proved that values take big role in the green consumer behavior and that values priorities
will determine the final behavior of a consumer. Sustainable consumer activities tend to
hold more altruistic values, meaning that they are more pro-social than pro-self in nature.
The sustainable consumer is less conservative in the way they think and behave, and are
more open to changes. Price will be less relevant among this population when purchasing
eco-friendly products. The major factors that are most important to this group are health
issues, safety concerns, buying locally and believing that green consumption positively
affects the environment (Gilg et al., 2004).

A 2009 study based on a nationwide survey of U.S consumers provides new
insights into consumer preferences, behaviors and attitudes toward sustainable behavior
and green products. The survey by Grail research group reveals important information
about what sustainable means to consumers, how they define green, how committed they
are to becoming more sustainable-conscious, and what are the characteristics that
extinguish green consumer from non-green consumer.

The study distinguished between two types of green consumers; ‘light green’, those who partially practice a sustainable behavior and whom some of the products they
buy are considered green, and ‘dark green’, those consumer who most of the products
they buy are green. 76% of the population studied is considered ‘light green’, while only 8% falls into the ‘dark green’ category (Grail research, 2009).

The main difference between the two groups is that ‘dark green’ consumers are more committed and proactive when buying green, have a better understanding of what green means, and are more driven by environmental and health concerns. For ‘light green’ consumers, the decision to first buy green is driven mostly by curiosity. As for demographics, both ‘light’ and ‘dark green’ consumers tend to be married women with no children; ‘dark green’ consumers are more likely to be older, more educated and more affluent than ‘light green’ consumers (Grail research, 2009).

The reason for purchasing sustainable products also differs between the two groups. Motivation for buying green are somewhat similar, however, ‘light green’ consumers make their buying decision based on impulse and curiosity, as opposed to the ‘dark green’ shoppers who plan their purchases ahead of time. For the sustainable consumer in general, environmentally friendly products are superior in regards to quality, safety, health issues and price. Majority of them indicated that the main reason that they started to behave in a more sustainable manner and purchase green products is due to the fact that they became more conscious about environmental issues (Grail research, 2009).

Environmentally Friendly Behaviors

Environmentally friendly behavior refers to consumer behavior that is taking into consideration the impact on earth and trying to minimize the negative effects on the environment. Developing environmentally friendly behaviors allows one to preserve the environment while shopping with conscious. In the apparel industry, environmentally friendly behavior is a relatively new concept, and therefore has not been studied
adequately. In that extent, organic apparel consumers have been examined in much less detail than organic food consumers.

Environmental behavior in the clothing industry can be expressed in different ways and is comprised of various factors; sustainable clothing that are produced with minimum damage to the environment, apparel made from organic fibers, product’s quality, reselling or donation of clothing, reuse and reconstructing old garments into new trendy designs (Blanchard, 2007). All of the above factors contribute to the conscious decision the consumer is trying to make when purchasing an apparel/textile product. Most consumer are not aware of the fact that the impact an individual can make is tremendous; choosing higher quality product that can last longer, for example, would be a much better choice than an item of low quality that will need to be replaced sooner. In addition, repairing or reshaping a pair of jeans versus discarding the garment would allow the individual to keep and use a fashion item longer than anticipated (Gore, 2006).

The idea of environmentally friendly apparel is far broader than producing clothing made out of organic fibers. Utilization of natural fibers and organic production processes is only a small fraction of what needs to be done to fully engage in environmentally friendly practices. Many other factors need to be considered in reviewing the larger picture of the apparel industry. The main focus however, should be the consumer; helping them adopts and demonstrates environmentally friendly behaviors (Chen & Burns, 2006).

The traditional consumption process, as an aspect of consumer behavior, involves three components; pre-purchase, purchase, and post-purchase. The disposal component, which is part of post-purchase behavior, is a new area of research and therefore requires
further investigation (Birtwistle & Moore, 2007). Such research will allow professional to better understand ways in which a consumer could engage in environmentally friendly behavior.

According to Jacoby et al. (1977) who developed a basic framework, this behavior is dependent upon three main factors: Psychological characteristics of decision making, such as personality, attitudes, social conscience, etc. Intrinsic factors to the product, such as condition, age, style, value, initial cost, durability, etc. and Situational factors extrinsic to the product such as finances, storage space, fashion changes, etc. These factors will determine whether a consumer will be considered a “redistributor” or an “end user” of a product (Birtwistle & Moore, 2007).

In today’s fast fashion world the apparel consumer faces some difficulties in expressing environmentally friendly behavior. Rapid stock turnover and vertical integration retailers characterize fast fashion. It has the objective of getting products into store within the shortest time possible. According to Mintel (2002), the exceptional growth of fast-fashion retailers can be attributed to high impulse buying, an increase in sourcing from low-cost countries and a change in consumer attitudes, with a removal of stigma attached to buying from value retailers (Birtwistle et al., 2003). This has resulted in an increased number of “seasons”, and shorter shipping times from suppliers to the stores (Mintel, 2002). As a result, the consumer has the “privilege” to purchase multiple items at lower costs and enjoy a variety of designs and new trends. This contradicts the individual attempt to become more environmentally conscious when shopping for clothes. The temptation to purchase more at lower prices is a struggle the fashion consumer is facing on a daily basis.
Fast fashion is not only faster and less expensive in its nature but usually depicts lower quality products. The negative possible outcome of higher quantities at lower prices could be filling up landfills around the nations, with apparel and textile products that shortly become useless. The production of excessive clothing reduces our supply of natural resources, contributing to an increase use of landfills (Young, Jirousek, & Ashdown, 2004). Fast fashion retailers, such as H&M, TopShop and Zara, sell garments that are usually used less than ten times, at a very competitive price point. This increase in consumption has led to new phenomenon of disposing garments that might be consider new or have only been used only few times (Birtwistle & Moore, 2007).

Some possible alternatives to the excessive production of apparel and textile items and reducing the high levels of disposals, include re-use, recycle, discarded, or destroyed. One major trend nowadays is reconstructing old garments into new designs. Garments reconstruction process involves reshaping used items into new, trendy designs. Jackets can be transformed into skirts, and dresses can take a new form of a top (Blanchard, 2007). This process allows an individual to express his sense of creativity while acting environmentally friendly.

Environmentally friendly behavior might also include disposal of clothing to charity shops. Consumers who engage in such behavior help protecting the environment by simply allowing the donated items to be sorted, and then either sold, sent to developing countries where they are re-used or sent to recycling plants and made into fillings or cleaning rugs (Birtwistle & Moore, 2007). One simple action makes the difference between acting environmentally friendly and being careless about the environment. The advantage of re-using and recycling is clear and has both
environmental and economical benefits (Birtwistle & Moore, 2007). It reduces the need for landfill space, prevents water pollution, decreases green house gas emission and keeps a clean, safe environment.

Buying local is also considered a way to practice eco-friendly behavior and contribute to the effort of conserving the environment. Purchasing from the local community not only supports the success of the community, it also reduces harmful pollutions from transportation (Blanchard, 2007 & Gore, 2006). Buying locally reduces transportation costs that might occur in delivering a product to the consumer.

The concept of environmentally friendly behavior and sustainable consumption is fairly new and might not be considered common or familiar in different parts of the world. In a study conducted by Birtwistle and Moore (2007), the researchers investigated consumers’ disposal of fashion products and how it might be possible to increase sustainable consumption of textile. Different factors affected their textile disposal behavior; demographics, awareness of the environment, general recycling behavior, fashion purchasing behavior, fashion innovativeness, attitudes to textile reuse and recycling, and the influence by celebrity and media. It was found that consumers were unaware of the need for clothing recycling, as well as that they lack the knowledge necessary to engage in such actions. Respondents did not have the knowledge of how and where clothing was disposed of, or even how it was made. Their lack of knowledge resulted in a behavior that negatively affected the environment. Should they have been educated about the issue, their actions might have been shifted towards more environmental-friendly behavior (Birtwistle and Moore, 2007).
More information about sustainable consumption and the incentives of practicing eco-friendly behavior in the area of fashion clothing and textiles should be provided to consumers. The increased awareness of the issue would be beneficial environmentally and economically as one. The government and other advocates of sustainable consumption must endeavor to better understand the consumer motivations and attitudes towards textile disposition to reduce the amount of textile waste in landfills in the future (Birtwistle & Moore, 2007). Although consumers illustrate a concern for the environment, there is no correlation between awareness of environmental issues, textile disposal behavior, and the attitude to textiles’ reuse and recycling (Birtwistle & Moore, 2007).

**The Apparel Industry**

The apparel industry is composed of the “makers and sellers of fashionable clothing” (fashiondictionary.com). This is a complex chain consisted of a range of stages and variables. The apparel business is ever changing and is affected by social, economical and global trends. Sustainability, as being one of the latest trends in today’s global world, has made its impact on the apparel and textile industry as well. The concept of sustainable clothing is slowly penetrating into the complex structure of the fashion business. During the last decade, major changes have been made in order to transfer the apparel and textiles industry into a more conscious and environmentally friendly business. Different members of the industry are taking drastic measures to be able to accommodate the changes and become more eco-friendly.

In the book “Sustainable Fashion Why Now”, the authors present the contradictory concepts of fashion and sustainability (Hethorn & Ulasewicz, 2008).
Fashion is fast and changing while sustainability is all about preservation and conservation. It is discussed how apparel and textile can be produced with an ethical manner and while using renewable resources and socially responsible approaches (Hethorn & Ulasewicz, 2008). The debate over this issue will ever be going as the creation and practice of sustainable clothing is a difficult mission. However, the apparel industry is following the path of other industries in becoming more environmentally conscious due to increased consumer awareness and demand.

Nationwide survey from 2009 reveals that apparel products category has specific features that are viewed by shoppers as most important for driving purchases. 70% of respondents indicated that the most important feature of a sustainable apparel product is that the manufacturing process causes minimal harmful emissions. The second most important feature is packaging. Product packaging made of recyclable materials found to be more attractive and potentially will encourage a purchase. Lastly, if the product itself is recyclable or made from recyclable materials, it is more likely that the consumer will purchase the item (Grail research, 2009). The results of this study suggest that consumer look for alternative sustainable products in the apparel industry. It seems that the adoption of sustainable manufacturing practices is perceived as the most important green element in the apparel industry.

The eco-friendly trend and increased demand for sustainable products is being recognized by the fashion business. All members of the apparel and textile industry including suppliers, manufacturers, designers, retailers, and consumers are starting to focus on sustainable clothing. The trend has made its impact; we see companies such Patagonia, Nike, H&M, Levi’s, Louis Vuitton, Gucci and more are shifting their
production, selling and marketing practices dramatically to be able to adjust to market changes.

According to a 2010 study by Grail Research Group, the sustainable trend in the apparel industry focuses on four major areas: packaging, products, business operations, and socially responsible activities. Apparel and textile brands are creating eco-friendly packaging by optimizing the amount of material used, reducing the use of plastic and metals and using recyclable materials such as paper. Many companies are developing sustainable products by using eco-friendly raw materials, such as organic cotton and natural dyes. Many are also reducing the use of leather, fur and other endangered natural resources. Some brands are focusing on sustainable business operations by reducing water and energy consumption, using renewable energy and partnering with ethical companies to build a sustainable image. In addition to changing business practices, apparel companies have been organizing, funding, supporting and participating in various social and environmental initiatives like auctions or donations (Grail research, 2010).

Sustainable packaging is becoming major trend in the apparel industry. Many brands are using eco friendly materials to package and ship their products. The use of recyclable bags has become wide, and plastic or even paper shopping bags are much less common. Urban Outfitters was one of the first apparel retail companies to forgo the traditional paper shopping bag to reusable bag made of recyclable fibers. They made the switch to reusable shopping bags made from non-woven polypropylene (PPNW) in order to encourage an eco-friendly mindset and make consumers familiar with the possible sustainable alternatives.
Louis Vuitton had started using recycled materials for packaging more than a decade ago. In 2001, 85% of the corrugated packaging used by the company to transport products was composed of recycled fibers. Few years later, they implemented a carbon inventory and began using eco-labeled paper for all packaging. In 2006, the company was able to reduce dramatically its transportation energy consumption by discontinuing the use of intermediate packaging while transporting products from workshops directly to stores (Grail research, 2010).

Luxury goods companies as well as ready-to-wear brands are developing products made from eco-friendly raw materials, to address the growing need for sustainable apparel. In 2009, Gucci had created a line of organic cotton t-shirt using natural dyes. The fashion house is planning to substitute all its mannequins with eco-friendly versions made of 100% recyclable polystyrene and finished with water-based paints. In April 2011, H&M had launched their “Conscious Collection”, which was created as part of the company’s effort to create a more sustainable fashion future. Few years ago, the Donna Karen brand introduced limited edition t-shirts made from eco-friendly materials (70% bamboo and 30% organic cotton); donated 10% of the sales, each to Urban Zen and Tonic Foundation (charitable institutions that promote well-being).

Sustainable operations of apparel companies have also become more widely accepted. In the past five years, different brands have adopted water conservation practices, leveraged renewable energy sources, and partnered with ethical and socially responsible organizations to make their business operations more sustainable. In 2006, the luxury brand, Louis Vuitton Began transporting 60% of its leather goods from France to Japan via ship, to avoid pollution caused by jet fuel. It also reduced energy use by 30%
at all new stores, by implementing a new lighting concept. In 2007 the company opened a green warehouse built primarily from eco-friendly materials. Five years ago, the luxury company Tiffany&Co installed large solar power systems at its distribution facilities in the U.S. and in 2007 signed on to the U.S. Environmental Protection Agency’s Climate Leaders program and aims to reduce its U.S. greenhouse gas emissions by 10% per square foot by 2011(Grail research, 2010).

Sustainable or socially responsible activities have become popular among apparel and textile companies. In addition to producing clothing that are made from natural fibers and adjusting production processes, apparel and textile companies are showing great effort in becoming more socially and environmentally responsible. The luxury brand Sergio Russi has made a commitment in 2009 to donate a portion of the sales of its ‘Eco Pump’, a stiletto shoe made from raw materials, to social and environmental organizations. Patagonia, a leading brand in the outdoor clothing market, is also known for its long years’ commitment to the environment and community. The company provides environmental grants, and funds activities to protect habitat, wilderness and biodiversity. Patagonia has given more than $40 million to more than 1000 environmental organizations (Chouinard & Brown, 1997).

Major trend in the apparel and textile industry over the last decade is the use of natural materials in Eco-Fashion. Environmentally friendly textile products refer to fibers, fabrics, or apparel that’s manufacturing, usage, maintenance and ultimate disposal have minimal negative impact on the environment (Chen & Burns, 2006). Different natural materials used for the making of textile products may include: banana fiber, soy-based fibers, corn – fiber knit, wood pulp, seaweed, and fleece made from recycled
plastic bottles (Gershon, 2005). Some of the most popular materials include organic cotton, hemp, and bamboo.

Cotton is the most widely globally used material in the textile industry. According to the United States Department of Agriculture, in 2010 alone, US production of cotton fiber was approximately 12 billion pounds, which accounts for about 40% of the textile fiber consumption in the United States. The common public perception is that cotton is an environmentally responsible product. The truth is that cotton crops require extensive irrigation and mass use of hazardous chemicals. It takes roughly one-third of a pound of chemicals (pesticides and fertilizers) to grow enough cotton for just one T-shirt. Over 2 billion pounds of synthetic fertilizers are applied to conventional cotton the same year, making cotton the fourth most heavily fertilized crop behind corn, winter wheat, and soybeans (EPA, 2010).

Sustainable practices have become dominant in cotton production. Organic cotton is one of the most used natural fibers in the textile industry and is the most popular among consumer. The new technologies and expertise have made it possible for farmers to substantially decrease water and chemical use on cotton crops (U.S. Cotton & the Environment, 2007). Organic cotton builds strong soil through crop rotation and retains more water thanks to more organic matter in the soil, controls weeds through cultivation and physical removal, balances pests with their natural predators; beneficial insects, and trap crops that lure unwanted insects away from the cotton crop, and relies on the seasonal freeze and water management for defoliation (U.S. Cotton & the Environment, 2007).
All cotton sold as organic in the United States must meet strict federal regulations covering how the cotton is grown and produced. In order to be certified as an organic cotton operation, a farm must undergo a three-year conversion process for the land before they can produce their first harvest, thus becoming an expensive and timely commitment process (U.S. Cotton & the Environment, 2007). Despite the extra costs, organic cotton is potentially more profitable in the long term than the conventional alternative.

The Global Organic Textile Standard (GOTS) is recognized as the leading processing standard for textiles made from organic fibers worldwide. It defines high-level environmental criteria along the entire supply chain of organic textiles and requires compliance with social criteria as well. Only textile products that contain a minimum of 70% organic fibers can become certified according to GOTS. “All chemical inputs such as dyestuffs and auxiliaries used must meet certain environmental and toxicological criteria and also the choice of accessories is limited under ecological aspects. A functional waste water treatment plant is mandatory, and all processors must comply with social minimum criteria.” (www.global-standard.org).

Products made of organic cotton are not only less available in the apparel market but are considerably more expensive than the traditional cotton clothing. Price for an organic cotton t-shirt is nearly double ($12-20) the price of a basic t-shirt made from regular cotton ($6-10). Current market research reveals that consumer willingness to pay for sustainable apparel is increasing. Women’s Wear Daily (2008) reported the International Textile Fair in January 2008 was showing a growing acceptance toward organic materials. The buyers at the fair viewed the rising cost as insignificant toward
organic materials. They are starting to feel that it’s worth the extra expense (Tucker, 2008).

Wool is another commonly renewable resource, natural fiber used in the apparel and textile market. It is considered the most significant animal fiber used in textiles (Chen & Burns, 2006). Wool production however is much less harmful to the environment than cotton production. It requires substantially lower amounts of water and zero use of fertilizers and herbicides. Negative impacts on the environment do exist during production processes of wool; soil erosion, runoff contamination and use of chemicals, soap and alkaline solutions (Chen & Burns, 2006).

The need for natural green fibers is growing, and the apparel industry is in constant search for such alternatives. Converting conventional fibers into 100% organic is a complex process, however required by market trends and consumer’s demand. Current market researches indicate that the average consumer is willing to pay at least 50% more on apparel and textile items that are considered sustainable (Lin, 2010). In the years to follow it is expected that consumer’s knowledge and involvement levels of sustainable apparel will increase and therefore demand for eco-friendly and green products continue to grow. In order to meet increased interest, environmentally friendly apparel products should be more available in the market (Lin, 2010).

The Role of Knowledge

Knowledge and awareness are two of the top reasons whether consumer chooses to engage in any kind of sustainable shopping behavior or not. Several studies have been indicated that the level of knowledge is directly related to consumer environmentally friendly behavior and therefore affects willingness to purchase sustainable apparel. According to D’Souza et al. (2006) if a “consumer has knowledge about the environment
and pollution promulgation, the causes and impact on the environment, then their awareness levels would increase and thus would, potentially, promote a favorable attitude towards green products” (p. 164)

Members of the apparel and textile industry should strive for a more sustainable environment. Designers, retailers and manufacturers in the apparel and textile industry are major key players in the emerging sustainable development. Designers have an important role in educating and changing behavior of users towards more sustainable practice. Designing eco-friendly garments would encourage fashion trends followers to develop a sustainable lifestyle. Apparel and textile companies, as part of their efforts to become more socially responsible, should deliver a sustainable message to their consumers. In order for sustainability to have a long lasting impact on consumers’ perception, they must be educated and made aware of the social and environmental commitments members of the fashion industry are making.

It is the retailers’ responsibility to share and explain their commitment to becoming ‘green’. Highlighting positive activities, and sharing information on sustainable production processes and standards, make consumer more aware of the general move in the industry. Providing information of product specific environmental aspects on labels, packaging, brochures, magazines ads and television commercials will potentially enhance level of knowledge among consumers and create a positive image for a brand. Better advertising and creative marketing strategies will aid in reaching apparel consumers who have some level of eco-conscious purchasing behavior.
Educating consumers can be done through promoting green behavior and increasing awareness of environmental issues. Companies can also help consumers actively participate and contribute to sustainable initiatives. An accessible internet-based resource would help consumers learn about the differences between a 100% cotton shirt and a 100% polyester shirt, or assist them in finding a company that sells environmentally friendly apparel (Kim, 2010). Improved standardized product labeling is yet another effective way to provide product information to consumers. Uniform eco-labeling programs in the U.S are necessary to increase understanding of the different versions of sustainable apparel products among consumers.

The media is yet another major tool that can affect consumer perception, awareness and knowledge of sustainable apparel. The media has the power to impact any transition into a more sustainable society. It can educate viewers by delivering eco-friendly messages and carrying sustainable content programs (Huckle & Sterling, 2001). Many believe that educating the public about sustainability is not the media’s responsibility; however, there is no doubt that the media is such a powerful educational toll to the extent that it can actually make a difference in public knowledge and awareness of sustainable issues.

Some will advocate that government and other official agencies should also make sustainable information available for the general public, and maintain programs that educate consumer about the harmful effects apparel and textile production has on the environment. Marketing campaigns promoting sustainability that are driven by the government will educate consumers about social responsibility and green consumption issues. Involvement of officials in advocating sustainability might be done through
creating new policies, regulations and laws. Consumers can adjust more quickly to an environmentally friendly behavior if such behavior is encouraged by the government or even required by the law.

Others would argue that government regulation is not the answer; industry leaders should take the initiative to form associations and standards, with voluntary compliance. Their role is to educate consumer about sustainability, and increase knowledge levels on sustainable practices and products in the apparel and textile industries. Due to low knowledge levels, consumers often face difficulties in identifying sustainable products options. Lacking information, they are unable to differ between good and bad alternatives for a product. Companies should provide this useful information, allowing the consumer to make the right consumption choices. Industry members can educate consumer about green or sustainable alternative by using eco-friendly labels, providing product information or using magazine ads and television commercials to increase awareness.

Higher education institutes should also serve as a platform to integrate the concept of sustainability into the education system. In a world where sustainable development is becoming such a central issue in the apparel and textile industries, education is a great tool to address the crucial challenges of sustainable production and consumption. FCS policymakers should intertwine sustainability perspective into the National Standards for Teachers of Family and Consumer Sciences in response to the increasing government, business, and academic emphasis on sustainable development (Stall-Meadows, 2010).

Integrating sustainability into the apparel and textile higher education curriculum will make students more aware and knowledgeable of the emerging trends of sustainable
apparel and textile. It will clearly affect their critical thinking, learning, personal
development and behavior, and provide them with the knowledge necessary for
successful careers in the field. Learning how our everyday actions affect the short-term
and long-term future of our communities will increase concern for the environment and
teach students how to operate in a manner that minimizes harmful effects on the planet.

Regardless of the level at which sustainable education takes place, educators have
an obligation to prepare themselves and their students to seriously consider the effects of
our sustainable and non-sustainable actions. “When given the tools to understand global
issues as they relate to sustainability, future FCS professionals can better compete in a
global economy” (Miller & Kato, 2006). Shifting higher education to focus more on the
issue of sustainability is not effortless. Researchers explained that it involves intensive
efforts “to change the way future professionals think and work” at all levels—
philosophically, socially, and politically (Miller & Kato, 2006).

The best way to encourage consumers to engage in sustainable behaviors is to
teach them to rethink consumption patterns, and to actively participate in community
level activities (Collins, 2003). Their behavior is directly related to their knowledge;
researches have shown that knowledge level affects purchasing behavior patterns. When
an individual lacks the vital information required to make the right decision, he or she is
less likely to take into consideration environmental factors and therefore more likely to
purchase an item that is not considered eco-friendly. Knowledge as we discuss does not
necessarily refers to scientific knowledge, rather the ability of individuals to make
connections between forms of knowledge that link their own, everyday and
environmental concerns with public matters. Once this knowledge and information is
accessible to consumer, one will be more likely to adjust his or her behavior and adopt new practices that are considered more sustainable (Hobson, 2003).

Very few studies have been done in the past to explore the linkage between consumer knowledge of the environmental impact of clothing production, concern for the environment, and environmentally friendly consumption behavior within the context of textiles and apparel (Brosdahl & Carpenter, 2010). The influence of knowledge and concern on actual consumption behavior was examined by Brosdahl and Carpenter (2010) who suggested that knowledge of the environmental impacts of textiles and apparel production leads to concern for the environment, which in turn leads to favorable environmentally friendly consumption behavior.

Environmental knowledge can be divided into two categories; 1) knowledge about the impact of the product on the environment, and 2) knowledge about how the product is produced and how this affects the environment (Brosdahl & Carpenter, 2010). The main question is whether environmental knowledge is an originator of environmental behavior. Meaning that whether knowledge of sustainable apparel and textile will necessarily prevent one from purchasing a product that is harmful for the environment and encourage substituting this product with one that is considered green. Studies have shown that increased levels of general environmental knowledge will promote an increased general environmental behavior (Kim et al, 1997).

In the context of textiles and apparel however, Kim and Damhorst (1998) found that general environmental knowledge and general environmental behavior was not predictive of respondents’ environmental apparel consumption behavior. They also
suggested that environmental apparel consumption knowledge does not appear to lead to environmentally responsible apparel consumption behavior.

When testing the hypothesis that “knowledge of the environmental impact of textile and apparel production will positively influence environmentally friendly consumption behavior”, Brosdahl and Carpenter (2010) could not find enough evidence to support it. The results of their study indicated that knowledge alone does not translate into behavior. However, the study did find that knowledge of the environmental impacts of textile and apparel production does influence environmental concern, which in turn modifies consumer’s purchasing behavior. Therefore, concern for the environment serves as a mediator between knowledge and behavior.

Brosdahl and Carpenter (2010) concluded that providing consumers with knowledge of the environmental impacts of textile and apparel consumption could influence their concern for the environment, and potentially, their consumption behavior. They believe that consumers should be educated about sustainability in the textile and apparel market so they could better understand the impact of their efforts, knowing what, if and how much, environmental actions such as recycling, and purchasing environmentally friendly products will actually support a social environmental cause. “Whether consumers don’t have information or could use more information, education of consumers appears to be the key” (Brosdahl & carpenter, 2010).

A different study performed in 2010 by Kim, supported the common notion that “knowledge acts as a constraint against consumers engaging in pro-environmental behaviors”. The majority of respondents in the study depicted limited awareness of the
relationship between environmental issues, and apparel production and consumption. This limited knowledge serves as a constraint to eco-conscious apparel acquisitions because the participants did not have the knowledge they need in order to be able to compare environmental impacts of different materials and select the most sustainable one (Kim, 2010).

Lack of knowledge may also lead to misunderstanding or misinterpretation of information provided to consumers. Consumers, who have incorrect knowledge about environmentally preferable apparel and acquisition sources or about the variety of sustainable fibers available for textile and apparel, are more prone to base their decisions on misinformation while relying on mainstream companies to meet their needs (Kim, 2010). Limited knowledge of sustainable apparel and textile practices and product serves as a barrier to environmentally friendly purchasing behavior.

Knowledge is considered as an internal barrier to eco-conscious apparel acquisition. In order to increase engagement in such behavior, consumers need more information about sustainable apparel and textile products. Better information about manufacturing and production processes, energy used while transporting apparel goods, and sustainable fibers used for apparel and textile, would allow consumers to make more conscious decisions when purchasing apparel and textile items. Additional information about where to acquire sustainable apparel products and about the different brands carrying such collections will potentially result in increased demand for these items.
Willingness to Purchase

Different characteristics are related to consumer willingness to purchase sustainable textile and apparel. Many studies have been done in order to examine the main factors affecting consumer’s willingness to purchase sustainable apparel; and different researches have been conducted to find methods allowing professional to increase willingness to purchase among shoppers. In the sustainable textile and apparel market the barriers are even more distinct than in any other fashion market. It is an emerging fashion trend, which is harder and taking longer to adapt to due to various reasons. Willingness to purchase should not be mistaken with the willingness to pay a premium for purchasing sustainable apparel and therefore should be carefully examined.

Previous literature has asserted that consumers who are environmentally conscious would purchase environmentally friendly products and were even willing to pay more for them (Kim & Damhorst, 1998); however, this pattern could not have been supported by other studies and therefore cannot be generalized to the entire apparel sector. Different variables must be altered before consumers will be willing to pay the extra dollar and purchase eco-friendly apparel and textile products. Higher prices, low availability, little choice, style and color insufficiency, lack of product information and uncertainty about actual environmental benefits are among consumers’ main barriers to purchasing sustainable apparel products (Meyer, 2001).

Gam et al. (2010) conducted a research about mothers’ willingness to purchase organic cotton clothing for their children. The study found that mothers who initially had higher levels of environmental concerns and higher levels of involvement with organic
cotton clothing are more willing to purchase sustainable apparel. They could not support the hypothesis, however, that mothers who purchase children apparel more frequently and typically spend more on children clothing will be willing to purchase organic cotton clothing. Also, mothers’ willingness to pay a premium for purchasing children’s organic cotton clothing could not be supported.

It has been found that price is one of the most decisive factors in determining when consumers actually purchase apparel products in general and sustainable apparel in particular (Gem et al., 2010). According to the study, consumers will be willing to purchase environmentally friendly textile apparel products only if they perceived the product attributes as superior to similar products that are not considered eco-friendly (Gem et al., 2010).

A study performed by Hustvedt and Dickson (2008) focused on the psychographic variables affecting consumer willingness to purchase organic cotton apparel products. They created a psychographic profile for specific market segment of consumers interested in purchasing organic cotton apparel. According to the study, consumers in this market segment have positive attitudes towards organic and sustainable agriculture, and are more concerned about the impact of clothing production on the environment than other consumer. They also prefer to “buy locally” and have a strong self-identity as environmental, organic, and socially responsible consumers (Hustvedt & Dickson, 2008).

Some consumers are willing to pay more for eco-friendly apparel products, recognizing both the environmental and personal benefits. However, not all consumers
feel obligated to protect the environment and therefore many are unwilling to sacrifice low costs of conventional apparel products for products produced in an eco-friendly manner. Some are also unwilling to compromise style, colors and availability of the traditional cotton garments, for the relatively less stylish and muted tones of organic cotton apparel. Consumers may not feel that their daily activities have any real impact on the environment and therefore will not adjust their shopping behavior to become more sustainable.

Socio-demographics can be useful in determining preferences for eco-friendly apparel products (Lin, 2010). However, various studies reveal different demographic characteristics for consumer who are more willing to purchase and pay for such products. It has been yet to determine the true socio-demographic profile of the organic apparel consumer. Many researchers found that the majority of consumers are female, who generally tend to be more environmentally responsible than men. Age, race, level of education, and income levels vary. Available literature depicts no clear associations between age and willingness to pay for organic apparel. Some researchers found that age is not a factor in identifying environmentally friendly behavior (Laroche et al., 2001), while others found that age does impact environmentally friendly behavior (Fraj & Martinez, 2006). Contradictory results were also presented about the relationship between eco-friendly behavior and level of education. Some found that education plays no role in consuming sustainable products, while others reported a positive relationship between the two variables (Balderjahn, 1988; Butler & Francis, 1997). In addition, minimal research has conducted examining the impact of race on consumption of organic products (Lin, 2010).
In a case study conducted in Hawaii, the researcher was able to build a profile of consumers willing to pay more for organic cotton (Lin, 2010). The profile included behaviors, reasons for selecting cotton and demographic traits. Lin’s (2010) conceptual framework was that those who are willing to pay more for organic cotton are already active in protecting the environment or belong to an environmental organization. They consume organic food and other eco-friendly products. These consumers read the fabric content label before purchasing a garment, and most of them already own garments made from organic cotton. Consumer select cotton since it is easy to care for, inexpensive, soft, comfortable, aborts perspiration and readily available in the market. Major demographics included gender, age, education, ethnicity and family size. It was assumed that these characteristics would affect consumer’s willingness to pay for organic cotton.

Two major components of the conceptual framework constructed by Lin (2010) included attitudes and prior knowledge. Consumers who are willing to purchase sustainable apparel are more aware of the harmful effects clothing production has on the environment. They have thought about the amount of chemicals required to produce apparel item, they believe cotton is an important fiber and prefer organic cotton rather than the conventional option. These individuals are concerned with environmental issues regarding commercially grown cotton (Lin, 2010).

It is believed that consumers who are willing to purchase sustainable apparel and will most likely pay more for organic cotton have some prior knowledge regarding sustainable apparel. These individuals believe that organic cotton is more environmentally friendly than conventional cotton. They also have knowledge about the amounts of chemicals and water needed to produce a regular cotton T-shirt or a pair of
jeans (Lin, 2010). They have an overall positive attitude towards organic apparel and textile products, meaning that they are willing to alter their behavior in order to become more eco-friendly.

The results of the study (Lin, 2010) indicated that willingness to pay more for organic cotton varies based on environmental shopping attitudes as well as shopping behavior. There is a positive relationship between one’s environmental shopping attitude and behavior and his/her willingness to pay more for organic cotton. Lin’s (2010) findings support the general perception that consumers who have positive environmental shopping attitude and an environmentally friendly shopping behavior will be more willing to purchase and pay for sustainable apparel and textile products.

As with many previous studies done in the past, once again there was a lack of conclusive evidence regarding demographic factors and their impact on consumer’s willingness to purchase. Age, education level and ethnicity seem to have no major impact on willingness to purchase. Gender; however, is the only factor that revealed major differences between those who are willing to pay and those who are unwilling to pay, with female being the majority of shoppers who will pay more for organic cotton (Lin, 2010).

Different studies have revealed that consumers who are environmentally conscious will purchase green products and are willing to pay more for them (Kim & Damhorst, 1998). Also, consumers will more likely to buy products made by companies that have an eco-friendly image. This relationship had not yet extended to apparel purchasing behavior. According to Meyer (2001), consumers feel reluctant to purchase
green apparel products because they cost more but provide fewer choices, they have aesthetics and functional disadvantages, consumers lack information about them, and consumers are uncertain about the actual benefit to the environment.

It is suggested that individuals who are considered fashion conscious are more likely to adopt eco-friendly clothing and therefore their willingness to purchase sustainable apparel is higher than the average consumer. Gam (2011) studied the effect of fashion orientation, shopping orientation and eco-friendly behavior on consumer intention to purchase eco-friendly clothing in the future. It was hypothesized that those with an interest in fashion and shopping are likely to seek new knowledge regarding apparel products, have greater information about sustainable apparel and therefore greater potential to purchase eco-friendly clothing (Gam, 2011).

Fashion leaders, who might also be known as early adopters of fashion trends, usually depict higher levels of knowledge of new apparel products. Those who have higher interest in fashion are more likely to be exposed to information about eco-friendly clothing. Product knowledge influences the adoption of new products; increasing amount of information regarding sustainable apparel possessed by fashion leaders will result in higher motivation to purchase sustainable apparel (Gam, 2011). Gam (2011) asserted that consumers who are interested in fashion demonstrate their interest by purchasing new apparel products and that theirs reasons for shopping differ from those who are not interested in fashion.

Studies have shown that consumer’s demand and information sources differ based on the fashion and shopping orientation. Consumers who read fashion magazines and
other related fashion materials are more exposed to information regarding eco-friendly apparel. Magazine articles about leading fashion designers and well-known fashion brands implementing sustainable production methods and creating eco-friendly clothing collections encourage those who read them to seek these items for the sense of being innovative and creative (Vartan, 2008).

Gam’s (2011) findings revealed that consumers who are interested in fashion and shopping would purchase or adopt new apparel products (sustainable) earlier than other consumer groups. Consumers who have higher interest in being well dressed and who enjoy shopping, depicted a stronger purchase intention of sustainable apparel. Other reasons to purchase eco-friendly clothing included fun and wanting to try, and the main reason for not willing to purchase eco-friendly clothing is price. The main finding of the study indicated that environmental concern and eco-friendly behavior have a positive effect on environmental consumption, resulting in stronger willingness to purchase eco-friendly apparel products (Gam, 2011).

**Theoretical Framework**

The conceptual framework for this study is based upon the theory of planned behavior. Icek Ajzen, who suggested that there is a link between attitudes and behaviors, proposed the theory in 1985. The Theory of Planned Behavior is designed to predict and explain human behavior in specific contexts (Ajzen, 1991). It is an extension of the Theory of Reasoned Action focusing on three elements that affect an individual’s *Intention* to perform a given *Behavior*. These three elements include *Behavioral Attitudes*, *Subjective Norms*, and *Perceived Behavioral Control*. 
Ajzen (1988) argued that the intention indicates how hard people are willing to try to engage in a certain behavior; the stronger the intention, the more likely they will engage in that behavior. The idea is that behavioral achievement depends on the combination of intention and behavioral control of a person. Motivation (intention) and ability (behavioral control) interact in their effects on behavioral achievement (Ajzen, 1991). Therefore, intentions affect performance, and performance increases with behavioral control.

Attitude towards a behavior is the first independent determinant of intention. It refers to the “degree to which person has a favorable or unfavorable evaluation or appraisal of the behavior in question” (Ajzen, 1988). The second predictor is a social factor termed subjective norm; it refers to the perceived social pressure to perform or not to perform the behavior. Lastly, the degree of perceived behavioral control, whether a person is likely to perform a certain behavior or not, will eventually impact the individual's intention. “As a general rule, the more favorable the attitude and subjective norm with respect to a behavior, and the greater the perceived behavioral control, the
stronger should be an individual’s intention to perform the behavior under consideration” (Ajzen, 1991).

Primarily Ajzen discusses perceived behavioral control, as it is the major factor to interact with intention and create a behavior. These are the resources and opportunities available to a person and how one decides to use, which in turns leads to behavioral achievement. Perceived behavioral control refers to people’s perception of the ease or difficulty of performing the behavior of interest (Ajzen, 1991). According to the Theory of Planned Behavior, perceived behavioral control, together with behavioral intention, can be used directly to predict behavioral achievement. As Ajzen (1988) argues, this direct link between perceived behavioral control and behavioral achievement is supported by two rationales; (1) “the effort expended to bring a course of behavior to a successful conclusion is likely to increase with perceived behavioral control, and (2) perceived behavioral control can often be used as a substitute for a measure of actual control”.

**Conceptual Model**

In this study, we examine how environmental concerns, attitudes, and knowledge relate to individual’s intention to buy. Analyzing students’ environmental concerns, attitudes and their level of knowledge of sustainable apparel and textiles, would allow us to understand how it correlate to their willingness to purchase apparel and textile products and therefore predict whether or not they are likely to engage in a certain behavior. As suggested by Ajzen (1988), the more positive the independent predictors are (attitudes, norm, perceived behavioral control) the more favorable the intention to perform a behavior is. The model argues that the greater an individual’s environmental concerns, attitudes and knowledge are, the higher the willingness to purchase is. An
individual, who has greater concern for the environment, positive attitudes towards sustainability, and more knowledge about sustainable apparel and textiles, will more likely to be willing to purchase sustainable apparel and textile products. Figure 2 demonstrates the model being tested in this study.

Figure 2-2. Conceptual Model: Affect of Environmental Concern, Attitudes and Knowledge on Willingness to Purchase.
CHAPTER 3 - METHODOLOGY

The purpose of this study was to further investigate the correlation between students’ environmental concerns, attitudes and knowledge of sustainable apparel and textiles, and their willingness to purchase (WTP) sustainable apparel and textile products. The primary intent was to determine whether knowledge of sustainable apparel is related to the intention to engage in an environmentally friendly shopping behavior (willingness to purchase). The correlation between students’ environmental concerns, attitudes, and knowledge and their WTP sustainable apparel was examined. The differences in knowledge, before and after an educational workshop were measured to determine whether education enhance consumer knowledge of sustainable apparel and textiles. Differences in WTP before and after the implementation of the education workshop were also examined. Lastly, differences in knowledge and WTP, before and after workshop, were studied on the basis of students’ major (Apparel Design and Merchandising major students vs. Non Major students).

This chapter describes (a) the research design, (b) survey instrument, (c) instrument validity (d) instrument reliability, (e) the process of determining the population and sample, (f) the data collection procedures, (g) variables, and (h) data analysis.

Research Design

Pretest-posttest within subject research design was conducted in determining environmental concern, attitudes, knowledge, and willingness to purchase of college students toward sustainable apparel and textile. The treatment in the study included an
educational workshop; PowerPoint presentation on the issue of sustainability and environmentally friendly apparel and textile.

The pretest-posttest survey design was planned, in order to compare knowledge levels and learning outcomes of students’ groups exposed to an educational workshop about sustainability and sustainable apparel products and trends. The developed questionnaire was distributed to a sample of 100 students in two classes at the Family and Consumer Sciences Department, California State University, Northridge. The goal was to compare between Apparel Design and Merchandising major and Consumer Affairs major (non-major) students. Upon completion of the pre-survey, which was used to test students’ environmental concerns, attitudes, level of knowledge, and their willingness to purchase sustainable apparel and organic textiles, an educational workshop was implemented as an intervention to enrich students’ understanding of sustainable apparel and textile practices and products and potentially influence their willingness to purchase. The effectiveness of the workshop was examined using the same survey to reassess students’ knowledge level and willingness to purchase afterward.

A group-administrated questionnaire was implemented in the data collection. This method is best used when a researcher has an opportunity to survey a specific group in one place. The survey is usually given to a group of subjects at the same time and place. Different advantages exist in utilizing this approach. High response rate is the main advantage of this method, while the researcher can also benefit from minimum costs and availability to immediately answer questions of the respondents (Fraenkel & Wallen, 2006). The survey questionnaire requires an approval from Human Subjects Research
department, which protects any legal or ethical aspects of the study. Also the researcher must ensure the initial study design remain unchanged throughout the data collection.

**Instrument Development**

Instrument development in this study included two parts; (1) the development of a survey which was designed to measure students’ environmental concern, attitudes, knowledge and willingness to purchase sustainable apparel and textiles, and (2) the implementation of an educational workshop in the form of PowerPoint presentation on the topic of sustainability and environmental friendly apparel. Each of the instruments used was carefully completed to best achieve the goals of the study.

(1) Survey Development

The survey instrument was comprised of five major sections, in order to test: (I) Environmental Concern; (II) Attitudes; (III) Knowledge; (IV) Willingness to Purchase (WTP); (V) Demographics. Sections I, II, IV (Environmental Concern, Attitudes, and WTP) are comprised of statements utilizing the five-point Likert Scale. For sections I, Environmental Concern, II, Attitudes, and IV, WTP, the Likert Scale provides a selection for the respondents utilizing a five-point scale: (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree and (5) Strongly Agree. Section III, which evaluates knowledge levels among students, encompasses various multiple-choices questions and true/false questions. Section V, Demographics, which designed to collect background information on the respondents, is comprised of multiple-choice questions.

The survey instrument was created utilizing previous studies in the area of environmentally friendly clothing, and was patterned after research design instruments used in several past studies. The concepts associated with eco fashion and
environmentally friendly behavior from the survey instruments were utilized in creating the instrument for this study. The content in each section was derived from the literature review and past studies (Bentley et al, 2004; Crawford, 2008; Hustvedt, 2006).

The cover page included information about the topic being studied and its importance, asking for students’ participation and ensuring complete confidentiality to respondents.

Section I was designed to measure the students’ level of environmental concern. This section contained eight statements regarding the topic, asking the students to rate these statements. In designing the questions for the research instrument, Fraenkel and Wallen (2006) highlight the following criteria that should be used for closed-ended questions: “…be sure the question is unambiguous; keep the focus as simple as possible; keep the questions/statements short; use common language; avoid the use of terms that might bias responses; avoid leading questions; and avoid double negatives”. In this section the students were instructed to rate their agreement with important topics associated with general environmental concern. All statements were targeted toward the students’ personal concern and how he/she viewed himself/herself in this regard.

Section II was designed to measure the students’ attitudes toward sustainable apparel and textile. This section included thirteen attitudinal statements. The attitudinal statements identified positive and negative opinions associated with sustainable apparel and textiles. Some statements referred to the subjects’ friends and family view on sustainable apparel. The statements were designed in order to understand how the subject views the issue of environmentally friendly clothing and understand how important this topic is to them. Lastly, it examined the respondents’ familiarity with sustainable apparel.
Section III requested the students to answer questions regarding their knowledge about sustainable apparel and textile. The students were asked to circle a letter next to each question, which they feel represents the correct answer. Section three was comprised of fifteen knowledgeable questions; six true/false questions and nine multiple-choice questions. These questions were derived from the literature on consumer behavior toward environmentally friendly apparel and included the topics of eco friendly apparel companies, designers, and textiles. They tested the subjects’ knowledge of apparel production processes and products. Concepts associated with organic, eco fashion, fair trade, and environmental issues were incorporated in the questions.

Section IV was designed to measure the students’ willingness to purchase sustainable apparel and textile. Fifteen statements were chosen in order to allow the students to best describe their purchasing behavior of environmentally friendly clothing. Subjects were asked to rate these statements based on their agreement with the content of each. The idea was to assess willingness to purchase based on past, present and future engagement of students in sustainable apparel consumption and environmentally friendly behavior.

Section V gathered information about respondents’ demographics and requested students to provide a single response to the following information: gender, age, ethnic group, education level, income, and major.

(2) Educational Workshop Development

An educational workshop in the form of a PowerPoint presentation was created in order to educate students on current sustainable apparel and textile issues, and increase their knowledge about environmentally friendly apparel. The workshop was designed to
provide sufficient information and data concerning these issues, and potentially increase knowledge levels on the following topics; sustainability, apparel and textile production processes, sustainable apparel and textile products, environmentally friendly materials and fabrics, eco-friendly retailers, and eco labels. Upon completion of the pre-survey the students were asked to take part in a 30 minutes educational workshop session. The workshop, thought by the researcher, served as an intervention tool designed to enrich students’ understanding of sustainable apparel and textile, and potentially influence their shopping behavior. To test the effectiveness of the workshop, a post-survey was redistributed to reassess students’ knowledge level and change in willingness to purchase sustainable apparel.

**Instrument Validity**

Validity is defined as the extent to which the instrument measures what it purposes to measure. Isaac and Michael (1995) describes in their book four different forms to measure it; (1) Face validity, (2) Content validity, (3) Criterion validity, and (4) Construct validity. Face validity is a cursory review of the survey items by untrained individuals to get their opinion on the instrument (Isaac & Michael, 1995). It is considered very casual form of validity measurement, and therefore less reliable, therefore this method was not used in this research. Content validity is a subjective measure of how appropriate the items seem to a set of reviewers who have some knowledge of the subject matter (Isaac & Michael, 1995). Usually consists of an organized review of the survey’s contents to ensure that it contains everything it should and doesn’t include anything that it shouldn’t. Criterion validity is a measure of how well one instrument stacks up against another instrument or predictor (Isaac & Michael, 1995).
Lastly, Isaac and Michael (1995) discuss construct validity as the most reliable form of all four; it is used to measure how meaningful the scale or instrument is when it is in practical use.

To ensure the validity of the instruments (survey questionnaire and PowerPoint workshop) in this study, several types of measurements were used. The researcher’s graduate advisory committee served as a panel of experts in reviewing the survey and workshop instruments to assess the content validity of the questionnaire and presentation. Content validity ensures that the instrument is truly measuring the premise of the research objectives. Also, a professional in the field of research methods and statistics reviewed the survey prior to applying it. In addition to having the panel of experts critique the survey, it is important for the survey to be field tested before it is administered to the desired population. The survey was pretested by administering it to a group of students that was similar to the study’s population to ensure validity. The group consisted of 26 students enrolled in an upper level Textile and Lab course (FCS 360) at the FCS department at California State University, Northridge. The class consisted of college students at the junior and senior class level. The field test revealed no problems; therefore no changes were made to the survey instrument.

**Instrument Reliability**

Isaac and Michael (1995) define reliability as the extent to which a questionnaire, test, observation or any measurement procedure consistently measures what it is supposed to. Meaning, whether the instrument produces the same results on repeated trials, the stability of scores over time or across raters. There are four types of reliability; (1) Test-Retest Reliability, the correlation between two successive measurements within
the same test, (2) Equivalent Forms Reliability, the successive administration of two parallel forms of the same test, (3) Split Half Reliability, when dividing test items in two parts, when correlating the first and second half of the items, they should be highly correlated if they are reliable, and (4) Internal Consistency Reliability, when test items are homogeneous or all measuring the same construct (Isaac & Michael, 1995).

In conducting research, a score of 0.70 or higher is considered adequate when determining reliability (Fraenkel & Wallen, 2007). In this study, instrumental reliability was computed using consistency reliability. Cronbach’s alpha was used in order to determine the level of internal consistency reliability, acceptable reliability (Cronbach’s alpha scores greater than 0.70) was found in all cases with the exception of the pretest and posttest knowledge scales.

For section I, environmental concern, alpha levels were .868 for pretest, and .891 for posttest. Section II which measured attitudes, computed alpha level of .806 (pretest), and .812 (posttest). Section IV, willingness to purchase, alpha levels were .865 and .908. The knowledge section of the instrument had a reliability of .457 pretest and .538 posttest, which is lower than desired. Perhaps this low reliability can be partially attributed to several questions, which only few students answered correctly. It is also possible that the knowledge section possessed low reliability due to the level of difficulty of some of the question included. (Gronlund & Linn, 1990).

**Variables**

The independent variables included environmental concerns, attitudes and knowledge of sustainable apparel and textile among college students enrolled in FCS classes. Students’ major (Apparel Design and Merchandising vs. Non-Major) was also
considered independent variable. The dependent variable was students’ willingness to purchase sustainable apparel and textile. Demographic characteristics served as control variables in the study.

(1) Independent variables

Environmental Concern

The environmental concern items included in the questionnaire were designed to assess students’ concerns toward the environment in the context of sustainable consumption. The eight items, measured with a 1 to 5 Likert type scale (1 = strongly disagree, 5 = strongly agree), covered a range of topics related to environmentally friendly consumption behavior (see Table 3-1). Three items (1.1, 1.2, and 1.5) were included to measure self-view as a consumer. Sustainable purchasing behavior was measured with items 1.3, 1.4 and 1.8.

Table 3-1

*Items for this section were constructed based on the following studies; Bentley et al, 2004; Crawford, 2008; Hustvedt, 2006.*
Attitudes

The general attitudes items included in the questionnaire were designed to assess students’ attitudes toward sustainable apparel and textile. The thirteen items, measured with a 1 to 5 Likert type scale (1 = strongly disagree, 5 = strongly agree), covered a range of topics related to organic apparel products and apparel production (see Table 3-2). Three items (2.1, 2.2, and 2.3) were included to measure personal general attitudes toward sustainable apparel. Attitudes of family and friends toward sustainable apparel consumption were measured with items 2.4 and 2.5. Items 2.7-2.13 were included to measure attitudes toward sustainable apparel/textile practices and products.

Table 3-2

*Items Used to Measure Attitudes*

<table>
<thead>
<tr>
<th>Number</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Sustainable practices of apparel/textile industry are important to me</td>
</tr>
<tr>
<td>2.2</td>
<td>I am concerned about the impact of apparel/textile production on the environment</td>
</tr>
<tr>
<td>2.3</td>
<td>I feel ethically obligated to purchase organic apparel/textile products</td>
</tr>
<tr>
<td>2.4</td>
<td>My family thinks that I should purchase sustainable apparel/textile</td>
</tr>
<tr>
<td>2.5</td>
<td>My friends think that I should purchase sustainable apparel/textile</td>
</tr>
<tr>
<td>2.6</td>
<td>Sustainable apparel/textile is less stylish</td>
</tr>
<tr>
<td>2.7</td>
<td>Sustainable apparel/textile is expensive to produce</td>
</tr>
<tr>
<td>2.8</td>
<td>Sustainable apparel/textile is expensive to purchase</td>
</tr>
<tr>
<td>2.9</td>
<td>Availability of sustainable apparel/textile is limited in the market</td>
</tr>
<tr>
<td>2.10</td>
<td>Variety of sustainable apparel/textile is limited in the market</td>
</tr>
<tr>
<td>2.11</td>
<td>Styles and colors of sustainable clothing is very limited</td>
</tr>
<tr>
<td>2.12</td>
<td>I am familiar with the different brands that sell sustainable clothing</td>
</tr>
<tr>
<td>2.13</td>
<td>I would like to purchase sustainable apparel items, however, I don’t know where I can buy them</td>
</tr>
</tbody>
</table>

*Items for this section were constructed based on the following studies; Bentley et al, 2004; Crawford, 2008; Hustvedt, 2006.*
Knowledge

The Knowledge items included in the questionnaire were designed to test students’ knowledge of sustainable apparel/textile practices and products. Fifteen items, measured with a true-false questions and multiple-choice questions, covered a range of topics related to sustainable apparel products and production (see Table 3-3). Four items (3.1-3.4) were included to measure knowledge of apparel production processes’ impact on the environment. Knowledge of sustainable apparel practices and products were measured with items 3.7-3.14

Table 3-3

Items Used to Measure Knowledge

<table>
<thead>
<tr>
<th>Number</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1.</td>
<td>Sustainable apparel/textile is good for the environment</td>
</tr>
<tr>
<td>3.2.</td>
<td>The dyes and chemicals used in apparel and textile products are harmful for the environment</td>
</tr>
<tr>
<td>3.3.</td>
<td>The impact of clothing production on the environment is irreversible</td>
</tr>
<tr>
<td>3.4.</td>
<td>Not all apparel/textile products have negative impact on the environment</td>
</tr>
<tr>
<td>3.5.</td>
<td>Sustainable apparel/textile products last longer and have better quality</td>
</tr>
<tr>
<td>3.6.</td>
<td>Sustainable apparel/textile products are better for my health</td>
</tr>
<tr>
<td>3.7.</td>
<td>Sustainable apparel refers to;</td>
</tr>
<tr>
<td>3.8.</td>
<td>Eco Fashion focuses on all of the concepts except</td>
</tr>
<tr>
<td>3.9.</td>
<td>Which of the following are considered environmentally friendly fabrics</td>
</tr>
<tr>
<td>3.10.</td>
<td>What material is most commonly used for sustainable textile</td>
</tr>
<tr>
<td>3.11.</td>
<td>Which of the following statement is correct</td>
</tr>
<tr>
<td>3.12.</td>
<td>Sustainable apparel is made from _____ fibers, using _____ dyes</td>
</tr>
<tr>
<td>3.13.</td>
<td>The following retailers are known for promoting sustainable clothing</td>
</tr>
<tr>
<td>3.14.</td>
<td>Information about sustainable apparel/textile is available at</td>
</tr>
<tr>
<td>3.15.</td>
<td>Eco labels are designed to provide the following information</td>
</tr>
</tbody>
</table>

*Items for this section were constructed based on the following studies: Bentley et al, 2004; Crawford, 2008; Hustvedt, 2006.*
**Students’ Major**

Students’ major was detected in order to compare the differences in knowledge between the two groups (based on major), and therefore the differences in willingness to purchase sustainable apparel and textile.

Table 3-4

*Items Used to Measure Students’ Major*

<table>
<thead>
<tr>
<th>Number</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1.</td>
<td>Apparel Design and Merchandising Major (ADM)</td>
</tr>
<tr>
<td>5.2.</td>
<td>Consumer Affairs Major</td>
</tr>
</tbody>
</table>

(2) Dependent Variables

*Willingness to Purchase Sustainable Apparel and Textile*

The WTP items included in the questionnaire were designed to assess students’ purchasing behavior of environmentally friendly clothing. Fifteen items, measured with a 1 to 5 Likert type scale (1 = strongly disagree, 5 = strongly agree), covered a range of topics related to sustainable apparel and textile consumption behavior (see Table 3-5). Six items (4.3-4.6, 4.10, and 4.11.) were included to measure how engaged students are in purchasing sustainable apparel/textile products. Limitations to willingness to purchase sustainable apparel were detected with items 4.7, 4.8 and 4.14
Table 3-5

*Items Used to Measure Students’ Willingness to Purchase Sustainable Apparel/Textile*

<table>
<thead>
<tr>
<th>Number</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1.</td>
<td>In general, purchasing sustainable apparel/textile is important to me</td>
</tr>
<tr>
<td>4.2.</td>
<td>I have purchased a sustainable apparel/textile item at least once in the past</td>
</tr>
<tr>
<td>4.3.</td>
<td>I always prefer to buy sustainable apparel than conventional apparel items</td>
</tr>
<tr>
<td>4.4.</td>
<td>When purchasing apparel item I look at the label for information about the product</td>
</tr>
<tr>
<td>4.5.</td>
<td>The next time I will go apparel shopping I will most likely purchase an item that is environmentally friendly</td>
</tr>
<tr>
<td>4.6.</td>
<td>I will go out of my way to purchase sustainable apparel products</td>
</tr>
<tr>
<td>4.7.</td>
<td>I don’t purchase sustainable clothing items due to the high price</td>
</tr>
<tr>
<td>4.8.</td>
<td>I don’t purchase sustainable apparel items due to limited availability</td>
</tr>
<tr>
<td>4.9.</td>
<td>I purchase sustainable apparel items online and in stores</td>
</tr>
<tr>
<td>4.10.</td>
<td>I purchase clothing only from eco-friendly designers/retailers</td>
</tr>
<tr>
<td>4.11.</td>
<td>When deciding which apparel products to buy, sustainability is the most important factor</td>
</tr>
<tr>
<td>4.12.</td>
<td>I try to encourage other people to buy sustainable apparel products</td>
</tr>
<tr>
<td>4.13.</td>
<td>I purchase a variety of sustainable apparel/textile items</td>
</tr>
<tr>
<td>4.15.</td>
<td>Purchasing sustainable clothing increases my peace of mind</td>
</tr>
</tbody>
</table>

*Items for this section were constructed based on the following studies; Bentley et al, 2004; Crawford, 2008; Hustvedt, 2006.*

**The Population & Sample**

The population for this study consisted of students in Family and Consumer Sciences (FCS) department at the California State University, Northridge (CSUN). Students enrolled in upper level classes of ADM as well as Consumer Affairs major (non major) students were chosen for this study. The sample population was selected due to the convenience of having students as a study population. Students in Family and Consumer Sciences were selected for the research, due to the emphasis FCS implements towards the inclusion of resource development and sustainability in their curricula.

A nonrandom purposive sampling was the chosen method in selecting the sample.
Fraenkel and Wallen (2007) define purposive sampling as when: “…on occasion, based on previous knowledge of a population and the specific purpose of the research, investigators use personal judgment to select a sample. Researchers assume they can use their knowledge of the population to judge whether or not a particular sample will be represented (Fraenkel & Wallen, 2007).

Data Collection

Surveys were administered to upper-level courses in FCS at two different classes in Apparel Design and Merchandising, and Research Methods, during the fall semester of 2011. Each class member turned in a survey, for a total of 96 surveys. 48 students of FCS 360, and 48 students of FCS 324 course participated in the study.

Table 3-6

Number of Respondents from the Two Classes at FCS department at CSUN

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCS 324</td>
<td>48</td>
</tr>
<tr>
<td>FCS 360</td>
<td>48</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>96</strong></td>
</tr>
</tbody>
</table>

Data Analysis

The first step of the preliminary data analysis following coding was to examine the responses to remove any questionnaires that were not complete enough to include in analysis. The questionnaires of respondents who failed to complete at least 90% of the items were removed from further statistical analysis.

Following the initial data analysis, the analytical part of this study focused on two main methods; (1) descriptive statistics to compute respondents environmental concerns,
attitudes, knowledge and WTP scores, as well as the correlation between the independent and dependent variables, and (2) inferential statistics to determine differences in knowledge and WTP between ADM and non-major students, before and after educational workshop.

The raw data was entered into the Statistical Package for the Social Sciences (SPSS). The alpha level was set at .05 to determine statistical significance.

1. Demographical data from the students (section V) were described using descriptive statistics.

2. Environmental Concern (section I) scores were computed using descriptive statistics. A mean and standard deviation were calculated for this section. Questions which indicated no answer were coded “9”.

3. Descriptive statistics on the Attitudes section (II) were computed, showing a mean and standard deviation. Questions which indicated no answer were coded “9”.

4. Descriptive statistics on the Willingness to purchase section (IV) were computed, showing a mean and standard deviation. Questions which indicated no answer were coded “9”.

5. Knowledge scores were calculated for each question in Section III. A correct answer was coded “1”, and incorrect answer was coded “0”. Questions which indicated no answer were coded “9”.

6. A series of independent-samples t-tests were conducted in order to define differences in pretest and posttest scale scores for all four sections on the basis of student major.
7. Correlation analysis was used to determine the relationship between subjects’ environmental concerns, attitudes, knowledge, and willingness to purchase scores of both ADM and non-major students. For analysis purposes the student’s type of major data was coded into two categories: apparel design and merchandising (1), and non-major (0).

8. Repeated measure ANOVA analysis was used to determine differences in knowledge scores of students toward sustainable apparel between apparel majors and non-apparel majors before (pretest) and after (posttest) the educational workshop. For analysis purposes the students’ type of major data was coded into two categories: apparel design and merchandising (1), and non-major (0).

9. Repeated measure ANOVA analysis was used to determine differences in willingness to purchase scores of students toward sustainable apparel between apparel majors and non-apparel majors before and after the educational workshop. For analysis purposes the students’ type of major data was coded into two categories: apparel design and merchandising (1), and non-major (0).
CHAPTER 4: RESULTS AND DISCUSSION

This chapter details the primary analyses conducted on the survey data followed by the implementation of an educational workshop in the form of a PowerPoint presentation. It presents the results computed based on the study’s objectives and hypotheses.

The first objective of this study was to determine the relationship between consumer environmental concerns, attitudes, and knowledge and their willingness to purchase sustainable apparel and textiles.

The second objective was to investigate whether education plays a role in enhancing consumer/students knowledge of sustainable apparel and textiles, and therefore increases their willingness to purchase sustainable apparel and textile products.

Lastly, the study intends to assess whether there is a difference in knowledge levels and willingness to purchase sustainable apparel and textiles products between Apparel Design and Merchandising students vs. Non-Major students before and after the implementation of the educational workshop.

Response Rate

The total number of returned questionnaires was 96 out of 100 questionnaires that were delivered (overall response rate of 96%). Of the 96 questionnaires, 92 were usable (95.8%).

Respondent Demographics

Descriptive statistics was used to analyze the demographics of survey respondents, which are summarized in Table 4-1.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>( f )</th>
<th>% Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>20</td>
<td>21.7</td>
</tr>
<tr>
<td>Female</td>
<td>72</td>
<td>78.3</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 and Under</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>20 to 24</td>
<td>79</td>
<td>85.9</td>
</tr>
<tr>
<td>25 to 29</td>
<td>12</td>
<td>13.0</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>6</td>
<td>6.5</td>
</tr>
<tr>
<td>Asian</td>
<td>15</td>
<td>16.3</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>26</td>
<td>28.3</td>
</tr>
<tr>
<td>Native American</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Native Hawaiian</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>37</td>
<td>40.2</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>8.7</td>
</tr>
<tr>
<td>Education Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed high school</td>
<td>14</td>
<td>15.2</td>
</tr>
<tr>
<td>Some college</td>
<td>73</td>
<td>79.3</td>
</tr>
<tr>
<td>Completed baccalaureate</td>
<td>5</td>
<td>5.4</td>
</tr>
<tr>
<td>Some graduate work</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Completed graduate degree</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Income Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $10,000</td>
<td>32</td>
<td>34.8</td>
</tr>
<tr>
<td>$10,000-$24,999</td>
<td>23</td>
<td>25.0</td>
</tr>
<tr>
<td>$25,000-$49,999</td>
<td>14</td>
<td>15.2</td>
</tr>
<tr>
<td>$49,999-$74,999</td>
<td>9</td>
<td>9.8</td>
</tr>
<tr>
<td>$75,000 and over</td>
<td>14</td>
<td>15.2</td>
</tr>
</tbody>
</table>

The majority of respondents within the sample population were female with slightly over 78%, whereas male represented only 22% of the respondents. The age of participants ranged from 19 to 29; age was found to have a mean of 22.39 years (\( SD = 2.227 \)). When broken down into categories, the majority of respondents, over 85% of
students, fell in the 20 to 24 years age category. With regard to race/nationality, slightly over 40% of respondents in the sample were White, with close to 30% being Hispanic. Slightly over 16% of individuals were Asian, with a little over 6% of respondents being Black. Close to 9% of respondents in total were of another race. As expected, the majority of respondents (nearly 80%) had some college education, while slightly over 15% of respondents had high school education. Additionally, slightly above 5% of individuals had a baccalaureate degree as their highest level of education. As shown in Table 4-1, the majority of respondents (nearly 35%) have an annual income level of less than $10,000. Exactly 25% of the study subjects had an annual income of $10,000-$24,999. Slightly over 15% of the sample population has an annual income of $25,000-$44,999, while almost 10% reported an annual income of $45,000-$74,999. Additionally, slightly above 15% of individuals had over $75,000 annual income.

Reliability Analysis

A series of reliability analyses were conducted on all scale items, with the results of these analyses summarized in the following table (4.2). Cronbach’s alpha was used in order to determine the level of internal consistency reliability, with this table also presenting the sample sizes associated with each of the scales. Acceptable reliability (i.e., Cronbach’s alpha scores greater than 0.70) was found in all cases with the exception of the pretest and posttest knowledge scales. The results of these two analyses indicated that for these two scales, reliability was limited.
Table 4-2

Reliability Analyses

<table>
<thead>
<tr>
<th>Scale</th>
<th>Cronbach’s Alpha</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Concern: Pretest</td>
<td>.868</td>
<td>8</td>
</tr>
<tr>
<td>Environmental Concern: Posttest</td>
<td>.891</td>
<td>8</td>
</tr>
<tr>
<td>Attitude: Pretest</td>
<td>.806</td>
<td>13</td>
</tr>
<tr>
<td>Attitude: Posttest</td>
<td>.812</td>
<td>13</td>
</tr>
<tr>
<td>Knowledge: Pretest</td>
<td>.457</td>
<td>15</td>
</tr>
<tr>
<td>Knowledge: Posttest</td>
<td>.538</td>
<td>15</td>
</tr>
<tr>
<td>WTP: Pretest</td>
<td>.865</td>
<td>15</td>
</tr>
<tr>
<td>WTP: Posttest</td>
<td>.908</td>
<td>15</td>
</tr>
</tbody>
</table>

Descriptive Statistics

Descriptive statistics was used to analyze all pretest and posttest scores of all four sections; environmental concern, attitudes, knowledge, and willingness to purchase. Means and standard deviation were computed. Means for environmental concern were generally found to range from 3 to 4, with standard deviations approximating 1. Means for attitudes items were generally between 2 and 3.5, with their standard deviations again approximating 1. Regarding knowledge items, means were found to be below 1 in all cases, with standard deviations generally approximating 0.4. Finally, regarding the willingness to purchase, means were generally found to range from 2 to 3, with standard deviations approximating 1. Pretest and posttest scores did not differ substantially.
Table 4-3 summarizes pretest and posttest scale scores, which are calculated as the mean of each scale’s constituent items. Means and standard deviations were not found to substantially change from pretest to posttest scores. Pretest mean for environmental concern approximating 3.45, the mean for attitudes approximating 3, the mean for knowledge approximating 0.7, and the mean for willingness to purchase approximating 2.8. Posttest means for all four variables were slightly higher, with mean for environmental concern approximating 3.5, the mean for attitudes approximating 3.2, the mean for knowledge approximating 0.75, and the mean for willingness to purchase approximating 3.2.

Table 4-3

Descriptive Statistics; Frequency Table: Scale Scores

<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Valid</td>
<td>Missing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Concern</td>
<td>92</td>
<td>0</td>
<td>3.455</td>
<td>.660</td>
</tr>
<tr>
<td>Attitudes</td>
<td>91</td>
<td>1</td>
<td>3.073</td>
<td>.544</td>
</tr>
<tr>
<td>Knowledge</td>
<td>91</td>
<td>1</td>
<td>.699</td>
<td>.143</td>
</tr>
<tr>
<td>WTP</td>
<td>92</td>
<td>0</td>
<td>2.817</td>
<td>.642</td>
</tr>
<tr>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Concern</td>
<td>92</td>
<td>0</td>
<td>3.500</td>
<td>.686</td>
</tr>
<tr>
<td>Attitudes</td>
<td>92</td>
<td>0</td>
<td>3.181</td>
<td>.532</td>
</tr>
<tr>
<td>Knowledge</td>
<td>89</td>
<td>3</td>
<td>.757</td>
<td>.147</td>
</tr>
<tr>
<td>WTP</td>
<td>90</td>
<td>2</td>
<td>3.199</td>
<td>.693</td>
</tr>
</tbody>
</table>

_t_-Test Statistics

A series of independent-samples _t_-tests were conducted in order to determine whether any significant differences were present between the above pretest and posttest scale scores and to determine differences in means between the two groups. The _t_-test
statistics allowed the researcher to analyze the differences in knowledge and willingness to purchase in regards to the educational workshop. The following hypothesis was tested; H4: Education plays no role in enhancing students’ knowledge of sustainable apparel and textiles.

First, table 4-4 summarizes descriptive statistics associated with these scale scores. Again, substantial differences in mean scores or standard deviations were not found on the basis of major, while calculated values for the standard error of the mean were also found to be similar when comparing pretest and posttest scores. While no substantial differences in these measures were indicated for pretest and posttest scores for either major, ADM students presented higher scores means for all variables tested.

Table 4-4

*Independent-Samples t-Tests: Pretest-Posttest*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Major</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>0</td>
<td>46</td>
<td>3.332</td>
<td>0.720</td>
<td>0.106</td>
</tr>
<tr>
<td>Concern</td>
<td>1</td>
<td>46</td>
<td>3.579</td>
<td>0.575</td>
<td>0.085</td>
</tr>
<tr>
<td>Attitudes</td>
<td>0</td>
<td>46</td>
<td>2.990</td>
<td>0.557</td>
<td>0.082</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>45</td>
<td>3.157</td>
<td>0.524</td>
<td>0.078</td>
</tr>
<tr>
<td>Knowledge</td>
<td>0</td>
<td>46</td>
<td>0.657</td>
<td>0.154</td>
<td>0.023</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>45</td>
<td>0.742</td>
<td>0.118</td>
<td>0.018</td>
</tr>
<tr>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>0</td>
<td>46</td>
<td>3.375</td>
<td>0.641</td>
<td>0.094</td>
</tr>
<tr>
<td>Concern</td>
<td>1</td>
<td>46</td>
<td>3.625</td>
<td>0.713</td>
<td>0.105</td>
</tr>
<tr>
<td>Attitudes</td>
<td>0</td>
<td>46</td>
<td>3.069</td>
<td>0.497</td>
<td>0.073</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>46</td>
<td>3.294</td>
<td>0.548</td>
<td>0.081</td>
</tr>
<tr>
<td>Knowledge</td>
<td>0</td>
<td>46</td>
<td>0.722</td>
<td>0.166</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>45</td>
<td>0.795</td>
<td>0.113</td>
<td>0.017</td>
</tr>
</tbody>
</table>
Table 4-5 summarizes the results of the independent-samples $t$-tests conducted.

Significant differences were found in pretest for knowledge and posttest for attitudes and knowledge on the basis of student major. In all cases, ADM majors were found to have significantly higher scores as compared with non-ADM majors.

Table 4-5

*Independent-Samples t-Tests*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Levene’s Test</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$F$</td>
<td>$p$</td>
<td>$t$</td>
<td>$df$</td>
<td>$p$</td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>.728</td>
<td>.396</td>
<td>1.820</td>
<td>90</td>
<td>.072</td>
<td></td>
</tr>
<tr>
<td>Concern</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitudes</td>
<td>.004</td>
<td>.952</td>
<td>1.476</td>
<td>89</td>
<td>.144</td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>3.403</td>
<td>.068</td>
<td>2.978</td>
<td>89</td>
<td>.004</td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>.648</td>
<td>.423</td>
<td>1.768</td>
<td>90</td>
<td>.080</td>
<td></td>
</tr>
<tr>
<td>Concern</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitudes</td>
<td>.072</td>
<td>.789</td>
<td>2.070</td>
<td>90</td>
<td>.041</td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>7.598</td>
<td>.007</td>
<td>2.454</td>
<td>79.598</td>
<td>.016</td>
<td></td>
</tr>
</tbody>
</table>

**Correlation Statistics**

Correlation statistics was used to determine the relationship between subjects’ environmental concern, attitudes, knowledge level, and their willingness to purchase. The following hypotheses were tested using correlation analysis:

H1: There is no correlation between consumer environmental concerns and willingness to purchase sustainable apparel and textiles.

H2: There is no correlation between consumer attitudes and willingness to purchase sustainable apparel and textiles.
H3: There is no correlation between consumer knowledge and willingness to purchase sustainable apparel and textiles.

Table 4-6 summarizes correlations conducted between these four scale items. Strong, significant, and positive correlations were found between environmental concern and willingness to purchase, and attitude and willingness to purchase. In the pretest results, knowledge and WTP were not found to have significant correlation.

Table 4-6

Pretest Correlations

<table>
<thead>
<tr>
<th>Measure</th>
<th>Environmental Concern</th>
<th>Attitudes</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>.601</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>.181</td>
<td>.078</td>
<td></td>
</tr>
<tr>
<td>WTP</td>
<td>.573</td>
<td>.673</td>
<td>.114</td>
</tr>
</tbody>
</table>

Table 4-7 summarizes the results of the posttest correlations conducted between these items, similar pattern to pretest with slightly higher mean scores was found. Strong, positive, and significant correlations were found between environmental concern and WTP, as well as attitude and WTP. Knowledge and WTP did not depict positive correlation.

Table 4-7

Posttest Correlations

<table>
<thead>
<tr>
<th>Measure</th>
<th>Environmental Concern</th>
<th>Attitudes</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>.702</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>.231</td>
<td>.090</td>
<td></td>
</tr>
<tr>
<td>WTP</td>
<td>.723</td>
<td>.698</td>
<td>.247</td>
</tr>
</tbody>
</table>
Repeated-Measures ANOVA

Following the correlation analysis, a repeated-measures ANOVA was conducted in order to explore the differences in knowledge scores of students toward sustainable apparel comparing ADM and non-apparel majors before and after the educational workshop. A repeated-measures ANOVA was conducted focusing upon differences in knowledge scores of students toward sustainable apparel comparing students on the basis of major as well as before and after the educational workshop. A second repeated-measures ANOVA focused upon differences in willingness to purchase scores, comparing the two groups before and after the treatment. Hypotheses related to students’ major were tested using repeated-measure ANOVA analysis to reduce error level.

H6: There is no difference in knowledge levels between ADM students and Non-Major students before educational workshop.

H7: There is no difference in knowledge levels between ADM students and Non-Major students after educational workshop.

H8: There is no difference in willingness to purchase sustainable apparel and textiles between ADM students and Non-Major students before educational workshop.

H9: There is no difference in willingness to purchase sustainable apparel and textiles between ADM students and Non-Major students after educational workshop.

First, with regard to sample size, 46 non-apparel majors were included in this analysis, with 46 apparel majors also being included. Table 4-8 summarizes descriptive statistics associated with knowledge on the basis of pretest versus posttest scores as well
as on the basis of student major. Some substantial increases were found over time, while higher scores were also indicated for apparel majors.

Table 4-8

*Descriptive Statistics; Pretest-Posttest Knowledge*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Major</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Knowledge</td>
<td>0</td>
<td>.657</td>
<td>.154</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>.741</td>
<td>.118</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>.697</td>
<td>.144</td>
<td>92</td>
</tr>
<tr>
<td>Posttest Knowledge</td>
<td>0</td>
<td>.722</td>
<td>.166</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>.800</td>
<td>.110</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>.759</td>
<td>.147</td>
<td>92</td>
</tr>
</tbody>
</table>

Following this, Box’s $M$ test of the equality of covariance matrices was conducted in order to test this assumption of the repeated-measures ANOVA. This test was found to achieve statistical significance, $F(3, 1828978.079) = 4.066$, Box’s $M = 12.513, p < .01$, indicating that this assumption was violated in this analysis. Next, Levene’s test for the equality of variances was conducted in order to test the second assumption of the repeated-measures ANOVA. With regard to pretest knowledge scores, this test failed to achieve statistical significance, $F(1, 86) = 3.451, p = .067$. This indicates that this assumption was not violated in this case. Next, with regard to posttest knowledge scores, Levene’s test was found to achieve significance, $F(1, 86) = 8.843, p < .01$, indicating that this assumption was violated in this case.

Table 4-9 summarizes the multivariate tests conducted in this analysis. Statistical significance was found for time, indicating a significant increase in scores over time.
However, the interaction between time (workshop) and major was not found to achieve statistical significance, indicating that no significant interaction was present between these two factors.

Table 4-9

*Multivariate Tests; Knowledge*

<table>
<thead>
<tr>
<th>Effect</th>
<th>Value $\eta^2$</th>
<th>F</th>
<th>Hyp. df</th>
<th>Error df</th>
<th>Sig.</th>
<th>Part.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pillai's Trace</td>
<td>.078</td>
<td>7.257</td>
<td>1.000</td>
<td>86.000</td>
<td>.008</td>
<td>.078</td>
</tr>
<tr>
<td>Wilks' Lambda</td>
<td>.922</td>
<td>7.257</td>
<td>1.000</td>
<td>86.000</td>
<td>.008</td>
<td>.078</td>
</tr>
<tr>
<td>Hotelling's Trace</td>
<td>.084</td>
<td>7.257</td>
<td>1.000</td>
<td>86.000</td>
<td>.008</td>
<td>.078</td>
</tr>
<tr>
<td>Roy's Largest Root</td>
<td>.084</td>
<td>7.257</td>
<td>1.000</td>
<td>86.000</td>
<td>.008</td>
<td>.078</td>
</tr>
</tbody>
</table>

| Workshop * Major     |               |      |          |          |      |       |
| Pillai's Trace       | .000          | .020 | 1.000   | 86.000   | .888 | .000  | .020  | .052 |
| Wilks' Lambda        | 1.000         | .020 | 1.000   | 86.000   | .888 | .000  | .020  | .052 |
| Hotelling's Trace    | .000          | .020 | 1.000   | 86.000   | .888 | .000  | .020  | .052 |
| Roy's Largest Root   | .000          | .020 | 1.000   | 86.000   | .888 | .000  | .020  | .052 |

Next, table 4-10 summarizes the tests of within-subjects effects associated with this analysis. Again, statistical significance was found for time, indicating a significant increase in knowledge scores, while the interaction between time and student major failed to achieve significance.
Table 4-10

Tests of Within-Subjects Effects; Knowledge

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig.</th>
<th>Part. η²</th>
<th>NP</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sphericity Assumed</td>
<td>.169</td>
<td>1</td>
<td>.169</td>
<td>7.257</td>
<td>.008</td>
<td>.078</td>
<td>.7257</td>
<td>.759</td>
</tr>
<tr>
<td>Greenhouse-Geisser</td>
<td>.169</td>
<td>1</td>
<td>.169</td>
<td>7.257</td>
<td>.008</td>
<td>.078</td>
<td>.7257</td>
<td>.759</td>
</tr>
<tr>
<td>Huynh-Feldt</td>
<td>.169</td>
<td>1</td>
<td>.169</td>
<td>7.257</td>
<td>.008</td>
<td>.078</td>
<td>.7257</td>
<td>.759</td>
</tr>
<tr>
<td>Lower-bound</td>
<td>.169</td>
<td>1</td>
<td>.169</td>
<td>7.257</td>
<td>.008</td>
<td>.078</td>
<td>.7257</td>
<td>.759</td>
</tr>
<tr>
<td>Workshop * Major</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sphericity Assumed</td>
<td>.000</td>
<td>1</td>
<td>.000</td>
<td>.020</td>
<td>.888</td>
<td>.000</td>
<td>.020</td>
<td>.052</td>
</tr>
<tr>
<td>Greenhouse-Geisser</td>
<td>.000</td>
<td>1</td>
<td>.000</td>
<td>.020</td>
<td>.888</td>
<td>.000</td>
<td>.020</td>
<td>.052</td>
</tr>
<tr>
<td>Huynh-Feldt</td>
<td>.000</td>
<td>1</td>
<td>.000</td>
<td>.020</td>
<td>.888</td>
<td>.000</td>
<td>.020</td>
<td>.052</td>
</tr>
<tr>
<td>Lower-bound</td>
<td>.000</td>
<td>1</td>
<td>.000</td>
<td>.020</td>
<td>.888</td>
<td>.000</td>
<td>.020</td>
<td>.052</td>
</tr>
<tr>
<td>Error (Workshop)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sphericity Assumed</td>
<td>1.999</td>
<td>86</td>
<td>.016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greenhouse-Geisser</td>
<td>1.999</td>
<td>86</td>
<td>.016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Huynh-Feldt</td>
<td>1.999</td>
<td>86</td>
<td>.016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower-bound</td>
<td>1.999</td>
<td>86</td>
<td>.016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Next, with regard to the between-subjects effects, the effect of student major was found to achieve statistical significance in this analysis. This indicates that apparel majors had significantly higher knowledge scores as compared with non-majors. Table 4-11 presents the data.

Table 4-11

Tests of Between-Subjects Effects; Knowledge

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig.</th>
<th>Part. η²</th>
<th>NP</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>93.567</td>
<td>1</td>
<td>93.567</td>
<td>5816.782</td>
<td>0.000</td>
<td>0.985</td>
<td>5816.782</td>
<td>1.000</td>
</tr>
<tr>
<td>Major: ADM</td>
<td>0.292</td>
<td>1</td>
<td>0.292</td>
<td>18.133</td>
<td>0.000</td>
<td>0.174</td>
<td>18.133</td>
<td>0.988</td>
</tr>
<tr>
<td>Error</td>
<td>1.383</td>
<td>86</td>
<td>0.016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4-12, presented below, summarizes the estimated marginal means associated with this analysis. As indicated earlier, mean knowledge scores were found to be significantly higher for apparel majors as compared with non-apparel majors, while significant increases in scores were found over time.

Table 4-12

*Estimated Marginal Means; Knowledge*

<table>
<thead>
<tr>
<th>Source Interval</th>
<th>Mean</th>
<th>SE</th>
<th>95% Confidence Lower</th>
<th>95% Confidence Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grand Mean</td>
<td>.730</td>
<td>.010</td>
<td>.711</td>
<td>.749</td>
</tr>
<tr>
<td>By Major</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>.689</td>
<td>.013</td>
<td>.663</td>
<td>.715</td>
</tr>
<tr>
<td>1</td>
<td>.771</td>
<td>.014</td>
<td>.743</td>
<td>.798</td>
</tr>
<tr>
<td>By Workshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.699</td>
<td>.015</td>
<td>.670</td>
<td>.728</td>
</tr>
<tr>
<td>2</td>
<td>.761</td>
<td>.015</td>
<td>.731</td>
<td>.791</td>
</tr>
<tr>
<td>By Major * Workshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 Major</td>
<td>1</td>
<td>.657</td>
<td>.020</td>
<td>.616</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>.722</td>
<td>.021</td>
<td>.680</td>
</tr>
<tr>
<td>1 Major</td>
<td>1</td>
<td>.741</td>
<td>.021</td>
<td>.699</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>.800</td>
<td>.022</td>
<td>.756</td>
</tr>
</tbody>
</table>

A second repeated-measures ANOVA was conducted in order to determine whether differences in willingness to purchase scores toward sustainable apparel exist when comparing ADM and Non-ADM majors before and after taking the educational workshop. Sample size for this analysis included a total of 46 non-apparel majors along with 46 apparel majors. Table 4-13 presents the descriptive statistics associated with
these data. As shown, some increases in WTP means were found among apparel majors as compared with non-majors, while increases in scores were also indicated over time.

Table 4-13

*Descriptive Statistics; Pretest-Posttest Willingness to Purchase*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Major</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WTP</td>
<td>0</td>
<td>2.729</td>
<td>0.688</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2.906</td>
<td>0.605</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2.819</td>
<td>0.649</td>
<td>92</td>
</tr>
<tr>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WTP</td>
<td>0</td>
<td>3.194</td>
<td>0.679</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>3.203</td>
<td>0.713</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.199</td>
<td>0.693</td>
<td>92</td>
</tr>
</tbody>
</table>

Following the repeated measure ANOVA analysis, Box’s *M* test of the equality of covariance matrices was conducted in order to test this assumption of the repeated-measures ANOVA. This test was not found to achieve statistical significance, indicating no violation of this assumption, *F*(3, 1490495.245) = .411, Box’s *M* = 1.265, *p* = .745. Following this, Levene’s test was conducted testing the equality of variances. Among pretest purchasing scores, no significant difference was found, *F*(1, 88) = .000, *p* = .988. Additionally, no significant difference was found among posttest scores, *F*(1, 88) = .999, *p* = .320. These results indicate no significant violation of this assumption within this analysis.

Table 4-14 summarizes the multivariate tests associated with this analysis. The effect of time was found to achieve statistical significance, indicating a significant
increase in scores over time. However, no significant interaction was found between time and student major.

Table 4-14

Multivariate Tests; WTP

<table>
<thead>
<tr>
<th>Effect</th>
<th>Value</th>
<th>F</th>
<th>Hyp.df</th>
<th>Error df</th>
<th>Sig.</th>
<th>Part. $\eta^2$</th>
<th>NP</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pillai's Trace</td>
<td>.131</td>
<td>13.313</td>
<td>1.000</td>
<td>88.000</td>
<td>.000</td>
<td>.131</td>
<td>13.313</td>
<td>.950</td>
</tr>
<tr>
<td>Wilks' Lambda</td>
<td>.869</td>
<td>13.313</td>
<td>1.000</td>
<td>88.000</td>
<td>.000</td>
<td>.131</td>
<td>13.313</td>
<td>.950</td>
</tr>
<tr>
<td>Hotelling's Trace</td>
<td>.151</td>
<td>13.313</td>
<td>1.000</td>
<td>88.000</td>
<td>.000</td>
<td>.131</td>
<td>13.313</td>
<td>.950</td>
</tr>
<tr>
<td>Roy's Largest Root</td>
<td>.151</td>
<td>13.313</td>
<td>1.000</td>
<td>88.000</td>
<td>.000</td>
<td>.131</td>
<td>13.313</td>
<td>.950</td>
</tr>
<tr>
<td>Workshop * Major</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pillai's Trace</td>
<td>.007</td>
<td>.647</td>
<td>1.000</td>
<td>88.000</td>
<td>.423</td>
<td>.007</td>
<td>.647</td>
<td>.125</td>
</tr>
<tr>
<td>Wilks' Lambda</td>
<td>.993</td>
<td>.647</td>
<td>1.000</td>
<td>88.000</td>
<td>.423</td>
<td>.007</td>
<td>.647</td>
<td>.125</td>
</tr>
<tr>
<td>Hotelling's Trace</td>
<td>.007</td>
<td>.647</td>
<td>1.000</td>
<td>88.000</td>
<td>.423</td>
<td>.007</td>
<td>.647</td>
<td>.125</td>
</tr>
<tr>
<td>Roy's Largest Root</td>
<td>.007</td>
<td>.647</td>
<td>1.000</td>
<td>88.000</td>
<td>.423</td>
<td>.007</td>
<td>.647</td>
<td>.125</td>
</tr>
</tbody>
</table>

Next, the following table (4-15) presents the results associated with the within-subjects effects found in this analysis. Again, statistical significance was found with regard to workshop, with scores significantly increasing over time, while no significance was found with regard to the interaction between time and student major.
Table 4-15

Tests of Within-Subjects Effects; WTP

<table>
<thead>
<tr>
<th>Source</th>
<th>Value</th>
<th>F</th>
<th>Hyp.df</th>
<th>Error df</th>
<th>Sig.</th>
<th>Part. $\eta^2$</th>
<th>NP</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sphericity Assumed</td>
<td>6.533</td>
<td>1.000</td>
<td>6.533</td>
<td>13.313</td>
<td>.000</td>
<td>.131</td>
<td>13.313</td>
<td>.950</td>
</tr>
<tr>
<td>Greenhouse-Geisser</td>
<td>6.533</td>
<td>1.000</td>
<td>6.533</td>
<td>13.313</td>
<td>.000</td>
<td>.131</td>
<td>13.313</td>
<td>.950</td>
</tr>
<tr>
<td>Huynh-Feldt</td>
<td>6.533</td>
<td>1.000</td>
<td>6.533</td>
<td>13.313</td>
<td>.000</td>
<td>.131</td>
<td>13.313</td>
<td>.950</td>
</tr>
<tr>
<td>Lower-bound</td>
<td>6.533</td>
<td>1.000</td>
<td>6.533</td>
<td>13.313</td>
<td>.000</td>
<td>.131</td>
<td>13.313</td>
<td>.950</td>
</tr>
<tr>
<td>Workshop * Major</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sphericity Assumed</td>
<td>.318</td>
<td>1.000</td>
<td>.318</td>
<td>.647</td>
<td>.423</td>
<td>.007</td>
<td>.647</td>
<td>.125</td>
</tr>
<tr>
<td>Greenhouse-Geisser</td>
<td>.318</td>
<td>1.000</td>
<td>.318</td>
<td>.647</td>
<td>.423</td>
<td>.007</td>
<td>.647</td>
<td>.125</td>
</tr>
<tr>
<td>Huynh-Feldt</td>
<td>.318</td>
<td>1.000</td>
<td>.318</td>
<td>.647</td>
<td>.423</td>
<td>.007</td>
<td>.647</td>
<td>.125</td>
</tr>
<tr>
<td>Lower-bound</td>
<td>.318</td>
<td>1.000</td>
<td>.318</td>
<td>.647</td>
<td>.423</td>
<td>.007</td>
<td>.647</td>
<td>.125</td>
</tr>
<tr>
<td>Error (Workshop)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sphericity Assumed</td>
<td>43.188</td>
<td>88.000</td>
<td>.491</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greenhouse-Geisser</td>
<td>43.188</td>
<td>88.000</td>
<td>.491</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Huynh-Feldt</td>
<td>43.188</td>
<td>88.000</td>
<td>.491</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower-bound</td>
<td>43.188</td>
<td>88.000</td>
<td>.491</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results of the between-subjects effects associated with the repeated measure ANOVA analysis is presented in table 4-16. The effect of student major was not found to achieve statistical significance in this analysis, indicating no significant differences in scores on the basis of student major.

Table 4-16

Tests of Between-Subjects Effects; WTP

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig.</th>
<th>Part. $\eta^2$</th>
<th>NP</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1627.69</td>
<td>1</td>
<td>1627.691</td>
<td>3942.634</td>
<td>.000</td>
<td>0.978</td>
<td>3942.634</td>
<td>1</td>
</tr>
<tr>
<td>Major</td>
<td>0.389</td>
<td>1</td>
<td>0.389</td>
<td>0.942</td>
<td>0.334</td>
<td>0.011</td>
<td>0.942</td>
<td>0.16</td>
</tr>
<tr>
<td>Error</td>
<td>36.330</td>
<td>88</td>
<td>0.413</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Finally, the following table presents the estimated marginal means associated with this analysis was examined and is presented in the following table (4-17). As indicated earlier, significant increases in scores were found over time, with no other significant effects being found. A moderate increase in scores over time is indicated on the basis of the values presented below.

Table 4-17

*Estimated Marginal Means; WTP*

<table>
<thead>
<tr>
<th>Source</th>
<th>Mean</th>
<th>SE</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Grand Mean</td>
<td>3.008</td>
<td>.048</td>
<td>2.913</td>
</tr>
<tr>
<td>By Major</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>2.961</td>
<td>.068</td>
<td>2.825</td>
</tr>
<tr>
<td>1</td>
<td>3.054</td>
<td>.067</td>
<td>2.921</td>
</tr>
<tr>
<td>By Workshop</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2.817</td>
<td>.068</td>
<td>2.682</td>
</tr>
<tr>
<td>2</td>
<td>3.198</td>
<td>.073</td>
<td>3.052</td>
</tr>
<tr>
<td>By Major * Workshop</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major</td>
<td>Workshop</td>
<td>Mean</td>
<td>SE</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2.729</td>
<td>.098</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3.194</td>
<td>.105</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>2.906</td>
<td>.095</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3.203</td>
<td>.103</td>
</tr>
</tbody>
</table>

**Summary of Results**

In summary, the initial set of inferential statistical tests consisted of independent-samples t-tests focusing upon differences in pretest and posttest measures on the basis of student major. In these analyses the results indicated differences between ADM student and non-major students among all three sections; environmental concern, attitudes, and
knowledge. Differences were also found for both ADM and non-major students at all three variables for pretest and posttest scores. ADM majors were found to have higher scores with regard to pretest environmental concern (3.579 vs. 3.332), attitudes (3.157 vs. 2.990), and knowledge (0.742 vs. 0.657). Increased scores were found for all three measurements at posttest for ADM as well as non-major students. The following scores were computed; Environmental concern (3.625 vs. 3.375), attitudes (3.294 vs. 3.069), and knowledge (0.795 vs. 0.722)

Next, the analysis focused on the correlation between each of the independent variables; environmental concern, attitudes, and knowledge, and the dependent variable, willingness to purchase. The results of the correlation analysis were diverse. Among pretest measures, strong, significant, and positive correlations were indicated between environmental concern and willingness to purchase, and attitudes and willingness to purchase. Among posttest measures, strong, positive, and significant correlations were found between environmental concern and willingness to purchase, as well as attitudes and willingness to purchase. Knowledge and willingness to purchase however were not found to have strong, positive, significant correlation for either the pretest or posttest measures.

A repeated-measures ANOVA was then conducted focusing upon differences in knowledge scores of students toward sustainable apparel and textile comparing students on the basis of major as well as over time; before and after the educational workshop. The results presented higher knowledge scores for ADM students when compared with non-major students at both the pretest and posttest level (0.741 vs. 0.657, 0.800 vs. 0.722), however, only at the pretest level, results was found to significantly higher for
ADM, meaning that the workshop effectively decreased the gap in knowledge between the two groups. Significantly higher scores were found for both groups before and after the workshop (ADM-0.741/0.800, Non-0.657/0.722). A second repeated-measures ANOVA focused upon differences in willingness to purchase scores for ADM and non-major students before and after the workshop. Finding indicated higher scores for ADM students as well as an increase in scores over time for both groups (ADM-2.906/3.203, Non-2.729/3.194). However, the interaction of major and workshop did not have any statistical significance.

Table 4-18 summarizes the hypotheses being tested and the results of testing; four hypotheses tested were rejected, four failed to reject. Significant correlations between environmental concern and willingness to purchase, as well as attitudes and willingness to purchase was found and therefore rejected H1 and H2. Knowledge, however, which was the main factor studied, could not support any significance positive correlation with willingness to purchase, failing to reject H3. H4 was rejected as increased knowledge scores were found over time, after completion of the educational workshop. Hypotheses H5 was rejected as ADM students were found to have significantly higher pretest levels of knowledge. Results failed to reject H6, no significant differences in knowledge levels were found between majors after the workshop. Results also failed to reject H7-H8, no significance was found in WTP scores before and after the workshop on the basis of students major.
Summary of Hypotheses and Results of Testing

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Rejected</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 There is no correlation between consumer environmental concern and</td>
<td>Yes</td>
</tr>
<tr>
<td>willingness to purchase sustainable apparel and textiles.</td>
<td></td>
</tr>
<tr>
<td>H2 There is no correlation between consumer attitudes and</td>
<td>Yes</td>
</tr>
<tr>
<td>willingness to purchase sustainable apparel and textiles.</td>
<td></td>
</tr>
<tr>
<td>H3 There is no correlation between consumer knowledge and</td>
<td>No</td>
</tr>
<tr>
<td>willingness to purchase sustainable apparel and textiles.</td>
<td></td>
</tr>
<tr>
<td>H4 Education plays no role in enhancing students’ knowledge of</td>
<td>Yes</td>
</tr>
<tr>
<td>sustainable apparel and textiles</td>
<td></td>
</tr>
<tr>
<td>H5 There is no difference in knowledge levels between ADM students</td>
<td>Yes</td>
</tr>
<tr>
<td>and Non-Major students before educational workshop.</td>
<td></td>
</tr>
<tr>
<td>H6 There is no difference in knowledge levels between ADM students</td>
<td>No</td>
</tr>
<tr>
<td>and Non-Major students after educational workshop.</td>
<td></td>
</tr>
<tr>
<td>H7 There is no difference in willingness to purchase sustainable</td>
<td>No</td>
</tr>
<tr>
<td>apparel and textiles between ADM students and Non-Major students</td>
<td></td>
</tr>
<tr>
<td>before educational workshop.</td>
<td></td>
</tr>
<tr>
<td>H8 There is no difference in willingness to purchase sustainable</td>
<td>No</td>
</tr>
<tr>
<td>apparel and textiles between ADM students and Non-Major students</td>
<td></td>
</tr>
<tr>
<td>after educational workshop.</td>
<td></td>
</tr>
</tbody>
</table>

Discussion of Results

The major findings of this study reveal that, (a) the results rejected the first null hypothesis that “There is no correlation between consumer environmental concern and willingness to purchase sustainable apparel and textiles”, strong, positive correlation was found between the two variables. Students who exhibited higher environmental concern were demonstrating higher levels of willingness to purchase sustainable apparel and textile products.

(b) The results rejected the second null hypothesis that “There is no correlation between consumer attitudes and willingness to purchase sustainable apparel and textiles”, strong, positive correlation was found between the two variables. Students who
experienced positive attitudes toward the environment and the issue of sustainability were more inclined to purchase sustainable apparel and textiles.

And (c) the results failed to reject the third null hypothesis that “There is no correlation between consumer knowledge and willingness to purchase sustainable apparel and textiles”. Findings indicated no significant correlations between the independent variable studied, knowledge, and the dependent variable, willingness to purchase. Knowledge, as the main factor being studied, could not find to be significantly related to willingness to purchase, and therefore failed to reject the third hypothesis. As with previous studies (Brosdahl & Carpenter, 2010), knowledge alone does not translate into behavior. The results of this study can be compared to a study conducted by Kim and Damhorst (1998), who found that general environmental knowledge and general environmental behavior was not predictive of environmental apparel consumption behavior. However, this study did find a positive moderate correlation between knowledge and environmental concern, which found to be positively correlated to consumer’s willingness to purchase. Therefore, environmental concern can be seen as mediator between knowledge and willingness to purchase. Although knowledge did not have significant correlation with subjects’ willingness to purchase, it can be suggested, based on the findings, that limited knowledge of sustainable apparel and textiles serves as a barrier to willingness to purchase sustainable apparel and textiles.

Findings of this study also (d) rejected the fourth null hypothesis, “Education plays no role in enhancing students’ knowledge of sustainable apparel and textiles”, as increased knowledge scores were found for the posttest part, after completion of the educational workshop. For both groups, students exhibited higher knowledge scores at
the posttest survey, meaning that the educational workshop increased their knowledge level about the issue in study, however, with some limitations.

The increased knowledge scores can indicate that education serves as an important component in informing consumer about specific issues such as sustainable apparel and textiles. The fact that knowledge scores were moderately increased might suggest that the intervention tool, educational workshop, was not comprehensive enough to result in a major increase in students’ knowledge. The duration of the workshop (only 30 minute) might be another reason for the relatively moderate increase in knowledge levels. Should the participants have been given an extensive intense series of presentations, a different outcome might occur.

It can also be argued that the workshop would have been more effective in enhancing students’ knowledge if initial knowledge levels of both groups were less than average. Moderate pretest knowledge levels for ADM and non-major students can impact the effectiveness of the workshop given to both groups and therefore posttest knowledge scores. The affect of the educational workshop was limited due to preliminary knowledge of sustainable apparel and textiles. The results do suggest however, that consumer knowledge is dependent upon educating the public on the matter in question using various methods and application.

In addition, (e) three out of four hypotheses regarding students’ major and the differences in their knowledge and WTP were failed to be rejected with the exception of H5, “There is no difference in knowledge levels between ADM students and Non-Major students before educational workshop”. Differences in pretest knowledge scores between ADM students and non-major students were found. As expected, ADM students were
found to have significantly higher levels of knowledge about sustainable apparel and textiles when compared with non-ADM majors. ADM students were initially more knowledgeable about the issue of sustainability of the apparel and textiles industry than non-major students. The difference in knowledge can relate to the different curricula given to the ADM students, which focuses more about current issues of apparel and textiles, such as sustainability and eco-friendly fashion. Differences in knowledge level scores between the two groups at the pretest level suggest that the general public is somewhat less knowledgeable about these current issues then industry personnel and therefore need to be educated more about it in order to be willing to engage in sustainable shopping behavior.

The results failed to reject the following hypothesis (H6) that, “There is no difference in knowledge levels between ADM students and Non-Major students after educational workshop”. As previously discussed, after undergoing the presentational workshop, participants in both groups presented higher knowledge scores with the gap in knowledge levels between the groups decreasing. As expected, knowledge scores for non-majors became somewhat similar to ADM students after the workshop, with differences in knowledge decreasing.

The study reveals (f) minor differences in WTP between the two groups examined before and after the workshop. And therefore failed to reject the final two hypotheses, H7:“There is no difference in willingness to purchase sustainable apparel and textiles between ADM students and Non-Major students before educational workshop”, and H8:“There is no difference in willingness to purchase sustainable apparel and textiles between ADM students and Non-Major students after educational workshop”. ADM
students exhibited similar pretest WTP scores to non-major students. At the same time, an increase in WTP means was indicated over time for both apparel and non-majors. The similarity in WTP scores between the groups can suggest that other factor (other than knowledge) is affecting consumer WTP. It can be the relatively high price of sustainable apparel products (almost double than conventional apparel products), or the lack of availability in the market (very limited retailers are offering green fashion products), that prevent consumer from shopping for eco-friendly clothing.

As previously discussed, no correlation was found between knowledge and WTP. However, when further examining the results, the increase in knowledge scores for both groups and an increase in WTP for both groups can suggest that there is some type of interaction between the two measures. Although correlation analysis exhibited no significant correlation between knowledge and willingness to purchase, it can be implied that there is an indirect relationship between the two variables. Both groups exhibited increased knowledge and WTP over time, after the completion of the workshop. ADM students who had higher knowledge scores showed higher WTP at the pretest level. Also, higher knowledge scores and WTP scores were detected for both groups at the posttest stage, after the completion of the educational presentation.
CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary of Research

Sustainable apparel and textiles consumers have not been examined in any great level in previously published studies. The motivation for this study was a desire to better understand the factors that impact consumer willingness to purchase sustainable apparel and textiles, with knowledge being the main factor studied. The determination and description of the key factors impact the sustainable purchasing intention and shopping behavior for these products would benefit the eco-friendly apparel industry and its members who would seek to market to this segment. It would also benefit consumers themselves with a potential to better serve their needs in this department, as the study gives us better understanding of how knowledge is related to an individual’s willingness to purchase.

In order to better realize consumer willingness to purchase and the factors impacting it, the study was undertaken with three key objectives. The main objective was to determine the relationship between consumer environmental concerns, attitudes, and knowledge and their willingness to purchase sustainable apparel and textiles, when knowledge being the major factor studied. The second objective was to investigate whether education plays a role in enhancing consumer/students knowledge of sustainable apparel and textiles, and therefore increases their willingness to purchase sustainable apparel and textile products. Lastly, the study aimed to assess whether there is a difference in knowledge levels and willingness to purchase sustainable apparel and textiles between Apparel Design and Merchandising students vs. Non-Major students,
before and after the implementation of an educational workshop on the topic of sustainability and eco-friendly fashion.

Literature from apparel merchandising, consumer behavior, economics and marketing was reviewed to develop direction and a theoretical conceptual framework for this study. The theory of planned behavior (Ajzen, 1980) provided the basis of the conceptual model. The study used three basic analytic tools, descriptive analysis, t-test analysis, and repeated measure ANOVA analysis to achieve the specific objectives. The source of the data was a questionnaire survey of Family and Consumer Sciences students at California State University, Northridge. The questionnaire covered four major issues including environmental concerns, attitudes toward sustainable apparel and textiles, knowledge of sustainable apparel and textiles, and willingness to purchase sustainable apparel and textiles. A total of 92 questionnaires were studied in this research.

Conclusions

One of the main contributions of this study to the sustainable apparel and textile market was the determination of the relationship between environmental concern, attitudes and knowledge and consumer willingness to purchase sustainable apparel and textile products. As described in the previous chapter, a strong positive correlation between environmental concern and consumers purchase intention was found. Also, attitudes and willingness to purchase had significant positive correlation. Students, who exhibited higher environmental concern and attitudes scores, had higher scores of willingness to purchase sustainable apparel and textiles. No significant correlation was found between knowledge and willingness to purchase, however further findings revealed
that students with greater knowledge on sustainable apparel and textiles had higher scores for willingness to purchase environmentally friendly products. It can therefore be implied that higher knowledge levels of sustainable apparel and textiles will result in increased willingness to purchase sustainable apparel and textile products. The study stresses the importance of consumer knowledge on the issue of sustainability in the apparel industry. The average consumer, who is not familiar with environmentally friendly clothing and has minimal knowledge about it, is less likely to be willing to purchase such products and it is therefore less possible for him to engage in any kind of sustainable shopping behavior.

Other contribution of this study was made to the understanding of the importance of education on sustainable apparel issues. The implementation of the educational workshop demonstrated that the more educated students were regarding sustainable apparel and textile the higher their knowledge levels were regarding sustainable apparel and textiles. The results clearly indicated higher knowledge posttest scores for both groups (mainly with the non major students) after the PowerPoint presentation on sustainability and eco-friendly apparel. Results of this study concluded that knowledge levels have increased over time, decreasing the gap in knowledge between ADM students and Non-Major students. The educational workshop was effectively implemented as it significantly increased students’ knowledge levels of the issue in question.

Members of the apparel industry who engage in the sustainable fashion niche market must invest in educating consumers about the positive attributes of sustainable fashion and the negative effects of conventional clothing production processes. Finding ways to improve public knowledge about the different alternatives, focusing on eco-
friendly apparel, would potentially result in higher levels of willingness to purchase sustainable apparel and textile products, and therefore increased sales of products of this market.

The study also contributed to the evaluation of the differences in knowledge levels between Apparel Design and Merchandising students and Non-Major students before and after the workshop. ADM students exhibited higher initial knowledge levels when compared with Non-Major students. However, once obtaining the necessary information through the educational presentation, differences in knowledge levels between the two groups have decreased. Although ADM students exhibited higher preliminary knowledge levels it was expected that their pretest knowledge scores would be slightly higher. The results demonstrate that ADM students, who should potentially be highly knowledgeable about the issue of sustainability in the apparel industry, possess moderate knowledge levels that might limit their willingness to purchase sustainable apparel and textiles. It is recommended that industry and academic personnel will search for ways to enhance students’ knowledge about this important issue.

Based on the results, it is also suggested that the average shopper (in this study, the non-major student) lack the essential knowledge about sustainable apparel in order to make more conscious decisions when shopping for clothing. The results support the assumption that providing consumers with the basic information regarding sustainable apparel and textile will increase their knowledge levels and in return impact their willingness to engage in a sustainable shopping behavior. Not only knowledge levels improved over time, WTP scores also increased. Since the two measures subsequently increased for both groups in can be suggested that consumer who is more educated about
eco-friendly clothing will be more willing to purchase these products.

In this study, we examined how environmental concern, attitudes and knowledge each impact individual’s intention towards a particular behavior; their willingness to purchase. The conceptual model suggested that environmental concern, attitudes, and knowledge directly affect an individual’s willingness to purchase, his or her intention to engage in a sustainable shopping behavior. The study demonstrated that students’ environmental concern as well as their attitudes toward sustainable apparel and textiles are significantly related to their willingness to purchase such products. Level of knowledge of sustainable apparel and textiles did not demonstrate any direct, significant relationship with an individual’s willingness to purchase. The results did indicate a positive correlation between knowledge and environmental concern. Since environmental concern in this study had positive relationship with willingness to purchase, it can be implied that knowledge indirectly related to one’s willingness to purchase sustainable apparel and textile. The conceptual model wasn’t fully supported, as its main contribution, knowledge, didn’t have any significant correlation with willingness to purchase. Further investigation is recommended.

**Recommendations for Future Research**

The results of this study provide several suggestions and recommendations. First, since the results could not support any significant positive correlation between level of knowledge and consumers willingness to purchase sustainable apparel and textiles, it is suggested that further research should be done in order to determine weather such relationship does exist and how extensive the impact is.
The current study examined the sample population of Family and Consumer Sciences’ students. It is recommended that future studies will focus on a broader population to investigate the affect of knowledge on willingness to purchase among different groups.

Additional studies should also investigate ways to enhance knowledge levels of this specific issue among consumers. An experimental study could be conducted to determine if different educational methods, other than the study’s workshop, such as academic articles, television commercials, magazine ads, and public seminars, would influence consumer knowledge and therefore transform their shopping behavior of sustainable apparel and textile. A future study can incorporate a series of educational workshop to test the affect over time.

Finally, another important next step based on the results of this research would be to simulate a real purchase setting to investigate the immediate affect of knowledge of sustainable apparel and textile on shopping behavior. This scenario will demonstrate how consumer knowledge influences an individual’s shopping behavior, by analyzing actual sales of the products in study. It can also be beneficial in determining effective promotional methods and materials for the eco-friendly fashion market.
REFERENCES


Hobson K. 2003. Thinking habits into action, the role of knowledge and process in questioning household consumption practices. Local Environment 8(1), 95–112.


Mintel (2004), Clothing Retailing, Mintel Intelligence, London.


APPENDIX A: QUESTIONNAIRE

Sustainable Apparel and Textiles Survey

This Survey is being conducted by a graduate student at the Family and Consumer Sciences department at California State University, Northridge. The study is exploring the affect of awareness and knowledge on consumer willingness to purchase sustainable apparel/textile products. Please take 10 minutes to fill the following questionnaire. Your responses to the questions below will remain strictly confidential. Thank you for your participation.

Environmental Concern

It is important to understand your concern for the environment and your general sustainable practices. Please rate your agreement with the statements by circling one number next to each statement

1 2 3 4 5
Strongly Disagree Disagree Neutral Agree Strongly Agree

1. I consider myself as someone who is concerned for the environment 1 2 3 4 5
2. I consider myself an "environmental consumer" 1 2 3 4 5
3. The choices I make when shopping or using different services can affect the environment 1 2 3 4 5
4. When purchasing a product I consider the effect(s) it may have on the environment 1 2 3 4 5
5. I consider myself a "sustainable consumer" 1 2 3 4 5
6. I am responsible for making consumption choices more sustainable 1 2 3 4 5
7. As a consumer I have influence over the products/services I choose 1 2 3 4 5
8. I always choose green or sustainable products/services 1 2 3 4 5
Attitudes towards Sustainable Apparel/Textile

It is important to understand what you think about sustainable apparel/textile and the apparel industry. Please rate your agreement with the statements by circling one number next to each statement.

1  2  3  4  5
Strongly Disagree  Neutral  Agree  Strongly Agree

1. Sustainable practices of apparel/textile industry are important to me

2. I am concerned about the impact of clothing production on the environment

3. I feel ethically obligated to purchase organic apparel/textile products

4. My family think that I should purchase sustainable apparel/textile

5. My friends think that I should purchase sustainable apparel/textile

6. Sustainable apparel/textile is less stylish

7. Sustainable apparel/textile is expensive to produce

8. Sustainable apparel/textile is expensive to purchase

9. Availability of sustainable apparel/textile is limited in the market

10. Variety of sustainable apparel/textile is limited in the market

11. Styles and colors of sustainable clothing is very limited

12. I am familiar with the different brands that sell sustainable clothing

13. I would like to purchase sustainable apparel items, however, I don’t know where I can buy them
Knowledge of Sustainable Apparel/Textile

It is important to understand what you know about sustainable apparel/textile and the apparel industry. Please circle the letter that represents the correct answer to the following based on your personal knowledge.

1. Sustainable apparel/textile is good for the environment T  F

2. The dyes and chemicals used in apparel and textile products are harmful for the environment T  F

3. The impact of clothing production on the environment is irreversible T  F

4. Not all apparel/textile products have negative impact on the environment T  F

5. Sustainable apparel/textile products last longer and have better quality T  F

6. Sustainable apparel/textile products are better for my health T  F

7. Sustainable apparel refers to:
   a. Apparel made from organic cotton
   b. Apparel that is produced using no chemicals
   c. Clothing made using all natural materials
   d. Clothing that last longer than traditional garments

8. Eco Fashion focuses on all of the concepts except:
   a. Using organic fibers
   b. Using natural dyes
   c. Reducing harmful effects on the environment
   d. Producing affordable clothing
   e. Human and labor rights
9. Which of the following are considered environmentally friendly fabrics?
   a. Organic Cotton
   b. Hemp
   c. Bamboo
   d. Wool
   e. All of the above

10. What material is most commonly used for sustainable textile?
    a. Silk
    b. Wool
    c. Cotton
    d. Bamboo
    e. Lyocell

11. Which of the following statement is correct:
    a. Organic cotton production involves no pesticides use.
    b. Organic cotton is less durable than conventional cotton
    c. Genetically modified cotton is the same as organic cotton
    d. Organic cotton costs the same as conventional cotton

12. Sustainable apparel is made from ______ fibers, using ______ dyes
    a. Organic, chemical
    b. Natural, traditional
    c. Organic, Natural
    d. Inorganic, low pesticides
13. The following retailers are known for promoting sustainable clothing
   a. Patagonia
   b. NAU
   c. American Apparel
   d. Retailers a & b only
   e. All are known for their eco-friendly lines of clothing

14. Information about sustainable apparel/textile is available at:
   a. Online sites
   b. Fashion magazines
   c. Academic Articles
   d. Industry events
   e. All of the above contain important information about sustainable apparel/textile

15. Eco labels are designed to provide the following information:
   a. Garment size
   b. Care instructions
   c. Country of origin
   d. Environmental footprint
   e. All of the above
Willingness to Purchase Sustainable Apparel/Textiles

It is important to understand your apparel shopping behavior and likelihood of purchasing sustainable apparel/textile. Please rate your agreement with the statements below by circling one number next to each of the statement.

1  2  3  4  5
Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

1. In general, purchasing sustainable apparel/textile is important to me (1 2 3 4 5)
2. I have purchased a sustainable apparel/textile at least once in the past (1 2 3 4 5)
3. I always prefer to buy sustainable apparel over conventional apparel (1 2 3 4 5)
4. When purchasing apparel item I look at the label for information about the products (1 2 3 4 5)
5. The next time I will go apparel shopping I will most likely purchase an item that is environmentally friendly (1 2 3 4 5)
6. I will go out of my way to purchase sustainable apparel products (1 2 3 4 5)
7. I don’t purchase sustainable clothing items due to the high price (1 2 3 4 5)
8. I don’t purchase sustainable apparel items due to limited availability (1 2 3 4 5)
9. I purchase sustainable apparel items online and in stores (1 2 3 4 5)
10. I purchase clothing only from eco-friendly designers/retailers (1 2 3 4 5)
11. When deciding which apparel products to buy, sustainability is the most important factor (1 2 3 4 5)
12. I try to encourage other people to buy sustainable apparel products (1 2 3 4 5)
13. I purchase a variety of sustainable apparel/textile items (1 2 3 4 5)
14. I prefer trendy over eco-friendly clothing (1 2 3 4 5)
15. Purchasing sustainable clothing increases my peace of mind (1 2 3 4 5)
General Questions

1. What is your Gender? (Please circle a letter)
   a) Male
   b) Female

2. What is your age? (Please fill in the blank)
   __________ Years

3. What is your ethnic group? (Please circle a letter)
   a) African American
   b) Asian
   c) Hispanic/Latino
   d) Native American
   e) Native Hawaiian
   f) White/Caucasian
   g) Other

4. Which is the highest level of education that you have completed?
   a) Completed high school
   b) Some college
   c) Completed baccalaureate degree
   d) Some graduate work
   e) Completed graduate degree

5. What is your current yearly household income?
   a) Less than $10,000
   b) $10,000-$24,999
   c) $25,000-$49,999
   d) $49,999-$74,999
   e) $75,000 and over

6. What is your Major? (Please fill in the blank)
   __________________________________________

Thank you for your participation!
APPENDIX B: HUMAN SUBJECTS PROPOSAL

December 6, 2011

Alona Tevel
1045 South Bedford St. #7
Los Angeles, CA 90035

Re: "The Affect of Knowledge on Consumers' Willingness to Purchase Sustainable Apparel" Research Protocol

Dear Ms. Tevel:

Enclosed for your records is a copy of the cover sheet of your approved Human Subjects Protocol Form. Please note that your project has been approved as exempt. If there are any changes to your protocol, you must contact the Office of Research and Sponsored Projects to ensure your project is still within the exempt guidelines.

If you have any questions, call this office at (818) 677-2901.

Sincerely,

Suzanne Blanding, Compliance Officer
On Behalf of
Committee for the Protection of Human Subjects

enclosure
Student Researcher
HUMAN SUBJECTS PROTOCOL APPROVAL FORM
CALIFORNIA STATE UNIVERSITY, NORTHridge

1. Title of research
   The Affect of Knowledge on Consumers' Willingness to Purchase Sustainable Apparel

2. Principal Investigator
   Alona Tevel

3. Address
   1045 South Bedford St, #7
   Los Angeles, CA 90035
   Home phone 310-967-0992
   Email Address atol0@hotmail.com

4. Co-Investigators:
   1. ___________________________ Student: ☐ Faculty: ☐
   2. ___________________________ Student: ☐ Faculty: ☐

5. Name of Faculty Advisor
   Dr. Wei Cao
   Faculty Advisor ext. 4486

6. Projected Dates of Data Collection:
   Begin Subject Recruitment/Data Collection: Oct 2011
   End Data Collection: Nov 2011

7. Course prefix and number for thesis/grad. project
   FCS 698C
   Course title Directed Research Study

8. Check one:
   ☒ Unfunded
   ☐ Funded
   Name of Funding Source:
   Date (to be) submitted

9. History of Protocol:
   ☒ New
   ☐ Continuing (Previous Approval Date ______)

10. Existing Data: Will this study involve the use of existing data or specimens? (Data/specimens currently existing at the time you submitted this project)?
    ☒ No
    ☐ Yes
    If Yes, attach documentation indicating the authorization to access the data if not publicly available and if accessing from an agency outside of CSUN.

11. Subjects to be recruited (Check all that apply)
    a. ☒ Adults (18+ years)
    b. ☐ Minors specify age:
    c. ☐ Cognitively or Emotionally Impaired Persons
    d. ☒ CSUN Students
    e. ☐ Others (describe)
    g. ☐ Using existing data, no subjects will be recruited

12. Data will include (check all variables that apply): You must specify all of this information in the Project Information form.
    a. ☐ names of people h. ☐ marital status
    b. ☐ email address i. ☐ income
    c. ☐ street address j. ☐ social security number
    d. ☐ phone numbers k. ☐ job title
    e. ☒ age l. ☐ names of employers
    f. ☒ gender m. ☐ types of employers
    g. ☒ ethnicity n. ☐ physical health report

13. Will subjects be identified by a coding system (i.e., other than by name)? YES ☒ NO ☐

14. Is compensation offered? YES ☐ NO ☒

15. If yes, describe (e.g., gift cert., cash, research credit).

16. Number of Subjects: 100

CSUN Office of Research and Sponsored Projects
Committee for the Protection of Human Subjects, Revised 10/06
17. Method of recruiting (elaborate in Section 2 of Project Information Form): In class survey.

18. Will there be any deception (that is, not telling subjects exactly what is being tested)? YES ☐ NO ☒ (Provide justification for deception and explain how subjects are debriefed in Section 2 of the Project Information Form)

19. Potential Risk Exposure (Check all that apply): ☐ Physical ☐ Psychological ☐ Economic ☐ Legal ☐ Social ☐ Other, describe: ________________________________

20. Data Collection Instruments (Check all that apply) a. ☒ standardized tests b. ☐ questionnaire c. ☐ interview d. ☐ other (specify) 21. Recorded by (Check all that apply) a. ☐ written notes b. ☐ audio tape c. ☐ video tape/film d. ☐ photography e. ☐ classroom observation

22. Administered by (Check all that apply) a. ☒ in person (group setting) b. ☐ in person (individual) c. ☐ telephone d. ☐ electronic mail/website e. ☐ mail f. ☐ other (specify):

23. Findings used for (Check all that apply) a. ☐ publication b. ☐ evaluation c. ☐ needs assessment d. ☐ thesis/dissertation e. ☐ other (specify):

24. Are drugs or radioactive materials used in this study? YES ☐ NO ☒ If yes, list the drugs or radioactive materials used in Section 1 of the Project Information Form and provide a detailed description of each, with justification for its use.

25. Are any medical devices or other equipment to be used in this study? YES ☐ NO ☐ If yes, describe in detail the medical devices or equipment to be used in Section 2 of the Project Information Form.

26. Did you attach a copy of any questionnaire(s), survey instrument(s) and/or interview schedule(s) referred to in this protocol? YES ☐ NO ☐

27. Is a letter of permission for subject recruitment attached (if recruiting from an agency outside of CSUN)? YES ☐ NO ☐

28. SIGNATURES: Refer to page 1, General Instructions-Letter D, before signing.

Signature of Faculty Advisor ______________ Date ______________ Student Investigator's Signature ______________ Date ______________ (specify grad. or undergrad.)

FOR SACPHS AND RESEARCH OFFICE USE ONLY

Noted, exempt ☐ Approved, Minimal Risk ☐

Approved, Greater than Minimal Risk ☒ Approved, Expedited Review

Chair, SACPHS ______________ Date ______________

Expedited Reviewer(s) ______________

CSUN Office of Research and Sponsored Projects Committee for the Protection of Human Subjects, Revised 10/06
### APPENDIX C: CODING GUIDE

<table>
<thead>
<tr>
<th>Column</th>
<th>Variable Name</th>
<th>Questionnaire Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pre ID</td>
<td>Subject Number</td>
</tr>
<tr>
<td>B</td>
<td>Pre Survey</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>Major</td>
<td>ADM / 1</td>
</tr>
</tbody>
</table>

**Environmental Concern**
- D E1 Concern for Environment
- E E2 Environmental Consumer
- F E3 Shopping Affect
- G E4 Purchasing Consideration
- H E5 Sustainable Consumer
- I E6 Responsible Consumption
- J E7 Consumer Influence
- K E8 Green Products

**Sustainable Apparel Attitudes**
- L A1 Sustain Apparel Practices
- M A2 Clothing Production Impact
- N A3 Ethical Purchase
- O A4 Family Perception
- P A5 Friends Perception
- Q A6 Sustainable Apparel Stylish
- R A7 Sustain Apparel Production
- S A8 Sustain Apparel Purchase
- T A9 Sustain Apparel Available
- U A10 Sustainable Apparel Variety
- V A11 Sustain Clothing Style
- W A12 Familiar W/Sustain Apparel
- X A13 Sustain Apparel Knowledge

**Sustainable Apparel Knowledge**
- Y K1 Sustain Apparel Good for Environment
- Z K2 Dyes and Chemicals
- AA K3 Clothing Production Impact
- AB K4 Products Negative Impact
- AC K5 Sustain Apparel Products Quality
- AD K6 Health
- AE K7 Sustain Apparel Definition
- AF K8 Eco-Fashion
- AG K9 Eco-Friendly Fabrics
- AH K10 Sustainable Textile
- AI K11 Organic Cotton
- AJ K12 Fibers and Dyes
- AK K13 Sustainable Retailers
- AL K14 Availability of Information
### Eco-Labels

<table>
<thead>
<tr>
<th>AM</th>
<th>K15</th>
<th>Eco-Labels</th>
</tr>
</thead>
<tbody>
<tr>
<td>AN</td>
<td>P1</td>
<td>Willingness To Purchase</td>
</tr>
<tr>
<td>AO</td>
<td>P2</td>
<td>Purchase Importance</td>
</tr>
<tr>
<td>AP</td>
<td>P3</td>
<td>Previous Sustain Purchase</td>
</tr>
<tr>
<td>AQ</td>
<td>P4</td>
<td>Sustain Apparel Preferences</td>
</tr>
<tr>
<td>AR</td>
<td>P5</td>
<td>Labels Information</td>
</tr>
<tr>
<td>AS</td>
<td>P6</td>
<td>Future Sustain Purchase</td>
</tr>
<tr>
<td>AT</td>
<td>P7</td>
<td>Sustain Purchase Behavior</td>
</tr>
<tr>
<td>AU</td>
<td>P8</td>
<td>Sustain Apparel Price</td>
</tr>
<tr>
<td>AV</td>
<td>P9</td>
<td>Sustainable Apparel</td>
</tr>
<tr>
<td>AW</td>
<td>P10</td>
<td>Online/In Store Purchase</td>
</tr>
<tr>
<td>AX</td>
<td>P11</td>
<td>Encourage Others</td>
</tr>
<tr>
<td>AY</td>
<td>P12</td>
<td>Variety Of Sustain Products</td>
</tr>
<tr>
<td>AZ</td>
<td>P13</td>
<td>Trendy Clothing Preference</td>
</tr>
<tr>
<td>BA</td>
<td>P14</td>
<td>Sustain Apparel Peace of Mind</td>
</tr>
<tr>
<td>BB</td>
<td>P15</td>
<td>Sustain Apparel</td>
</tr>
</tbody>
</table>

### Demographics

<table>
<thead>
<tr>
<th>BC</th>
<th>Pre_G</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>BD</td>
<td>Pre_A</td>
<td>Age</td>
</tr>
<tr>
<td>BE</td>
<td>Pre_R</td>
<td>Race</td>
</tr>
<tr>
<td>BF</td>
<td>Pre_E</td>
<td>Education</td>
</tr>
<tr>
<td>BG</td>
<td>Pre_I</td>
<td>Income</td>
</tr>
<tr>
<td>BH</td>
<td>Post ID</td>
<td>Subject Number</td>
</tr>
<tr>
<td>BI</td>
<td>Post Survey</td>
<td>2</td>
</tr>
<tr>
<td>BJ</td>
<td>Major</td>
<td>Non-ADM / 0</td>
</tr>
</tbody>
</table>

### Environmental Concern

<table>
<thead>
<tr>
<th>BK</th>
<th>E1</th>
<th>Concern for Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL</td>
<td>E2</td>
<td>Environmental Consumer</td>
</tr>
<tr>
<td>BM</td>
<td>E3</td>
<td>Shopping Affect</td>
</tr>
<tr>
<td>BN</td>
<td>E4</td>
<td>Purchasing Consideration</td>
</tr>
<tr>
<td>BO</td>
<td>E5</td>
<td>Sustainable Consumer</td>
</tr>
<tr>
<td>BP</td>
<td>E6</td>
<td>Responsible Consumption</td>
</tr>
<tr>
<td>BQ</td>
<td>E7</td>
<td>Consumer Influence</td>
</tr>
<tr>
<td>BR</td>
<td>E8</td>
<td>Green Products</td>
</tr>
</tbody>
</table>

### Sustain Apparel Attitudes

<table>
<thead>
<tr>
<th>BS</th>
<th>A1</th>
<th>Sustain Apparel Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>BT</td>
<td>A2</td>
<td>Clothing Production Impact</td>
</tr>
<tr>
<td>BU</td>
<td>A3</td>
<td>Ethical Purchase</td>
</tr>
<tr>
<td>BV</td>
<td>A4</td>
<td>Family Perception</td>
</tr>
<tr>
<td>BW</td>
<td>A5</td>
<td>Friends Perception</td>
</tr>
<tr>
<td>BX</td>
<td>A6</td>
<td>Sustainable Apparel Stylish</td>
</tr>
<tr>
<td>BY</td>
<td>A7</td>
<td>Sustain Apparel Production</td>
</tr>
<tr>
<td>BZ</td>
<td>A8</td>
<td>Sustain Apparel Purchase</td>
</tr>
<tr>
<td>CA</td>
<td>A9</td>
<td>Sustain Apparel Available</td>
</tr>
<tr>
<td>CB</td>
<td>A10</td>
<td>Sustainable Apparel Variety</td>
</tr>
<tr>
<td>CC</td>
<td>A11</td>
<td>Sustain Clothing Style</td>
</tr>
<tr>
<td>CD</td>
<td>A12</td>
<td>Sustain Apparel Familiar</td>
</tr>
<tr>
<td>CE</td>
<td>A13</td>
<td>Sustain Apparel Knowledge</td>
</tr>
</tbody>
</table>

**Sustainable Apparel Knowledge**
- CF K1 Sustain Apparel Good for Environment
- CG K2 Dyes and Chemicals
- CH K3 Clothing Production Impact
- CI K4 Products Negative Impact
- CJ K5 Sustain Apparel Products Quality
- CK K6 Health
- CL K7 Sustain Apparel Definition
- CM K8 Eco-Fashion
- CN K9 Eco-Friendly Fabrics
- CO K10 Sustainable Textile
- CP K11 Organic Cotton
- CQ K12 Fibers and Dyes
- CR K13 Sustainable Retailers
- CS K14 Availability of Information
- CT K15 Eco-Labels

**Willingness To Purchase**
- CU P1 Purchase Importance
- CV P2 Previous Sustain Purchase
- CW P3 Sustain Apparel Preference
- CX P4 Labels Information
- CY P5 Future Sustain Purchase
- CZ P6 Sustain Purchase Behavior
- DA P7 Sustain Apparel Price
- DB P8 Sustainable Apparel
- DC P9 Online/In Store Purchase
- DD P10 Eco-Friendly Retailers
- DE P11 Sustain Most Important
- DF P12 Encourage Others
- DG P13 Variety Of Sustain Products
- DH P14 Trendy Clothing Preference
- DI P15 Peace of Mind

**Demographics**
- DJ Post_G Gender
- DK Post_A Age
- DL Post_R Race
- DM Post_E Education
- DN Post_I Income