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College Students' Perceptions and Practices Towards Environmentally Friendly Clothing: A Comparison and Exploratory Study

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Despite the growing interest of environmentally friendly clothing (EFC), there have been discrepancies among customers in defining EFC. The purposes of this study were to assess the participants' environmental orientation and environmental knowledge toward EFC, to compare them in terms of college major and gender and identify relationships between orientation and knowledge, and to acquire the current perceptions and practices toward EFC. The revised New Environmental Paradigm scale (NEP) with 15 items, the Environmental Apparel Knowledge scale (EAK) with 11 items, and the developed perception and practice question sets with 12 items were used. A total of 122 undergraduate students participated through an online survey. Results indicated that students in sustainability-related majors have higher ratings in knowledge than students in other majors. Gender was not found to make a significant difference in either orientation or knowledge ratings. Orientation and knowledge were positively correlated, but not strongly. Results present the need for reinforcement of sustainable contents in university curricula. Practical feedback from this study has the potential to assist with the development of effective marketing campaigns. Sample size and grouping of majors are possible limitations in this study.

Keywords: environmental friendly clothing, environmental orientation, environmental apparel knowledge, perceptions, New Environmental Paradigm scale, Environmental Apparel Knowledge scale, majors, gender

Introduction

The fashion industry has long been associated with poor environmental standards and pollution, waste, and an unparalleled amount of consumerism (Dickson, Loker, & Eckman, 2009). In recent decades, the green marketing movement has swept through the consumer marketplace, prompting companies in many industries to develop and provide products that claim to be environmentally friendly. In the apparel industry, this movement initially began with bags and t-shirts touting environmental messages.

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Environmentally friendly clothing (EFC) has mainly emphasized the use of natural materials like cotton and to promote recycling, but the concept has been evolving to incorporate wider areas. McDonough and Braungart (2002) insisted on broadening the scope of EFC to consider the entire product life cycle, including materials, production, transportation of product, end use, and disposal. Their concept and model has been widely adopted in both academia and industry. The environmental impact analyzed using this approach may challenge traditional beliefs about EFC. For example, the use of a natural fiber, such as cotton, is not necessarily more environmentally friendly when compared to the synthetic polyester fiber when the use of pesticides in farming cotton, water, and energy expenditure in production were considered (Ayaz Shaikh, 2011; McDonough & Braungart, 2002). These evolving concepts often cause discrepancies between what is actually environmentally friendly and the definitions of EFC among customers, creating confusion when they make EFC purchasing decisions. In other words, although consumers are aware of environmental concerns and are willing to contribute to sustainability, the average consumer may not be able to clearly determine what makes clothing environmentally friendly, nor how clothing specifically contributes positively to the environment.

The relationship between environmental orientation and knowledge was one research interest for this study due to the possible discrepancies between them, and the importance of not only orientation but also the actual knowledge. Environmental knowledge can be learned from multiple sources, including a university's curriculum. The importance of a university education cannot be overlooked since it will be critical in developing appropriate on-time strategies or educational programs to enhance students' awareness and knowledge level; they are future customers and future practitioners who will lead the apparel industry as a policy/decision maker. In addition, the high percentage of female students enrolled in fashion programs gave rise to another variable, gender, in this research. Obtaining their current prevailing perceptions is of interest since the results can be practically reflected in curriculum and in marketing practices in the apparel industry.

The purposes of this study were to assess students' environmental orientation and environmental knowledge toward EFC, to compare them in terms of college major and gender and identify relationships between environmental orientation and knowledge at a university located in the Midwest of the United States. Additionally, students' perceptions and practical feedback toward EFC and current practices were obtained and analyzed.

Literature Review

The conceptual model of purchase intention for green apparel (Ko, 2012), which was developed based on the theory of planned behavior (Ajzen 1991), was used as a framework for this study. In this model, Ko (2012) proposed *man-nature orientation* and *environmental knowledge* as indirect antecedents, and *attitude towards purchasing green apparel product*, *subjective norm*,

internal perceived behavioral control, and *external perceived control* as direct antecedents of the purchase intention of green apparel products (p. 36). *Man-nature orientation* used for his study covers a narrower definition than the *environmental orientation* term used for this study and is encompassed by 5 questions. *Man-nature orientation* was initially proposed as one of the orientations in the framework of value-orientation by Kluckhohn and Strodtbeck (1961) to describe culture and values based on a human being's relationship with nature (Jandt, 2004) and presents three possibilities: subjugation to nature, harmony with nature, and mastery over nature. Multiple researchers have proposed *man-nature orientation* as a way to understand attitudes toward the relationship between human beings and nature (Chandler & Dreger, 1993; Snodgrass & Gates, 1998). *Environmental orientation* used for this study covers attitudes, beliefs, and values representing worldviews. In this study, major and gender were examined as two potential antecedents to influence *environmental orientation* and *environmental knowledge*.

Environmentally Friendly Clothing Practices and Discussions in the Textile and Apparel Area

The fashion industry has lagged behind other industries in the greening of their production loops (Thomas, 2008). However, as time has progressed, government agencies, nongovernmental organizations, and consumers have pushed for social responsibility in all industries, including fashion. Recently, sustainability in the textile and apparel area has been spotlighted; much research has been conducted from various perspectives. Multiple researchers have tried to identify relevant variables and factors pertaining to customers' purchasing decisions in consumer behavioral aspects.

Stephens (1985) researched the extension of socially responsible consumption behavior to clothing items. However, during the time of the study, participants were unable to clearly recognize any connection between clothing and the environment. Kim and Damhorst (1998) studied the relationship between general environmentally-responsible behavior and environmentally-responsible apparel consumption and found a strong correlation ($r = .66$). However, environmental orientation, as measured by the New Environmental Paradigm (NEP) scale, was not directly related to environmental apparel behavior in their study (Kim & Damhorst, 1998). Researchers have tried to find restricting factors of EFC behavior and purchase. Unappealing design has been recognized as one of the downsides in previous studies. For example, Joergens (2006) found that environmental issues caused by clothing production were not of interest to focus group participants, but rather, participants were concerned about how the garment felt and looked on the body. Furthermore, in this study, participants did not perceive the EFC they were shown to be stylish or fashionable (Joergens, 2006). Recently, multiple mainstream fashion companies and designers such as Hennes and Mauritz (H&M), Nike, Talbots, and Alberta Ferretti incorporated eco-friendly practices into their fashion product production processes.

Education/Major and Gender and Environmental Concern

Education. In general, education was found to be a predictor of environmental concern and behavior (Dunlap, Van Liere, Mertig, & Jones, 2000; Xiao & McCright, 2007). McDonough and Braungart (2002) found that a lack of education often restricted the average consumer's ability to judge the sustainability of an apparel item. The relationship between the level of education and environmental issues has been studied (Arcury & Christianson, 1990; Dunlap et al., 2000; Hines, Hungerford, & Tomera, 1987; Kozar & Connell, 2010; MacDonald & Hara, 1994; Ostman & Parker, 1987; Xiao & McCright, 2007). Several studies have found that individuals with high levels of education typically express more concern about the environment and take part in environmentally-responsible behaviors (Hines et al., 1987; Ostman & Parker, 1987; Scott & Willits, 1994; Tarrant & Cordell, 1997). The level of education attained by study participants has been found to be a more consistent sociodemographic variable than others such as gender or income. Oftentimes, a student's college major shapes how a student would follow causes and make purchase decisions due to its influence on knowledge. However, only a few researchers have explored the difference in environmental consciousness based on major. Rideout, Hushen, McGinty, Perkins, and Tate (2005) investigated college students' environmental attitudes in relation to their college majors using the NEP scale. The results indicated that the samples in the study showed nonsignificant effects of college major on environmental concern. Mobley, Vagias, and DeWard (2009) have found that other informational sources, such as reading environmental literatures, can help increase engagement in environmentally-responsible behavior. Hvenegaard (2007) also found that students use a variety of sources to educate themselves about environmental issues, including television (92% of cases), newspaper (79%), magazines (63%), and Internet (18%). Interestingly, only 35% of the cases cited the university as a source of environmental information.

Gender. Gender has been recognized as a potential predictor of opinions and attitudes towards EFC. Several researchers examined gender within their studies of environmentalism and social consciousness (Arcury, 1990; Butler & Francis, 1997; Hines et al., 1987; Scott & Willits, 1994; Stern, Dietz, & Kalof, 1993; Webster, 1975). However, gender was found to be a much less consistent variable than other factors, such as age, education, and political ideology (Dunlap et al., 2000; Scott & Willits, 1994; Xiao & McCright, 2007). Several studies have assessed environmental attitudes and have found varying results as to the effect of gender (Arcury, 1990; Arcury & Christianson, 1990; Hvenegaard, 2007; Scott & Willits, 1994; Stern et al., 1993; Tarrant & Cordell, 1997). Several studies have shown that gender may be a factor in determining differences in environmental opinion (Hvenegaard, 2007; Mohai, 1992; Scott & Willits, 1994; Stern et al., 1993). Others have found that gender and environmentally-responsible behavior have no relationship (Hines et al., 1987). Scott and Willits (1994) found that males may be somewhat more likely than females to participate in environmentally-relevant political behavior, and females may be more likely to take part in environmentally-protective

consumer behavior, as well as make purchase decisions, in terms of environmental considerations. Arcury and Christianson (1990) found that males had a more environmentalist worldview than females in their longitudinal study. Another study among college students found that females were less concerned about the environment than males (MacDonald & Hara, 1994). However, in a more recent study, Hvenegaard (2007) found that students who displayed scores that were more supportive of an environmental worldview were more likely to be female.

The New Environmental Paradigm (NEP) Scale and the Environmental Apparel Knowledge (EAK) Scale

The New Environmental Paradigm (NEP) scale and the Environmental Apparel Knowledge (EAK) scale were used to measure the levels of environmental orientation and environmental knowledge, respectively, in this study. The NEP scale has become a popular measure of environmental concerns and is treated as a measure of endorsement of a fundamental paradigm or worldview, as well as of environmental attitudes, beliefs, and values, reflecting the ambiguity inherent in measuring these phenomena. The revised NEP scale (Dunlap et al., 2000) was used to measure participants' environmental orientation and new worldview, replacing the old worldview of limitless growth and the inevitability of progress. The original NEP scale developed by Dunlap and Van Liere (1978) was revised in 2000 to address the wider range of ecological worldviews now present, offer a balance of pro- and anti-NEP items, and update terminology (Dunlap et al., 2000). This 15-statement scale has been used in studies pertaining to environmental issues and education (Mobley et al., 2009; Ruff & Olson, 2009), social responsibility and apparel (Kim & Damhorst, 1998; Kozar & Connell, 2010), and environmental concern and purchase behavior (Minton & Rose, 1997; Roberts & Bacon, 1997). The NEP has been used to determine environmental attitudes, perceptions, and other behaviors (Arcury & Christianson, 1990; Ebreo, Hershey, & Vining, 1999; Hvenegaard, 2007; Scott & Willits, 1994; Stern et al., 1993; Stern, Dietz, & Guagnano, 1995; Tarrant & Cordell, 1997; Wiidegren, 1998). The NEP scale has a high level of internal consistency ($\alpha = .83$) where the NEP has been used as a unidimensional scale (Dunlap & Van Liere, 1978).

Knowledge was considered as one of the key factors in a wide range of socially responsible consumer behaviors (Roubanis, 2008; Tanner & Kast, 2003). Joergens (2006) emphasized that consumers needed to be more knowledgeable to be able to make purchase decisions about EFC. The Environmental Apparel Knowledge (EAK) scale with 11 items was developed by Kim and Damhorst (1998) to measure participants' knowledge of the impact of apparel products on the environment. In Kim and Damhorst's (1998) study, the EAK scale was used with two additional scales, measuring environmentally-responsible apparel consumption behavior and general environmentally-responsible behavior. Several researchers have applied the EAK scale in their studies (Kozar & Connell, 2010) to compare participants' knowledge with other variables, but the EAK scale has been used less comprehensively compared to the NEP.

Consequently, the following research questions were investigated in this study:

- 1) Does major relate to student environmental orientation and knowledge?
- 2) Does gender influence student environmental orientation and knowledge?
- 3) Are environmental orientation and knowledge correlated?
- 4) What are the participants' perceptions and practical feedback regarding current EFC practices?

Methodology

Sampling and Data Collection Procedure

The sample for this study was undergraduate students ages 18 or older enrolled at a Midwest university located in the United States during the spring of 2011. A mass e-mail was sent to all undergraduate students by the Director of Research Compliance at the university which contained an invitation to participate in the study and a letter of consent. A total of 122 students participated in this study by completing a voluntary online survey. Data collection was completed using Integrated Network Quizzing, Surveying, and Interactive Testing (InQsit), version 12.4.0, which is an online assessment program. The survey was available online for two weeks, after which the survey was closed. A follow-up email was sent one week after the initial email in an effort to increase participation. The protocol was classified as exempt by the University Institutional Review Board.

Instrumentation and Data Analysis

A questionnaire with forty-four items was developed combining the two existing scales after minor modifications and a set of questions developed by the researcher. Specifically, the revised NEP scale, as well as the original EAK scale, and an additional question set pertaining to perceptions towards EFC and current practice constituted the survey. The wording for the NEP scale was slightly altered to make it consistent with the EAK scale. Besides college major and gender, other variables were analyzed, including the number of sustainability courses taken by participants, age, and class level. The scores from the two scales were analyzed using correlational tests to see if the scales were related. A one-way ANOVA was used to test differences among collegiate majors, the number of environmental courses taken by participants, as well as class levels on both the NEP and EAK scores. The NEP and EAK scores depending on gender were tested using an independent samples *t*-test. Correlations were run to test age with the NEP and EAK scores. Descriptive statistics were used to analyze the feedback from the participants about their perceptions and current practices.

Findings and Discussion

Participants ranged in age from 19 to 55 years ($M = 22$ years). All class levels were represented with 35.2% freshmen, 18.9% sophomores, 17.2% juniors, 24.6% seniors, and 4.1% other. Participants included 26.2% males ($n = 32$) and 73.8% females ($n = 90$). Participants' majors were grouped into larger categories due to the variety of individual majors (e.g., Japanese or German Education majors were grouped into *Language/Writing*; Biology, Nursing, and Chemistry were grouped into *Natural Sciences/Medical*). The largest major group was *Social Sciences* ($n = 22$). The other major groups were as follows: *Technology/Communication* ($n = 18$), *Natural Sciences/Medical* ($n = 16$), *Environmentally-Related* ($n = 16$), *Fashion-Related* ($n = 9$), *Business* ($n = 9$), *Education* ($n = 9$), *Arts* ($n = 8$), *Language/Writing* ($n = 5$), and *Others* ($n = 9$).

Descriptive Statistics: Overall NEP and EAK Findings

In the analysis of the NEP data, the results revealed that the NEP scale was internally consistent ($\alpha = .846$), supporting previous research (Arcury, 1990; Dunlap et al., 2000; Hvenegaard, 2007; Kim & Damhorst, 1998). Table 1 shows the mean and standard deviation of each item.

Table 1. Means and Standard Deviations for New Environmental Paradigm Scale Items

Item	<i>n</i>	<i>M</i>	<i>SD</i>
* 1. We are approaching the limit of the number of people the earth can support.	122	3.97	1.15
2. Humans have the right to modify the natural environment to suit their needs.	122	3.26	1.27
* 3. When humans interfere with nature it often produces disastrous consequences.	122	3.87	1.07
4. Human ingenuity will insure that we do NOT make the earth unlivable.	122	3.07	1.13
* 5. Humans are severely abusing the environment.	122	4.18	1.04
6. The earth has plenty of natural resources if we just learn how to develop them.	122	2.43	1.21
* 7. Plants and animals have as much right as humans to exist.	122	4.21	1.06
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.	122	3.57	1.14
* 9. Despite our special abilities humans are still subject to the laws of nature.	121	4.34	.86
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated.	122	3.51	1.12
* 11. The earth is like a spaceship with very limited room and resources.	122	3.71	1.09
12. Humans were meant to rule over the rest of nature.	121	3.45	1.41
* 13. The balance of nature is very delicate and easily upset.	122	3.66	1.12
14. Humans will eventually learn enough about how nature works to be able to control it.	122	3.45	1.10
* 15. If things continue on their present course, we will soon experience a major ecological catastrophe.	122	3.85	1.03

*Items were reverse-coded in analysis; disagreement indicated a higher environmental orientation.

As seen in Table 1, overall mean scores for the NEP indicated a moderate or positive stance for environmental orientation ($M = 3.63$ on a 7-point Likert scale) among participants presenting lower scores for items 4 and 6 compared to other items ($M = 3.07$ and $M = 2.43$, respectively). Similar results were found in Dunlap et al. (2000) study, although this study showed a higher score for item 14.

The EAK scale yielded a Cronbach's alpha of .624 for internal consistency, which is similar to the Cronbach's alpha from the original study using the EAK scale ($\alpha = .60$) (Kim & Damhorst, 1998). Table 2 displays the mean and standard deviation of each item in the EAK scale.

Table 2. Means and Standard Deviations for Environmental Apparel Knowledge Scale Items

Item	<i>n</i>	<i>M</i>	<i>SD</i>
1. Chemical pollutants are produced during manufacturing of synthetic or manufactured fibers such as polyester.	121	5.66	1.18
* 2. Chemical pollutants are not produced during processing of natural fibers such as cotton.	121	4.10	1.59
* 3. Federally and regionally mandated standards for clear air and water have not yet been imposed on textile companies.	121	3.82	1.40
4. Air pollution can occur during some common dye processes of textiles.	119	5.61	.88
5. Dyeing and finishing processes use a lot of water.	120	5.74	1.08
* 6. Fibers such as wool cannot be commercially recycled.	118	4.25	1.39
7. Disposable diapers have substantially contributed to the quantity of textile products discarded in landfills.	120	5.77	1.30
8. Special finishes on fabrics may create problems for recycling.	121	5.81	1.08
9. Phosphate-containing detergents can be a source of water pollution.	120	5.72	1.22
10. Natural fibers are usually bio-degradable.	121	5.19	1.20
* 11. The use of larger quantities of natural fibers will significantly decrease energy consumption.	120	3.38	1.39

*Items were reverse-coded in the data analysis (e.g., disagreement indicated knowledge).

The overall mean for the EAK scores was 5.01 (on a 7-point Likert scale), indicating a relatively high knowledge of environmental apparel issues. Table 2 shows that a majority of participants had correct knowledge for items 1, 4, 5, 7, 8, 9, and 10. These results are consistent with an earlier study (Kim & Damhorst, 1998). In particular, participants were highly knowledgeable (over 80% correct) about items 4, 5, 7, and 8, while items 3 and 11 revealed that only 29% and 18% of participants had correct knowledge, respectively. Item 3 illustrated that participants were not aware of federal or regional mandates pertaining to textile companies. This could be due to the lack of textile companies currently operating in the United States, reducing common knowledge about the topic. Perhaps the participants had less education about sustainability issues, specifically those related to the apparel and textile industry. Statement 11 also merited consideration because only 18% of participants knew that natural fibers do not necessarily decrease energy consumption. Furthermore, a large group of participants (30.8%) provided a

neutral response to this statement with the potential common misconception that natural fibers take less energy for production than other fibers.

Analysis for the Relationships among NEP, EAK, Major, and Gender

The differences in the NEP scores and EAK scores by gender were analyzed using an independent samples *t*-test. No significant differences were found in either the NEP scores or the EAK scores based on gender ($p = .154$ for NEP and $p = .779$ for EAK). In descriptive statistical analysis, female students ($M = 3.68$, $SD = .63$) had higher scores than male students ($M = 3.50$, $SD = .61$) for the NEP ratings even though the EAK ratings were very similar, with 5.03 ($SD = .52$) for males and 5.01 ($SD = .47$) for females. A higher participation rate of female students (73.8%) was also observed, which might reflect higher interest towards EFC.

When comparing college major, descriptive statistical results showed that the total mean was 3.63 ($SD = .63$) for the NEP ratings. Social science ($M = 3.88$, $SD = .66$) and education majors ($M = 3.82$, $SD = .44$), environmentally-related major ($M = 3.71$, $SD = .56$), natural science/medical major ($M = 3.70$, $SD = .45$) showed comparatively higher mean scores, while business ($M = 3.29$, $SD = .89$) and arts ($M = 3.26$, $SD = .96$) had comparatively low NEP scores. Fashion-related majors had a mean score of 3.4 ($SD = .41$), which is below average. For the EAK ratings, the total mean was 5.01 ($SD = .48$). Environmentally-related majors earned the highest score ($M = 5.44$, $SD = .38$), and business and fashion-related majors had a score of 4.95 ($SD = .61$) and 4.88 ($SD = .50$), respectively, presenting below-average scores. It was interesting that education majors obtained 4.89 ($SD = .40$) in the EAK ratings which is below average even though they earned high scores in the NEP ratings.

One-way ANOVA was used to analyze relationships and differences in the NEP scores and EAK scores by collegiate major. No significant differences were found in NEP based on major, but some were found in EAK scores between specific majors. Specifically, majors grouped as *Environmentally-Related* were found to be significantly different in scores than majors grouped in *Natural Science/Medical* ($p = .046$) and *Technology/Communication* ($p = .022$) at $p < 0.05$ level. It seemed logical that the student group with *Environmentally-Related* majors would score higher on the scale, as the information pertained directly to their area of study. However, the participants did not score differently from the other majors on the NEP scale, which primarily assessed ecological orientation. Perhaps this indicated that because the EAK specifically focused narrowly on the apparel and textile industry-related environmental matters, other majors, except *Environmentally-Related* majors, were simply unaware of these specific matters, while the NEP is more value- and orientation-based. It was notable that the *Fashion-Related* majors scored similarly to other majors and were not more aware of environmental knowledge in terms of apparel as measured by the EAK. Descriptive statistics revealed that *Fashion-Related* majors and *Business* majors had lower mean scores for both the NEP and EAK.

Additional analysis was performed to see the differences by the number of sustainability courses taken by participants' age and class level. The number of sustainability courses taken by participants did not seem to affect the NEP or EAK scores. Even though some majors showed differences for the EAK scores, it was difficult to say if those who had not taken a sustainability course were less environmentally-oriented or -knowledgeable simply because they had not completed such a course. It presents the possibility for learning that specific knowledge outside of university courses. This result is consistent with previous research (Mobley et al., 2009) about the importance of reading environmental literature in increasing environmentally-responsible behavior. Age and NEP scores were significantly correlated ($r = .189$; $p = .05$), as were age and EAK scores ($r = .289$; $p = .01$). Young participants scored higher on the EAK than older participants in this study. It was interesting to find age correlated with both NEP and EAK scores. Past research using the EAK scale did not measure age and EAK scores even though much research has been done on age and NEP scores. An ANOVA was performed to see if class level (freshman, sophomore, etc.) would provide significantly different scores for the NEP and EAK. While no significant differences in the NEP scores were found, freshman scored significantly lower on the EAK scores (exhibiting less knowledge of environmental apparel issues) than both sophomores ($p = .008$) and seniors ($p = .033$), but not juniors ($p = .33$). Kozar and Connell (2010) reported a significant difference between upperclassmen and lowerclassmen on only two of the eleven items of the EAK scale in their study.

EFC Perception and Practice Survey Findings

Participants were asked to answer a series of additional statements developed by the researcher to garner an idea of their perceptions about EFC and current practice. The mean score was 4.04 ($SD = 0.97$) for the interest in EFC (*EFC interests me*), 4.01 ($SD = 0.90$) for the importance of EFC (*I believe that EFC is important*), and 3.69 ($SD = 1.11$) for perceived emotional appeal (*EFC emotionally appeals to me*) in 5-point Likert-type scale (1 = *strongly disagree* to 5 = *strongly agree*), which is relatively high. The mean score was 2.37 ($SD = .94$) for easiness to find EFC (*It easy to find EFC*), 3.37 ($SD = 0.82$) for fashionability of EFC (*EFC is fashionable*), 3.16 ($SD = 1.15$) for the purchase experience for EFC (*I have purchased EFC in the past*), and 3.2 ($SD = 0.90$) for the expensiveness of EFC (*I think that EFC is too expensive for me*).

Regarding high scores in perception questions, the nature of the survey as a self-driven approach might attract participants with high levels of interest in EFC. However, when participants were asked if they have a clear definition of EFC, 43.8% and 16.6% answered toward the unclear or unsure side of the scale, respectively, even though a large number of participants (77.9%) claimed that they were interested in EFC. Even though many of them answered that they are clear about the definition, their perceived definition might be incorrect or outdated.

The participants' perceived specific definition of EFC, sources of identification, and restricting factors were obtained through multiple choice questions (Table 3).

Table 3. Frequencies for Selected Items from Perception and Practice Survey of EFC

		<i>n</i> ^a	% of Cases
When I think of environmentally friendly	Materials from plant sources	70	57.9
	Biodegradable materials	103	85.1
	Material grown organically	92	76.0
	Less toxic chemicals and additives	92	76.0
	Less toxic energy and water in production	77	63.6
	Less energy and water in maintenance	72	59.5
	Recycling potential	94	77.7
	Other options	11	9.1
How do you know a garment or item is	Marketing claim	50	41.3
	Brand name	38	31.4
	Labeling in the garment	108	89.3
	Store/Retailer	35	28.9
	Media and/or news articles	38	31.4
	Other ^b	11	9.1
Which factors generally restrict you	Design	40	33.1
	Price	80	66.1
	Trends	22	18.2
	Color	14	11.6
	Availability	79	65.3
	None of the above	13	10.7

^aPercentage of cases reported is based on the 121 respondents who answered this question set.

^bThe majority of those who selected *Other* described independent research as the way to find out if a garment is environmentally friendly.

For the question, *When I think of EFC*, the largest number (85.1%) of participants selected 'biodegradable materials.' 'Recycling potential' (77.7%), 'material grown organically' (76.0%), and 'less toxic chemicals and additives' (76.0%) had the next highest scores. 'Less toxic energy and water in production' and 'Less energy and water in maintenance' received lower scores as EFC reflects the lower rate of consideration of production aspects of EFC, which is consistent with results from the EAK scale. There was a wide range of responses from the participants who selected others: purchasing second-hand clothing, less packing, fair trade clothing, clothing made of recycled materials, and use of hemp and animal sources.

In order to recognize the clothing product as EFC, labeling the garment (89.3%) scored the highest followed by marketing claim (41.3%). Higher percentages of responses for labeling and marketing claims as a media to recognize EFC indicated that the majority of participants rely on

what was listed on the garment or what they heard from the manufacturer or retailer about the garment, and it shows the importance of labeling and marketing claims. Issues, policies, and procedures for labeling and marketing claims were not covered in the scope of this study.

Regarding restricting factors that affected participant purchase, the top two factors included price (66.1%) and availability (65.3%). Availability as one of the restrictive factors might be due to the location of the small college town where the survey took place. A large group of participants (33.1%) felt that a garment's design would restrict them from purchasing EFC, yet 37.7% of participants felt that EFC was fashionable, and 54.1% had a neutral stance, which showed a less negative perception compared to the previous literature that stated, "Being fashionable and being environmentally concerned appear to be in direct conflict..." (Solomon & Rabolt, 2004, p. 482). As environmentally friendly garments become more desirable, this statement is becoming an antiquated perspective. Today, multiple mainstream fashion designers and companies are presenting green fashion, and it might have influenced participant responses.

Participants were able to select multiple items for the questions above. It was also determined that 32% ($n = 39$) of participants would be willing to pay 6-10% above the price they would typically pay in order to purchase EFC, which is closely followed by those willing to pay 1-5% more ($n = 38$; 31.1%). It is promising that 70% of total participants still want to pay additional costs for EFC even though they identify price as one of the top restriction factors.

Conclusions, Implications, and Limitations

Overall, the participants presented relatively high levels of environmental orientation and knowledge. There were no significant differences found in the NEP ratings by college major, but there were significant differences in the EAK ratings among certain majors.

Environmentally-Related majors presented higher in the EAK ratings than other major groups such as *Natural Science/Medical* and *Technology/Communication*, especially. In the analysis of the descriptive statistics, the majors with higher NEP scores did not consistently show higher scores on the EAK, which presents the need for reinforcing actual knowledge. The positive, but weak, relationship between the NEP and EAK scores also supports these findings. It was noticeable that fashion-related majors and business majors, which can be highly related to the fashion industry, presented slightly below-average means in both the NEP and EAK ratings even though there were no significant differences. Interestingly, the number of previously taken sustainability-related courses did not determine the level of environmental knowledge or orientation in this study. These findings may indicate that students are involved in their own research outside of the coursework offered on these topics; this reinforces the importance of these resources and supports the previous literature (Mobley et al., 2009). Furthermore, it can be also interpreted that the sustainability courses offered at the university during the study might not explicitly focus on the specific content contained in the EAK scale, which focuses on aspects of

apparel production. The lower scores for production-related items in the EAK ratings and perception questions demonstrate the need for emphasis on the production side. A low percentage of having a clear definition towards EFC (39.67%) from participants shows the need for education, not only through the university curriculum, but through other resources as well.

These results demonstrate the value of informational sources besides formal educational coursework and emphasize the need for reinforcement of the impact of apparel products on the environment in classes. This includes relevant fashion courses, as well as campus-wide classes, since it directly impacts the environment, and apparel takes up a large portion of human life.

This study found that gender did not relate to the level of environmental concern or knowledge of the environmental issues within the apparel industry. This furthers the inconclusiveness of the effect of gender on environmental attitudes as found in previous studies. Instead, it was found that age did relate to both environmental orientation and knowledge in additional analysis. These findings continue to support previous research indicating that age is a contributing factor, weak but significant, in determining environmental orientation and environmental apparel knowledge (Dunlap et al., 2000). Since the concept of sustainability is evolving, validating and updating the EAK scale to reflect the current and proper body of knowledge would be critical. For the instructors, continuous education, such as seminars, will be crucial to update and reflect its' concepts and contents into class materials. Stronger emphasis for the inclusion of updated textile/fashion-related sustainability content, especially production-related matter, in the classroom for apparel-related majors, are suggested, since they play an important role in the field and could therefore make a knowledgeable decision.

There are several valuable implications from a managerial perspective based on the perception and practice survey. Since the majority of customers are relying on the label, it will be critical to develop a reliable EFC label with standard symbols and effectively present it to customers. Marketing claims with educational messages for labels would be beneficial to appeal to customers. A clear definition of EFC is necessary, as well as appropriate labeling policies and marketing claims within the textile and apparel industry, so consumers can become more informed about purchase choices. The definition of what constitutes items as environmentally-friendly should be clarified and shared among industry practitioners to label EFC in order to establish continuity and easy recognition for customers. The EFC design often has been recognized as a downside by previous researchers, but this perception seems to be improved. In terms of price, it is recommended to have not only more expensive items but also moderately-priced items to promote the purchase of EFC over other conventional items. It will be critical to explore ways to decrease production costs and still maintain the sustainable value of EFC. Even though many students are interested in EFC, the distribution channel might have been one of the restrictive factors for these participants who reside in a location without many brick and mortar retail choices. Online retailers would contribute greatly to the accessibility for these customers.

Successful advertising to promote those retailers will be critical to reach customers effectively. The sample for this study was limited to college students attending a university in the Midwestern United States. In addition, those who volunteered to participate in the survey may have had a predisposed interest in this sustainability topic. Other limitations included the way the majors were grouped. The criterion for grouping majors was somewhat vague and subjective due to the overlaps in curriculum. The large number of differing majors made grouping majors challenging, causing some of the groups to be relatively small in size.

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