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Consumer Knowledge of the Environmental Impacts of Textile and Apparel Production, Concern for the Environment, and Environmentally Friendly Consumption Behavior

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ABSTRACT

Many textile and apparel manufacturers are attempting to address consumer demand for environmentally friendly products. However, few empirical studies exist to help researchers understand the relationships between the antecedents to consumers' eco-friendly consumption behavior in the context of textiles and apparel. Only two studies directly explore the linkages between consumers' knowledge of the environmental impacts of production, concern for the environment, and environmentally friendly consumption behavior within the context of textiles and apparel (Butler and Francis, 1997; Kim and Damhorst, 1998). Moreover, these and other studies from the broader literature on sustainability report conflicting results in terms the influence of knowledge and concern on actual consumption behavior (e.g., Hines et al., 1987; Schahn and Holzer, 1990; Vining and Ebreo, 1990; Chan, 1999; Takacs-Santa, 2007). The current research uses structural equation modeling (SEM) among a sample of consumers (N= 429) to examine the relationships between knowledge, concern, and consumption behavior for environmentally friendly textile and apparel products. Rival models are compared to clarify the relationships between the focal constructs, with findings suggesting that knowledge of the environmental impacts of textile and apparel production leads to concern for the environment, which in turn leads to environmentally friendly consumption behavior.

Keywords: Textiles and apparel, Sustainability, Green marketing, Environmentally-friendly, Eco-friendly

Introduction

As consumer demand for eco-friendly products continues to explode (Cone, 2008), apparel and textile manufacturers and retailers are attempting to satisfy this need through eco-friendly textile and apparel products that help combat the effects of man's growing carbon footprint, including eco-friendly fibers and fabrics, natural dyes, and non-toxic finish processes. Studies in the literature indicate a growing concern for the environment among consumers, which appears to translate into a demand for

environmentally friendly products (Williams, 2008; Carey, 2009). However, it is unclear whether stated concern for the environment translates directly into actual purchase behavior of eco-friendly products among consumers. For example, a recent study found that although consumers say the environment is very important to them, they are not acting in an environmentally responsible manner with regard to water usage and electricity consumption (IBM, 2009). Therefore, it appears that concern for the environment, alone, may not be enough to motivate consumers to seek out environmentally friendly products. Further, the role of knowledge of the environmental impacts of production is not well understood.

The overall objective of the present study was to examine the relationships between consumers' knowledge of the environmental impacts of textile and apparel production, concern for the environment, and environmentally friendly consumption behavior. Based on the increasing consumer demand for eco-friendly products, manufacturers and retailers must begin to better understand the antecedents to environmentally friendly consumption behavior. It is hoped that the results of this study will clarify the roles of knowledge and concern by examining their impact on consumption behavior.

Model, Literature Review, and Hypotheses

The proposed model focuses on the effects of consumer's knowledge of the environmental impacts of textile and apparel production and environmental concern on consumption behavior for environmentally friendly products (Figure 1).

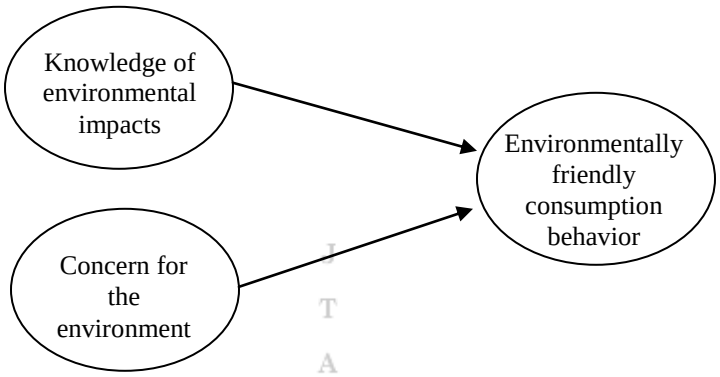

Figure 1. Proposed Model

Knowledge of the Environmental Impacts of Production

Knowledge is a characteristic that can have a powerful influence on almost every aspect of consumer behavior (Blackwell *et al.,* 2006). Environmental knowledge has been defined by Arcury and Johnson (1987) as "factual information that individuals have about the environment, the ecology of the planet, and the influence of human actions on the environment/ecology" (p. 32). 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). These authors also propose that 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.

In general, the consumer behavior literature has long upheld the notion that a positive relationship exists between knowledge and behavior (Hock and Deighton, 1989; Park *et al.,* 1994).

However, there are mixed results when looking at *environmental* knowledge being a precursor to *environmental* behavior. Several studies report that an increase in environmental knowledge has been a precursor to increased environmentally friendly behavior (Hines *et al.*, 1986/1987; Vining and Ebreo, 1990; Chan, 1999). In a meta-analysis of 128 studies, Hines *et al.* (1987) found only a moderate (.30) but significant correlation between knowledge and behavior. In contrast, other studies report no significance to the relationship between environmental knowledge and behavior (Arbuthnot and Lingg, 1975; Geller, 1981; Schahn and Holzer, 1990). In the context of textiles and apparel, Kim and Damhorst (1998) found that general environmental knowledge and general environmental behavior was not predictive of respondents' environmental apparel consumption behavior. In addition, environmental apparel consumption knowledge does not appear to lead to environmentally responsible apparel consumption behavior.

Therefore, the following hypothesis is offered:

H1. *Knowledge of the environmental impact of textile and apparel production will positively influence environmentally friendly consumption behavior.*

Environmental Attitude and Concern

Benton (1994) has termed the existence of ecological affect as ecological concern which "represents an individual's degree of emotional attachment to ecological issues" (Chan, 2001, p. 391). There has been evidence shown that a positive relationship exists between ecological concern and behavior (Dispoto, 1977; Maloney and Ward, 1973; Takacs-Santa, 2007). Gill *et al.* (1986) found that general environmental concern translated positively into recycling behavior. Minton and Rose (1997) also concluded that overall, possessing an environmental disposition, affected the intention to act in four pro-environmentally behaviors including recycling, purchasing environmentally-safe goods, searching for environmental-related information, and buying recycled goods, although they also found that consumers possessing a personal moral obligation were more likely to perform environmentally-friendly behaviors than merely having a concern for the environment itself. Takacs-Santa (2007) found that having a high level of environmental concern is "likely to be an important prerequisite of long-lasting pro-environmental behavior" (p. 26).

However, it is not clear whether consumers' attitude or concern for the environment will always turn into positive environmental change (Troy, 2007). Shapiro & Associates, at a Scholarly Publishing and Academic Resources Coalition seminar, shared that their research of 800 consumers found that "being 'green' is more of an aspiration than a reality at this point" (p.24) and that although there appears to be concern by consumers to care about the environment, this has yet to translate into any substantial behavior especially when it comes to the products they shop for and which retailers they choose. This seems to mirror the findings of the 2009 IBM study of UK's Millennial cohort group — that consumers may express concern for the environment, but they are not following through in their behavior.

Ajzen and Fishbein's (1980) theory of planned behavior is just one of many theoretical models of attitude-behavior models that hypothesizes that behavior is influenced through the intermediary of attitudes. The majority of research has found that ecological affect (in this case, concern) does, indeed, influence ecological behavior (Dispoto, 1977; Li, 1997; Maloney and Ward, 1973; Takacs-Santa, 2007). Only two previous studies were found that directly explored the link between environmental attitudes and apparel consumption behavior. Butler and Francis (1997) found that general environmental attitudes influenced apparel environmental attitudes, which influenced purchasing behavior of apparel products. In contrast, Kim and Damhorst (1998) found that although respondents had a moderately strong level of general environmental concern, this did not translate into

environmentally responsible apparel consumption.

Therefore, the following hypothesis is offered:

H2. *Concern for the environment will positively influence environmentally friendly consumption behavior.*

Methodology

The goal of this study was examine the effects of consumers' knowledge of the environmental impacts of textile and apparel production and concern for the environment on environmentally friendly consumption behavior. Three objectives guided the sample selection. First, it was important to examine the relationships between the focal constructs among a group of consumers who regularly shop for and purchase textile and apparel products. Second, when theory testing, research has shown that having a relatively homogeneous group of consumers helps to control error and diminish the inflationary effects of situational variables (e.g., income, age) on error within the measurement model (Assael and Keon, 1982; Goldsmith, 2002; Malhotra and King, 2003). Therefore, by using a homogeneous sample, a lesser degree of external validity is sacrificed for a greater degree of internal validity. Third, in order to examine the effect of knowledge of the environmental impacts of textile and apparel production, the sample must possess knowledge of textile and apparel production processes and their effect on the environment.

Given the objectives guiding the sample selection, data were collected via a self-administered survey among college students (N = 429) enrolled in textile and apparel programs within every region of the United States. Participation in the survey was completely voluntary. Not only is this sample purposive in terms of the goals of this research, but the literature indicates that college students exhibit intense demand for eco-friendly products (Lamstein, 1999; Phillips, 1999; Cone, 2006). Their generational cohort, Gen Y, is estimated to include nearly 80 million and has become known as one of the most informed age groups in terms of environmental issues (IBM, 2009). This generation is the first composed of true Earth-Day (started in 1970) children, those who learned about being eco-friendly beginning in pre-kindergarten and kindergarten (Phillips, 1999). Some of these children are now entering adulthood, and they are taking their environmental values with them into the consumer marketplace. With a spending power of roughly $172 billion, Generation Y has enormous influence and buying power behind them (Wells, 2008).

The age of respondents ranged from 18-26 years with a mean of 20.33 years. Most respondents were female (95%). Three-fourths of respondents were juniors or seniors, and the majority of respondents (79%) were enrolled in apparel design, product development, or apparel merchandising programs. Twenty-five percent of respondents were enrolled at universities in the Northeast, 22% in the Southeast, 35% in the Midwest and 18% in the West.

The scales used in the study were drawn from the sustainability literature. Knowledge of the environmental impacts of textile and apparel production was measured using the Kim and Damhorst (1998) scale. Concern for the environment was measured using the New Environmental Paradigm (NEP) Scale by Van Liere and Dunlap (1978). Consumption behavior for sustainable textile and apparel products was measured using the Kim and Damhorst (1998) scale. All of the measurement scales used five-point agree-disagree statements anchored by 'strongly disagree' and 'strongly agree'.

ANALYSIS AND RESULTS

Anderson and Gerbing's (1988) two-step approach was followed using the AMOS software to evaluate the measurement model prior to testing the full structural equation model. The resulting measurement model showed acceptable fit ($\chi^2_{(111)}$ of 171.586; GFI = .956; AGFI = .939; NFI = .923; CFI = .971; RMSEA = .036). Cronbach's alpha ranged from .71 to

.83 for the measurement scales. Composite reliabilities for the measures ranged from .70 to .81 and all but one of the constructs had a variance extracted estimate greater than .50, demonstrating reliability based on accepted standards (Anderson and Gerbing, 1988; Fornell and Larcker, 1981). The environmental concern construct demonstrated a variance extracted estimate of .48, slightly below the .50 criteria. All items loaded highly on their respective construct (>.51) and the variance extracted estimates exceeded the square of the phi estimates for all constructs, providing evidence of convergent and discriminant validity (Anderson and Gerbing, 1988; Fornell and Larcker, 1981). Correlations between the constructs ranged from .19 to .51.

The proposed structural model showed acceptable, but not particularly close fit ($\chi^2_{(112)}$ of 235.708; GFI = .941; AGFI = .919; NFI = .895; CFI = .941; RMSEA = .051, *p.*=.437). The first hypothesis (H1), which predicted that knowledge of the environmental impacts of textile and apparel production positively influences environmentally friendly consumption behavior was not supported (*p.*=.619). Hypothesis two, which posited that concern for the environment positively influences environmentally friendly consumption behavior was supported (γ = .556; *t* = 4.939, *p* <.001).

Given the moderate overall fit of the model, the modification indices were examined. The residual error terms for the knowledge and concern constructs produced a modification index of 58.074, indicating empirical support for a relationship between the two constructs. When examining relationships not hypothesized in the a priori theoretical model, the researcher must consider both empirical and theoretical evidence for such relationships. Due to the previously discussed conflicting findings reported in the literature with regard to the effects of knowledge and concern on consumption behavior, the researchers decided to explore the role of environmental concern as a mediator between knowledge of the environmental impacts of textile and apparel production and environmentally friendly consumption behavior (Figure 2).

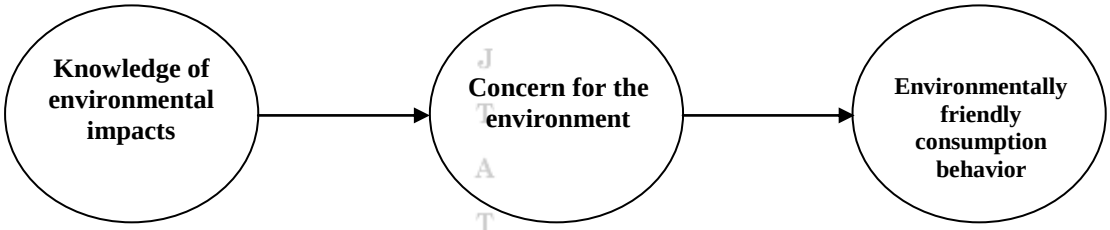

Figure 2. Rival Model

A nested modeling technique was used to compare the fit of the a priori and rival models simultaneously. The rival model showed much closer fit as compared to the a priori model ($\chi^2_{(112)}$ of 171.922; GFI = .956; AGFI = .939; NFI = .923; CFI = .972; RMSEA = .035, *p.*=.993) (Table 1). Therefore, our results suggest that knowledge of the environmental impacts of textile and apparel production lead to concern for the environment which, in turn, leads to environmentally friendly consumption behavior.

	A priori model	Rival model
χ^2	235.708	171.922
χ^2/df	2.105	1.535
GFI	.941	.956
AGFI	.919	.939
NFI	.895	.923
CFI	.941	.972
RMSEA *(p-value)*	.051 (*p.*=.437)	.035 (*p.*=.993)

Table 1. Comparison of Model Fit

Conclusions and Discussion

Although there is wide acceptance of the assertion that an increase in knowledge will influence attitude, an important precursor to influencing behavior, previous research has been mixed on whether, and to what extent, environmental knowledge will affect environmentally friendly consumption behavior on the part of consumers. In probably the most comprehensive study examining this question, Hines *et al.* (1987) found that knowledge has a moderate impact on environmental behavior. This finding was supported in later research by Chan, (1990), Hines *et al.* (1986/1987), and Vining and Ebreo, (1990), who all report that environmental knowledge influences environmentally friendly consumption behavior.

The first hypothesis, that knowledge of the environmental impacts of textile and apparel production would positively influence environmentally friendly consumption behavior, was not supported. Therefore, it appears that knowledge alone does not translate into behavior. Although this is in opposition to what is found in the majority of the consumer behavior literature (Hock and Deighton, 1989; Park *et al.*, 1994), it agrees with other studies including those in the context of textile and apparel products (Arbuthnot and Lingg, 1975; Geller, 1981; Schahn and Holzer, 1990; Kim and Damhorst, 1998). The second hypothesis, that concern for the environment would positively influence environmentally friendly consumption behavior, was supported. Our findings agree with those found in the broader literature on sustainability (Dispoto, 1977; Maloney and Ward, 1973; Takacs-Santa, 2007) as well as those found in the literature specific to textiles and apparel (Butler and Francis, 1997; Kim and Damhorst, 1998).

The nested modeling technique allowed for simultaneous testing of the a priori and rival models. Comparison of the fit indices for the models indicates support for the rival model. The rival model suggests that while knowledge of the environmental impacts of textile and apparel production does not directly impact environmentally friendly consumption behavior, knowledge does influence environmental concern. Therefore, concern for the environment serves as a mediator between knowledge and behavior.

From an academic perspective, this study has provided valuable evidence toward clarification of the relationships between two of the central antecedents of environmentally friendly consumption behavior within the context of textiles and apparel. Specifically, our results suggest that providing consumers with knowledge of the environmental impacts of textile and apparel consumption can influence their concern for the environment, and potentially, their consumption behavior. If greater numbers of mainstream consumers were aware of the harm that is done to the environment by production processes, perhaps they would be more concerned about the environment and in turn, would be more likely to seek out eco-friendly textile and apparel products. Although educating consumers is the socially responsible path of action for manufacturers, it can also be a double-edged sword. Will the goodwill associated with educating consumers drive them toward the eco-friendly products being offered, or will it open Pandora's box and cause grief for

manufacturers in the end? Manufacturers who are not technologically prepared with state-of-the-art, eco-friendly processes ready to be instituted may be fearful of educating consumers about current production practices and the associated environmental impacts.

Further, there are still lingering questions with regard to the issue of eco-friendly behavior among consumers. First and foremost, what causes the disconnect between concern and behavior? As is the case with all studies attempting to link behavior to attitudes, our findings must be interpreted cautiously. It is well-known that consumers will often answer attitudinal questions in a manner in which they think they "should" in order to be correct. It is reasonable that this phenomenon may also carry over when consumers answer behavioral questions. As it is currently "politically correct" to show support for sustainability in a wide variety of behaviors (recycling, purchasing "green" products, etc.), consumers answering questions about selecting environmentally friendly textile and apparel products may feel social pressure to self-report that they plan to, or already do, behave in sustainable ways. Future studies could partially overcome this hurdle, at least in terms of the behavioral component, by monitoring actual consumption behavior.

Perhaps concern for the environment does not always translate into environmentally friendly consumption behavior because consumers "do not understand the impact of their efforts" (IBM, 2009, p 6), i.e., not knowing what, if, and how much, environmental actions such as recycling, and purchasing environmentally friendly products will actually support a social or environmental cause. This explanation is supported by Takacs-Santa (2007), who suggests that one barrier to environmental action and concern may be that consumers are not receiving information on environmental problems. Although this is interesting given the fact that environmental and sustainability messages appear to be all around us, it is nonetheless a call for the need for education on environmental issues. This assertion would also interestingly support findings from the present study, i.e. if knowledge does indeed influence concern, which then positively influences environmentally friendly consumption behavior, then continued and additional efforts at educating consumers would be worthwhile. In short, whether consumers don't have information or could use more information, education of consumers appears to be key.

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