This is an Accepted Manuscript of an article published by Taylor & Francis in Journal of Global Fashion Marketing *on 10 March 2016, available online:* http://dx.doi.org/10.1080/20932685.2015.1131433.

Predicting environmentally responsible apparel consumption behavior of future apparel industry professionals: The role of environmental apparel knowledge, environmentalism, and materialism

*Amrut Sadachar, Ph.D.
Assistant Professor, Department of Consumer and Design Sciences
308 Spidle Hall, Auburn University, Auburn, Alabama 36849
Phone: 334-844-4084
Email: amrutsadachar@gmail.com

Frayen Feng, MS
Hub Submission Manager at Pfizer, China
Email: frayen1986@163.com

Elena E. Karpova, Ph.D.
Associate Professor, Department of Apparel, Events, and Hospitality Management
1072 LeBaron Hall, Iowa State University, Ames, Iowa 50011
Phone: 515-294-1121
Email: karpova@iastate.edu

Srikant Manchiraju, Ph.D.
Assistant Professor, Department of Retail Merchandising and Product Development
332 Sandels Building, Florida State University, Tallahassee, Florida 32306
Phone: 850-644-3779
Email: msriks@gmail.com

* Corresponding author

Predicting environmentally responsible apparel consumption behavior of future apparel industry professionals: The role of environmental apparel knowledge, environmentalism, and materialism

Abstract

The present study explored several critical constructs related to environmentally responsible apparel consumption, which include environmentalism, materialism, and knowledge of environmental issues pertaining to apparel products. The research focused on apparel merchandising and design students (n = 233) as future industry professionals who will be soon driving industry decisions in apparel production and consumption. A proposed research model was subject to confirmatory factor analysis and structural equation modeling. The model explained 58% of the variance in environmentally responsible apparel consumption behavior. Environmental apparel knowledge positively influenced environmentalism, and, in turn, environmentalism had a significant positive influence on environmentally responsible apparel consumption behavior. On the contrary, environmental apparel knowledge did not significantly influence materialism, and, in turn, materialism was not related to environmentally responsible apparel consumption behavior. Practical implications and limitations of the present study are also discussed.

Keywords: sustainability; materialism; environmentalism; apparel consumption

Extended Abstract

Although there has been a surge in green consumption research in recent years, there is limited understanding about the factors influencing sustainable apparel consumption and researchers have maintained that studies are needed to further understand consumers' green consumption behavior (Manchiraju & Sadachar, 2014). Findings on relationships among major research constructs related to sustainable apparel consumption, such as apparel environmental knowledge, attitude, and purchasing behavior, have been inconclusive (Connell & Kozar, 2014). Several studies (e.g., Bamberg, 2003; Nordlund & Garvill, 2002) have reported that pro-environmental attitudes do not always translate into pro-environmental behavior. Kollmuss and Agyeman (2002) investigated this pro-environmental attitude-behavior gap and suggested a comprehensive model in which consumer values were included alongside attitude in predicting

pro-environmental behavior. The present study used Kollmuss and Agyeman's (2002) model as a conceptual framework and included materialistic value alongside environmental attitude to predict environmentally responsible apparel consumption behavior. Our research examined several critical constructs related to apparel consumption: materialism (value), knowledge of apparel environmental issues, and environmentalism (attitude). This research contributes to a better understanding the reasons why people might engage or not in sustainable apparel consumption behaviors.

Based on Kollmuss and Agyeman's (2002) conceptual framework and previous studies, a research model and four hypotheses were proposed: *H1*- Environmental apparel knowledge is positively related to environmentalism; *H2*- Environmental apparel knowledge is negatively related to materialism; *H3*- Environmentalism is positively related to environmentally responsible apparel consumption behavior; and *H4*- Materialism is negatively related to environmentally responsible apparel consumption behavior.

Research participants were a convenience sample of undergraduate students enrolled in an apparel program in a large Midwestern university in the United States. Data were collected through a paper-based survey, which consisted of 7-point Likert-type scales (*1 = Strongly Disagree, 7 = Strongly Agree*) measuring: environmentalism (Banerjee & McKeage, 1994), materialism (Richins & Dawson, 1992), environmental apparel knowledge (Kim & Damhorst, 1998), and environmentally responsible apparel consumption behavior (Kim & Damhorst, 1998). Demographic items were also included. SPSS 22.0 software was used to perform descriptive statistics, reliability analysis, and exploratory factor analysis (EFA). Advanced statistical package Mplus 6.0 was used to conduct confirmatory factor analysis (CFA) and

structural equation modeling (SEM) which allowed for testing of the hypothesized model.

A total of 236 responses were collected, and 233 (205 females) responses were deemed usable. The participants' ages ranged from 18 to 31, with the majority (96%) being below 22 years old. The average participant was 20 years old. EFA identified the factor structure for each construct in the study. Items exhibiting low factor loadings (< .40) were deleted. Additionally, items with high cross loadings (>.30) or low communalities were eliminated. All sub-constructs satisfied the requirement for reliability ($\alpha > .70$) except environmentally responsible apparel disposal behavior that consisted of 2 items ($\alpha = .33$). Therefore, this sub-construct was not considered for further analysis. The Cronabach's α for all other sub-constructs ranged from .71 to .89 satisfying the required internal consistency.

The proposed model was tested through confirmatory factor analysis (CFA) as a part of structural equation modeling (SEM) using a maximum-likelihood estimation procedure. The measurement model resulted in an acceptable model fit ($\chi^2 = 264.24$, $df = 121$, $p < .001$; CFI = .92; RMSEA = .07; SRMR = .08). Evidence from measurement model satisfied the condition for convergent and discriminant validity. A structural model was tested to examine the hypothesized relationships indicated by hypotheses *H1-H4*. The structural model showed acceptable fit based on the established fit indices ($\chi^2 = 271.17$, $df = 123$, $p < .001$; CFI = .91; RMSEA = .07; SRMR = .09). The causal model supported hypotheses *H1* and *H3*. Environmental apparel knowledge was positively related to the environmentalism ($\beta = .25$, $p = .002$), and environmentalism was positively related to the environmentally responsible apparel consumption behavior ($\beta = .76$, $p = .001$). There was no significant relationship between environmental apparel knowledge and materialism ($\beta = -.05$, $p = .444$) as well as

materialism and environmentally responsible apparel consumption behavior (β = -.03, p = .782). Although the path coefficients magnitudes were in the proposed direction, they failed to reach statistical significance. Thus, hypotheses *H2* and *H4* were not supported. Overall, the model explained 58% of the variance in the environmentally responsible apparel consumption behavior (R^2 = .58, p = .000).

The finding related to significant positive relationship between environmentalism and environmentally responsible behavior is consistent with previous research (e.g., Shim, 1995). Our results supported the previous research findings that environmental apparel knowledge has a positive influence on environmental concern (e.g., Arcury & Johnson, 1987; Kim & Damhorst, 1998). However, environmental apparel knowledge didn't have any association with materialism, which indicated that greater knowledge of environmental apparel issues won't effectively decrease people's desire for possessions. Materialism had no association with environmentally responsible apparel consumption behavior.

In this study, we have empirically established not only the link between environmental knowledge and environmental concern but extended this link to environmentally responsible apparel consumption behavior. In other words, the study empirically confirmed the theoretical link between knowledge and attitude as well as between attitude and behavior. This result corroborates that knowledge affects attitude, which, in turn, drives the behavior. This is a significant contribution to the theoretical underpinnings of consumer behavior in general and environmentally responsible apparel consumption behavior in particular. The findings of our study point to the central role of education in promoting environmentally responsible behavior. The more knowledgeable consumers are about environmental issues, the more environmental

concern they will have, which translates into environmentally responsible behavior. Further, the findings of this study might be useful to apparel marketers and advertisers, who might want to highlight eco-friendly features of the apparel products and/or packaging (e.g., recycled and organic) when promoting their products. Limitations of this study include- participants from one Midwestern University in the US, and majority of the sample consisted of female participants. Consequently, the research findings might not be generalizable to broader population.

1. Introduction

In the 21st century, the changing dynamics of the apparel markets have led to an increase in the number of fashion seasons, lower product cost, and flexibility in delivery time (Johansson, 2010). These trends were termed as fast fashion characterized by a shortened fashion cycle and more frequent purchases and disposal of apparel items (Cachon & Swinney, 2011). Greater per capita apparel consumption and generation of waste (Schor, 2005) have contributed to a growing negative impact of the industry on the environment (Connell, 2010). Americans spent $354 billion on new clothes and shoes in 2012 (Michael, 2014), which is roughly one-quarter of the world's total apparel and footwear consumption. Per capita apparel and footwear consumption in the U.S. market is the highest in the world: 62 garments and 7 pairs of shoes in the course of a year. Close to 80% of all garbage generated in the country is buried in landfills, and textile and apparel constitute about 24 billion pounds a year (Stiska, 2010).

Environmental sustainability requires efforts from both apparel firms to produce green products and consumers to modify their clothing consumption behavior to be more sustainable (Connell & Kozar, 2014). Green Gauge report found that out of 2,000 Americans surveyed, 87%

were concerned about the environment (Connell, 2010). Green consumption has been gaining popularity in recent years (Hustvedt & Dickson, 2009; Yoo, Divita, & Kim, 2013). In the 2009 National Green Buying Research survey, four out of every five people were willing to buy green products throughout the recession (Vermillion & Peart, 2010).

Several academic studies have been conducted in the context of green apparel consumption such as bamboo textile and apparel purchase intentions (Yoo et al., 2013), consumers' purchase intention and willingness to pay for organic cotton products (Hustvedt & Dickson, 2009; Maloney, Lee, Jackson, & Miller-Spillman, 2014), and analyzing the drivers of green product adoption (Cheung, Lam, & Lau, 2015). Although there has been a surge in "green consumption" research, there is a limited understanding about factors influencing sustainable apparel consumption (Lee & Park, 2013; Manchiraju & Sadachar, 2014). Furthermore, findings on relationships among apparel environmental knowledge, attitude, and purchasing behavior are inconclusive (Connell & Kozar, 2014). A seminal study by Kim and Damhorst (1998) reported that environmental concern and knowledge did not clearly relate to environmentally responsible apparel consumption. Several other studies (e.g., Bamberg, 2003; Lee & Jackson, 2010; Nordlund & Garvill, 2002) have found that pro-environmental attitudes do not always translate into pro-environmental behavior. This pro-environmental attitude-behavior gap and barriers to pro-environmental behavior were investigated by Kollmuss and Agyeman (2002). Predicting pro-environmental behavior is so complex, that even the most influential models such as linear models (i.e., knowledge leading to attitude leading to behavior), prosocial behavior models, and sociological models were not fully successful to give an explanation for the gap between the possession of environmental knowledge, environmental awareness, and

displaying pro-environmental behavior (Kollmuss & Agyeman, 2002). To address this issue, Kollmuss and Agyeman's (2002) suggested a comprehensive model in which values were included alongside the attitude in predicting pro-environmental behavior. The present study used Kollmuss and Agyeman's (2002) model as a framework and included materialistic value as an additional variable. Materialistic value, the importance an individual attaches to worldly possessions (Belk, 1984), poses a hindrance to sustainable consumption (Jackson, 2005). Thus, with the goal of finding possible answer to the attitude-behavior gap, materialistic value was investigated in the present study.

Our study examined several critical constructs related to apparel consumption: materialism (value), knowledge of apparel environmental issues, and environmentalism (attitude). This research contributes to a better understanding the reasons why people might engage or not in sustainable behaviors. More specifically, the present study focused on current apparel consumption practices among future apparel industry professionals in the US. It is important to understand environmental attitudes and behaviors of college students majoring in apparel because in the next decades they will not only be active consumers but also will define sustainable practices of the global apparel industry.

2. Literature review and hypotheses

2.1. Environmental apparel knowledge and environmentalism

Environmental knowledge refers to "factual information that individuals have about the environment, the ecology of the planet, and the influence of human actions on the environment" (Arcury & Johnson, 1987, p. 32). Knowledge is a precondition for an individual's behavior (Bamberg & Moser, 2007). Increased knowledge about the environment leads to a greater

environmental concern (Bamberg & Moser, 2007). Furthermore, the assumption is that there is a close relationship between environmental knowledge, environmental attitude, or environmentalism (Arcury, 1990), and pro-environmental behavior (Kollmuss & Agyeman, 2002). This assumption is in accordance with the norm-activation model (NAM, Schwartz, 1977) and self-interest based models (Ajzen, 1991; see also Park & Sohn, 2012). According to Ajzen (1991), beliefs/knowledge and attitude in a particular domain predicts an individual's behavior in the domain in question. Ellen, Wiener, and Cobb-Walgren (1991) found that individuals with greater environmental knowledge had greater environmental concern and deeper belief that their effort may contribute to solving environmental problems. In a meta-analytic study, Bamberg and Moser (2007) found that knowledge was an important antecedent to pro-environmental attitude and behavioral intention. Based on the theoretical link between the knowledge/beliefs and attitude, the following hypothesis was proposed:

H1: Environmental apparel knowledge is positively related to environmentalism.

2.2. Environmental apparel knowledge and materialism

Materialism is a consumer economic value emphasizing the type and quantity of goods consumed (Richins & Dawson, 1992). An individual with materialistic values places a high importance on worldly goods (Belk, 1984). Richins and Dawson's (1992) conceptualization of materialism as a personal value has been widely accepted (Manchiraju, 2013). Banerjee and McKeage (1994) argue that materialists do not hold environmental protection as a core value. This sentiment was echoed by various scholars (e.g., Jackson, 2005; Kilbourne & Pickett, 2008). Furthermore, materialism is a pervasive value in the American culture (Wachtel, 1983), which is a value much older than environmentalism (Kilbourne & Pickett, 2008). Thus, it has

been maintained that individual's cognitive structures are more integrated with materialism value than environmentalism value, such that higher materialistic value is negatively correlated with one's environmental beliefs/knowledge. Kilbourne and Pickett (2008) demonstrated that individual's level of materialism is negatively related to environmental concerns and knowledge. Based on (1) Kollmuss and Agyeman's (2002) comprehensive model linking knowledge, attitudes, and value and (2) extant research, the following hypothesis was proposed:

H2: Environmental apparel knowledge is negatively related to materialism.

2.3. Environmentalism and environmentally responsible apparel consumption behavior

Environmentalism is a broad philosophy and social movement regarding concerns for environmental conservation and improvement of the state of the environment (Lincoln, 2009).[1] Concern for the environment has been conceptualized as an attitude (Gray, Borden, & Weigel, 1985). The environmentalism scale used in this study was developed by Banerjee and McKeage (1994), which is a combination and refinement of scales used in extant research (e.g., Dunlap & Van Leire, 1978; Weigel & Weigel, 1978). Banerjee and McKeage's (1994) thorough conceptualization of environmentalism includes a global level of concern and involves components such as : (1) beliefs about the relationship between humans and nature (Dunlap & Van Leire, 1984), (2) beliefs about the importance of the environment to the self, (3) beliefs that current environmental conditions are serious problems facing the world (Murch, 1974), and (4) beliefs that some radical changes in current lifestyles and economic systems may be required to prevent environmental damage (Catton & Dunlap, 1980).

[1] In this paper, environmentally responsible apparel consumption and green consumption are used interchangeably.

Belief/knowledge is a necessary prerequisite to form an attitude, which, in turn is known to drive behavioral intention and behavior, according to the NAM (Schwartz, 1977) and the theory of planned behavior (Ajzen, 1991). Multiple studies have corroborated that attitude is a good predictor of behavior (Armitage & Conner, 2001). For example, purchase behavior of products made of recycled material was predicted through favorability of environmental attitudes (Minton & Rose, 1995). Fraj and Martinez (2007) found that consumers who are concerned about environmental issues are prone to act in an environmental friendly manner. Similarly, consumers' environmentally friendly buying behavior was predicted through environmental concern and past environmentally friendly behavior (Khare, 2015). Based on the theoretical propositions and empirical research, the following hypothesis was proposed:

H3: Environmentalism is positively related to environmentally responsible apparel consumption behavior.

2.4. Materialism and environmentally responsible apparel consumption behavior

Researchers have suggested the negative implications of individual's materialism on the environment (Ghadrian, 2010; Manchiraju, 2013). Porritt (1984) maintained that materialistic lifestyle is among the root causes of the environmental decline. In a meta-analytic study, Hurst, Dittmar, Boand, & Kasser (2013) found that materialism was negatively related to pro-environmental attitude and behavior. Based on Kollmuss and Agyeman's (2002) comprehensive model linking values and pro-environmental behavior, as well as extant research, the following hypothesis was proposed:

H4: Materialism is negatively related to environmentally responsible apparel consumption behavior.

Based on Kollmuss and Agyeman's (2002) comprehensive model linking knowledge, attitudes, and values with pro-environmental behavior, we proposed a conceptual model to examine the relationships between: (a) environmental knowledge specific to apparel production, consumption, and disposal; (b) environmentalism; (c) materialism; and (d) environmentally responsible apparel consumption behavior (see Figure 1).

3. Research method

3.1. Sample and procedure

Research participants were a convenience sample of undergraduate students enrolled in an apparel program in a large land-grant Midwestern university. The study was approved by the university's Human Subject Review board. Data were collected through a paper-based survey that was administered during class periods. Students in several upper-level large-size lecture courses were invited to complete the survey for a small extra credit toward the grade. The survey consisted of 7-point Likert-type scales measuring: environmentalism (Banerjee & McKeage, 1994), materialism (Richins & Dawson, 1992), environmental apparel knowledge (Kim & Damhorst, 1998), and environmentally responsible apparel consumption behavior (Kim & Damhorst, 1998). All scales used 7-point Likert type scales (*1 = Strongly Disagree, 7 = Strongly Agree*). Demographic items were also included.

Environmentalism was measured by 19 items (7 internal environmentalism, 6 substantive environmentalism, and 6 external environmentalism) developed by Banerjee and McKeage (1994). Materialism was measured using 18 items (6 happiness, 5 acquisition centrality, and 6 possession-related success) developed by Richins and Dawson (1992). Environmental apparel knowledge was measured by 10 items (Kim & Damhorst, 1998). The scale explored respondents' knowledge of the impact of apparel products on the environment. Items were

composed of knowledge about processing of fibers, recyclability of fibers, contribution of textile product to waste disposal, and by-products from cleaning agents (Kim & Damhorst, 1998). Environmentally responsible apparel consumption behavior was measured by 13 items (8 items on purchase behavior, Kim & Damhorst (1998) (e.g., "I buy apparel made from recycled material") and 2 items related to apparel purchase frequency (e.g., "I buy new apparel styles every season to keep up with current fashion trends"), 2 items related to apparel disposal behavior (e.g., "When I no longer like apparel, I just throw it away"), and 1 item related to apparel price (i.e., "Apparel price is more important to me than its environmental characteristics").

3.2. Data analysis

A variety of statistical techniques were employed in the analyses of the survey data. First, descriptive statistics were performed on participants' demographic characteristics. Second, exploratory factor analysis (EFA) using SPSS 22.0 software was conducted with items for each construct to identify the factor structures. Third, the internal scale reliability of items comprising each factor was calculated using Cronbach's α coefficient. Fourth, the measurement model (confirmatory factor analysis (CFA)) and the structural equation model (SEM) were tested using the advanced statistical package MPlus 6.0. The structural model allowed for testing of the proposed hypothesized model represented in Figure 1.

4. Results

4.1. Preliminary analysis

A total of 236 responses were collected, and 233 (205 females) responses were deemed usable. The participants' ages ranged from 18 to 31, with majority (96%) were below 22 years of age.

The average participant was 20 years old.

EFA confirmed three subscales for the three research variables: materialism, environmentalism, and environmentally responsible apparel consumption behavior (Figure 1). Using EFA, items exhibiting low factor loadings (< .40) were deleted. Additionally, items with high cross loadings (>.30) or low communalities were eliminated (Hair, Anderson, Tatham, & Black, 1998). This process resulted in deleting three items from the environmental apparel knowledge scale, one item from the acquisition centrality (materialism subscale), three items from the type of apparel purchased subscale which included one item related to apparel price.

After the EFA, reliability of each sub-construct was assessed using Cronbach's α coefficient for a minimum acceptable level of .70 (Hair et al., 1998). All sub-constructs satisfied this requirement except environmentally responsible apparel disposal behavior that consisted of 2 items (α = .33). Therefore, this sub-construct was not considered for further analysis. Cronbach's α for other sub-constructs were as follows: types of apparel purchased (environmentally responsible apparel purchase behavior) .83, apparel purchase frequency .71, internal environmentalism .89, substantive environmentalism .86, external environmentalism .78, materialism success .77, materialism acquisition centrality .73, materialism happiness .78, and environmental apparel knowledge .84.

4.2. Measurement model

With the intention of testing the hypothesized relationships (*H1-H4*) among the four variables of the study and to simplify the structural paths, higher order construct represented by their sub-constructs were used in the model testing. As environmentalism, materialism, environmentally responsible apparel consumption behavior are multidimensional constructs,

measurement model included these constructs as second order constructs, whereas environmental apparel knowledge was included as first order construct. To maintain consistency in the level of abstraction across all constructs (Bagozzi & Heartherton, 1994), such partial aggregation measurement model is preferred in the case of multidimensional constructs (Ahuvia & Wong, 2002).

The proposed model (Figure 1) was tested through confirmatory factor analysis (CFA) as a part of structural equation modeling (SEM) using a maximum-likelihood estimation procedure. The present study used item parceling technique. In the parceling process, parcels are formed by averaging the scores of two or more items and using these parcels to represent the item scores (Bandalos, 2002). Because fewer parameters are estimated using parceling, parameter estimates become more stable (Bagozzi & Heatherton, 1994) and produce better model fit (Thompson & Melancon, 1996). The measurement model with parceled items resulted in an acceptable model fit ($\chi^2 = 264.24$, $df = 121$, $p < .001$; CFI = .92; RMSEA = .07; SRMR = .08). Overall coefficient α for environmental apparel knowledge, environmentalism, materialism, and environmentally responsible apparel consumption behavior constructs were .84, .90, .86, and .75 respectively, indicating satisfactory reliability. Convergent validity for each construct was determined through the fact that all factor loadings were significant (*t*-values ranged from 5.94 to 22.04, $p < .001$) and average variance extracted (AVE) for each construct was higher than or equal to .50 (ranged from .50 to .75) (Hair et al., 1998). Based on the comparison of AVE with the squared correlations between constructs (Fornell & Larcker, 1981), it was found that for each pair of construct, the squared correlations between the two constructs were less than the AVE for each construct. Based on this result, measurement model

satisfied the condition for discriminant validity.

Insert Figure 1 here

4.3. Structural model: hypotheses testing results

A structural model using item parceling technique was tested to examine the hypothesized relationships indicated by *H1-H4*. Figure 1 indicates the estimated path coefficients and their significance levels in the structural model. The structural model showed acceptable fit based on the established fit indices ($\chi^2 = 271.17$, $df = 123$, $p < .001$; CFI = .91; RMSEA = .07; SRMR = .09). The causal model supported hypotheses *H1* and *H3*. Environmental apparel knowledge was positively related to the environmentalism ($\beta = .25$, $p = .002$), and environmentalism was positively related to the environmentally responsible apparel consumption behavior ($\beta = .76$, $p = .001$). There was no significant relationship between environmental apparel knowledge and materialism ($\beta = -.05$, $p = .444$) and materialism and environmentally responsible apparel consumption behavior ($\beta = -.03$, $p = .782$). Although the path coefficients magnitudes were in the proposed direction, they failed to reach statistical significance. Thus, hypotheses *H2* and *H4* were not supported. The model explained 58% of the variance in the environmentally responsible apparel consumption behavior ($R^2 = .58$, $p = .000$).

5. Discussion & conclusions

In this study, we examined how environmentalism and materialism influenced environmentally responsible apparel consumption behavior of college students majoring in apparel merchandising and design. The influence of environmental apparel knowledge on both environmentalism and materialism was also tested. The results indicated that environmental apparel knowledge had a significant positive influence on environmentalism, which in turn,

had a significant positive influence on environmentally responsible apparel consumption behavior. On the contrary, environmental apparel knowledge did not influence materialism, which was not related to environmentally responsible apparel consumption behavior.

The findings are consistent with previous research (e.g., Arcury, 1990; Shim, 1995). For example, Shim (1995) found a positive relationship between environmental attitude and environmentally-oriented clothing disposal. At the same time, our findings contradicted the conclusions by Kim and Damhorst (1998), who reported insignificant relationship between environmental concerns and environmentally responsible apparel consumption behavior. This contradictory result might be due to: (1) the difference in the student sample composition and (2), the greater emphasis on environmental issues over the last two decades.

Our results also supported the previous research findings that environmental apparel knowledge has a positive influence on environmental concern (e.g., Arcury & Johnson, 1987; Kim & Damhorst, 1998). However, environmental apparel knowledge didn't have any association with materialism, which indicated that greater knowledge of environmental apparel issues won't effectively decrease people's desire for possessions. Materialism had no association with environmentally responsible apparel consumption behavior. It is possible that materialists, who rely on impression management using possessions, are likely to follow the current "green" trend.

6. Implications, limitations, & future research

In the study, we have empirically established not only the link between environmental knowledge and environmental concern but extended this link to environmentally responsible apparel consumption behavior. In other words, the study empirically confirmed the theoretical

link between knowledge and attitude as well as between attitude and behavior. This result corroborates that knowledge affects attitude, which, in turn, drives the behavior. This is a significant contribution to the theoretical underpinnings of consumer behavior in general and environmentally responsible apparel consumption behavior in particular.

The findings of our study point to the central role of education in promoting environmentally responsible behavior. The more knowledgeable consumers are about environmental issues, the more environmental concern they will have, which translates into environmentally responsible behavior. This result is critical not only for educators and non-profit organizations but also for apparel companies that want to promote environmentally responsible apparel products, services, and practices.

The participants in our study were students majoring in apparel and therefore represent future professionals, who will define the industry's sustainable initiatives and practices in the next several decades. To date, to our knowledge, no study has focused on environmentally responsible apparel consumption using this specific sample. Therefore, the present study contributes to our understanding of future apparel industry professionals' environmental apparel knowledge, environmentalism, materialism, and environmentally responsible apparel consumption behavior relationships.

The present study has several limitations. First, the participants were recruited from one Midwestern University. Second, the majority of the sample consisted of female participants, which is typical for students majoring in apparel and the industry gender distribution (Karpova, Garrin, & Lee, 2015). Consequently, the research findings might not be generalizable to broader population. Future studies can investigate apparel major students in other universities

or countries and/or majors. More diverse sample can be recruited. Employing qualitative and mixed methods to explore the issue of apparel green consumption behavior might be useful for understanding deep rooted motivations for the related attitudes and behaviors.

References

Ahuvia, A. C., & Wong, N. Y. (2002). Personality and values based materialism: Their relationships and origins. *Journal of Consumer Psychology, 12*(4), 389-402.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Arcury, T. A. (1990). Environmental attitude and environmental knowledge. *Human Organization, 49(*4), 300-304.

Arcury, T. A., & Johnson, T. P. (1987). Public environmental knowledge: A statewide survey. *Journal of Environmental Education, 18*(4), 31-37.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behavior: A meta-analytic review. *British Journal of Social Psychology, 40*, 471-499.

Bagozzi, R. P., & Heatherton, T. F. (1994). A general approach for representing multifaceted personality constructs: application to self-esteem. *Structural Equation Modeling, 1*(1), 35-67.

Bamberg, S. (2003). How does environmental concerns influence specific environmentally friendly behavior? A new answer to an old question. *Journal of Environmental Psychology*, 23, 21-32.

Bamberg, S., & Moser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour.

Journal of Environmental Psychology, *27*, 14-25.

Bandalos, D. L. (2002). The effects of item parceling on goodness of fit and parameter estimate bias in structural equation modeling. *Structural Equation Modeling, 9*(1), 78-102.

Banerjee, B., & McKeage, K. (1994). How green is my value: Exploring the relationship between environmentalism and materialism. *Advances in Consumer Research, 21*,147-147.

Belk, R. W. (1984). Three scales to measure constructs related to materialism: Reliability, validity, and relationships to measures of happiness. *Advances in Consumer Research, 11*(1), 291-297.

Cachon, G. P., & Swinney, R. (2011). The value of fast fashion: Quick response, enhanced design, and strategic consumer behavior. *Management Science*, *57*(4), 778-795.

Catton, W. R., & Dunlap, R. E. (1980). A new ecological paradigm for post-exuberant society. *American Behavioral Scientist, 24*(1), 15-48.

Cheung, R., Lam, A., & Lau, M. (2015). Drivers of green product adoption: The role of green perceived value, green trust, and perceived quality. *Journal of Global Scholars of Marketing Science, 25*(3), 232-245.

Connell, K. Y. H. (2010). Internal and external barriers to eco-conscious apparel acquisition. *International Journal of Consumer Studies*, *34*(3), 279-286.

Connell, K. Y. H., & Kozar, J. M. (2014). Environmentally sustainable clothing consumption: Knowledge, attitudes, and behavior. *Textile Science and Clothing Technology*, 41-61.

Dunlap, R. E., & Van Leire, K. D. (1978). The new environmental paradigm. *Journal of Environmental Education, 9*(4), 10-19.

Dunlap, R. E., & Van Leire, K. D. (1984). Commitment to the dominant social paradigm and concern for environmental quality. *Social Science Quarterly, 65*(4), 1013-1028.

Ellen, P. S., Wiener, J. L., & Cobb-Walgren, C. (1991). The role of perceived consumer effectiveness in motivating environmentally conscious behaviors. *Journal of Public Policy & Marketing, 10*(2), 1002-117.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18,* 39-50.

Fraz, E., & Martinez, E. (2007). Ecological consumer behavior: An empirical analysis. *International Journal of Consumer Studies, 31*, 26-33.

Ghadrian, A-M. (2010). *Materialism: Moral and social consequences*. Oxford, UK: Ronald.

Gray, D. B., Borden, R. J., & Weigel, R. H. (1985). *Ecological beliefs and behaviors: Assessment and change*. Westport, Conn: Greenwood Press.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis*. NJ: Prentice-Hall.

Hurst, M., Dittmar, H., Bond, R., & Kasser, T. (2013). The relationship between materialistic values and environmental attitudes and behaviors: A meta-analysis. *Journal of Environmental Psychology*, *36*, 257-269.

Hustvedt, G., & Dickson, M. A. (2009). Consumer likelihood of purchasing organic cotton apparel. *Journal of Fashion Marketing Management, 13*(1), 49-65.

Jackson, T. (2005). Live better by consuming less? Is there a double dividend in sustainable consumption? *Journal of Industrial Ecology, 9*(1/2), 19-36.

Johansson, E. (2010). *Slow fashion.* (Master's thesis). The Swedish School of Textiles.

Retrieved March 16, 2011 from http://bada.hb.se/bitstream/2320/6776/1/2010.9.15.pdf

Karpova, E., Garrin, A., & Lee, J. (2015). Being a minority: Experiences of male students in an apparel program. *Clothing and Textiles Research Journal*, *33*(4), 297-313.

Khare, A. (2015). Influence of green self-identity, past environmental behavior and income on Indian consumers' environmentally friendly behavior. *Journal of Global Scholars of Marketing Science, 25*(4), 379-395.

Kilbourne, W., & Pickett, G. (2008). How materialism affects environmental beliefs, concern, and environmentally responsible behavior. *Journal of Business Research*, *61*(9), 885-893.

Kim, H. S., & Damhorst, M. L. (1998). Environmental concern and apparel consumption. *Clothing and Textiles Research Journal, 16*(3), 126-133.

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research, 8*(3), 239-260.

Lee, M., & Jackson, V. P. (2010). Consumer awareness and evaluation of retailers' social responsibility: An exploratory approach into ethical purchase behavior from a U.S. perspective. *Journal of Global Scholars of Marketing Science, 20*(1), 49-58.

Lee, H., & Park, S. (2013). Environmental orientation in going green: A qualitative approach to consumer psychology and sociocultural factors of green consumption. *Journal of Global Scholars of Marketing Science, 23*(3), 245-262.

Lincoln, C. (2009). Light, dark and bright green environmentalism. *Green Daily.* Retrieved

November 2, 2009 from http://www.greendaily.com/2009/04/23/light-dark-and-bright-green-environmentalism/.

Maloney, J., Lee, M., Jackson, V., & Miller-Spillman, K. A. (2014). Consumer willingness to purchase organic products: Application of the theory of planned behavior. *Journal of Global Fashion Marketing, 5*(4), 308-321.

Manchiraju, S. (2013). Materialism in consumer behavior and marketing: A review. *Management & Marketing, 8*(2), 329-352.

Manchiraju, S., & Sadachar, A. (2014). Personal values and ethical fashion consumption. *Journal of Fashion Marketing and Management, 18*(3), 357-374.

Michael, C. (2014). AAFA releases apparel stats 2013 and shoes stats 2013 reports. Retrieved April 29, 2015, from https://www.wewear.org/aafa-releases-apparelstats-2013-and-shoestats-2013-reports/

Minton, A. P., & Rose, R. L. (1997). The effects of environmental concern on environmentally friendly consumer behavior: An exploratory study. *Journal of Business Research, 40*, 37-48.

Murch, A. W. (1974). Who cares about the environment? The nature and origins of environmental concern. *Environmental Concern. New York: MSS Information Corporation*, 9-42.

Nordlund, A. M., & Garvill, J. (2002). Value structures behind pro-environmental behavior. *Environment and Behavior, 34*, 740-756.

Park, S., & Sohn, S. (2012). Exploring the normative influences of social norms on individual environmental behavior. *Journal of Global Scholars of Marketing Science, 22*(2), 183-

194.

Porritt, J. (1984). *Seeing green: The politics of ecology explained*. Oxford, UK: Basil Blackwell.

Richins, M. L., & Dawson, S. (1992). A consumer values orientation for materialism and its measurement: Scale development and validation. *Journal of Consumer Research, 19*, 303-316.

Schor, J. B. (2005). Prices and quantities: Unsustainable consumption and the global economy. *Ecological Economics*, *55*(3), 309-320.

Schwartz, S. H. (1977). Normative influence on altruism. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 10, pp. 221-279). New York, NY: Academic Press.

Shim, S. (1995). Environmentalism and consumers' clothing disposal patterns: An exploratory study. *Clothing and Textiles Research Journal, 13*(1), 38-48.

Stiska, A. (2010). A care tag for our planet: Levi's care tags promote donating to Goodwill. Retrieved May 2, 2015, from http://www.goodwill.org/press-releases/a-care-tag-for-our-planet-levis-care-tags-promote-donating-to-goodwill/

Thompson, B., & Melancon, J. G. (1996). *Using item 'testlet'/'parcels' in confirmatory factor analysis: An example using the PPSDQ-78*. Document No. ED 404-349, ERIC.

Vermillion, L. J., Peart, J. (2010). Green marketing: Making sense of the situation. Proceedings of *Academy of Marketing Studies, 15*(1), 68-72.

Wachtel, P. L. (1983). *The poverty of affluence: A psychological portrait of the American way of life.* New York: Free Press.

Weigel, R., & Weigel, J. (1978). Environmental concern the development of a measure.

Environment and Behavior, *10*(1), 3-15.

Yoo, J., Divita, L., & Kim, H. (2013). Environmental awareness on bamboo product purchase intentions: do consumption values impact green consumption? *International Journal of Fashion Design, Technology, and Education, 6*(1), 27-34.

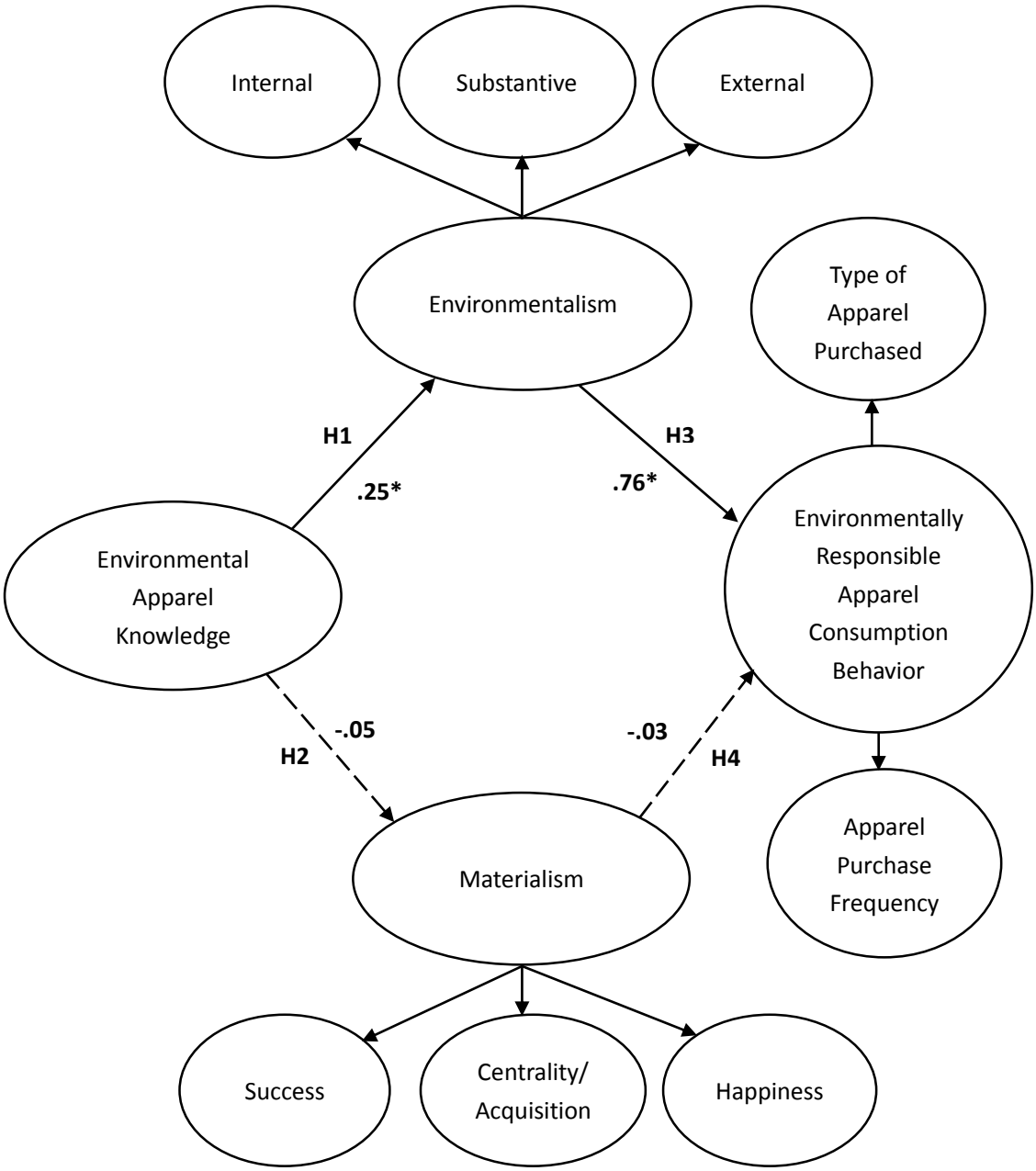

Figure 1. Research model: Structural modeling showing path coefficients.

Notes: Dotted lines indicate insignificant paths. *$p < .05$, $R^2 = .58$