

Environmentally Sustainable Clothing Consumption: Knowledge, Attitudes, and Behavior

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Abstract The purpose of this chapter is to overview the current body of knowledge related to environmentally sustainable clothing consumption. The chapter discusses consumers' knowledge of and attitudes towards environmental issues related to the production, consumption, and distribution of clothing. Additionally, the chapter examines current consumer engagement levels in environmentally sustainable clothing consumption and analyzes the relationships between knowledge, attitudes, and clothing consumer behavior. Finally, the chapter concludes with a consideration of consumers' perceived barriers to environmentally sustainable clothing consumption.

Keywords Environmentally sustainable clothing • Consumption • Attitudes • Knowledge

1 Introduction

As humans consume goods and services, we also contribute towards environmental change and degradation. Consumption not only depletes the Earth of both renewable and nonrenewable resources, but also creates unmanageable quantities of solid waste and emits dangerous substances into the air, water, and land. As stated by Winter [62], “Unsustainable human behaviors destroy water, land, forests and energy reserves throughout the world. Similar pictures of ecological decline could be drawn for air pollution, mineral depletion, and loss of biodiversity.”

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Our current patterns of consumption are unsustainable. The *Living Planet Report* [63] is a biannual ecological footprint assessment report of the area of biologically productive land required to meet human consumption demands. The 2012 report assessed humans to be overshooting Earth's biocapacity by approximately 50 %, providing evidence that humans are consuming beyond Earth's carrying capacity and are contributing towards environmental vulnerability. Therefore, consumption of both goods and services, including textiles and clothing, is an environmentally significant human behavior which needs to be addressed as an immediate environmental research priority.

The purpose of this chapter is to overview the current body of knowledge relating to environmentally sustainable clothing consumption. The chapter discusses consumers' knowledge of and attitudes towards environmental issues related to the production, consumption, and distribution of clothing products. Additionally, the chapter examines current consumer engagement levels in environmentally sustainable clothing consumption and analyzes the relationships between consumer knowledge, attitudes, and clothing consumption behavior. Finally, the chapter concludes by considering consumers' perceived barriers to environmentally sustainable clothing consumption.

2 Clothing Consumption and Environmental Change

Because consumption transforms both matter and energy, it is environmentally important. Environmental change associated with consumption of goods and services, including clothing and textiles, is the result of two primary factors. The first is the pollution and waste generated through consumption and the second the amount of natural resources expended through consumption.

Both the manufacturing processes involved in the production of goods and the actual consumption of goods generate pollutants. For example, the manufacturing requirements for a typical cotton T-shirt results in the production and release of harmful pollutants such as pesticides, heavy metals, and other harmful chemicals to air, water, and soil. While humans have devised numerous methods for capturing some of these pollutants, there is still a significant portion released into the natural environment. The discharge of harmful chemicals and other pollutants into the atmosphere, water systems, and soil subsequently alters biological, chemical, and physical processes. While Earth's natural systems are able to absorb pollutants and maintain equilibrium to a certain degree, human behavior releases pollutants into the natural environment at a rate and degree to which natural systems cannot always self-regulate effectively. Therefore, in many instances, the net result of the release of environmental pollutants and alterations to these systems is increased vulnerability of Earth's natural ecosystems [10].

Consumption also creates solid waste through waste raw materials, disposable packaging, and the actual discarded products. While approximately 35 % of all municipal solid waste is recycled or composted [23], the majority is either

incinerated or sent to landfills. On a yearly basis the United States creates approximately 7.6 billion tons of industrial waste and 250 million tons of municipal waste—which, after recycling approximately 1.53 pounds of waste per person, equals close to 4.4 pounds of waste per person per day [23]. The environmental concerns related to solid waste are multifaceted and include issues such as degradation of land, leaching of toxins into water systems, and release of methane gases and other emissions into soil and the atmosphere [10].

The second major way the consumption of goods contributes towards global environmental change is through the depletion of finite natural resources. Within mainstream modes of production and consumption it is difficult to produce and consume products without expending both renewable and nonrenewable resources. Production requires natural resources such as fossil fuels (coal, oil, and natural gas) as energy inputs for operating manufacturing processes and as raw materials for manufacturing the actual products (for example, a vast majority of plastic is synthetically derived from petrochemicals). Additionally, in most instances, the consumption of the products requires further inputs of natural resources. For example, washing and drying clothing requires inputs such as water, fuel, and chemical detergents. Unfortunately, the consumption of both nonrenewable and renewable resources significantly contributes to both localized and global environmental change [10].

It is evident that, because of the waste and pollution generated and the natural resources depleted, production and consumption of goods is a significant anthropogenic cause of environmental change. As stated in Stern et al. [57]:

Consumption consists of human and human induced transformations of materials and energy. Consumption is environmentally important to the extent that it makes materials or energy less available for future use, moves a biological system toward a different state, or through its effects of those systems, threatens human health, welfare, or other things people value.

Clothing consumption refers to an individual's clothing acquisition decisions and the use of clothing by the individual. It encompasses acquisition, storing, using, maintaining, and discarding of clothing products [61]. When considering consumer behavior that degrades the natural environment, it is common to focus on obvious culprits such as the dependence on products which consume petroleum or the high reliance on disposable, single use products. However, most individuals do not consider the associated environmental impacts of their clothing purchases and other consumption behavior. Throughout the product life cycle of clothing, practically everything from the manufacturing of fibers to the disposal of garments contributes towards the degradation of ecosystem health. Consequently, clothing consumption, in the aggregate, is a contributory cause of environmental change and the environmentally unsustainable consumption of textile and clothing products is an increasingly important phenomenon.

As long as the unsustainable consumption of clothing products persists, environmental degradation will continue as well. Environmental integrity and overall sustainability not only require efforts by textile and clothing firms to produce more

sustainable products, but also necessitate the modification of clothing consumption behavior of individuals so that they become more environmentally responsible and benign.

In a National Academies report, Brewer and Stern [7] identified attaining an improved and more thorough understanding of environmentally significant individual behavior to be one of the most important current research priorities:

Because the activities of individuals and households have major environmental consequences in the aggregate, considerable environment improvement can in principle result from change in their behavior. However, fundamental understanding is only beginning to develop regarding how various influences interact to shape and alter that behavior.

In order to expand the understanding of environmentally significant individual behavior, Brewer and Stern [7] encourage a focus on increasing fundamental knowledge of consumer choice and how factors such as information, incentives, and constraints combine and interact with personal values, attitudes, and beliefs to inform and shape the consumer decision-making process. This type of knowledge and understanding is essential for policy and other decision makers who are working to modify environmentally significant consumer behavior.

3 Variables Influencing Sustainable Clothing Consumption

Clothing consumer behavior is complicated; many different factors, both internal and external with respect to the consumer, influence this behavior. Key to understanding clothing consumer behavior and thus being capable of promoting behavioral modifications is a better understanding of how and why consumers engage in particular behavior. A variety of variables influence sustainable consumer behavior. Stern [56] categorizes these relevant variables into four major types: personal capabilities, attitudinal factors, contextual forces, and habit or routine. For example, because all individuals have different skill sets, knowledge, and capacities, personal capabilities are a major variable influencing consumer decisions and behavior. Another variable, attitudinal factors include an individual's values, beliefs, and attitudes. In the most recent research on consumers' environmentally sustainable clothing behavior, the emphasis has been on the knowledge and attitudinal variables in encouraging the consumption of environmentally sustainable clothing. Therefore, because of the scholarly emphasis on these variables, this chapter also focuses on the variables of knowledge and attitudes.

4 Knowledge and Environmentally Sustainable Consumer Behavior

Research investigating environmentally significant human behavior commonly considers the role played by personal capability variables, including knowledge of general and behavior-specific environmental issues [56]. Knowledge is a variable which can strongly influence many aspects of consumer behavior [51]. Environmental knowledge defined by Arcury and Johnson [2] is the “factual information that individuals have about the environment, the ecology of the planet, and the influence of human actions on the environment.” As evidenced in previous research, environmental knowledge is an important predictor of environmentally sustainable behavior [1, 30, 49, 50, 58].

A prevailing perception is that a lack of sufficient knowledge about environmental issues is one of the reasons why consumers make decisions leading to behavior which is not ecologically conscious. According to Thøgersen [59] there are a number of reasons why limited knowledge may act as a constraint. First, consumers may be unaware that particular behavior is even associated with negative environmental impacts. Second, while consumers might be aware of the environmental impact associated with different behavior, they may be uncertain of the exact nature of the impact and thereby not understand the nature of the necessary behavior change. Further, while some consumers may be aware that a particular behavior is negative for the environment, they may not know how to change their behavior in order to be more environmentally sustainable.

There is considerable evidence that ecologically conscious consumers have more knowledge about environmental issues when compared to other consumers. For example, Thøgersen [59] examined how a lack of environmental knowledge may prevent formation of environmental attitudes and engagement in environmentally preferable behavior. Thøgersen concluded that knowledge is one important reason why consumers make unsustainable choices and that the more knowledge a consumer has about an environmental issue, the more likely the individual is to engage in environmentally preferable behavior. A study by Antil [1] presented similar relationships, as did Henion [30], who concluded that, when consumers are informed about the environmental consequences of high phosphate content detergents, they are more likely to purchase environmentally safe detergents than consumers who are not provided with the information. In their study, Granzin and Olsen [28] found that knowledge about environmental protection was a significant predictor of environmental behavior such as walking for conservation purposes or recycling household waste.

Borden and Schettino [5] tested the relationships between environmental concern, environmental knowledge, and environmentally consequential behavior. According to the authors, a high level of concern about the environment does not consistently translate into a person actively seeking out information related to the environment. The study also indicated that the reverse is true; as individuals increase their knowledge about environmental issues, they do not necessarily show

increased concern for the environment. Additionally, in contrast to previously reviewed literature, the study found that increased knowledge about environmental conditions does not necessarily result in increased participation in proenvironmental behavior.

Stern [55] considered possible explanations as to why knowledge may not translate into behavior. He stated that providing consumers with information and increasing their understanding of the impact of environmentally significant behavior may sometimes encourage consumers to engage in behavior which is positive for the environment. However, the commitment to environmentally preferable behavior depends on the effectiveness of both the design and the delivery of relevant information to the consumer. Stern established that, when there are considerable external constraints on particular behavior, the relationship between knowledge and behavior is much less certain. For example, a consumer may know that buying organically-grown food is environmentally beneficial, and the individual may even know where to buy organic products, but the higher cost of the food acts as a constraint on behavior and, as a result, behavior modification does not occur.

4.1 Consumers' Knowledge of Environmental Issues Related to Clothing Consumption

In recent years, the extent of consumers' knowledge of environmental issues involved in the production, distribution, and consumption of clothing has been a focus of research. What the predominance of this research has demonstrated is that consumer knowledge about environmental issues resulting from the production, distribution, and consumption of clothing and textiles is low. For example, one of the first known studies to investigate environmentally sustainable clothing consumption found that awareness of the environmental consequences associated with clothing and textile products is less than with other products such as gasoline and soft drink bottles [54].

In more recent years, studies assessing consumers' knowledge of environmental issues associated with clothing and textiles have primarily utilized the Environmental Apparel Knowledge Scale [38]. The scale includes statements regarding chemical pollutants produced in the manufacture and processing of fibers, the recyclability and biodegradability of goods, and federally mandated standards for clean air and water imposed on manufacturing firms. Studies employing the Environmental Apparel Knowledge Scale consistently report low levels of knowledge among consumers [38, 41, 43].

Additional studies validate the notion that consumers are generally uninformed about the environmental consequences of the clothing industry. A qualitative research study with self-identified environmentally conscious consumers also supports indications that knowledge about environmental issues in the clothing and

textiles industry is low, even among individuals well informed about other environmental issues [11]. Finally, Hill and Lee [31] and Goworek et al. [27] also reported limited consumer understanding regarding how clothing production and consumption affect the environment.

As noted previously, the personal capability of knowledge of environmental issues in the clothing and textiles industry is theorized to be an important driver of consumer engagement in environmentally sustainable clothing consumption. Unfortunately, empirical research has also demonstrated that this knowledge is minimal among most consumers. As a result, it is plausible that knowledge is constraining environmentally sustainable behavior. For example, when consumers are unaware of the environmental effects associated with different fibers and are misinformed about fibers which are “good” or “bad” for the environment, they lack the information they need to compare the environmental footprints between different garments which impacts on their abilities to select those which are more environmentally preferable [11]. Therefore, initiatives to increase participation in environmentally sustainable clothing consumption may, at least in part, need to focus on consumer education.

5 Attitudes and Environmentally Sustainable Consumer Behavior

Attitudes, the positive or negative evaluations of the quality(ies) of a specific object or behavior [18, 45], are also significant drivers of human behavior. Two of the attitudes commonly included in studies on sustainable consumer behavior include perceived consumer effectiveness (PCE) and degree of environmental concern.

The degree to which consumers believe their behavior is effective at mitigating environmental impact and at affecting environmental problems, or their PCE, is one of the attitudinal factors differentiating between consumers' commitment to proenvironmental behavior [1, 39, 48, 60]. In a national survey of American adults, Roberts [48] found that PCE accounted for 33 % of the variation in sustainable consumer behavior. Earlier studies by Antil [1], Kinnear et al. [39], and Webster [60] produced similar results. Similarly, Balderjahn's [3] study determined that the more a consumer believes in the power of individual consumers to affect environmental issues, the more the consumer will engage in nonpolluting consumer behavior such as energy conservation and environmentally responsible purchasing and use of products. These research findings suggest that, when consumers are aware of environmental issues and believe that they, through their personal behavior, have the ability to contribute towards solving an environmental problem, they are much more likely to engage in environmentally positive behavior.

A consumer's level of environmental concern is also an important attitudinal variable which differentiates the extent of ecologically conscious behavior among consumers. The general conceptualization of environmental concern is the degree to which an individual is troubled about environmental vulnerability, the ecological repercussions of this vulnerability, and the inadequate nature of actions taken to ensure environmental protection [21]. Predictably, most studies find that consumers who are more likely to be concerned about environmental issues display higher levels of ecological consciousness within their consumer behavior [1, 4, 6, 25, 29, 46, 48, 52]. For example, in their study, Fraj and Martinez [25] found that consumers who are concerned about environmental issues such as pollution are "predisposed to act in an environmentally friendly manner." However, Schlegelmilch et al. [52] cautioned that the strength of the relationship between environmental concern and behavior depends on the actual behavior.

5.1 Consumer Attitudes and Sustainable Clothing Consumption

One of the first studies to examine environmental issues in relation to clothing consumption was Stephens [54]. By focusing on clothing acquisition and discard behavior, Stephens sought to understand the attitudes related to environmentally sustainable clothing consumption. The major finding of the study was that consumers with an attitude of concern about the natural environment associated clothing consumption with increased environmental vulnerability.

Generally speaking, people are concerned about the state of the natural environment and believe it should be protected. National surveys in the United States support this notion, with 69 % of individuals having either a great deal or a fair amount of concern about the quality of the environment and 49 % of the population believing that the quality of the environment is getting worse [26]. Research examining various aspects of sustainable clothing consumption also supports the notion that a majority of consumers are concerned about the state of the natural environment [9, 35, 38, 41, 43]. For example, participants in a study by Butler and Francis [9] not only indicated a general concern about the environment but also believed it is the responsibility of governments, industries, and individuals to engage in behavior which protects and improves the natural environment. Hustvedt and Dickson [36] found a majority of respondents perceived organic agriculture as positive for the environment, and 80 % of participants in a study by Kozar and Connell [41] asserted that humans are severely abusing the natural environment.

In terms of consumer attitudes towards environmentally sustainable clothing consumption, through a nationally administered survey of American adult female consumers, Butler and Francis [9] examined factors influencing the purchasing of clothing and the relationships between general environmental attitudes, clothing

related environmental attitudes, and environmentally sustainable clothing purchase behavior. Although consumers in the study held environmental attitudes which were at least somewhat proenvironment, they were more neutral in their attitudes about clothing and the environment. In another study, Hustvedt and Dickson [36] concluded that respondents seldom agreed they would buy organic clothing even if it was a burden—suggesting consumers are rather neutral in their attitudes towards sustainable clothing.

There is also evidence to suggest that consumers do not always hold very positive attitudes towards attributes and characteristics of environmentally sustainable clothing. For instance, as discussed in Connell [12], there is a perception among some consumers that environmentally sustainable clothing is less stylish compared to mainstream apparel. Further, many consumers perceive environmentally sustainable clothing as being very counter-culture in style, not well-fitting, and generally uncomfortable.

6 Consumers' Environmentally Sustainable Clothing-Consumption Behavior

Broadly speaking, behavior is concrete, intentional actions taken by individuals and groups often rooted in values and attitudes [45]. More specifically, consumer behavior is “the behavior that consumers display in searching for, purchasing, using, evaluating, and disposing of products and services which they expect to meet their needs” [51]. Environmentally sustainable clothing consumption includes clothing consumption behavior (acquisition, storing, using, maintaining, and discarding) which is environmentally preferable to mainstream clothing consumption behavior because the intent of engaging in the behavior is: (1) to create less pollution and waste and/or (2) to consume fewer natural resources [12].

The next section of the chapter discusses the current state of knowledge regarding consumer engagement in environmentally sustainable clothing consumption. Scholarship examining environmentally sustainable clothing consumption tends to focus on two aspects—acquisition and discarding behavior. Minimal research has investigated the other aspects of storing, use, and maintenance from a sustainability perspective.

6.1 Consumer Engagement in Environmentally Sustainable Clothing Acquisition Behavior

Environmentally sustainable clothing acquisition behavior includes acquiring clothing designed with environmentally preferable attributes, including garments made from environmentally preferable fibers (such as organically-grown cotton,

hemp, or recycled fibers) or clothing manufactured using environmentally preferable processes (such as closed loop manufacturing cycles or reduced utilization of toxic dyes and other harmful chemicals). Environmentally preferable clothing attributes may also relate to the design and construction of a garment. For example, clothing designed to be multifunctional, durable, and or classic in styling are all examples of environmentally preferable clothing attributes as they permit a consumer to reduce personal consumption and acquire fewer garments [12, 24].

Additionally, acquiring clothing through environmentally preferable sources such as second-hand sources, is another form of environmentally sustainable clothing acquisition. Second-hand sources include (but are not limited to) consignment or thrift stores, garage sales, family, or friends. Other environmentally sustainable sources for clothing acquisition include environmentally conscious companies and, in some instances, producers of homemade clothing [12].

Finally, limiting the quantity of clothing acquired is also a form of environmentally sustainable clothing acquisition. This might occur by purchasing clothing to meet needs and not wants, taking care of clothes so that they last longer, repairing or altering clothing, or reconstructing clothing to update the style of garments [12].

Some research indicates consumers are willing to pay more for environmentally sustainable clothing. For example, Ellis et al. [22] found consumers were willing to pay up to 25 % more for an organic cotton shirt compared to a shirt made from conventional cotton. Hustvedt and Bernard [34] also demonstrated consumers' willingness to pay premium prices for organic socks.

Yet, despite some participation in environmentally sustainable clothing consumption, overall consumer engagement in environmentally sustainable clothing acquisition behavior is low [9, 13, 14, 15, 27, 38, 43]. In one study, Butler and Francis [9] reported that 90 % of respondents never or only sometimes considered the environment when purchasing clothing. Among the participants in the Kozar and Connell [41] study, only 41 % of participants were willing to pay premium prices for eco-conscious garments and only one-third of the sample reported that a firm's environmental record influenced clothing-purchase decisions. Additionally, merely 12 % of participants in the Kozar and Connell study indicated that they had actively sought out or inquired about a firm's environmental policies or practices prior to making purchasing decisions. In another study, Connell and Kozar [14] reported approximately 70 % of participants had never considered the environmental impacts of garments when making clothing purchases and 50 % had never purchased clothing made from environmentally preferable fibers.

Despite the limited engagement among consumers in environmentally sustainable clothing consumption, there are select consumer segments engaged in sustainable clothing acquisition behavior. Hustvedt [33] examined environmental attitudes and clothing consumption behavior within the context of consumer preferences for cotton clothing in which a portion of organically-grown cotton fiber is blended with mainstream cotton fiber. Among her findings, Hustvedt determined that market segments using the attribute of organic content in their

clothing acquisition decisions do exist. The author concluded that, while some consumers desire and are willing to pay price premiums for 100 % organically-grown cotton clothing, another segment of consumers acquire clothing where the organically-grown cotton is blended with mainstream cotton—resulting in lower prices compared to 100 % organically-grown cotton clothing.

In a qualitative study utilizing eco-conscious research participants, Connell [12] determined a variety of environmentally sustainable clothing acquisition behavior, including establishing acquisitions limits, acquiring clothing with environmentally preferable attributes, and acquiring clothing through environmentally preferable sources. In setting limits for their clothing purchases, the participants in Connell's study consistently questioned personal needs and focused on purchasing clothing only when there was a genuine need and extending the technical and aesthetic lifetimes of garments already owned. The participants also focused on purchasing clothing made from environmentally preferable fibers, clothing classic in styling, and clothing produced in an environmentally preferable manner. Finally, the participants reported that, for environmental reasons, they purchased clothing from second-hand sources and companies with reputations of being environmentally responsible.

6.2 Consumer Engagement in Environmentally Sustainable Clothing Discard Behavior

In a 2014 report, the Council for Textile Recycling [16] indicated that approximately 15 % of post-consumer textile waste entering municipal solid waste streams is recovered by the textile recycling industry and reused or recycled. Within that 15 % of recycled post-consumer textile product waste, 35 % is resold as used clothing, 33 % is reprocessed into fibers, 25 % is used as rags or wipers, and 7 % is unusable and sent to landfill. Because of the low rate of post-consumer textile product recycling, the end-of-life fate for 85 % of clothing and textile products is a landfill. Annually, US consumers throw away 70 pounds of clothing and textile products [16]. Yet, through second-hand clothing stores and other avenues, it is possible to recycle clothing and keep it out of landfills. Consequently, the question remains as to why consumers are not engaging more consistently in sustainable behavior regarding the disposal of their garments.

Numerous studies have examined clothing discard behavior and consumers' levels of engagement in environmentally sustainable discard behavior. When consumers are done with a garment, Goworek et al. [27] and Daneshvary et al. [17] both found donating to charity shops, friends, and family a common practice for disposing of clothing. Koch and Domina [40] indicated, among their sample, passing clothing along to family and friends and utilizing the clothing for rags as the most common methods for clothing disposal. Donations to charitable organizations were another frequent action among the respondents.

However, despite some engagement in environmentally sustainable clothing disposition behavior, Goworek et al. [27] also found that, instead of donating or reusing items, consumers commonly threw away garments perceived to be inexpensive and poorly constructed. The authors determined that consumers commonly perceived low-priced garments as “throwaway clothes” and only occasionally repaired clothing for continued use. Furthermore, a study by Domina and Koch [19] indicated that, compared to younger adults, older adults were less likely to donate items to charities and were more likely to see clothing recycling as being time-consuming and, therefore, threw their used clothes away.

7 Relationships Between Consumers’ Knowledge, Attitudes, and Behavior

Findings on the relationships between knowledge of clothing-related environmental issues, attitudes, and behavior are inconclusive. Some researchers have suggested a positive relationship between these variables [32, 36, 43, 44, 53, 54], while other studies report that, despite maintaining attitudes of environmental concern or being knowledgeable about environmental issues related to clothing, consumers are limited in their engagement of environmentally sustainable clothing consumption [8, 9, 15, 38, 41]. In other words, even when consumers are knowledgeable about and concerned with environmental issues associated with clothing production, distribution, and consumption, a significant positive relationship between knowledge, attitudes, and environmentally sustainable clothing consumption does not always exist.

Some research asserts that those who understand how clothing consumption affects the environment try to decrease clothing waste through behavior such as purchasing second-hand clothing, recycling clothing, and purchasing classically styled garments [43, 54]. Additionally, there is evidence to support positive relationships between attitudes and behavior. For example, Hustvedt and Dickson [36] examined environmental attitudes and clothing consumption behavior within the context of consumer preferences for cotton clothing in which a portion of organically-grown cotton fiber is blended with mainstream cotton fiber. The authors concluded that, compared to consumers indifferent to organic cotton, market segments which use the organic content of clothing to inform their acquisition decisions are more aware of the environmental impacts of clothing products, are more supportive of organic agriculture, and have more positive attitudes towards purchasing organic cotton garments. Further, Lee [44] demonstrated that, when consumers are concerned about the state of the natural environment, they are more willing to pay for higher priced sustainable clothing.

Shim [53] and Koch and Domina [40] explored the relationship between attitudes and behavior within the context of clothing disposal. Shim examined the influence that consumers’ environmental attitudes and recycling behaviors have on

their patterns of clothing disposal. The clothing disposal patterns examined in the study were resale to a second-hand store, donation to a clothing charity, reuse, and discarding. Understanding the motivations underlying a consumer's disposal patterns was of particular interest in the study. A second objective was to determine how variables related to economics, the environment, convenience, or lack of awareness influenced disposal patterns. The study established that a consumer's environmental attitude had a positive impact on charity motivated donation, environmentally motivated donation, and environmentally motivated reuse. Additionally, environmental attitudes had a negative impact on convenience discarding and unawareness discarding. Shim's conclusion was that environmental attitudes are influential in clothing disposal patterns. Consumers with proenvironmental attitudes are likely to consider the environmental impacts when disposing of their garments and find ways to dispose of their clothing in such a way as to minimize environmental impact. A very similar finding by Koch and Domina lends support to this relationship.

However, there is also evidence to support the existence of a gap between consumer knowledge, attitudes, and behavior regarding sustainable clothing consumption. For instance, Butler and Francis [9] reported that, although consumers may hold environmentally conscious attitudes, most consumers never, or only sometimes, consider the environmental impacts of their clothing purchasing behaviors. Butler and Francis concluded that the existing discrepancy between consumers' attitudes and purchasing behavior may be because consumers make clothing-related purchasing decisions based on a variety of different factors (such as price, style, fit, and fashion) which outweigh any environmental considerations by the consumer.

Similar to Butler and Francis [9], Kim and Damhorst [38] focused on the relationships between environmental attitudes and clothing consumption behavior. However, this study also assessed the influence of environmental awareness and knowledge, a variable not factored into the Butler and Francis study. The authors accomplished this by investigating the level of knowledge consumers have about environmental issues related to textile and clothing production and the relationship between general environmental concern, knowledge of environmental issues related to clothing, general environmentally sustainable behavior, and environmentally sustainable clothing consumption. The environmentally sustainable clothing consumption behavior considered in the study included the acquisition of second-hand clothing, clothing which was environmentally preferable, and avoidance of certain garments for environmental reasons.

According to the conclusions of Kim and Damhorst [38], there was only a limited degree of environmentally sustainable clothing consumption among respondents. The study also found that the research participants were not highly involved in sustainable behavior in other areas of their lives and there were only low levels of knowledge about environmental issues in the textile and clothing industry. The only strong relationship between variables proved to be between the variables of general sustainability behavior and environmentally sustainable clothing consumption behavior. Therefore, the authors concluded that "many

intervening factors disrupt a clear and direct predispositional path between attitude and consumer behavior,” and “environmental concern and environmental knowledge are not strongly related to specific environmental behaviors for apparel consumption” [38].

Several studies have also demonstrated that, even when consumers are knowledgeable about how clothing production, distribution, and consumption impact the natural environment, engagement in environmentally sustainable clothing consumption habits is minimal [8, 15, 41, 44]. A study by Goworek et al. [27] demonstrated that even environmentally-knowledgeable consumers “bought low-priced clothing from ‘value retailers,’ despite being aware of the potential environmental impact of their actions and the fact that this clothing was unlikely to be durable.” In another study, changes in consumers’ knowledge of sustainability issues related to the clothing and textiles industry were assessed on two occasions—prior to and upon completion of a course that addressed topics specific to the global production and distribution of clothing and textiles. As part of their study, the authors also examined modifications in clothing purchasing behavior. The outcome of the study produced interesting results. Although consumers’ knowledge of clothing production environmental issues significantly increased after completing the course that addressed these topics, there was no significant change in clothing purchasing behavior. In fact, even those consumers displaying a higher knowledge of these issues did not report more engagement in sustainable clothing purchasing [15].

8 Consumers Perceived Barriers to Environmentally Sustainable Clothing Consumption

Given the inconsistency in findings regarding the relationships between the variables of knowledge, attitudes, and behavior, and the apparent overall gap between consumers’ knowledge of and concern with issues in the textiles and clothing industry and their actual purchasing decisions, scholars have sought to identify the personal and contextual barriers perceived by consumers in engaging in sustainable clothing purchasing [11, 32, 37].

8.1 Personal Barriers to Environmentally Sustainable Clothing Consumption

On a personal level, barriers to consumers’ environmentally sustainable clothing consumption behavior include a lack of knowledge about environmentally sustainable clothing, attitudes and beliefs about environmentally preferable clothing, clothing acquisition patterns and preferences, and personal resources and priorities [11].

A lack of knowledge about environmentally sustainable clothing consumption may act as a personal barrier in several ways. First, consumers have very limited awareness as to how clothing production affects the natural environment. This is a barrier because it limits understanding of how clothing consumption behavior affects the environment. Connell [11] explained how limited knowledge acts as a barrier to environmentally sustainable clothing consumption in terms of consumers' lack of knowledge about options for environmentally preferable clothing and sources for its acquisition. According to Connell, this limited knowledge means that consumers are unaware of the full range of environmentally preferable clothing and sources available to them, and therefore do not always consider the full range of available alternatives during consumption decisions.

Attitudes of consumers to attributes and relational characteristics of environmentally preferable clothing also act as personal barriers to ecological decision making. As discussed by Connell [11], consumers may not want to purchase environmentally preferable clothing because they do not like the style, fit, and/or tactile qualities. More specifically, consumers sometimes feel that environmentally preferable clothing is not stylish enough and often too counter-cultural. They also do not like the tendency of environmentally preferable clothing to be untailored and believe that some environmentally preferable fibers, such as hemp, are uncomfortable. Kang and Kim [37] also attributed consumers' hesitancy to purchase environmentally sustainable clothing to perceptions of the clothing not being fashionable enough to enhance personal image.

A final personal barrier to environmentally sustainable clothing consumption is a lack of economic resources [11, 13, 32, 37]. In their research, Hines and Swinker [32] investigated factors that influence consumers' willingness to purchase clothing containing recycled polyester fibers. The study used six identical sweatshirts with manipulated information on the garment tags. The researchers labeled three of the sweatshirts as containing 100 % polyester and the other three as containing 100 % recycled polyester. After pairing the sweatshirts into three sets, the researchers manipulated the price of the sweatshirts. The first set priced the recycled garment higher, the second set had the non-recycled garment priced higher, and in the third set both garments were the same price. So that the subjects would not determine the purpose of the study, the authors also included three additional product sets with different factors manipulated on the labels. The authors reported that 53 % of the subjects always selected the lower priced garment and only 27 % always picked the recycled fiber garment. However, when the price was constant between the two sweatshirts, 66 % of participants selected the recycled polyester sweatshirt. The results of this study suggest that consumers are willing to purchase clothing made from recycled fibers, but the higher prices of the products act as an external constraint on their behavior.

Kozar and Connell [42] explored the validity of perceived barriers among consumers in engaging in sustainable clothing purchasing behavior. This study discovered that consumers might be correct in their perceptions that clothing sold by sustainable retailers is more expensive than that sold by mainstream brands. However, findings indicated that a smaller discrepancy in the average price points

between better and sustainable retailers as compared to moderate and sustainable retailers existed. Price points also varied in product categories; smaller overall price differences for women's V-neck T-shirts existed as compared to women's boot-cut jeans.

8.2 Contextual Barriers to Environmentally Sustainable Clothing Consumption

The contextual barriers confronting consumers in their environmentally sustainable clothing consumption include limited availability of environmentally preferable clothing, inadequate information about environmentally sustainable clothing consumption, qualities of retail environments, the structure of the global clothing and textile complex, and societal norms [11].

In terms of contextual barriers, according to Connell [11], the limited availability of environmentally preferable clothing significantly constrains the environmentally sustainable consumption habits of consumers. More specifically, Connell highlighted how consumers find it difficult to locate sources for acquiring environmentally preferable clothing because only a minority of mainstream clothing retailers include sustainable goods in their merchandise assortment. Connell attributed the barrier of limited availability to the fact that it is difficult for consumers to locate environmentally preferable clothing which also has other desirable attributes and characteristics—such as being stylish, work-appropriate, and well-fitting. Consumers also perceive it difficult to acquire specific articles of clothing which are environmentally preferable, including footwear, formal wear, and men's pants [11, 13]. However, Kozar and Connell [42] asserted that consumers may be somewhat misguided in their perceptions that sustainable clothing retailers offer fewer product choices as compared to mainstream brands. As shown in their study, the product offerings for women's denim jeans and V-neck T-shirts were comparable among moderate, better, and sustainable retailers in terms of style, silhouette, and fabrication.

In addition to the limited availability of environmentally preferable clothing, the lack of information related to environmentally sustainable clothing acquisition is another contextual barrier to consumers' ecological decision making [11, 13]. Participants in the Connell [11] study lamented the insufficient and unreliable information about the environmental impacts of clothing production and environmentally preferable alternatives. Therefore, as consumers aim to make environmentally sustainable decisions related to their clothing consumption, they have inadequate information to guide that decision making.

For some consumers, a third contextual barrier to the consumption of environmentally sustainable clothing relates to the nature of clothing retail environments [12]. First, as highlighted in Connell [11], some consumers avoid purchasing second-hand clothing because of a perception that the merchandise in second-hand clothing stores is poorly organized. For these consumers, this poor

organization results in frustrating shopping experiences and, sometimes, avoidance of second-hand sources altogether. Second, Connell stated that the lack of knowledge of salespeople also occasionally acts as a contextual barrier to consumers' environmentally sustainable consumption, especially when the salespeople are unable to provide consumers with environment-related product information.

Another contextual barrier affecting consumers' environmentally sustainable clothing consumption behavior relates to societal norms [11]. Evidence suggests that consumers see societal norms surrounding appearance and dress expectations in their personal and professional lives as constraining their environmentally sustainable clothing consumption behavior—particularly because of the generally casual style of environmentally preferable clothing and the limited availability of business wear which is environmentally preferable [11].

In terms of contextual barriers to engaging in sustainable clothing disposal behavior, as suggested by Nordlund and Garvill [47], participation in sustainable consumer behavior is partially influenced by the convenience of the action. In other words, an important reason why consumers do not recycle household waste, including clothing, is because they consider the process inconvenient and time-consuming. In fact, research by Daneshvary et al. [17] and Domina and Koch [20] suggested that one of the most important contributors towards the low rate of post-consumer textile recycling is that clothing and textile recycling is not available as part of most kerbside recycling programs. These studies also conclude that the willingness to recycle more materials depends on the expansion of kerbside recycling programs to include items such as clothing.

9 Conclusions

Research has shown that a key factor in enhancing consumers' engagement in environmentally sustainable clothing consumption is the availability of education and knowledge development. In their work with students, educators can advocate and encourage students' knowledge about environmental issues in clothing and textile production, distribution, and consumption, and can help students overcome personal barriers to sustainable clothing consumption. Trade associations and industry firms can also foster sustainability education and enhance consumers' knowledge and abilities to identify, evaluate, and analyze the impact of their purchasing decisions, clothing consumption, and disposal practices.

Through various initiatives, consumers also need more information on the range of affordable possibilities for engaging in more environmentally preferable clothing practices, including limiting total consumption and purchasing better quality, classically-inspired apparel. Moreover, encouraging the purchase of second-hand goods can be worthwhile in advancing environmentally sustainable consumption. However, as noted previously, researchers have identified possible barriers which limit consumers in purchasing second-hand goods. Additional effort

should be made to overcome these barriers and identify methods of “best-practices” for second-hand retailers, including merchandising and personnel training.

Many researchers have noted that consumers may be limited in their environmentally responsible consumption behavior because of a lack of knowledge and information. Future research should explore the best marketing strategies and media outlets for informing consumers about environmental issues in association with the clothing and textiles supply chain and the differences in the operations and practices of sustainable vs mainstream firms. An important implication for clothing and textile companies operating with a greater commitment to environmental sustainability is the need to inform consumers more effectively about their brands and create additional visibility through targeted media campaigns. Continued research is also needed to explore reasons for the attitude–behavior gap existing among consumers, determining the most effective means for empowering consumers to practice more environmentally sustainable consumption habits. The power of social norms in modifying the behavior of certain market segments should also be a focus of additional research.

Future research should also explore further the extent to which consumers are knowledgeable about the use of organic materials in environmentally preferable clothing. Additional research should focus on identifying those market segments most likely to consider the organic content of their clothing when making clothing purchasing decisions. Previous researchers have determined that some consumers are motivated to purchase more environmentally preferable goods made of organic materials. However, limited information exists about the specific characteristics of these market segments. Further research in this area would not only assist in expanding the consumer groups motivated to buy more environmentally preferable goods, but also enables researchers and textile and clothing firms to understand better whether consumers might perceive price differences as less of a barrier if firms more effectively promoted the use of organic raw materials in environmentally preferable goods.

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