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Environmentally Responsible Apparel Consumption and Convertible Dresses

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Abstract

Among the many methods to make sustainable garments, convertible garments have the potential to change style and function that allow consumers to keep and use garments longer with the possibility of enhancing sustainability. This research analyzes consumer preferences in changeable design options for convertible dresses and the consumers' influence on environmentally responsible apparel consumption (ERC) behaviors on their preferences regarding changeable design options of dresses, which are popular items. An online survey collected data from a convenient sample of 321 female college students from four universities in the United States. Data were analyzed using IBM SPSS through descriptive analysis, cluster analysis, and independent samples *t*-test. There were significant differences between high and low ERC groups in design preferences that considered important aspects of purchasing, using convertible dresses, and purchase intentions. Detailed differences among sub-groups were analyzed. Designers are encouraged to make tying/folding/wrapping dresses with changes of size/fit, dress length, or color/pattern. The results are beneficial for apparel designers when developing convertible dresses with the guidance of consumers' design preferences and differences according to ERC levels.

***Key words*:** Convertible garment, Consumer, Dress, Design, Sustainability

I. Introduction

The World Commission on Environment and Development (1987) defined sustainability as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (p. 8). Since then, the meaning of sustainability has expanded to include the four dimensions of environment, economy, and society (Hethorn & Ulasewicz, 2015; Suk, 2015) and culture (Syn & Geum, 2014). Although there is increased awareness of the importance of sustainability in modern society, the fashion industry is often blamed for its high carbon footprint and for negatively impacting these four dimensions. Fast fashion has been a big trend for the past two decades, appealing to college students for its up-to-date styles at low prices (Siegel, 2019). However, fast fashion has been linked to lower cost production, with a small relationship to environmental friendly practices. Previous studies confirmed that little knowledge exists of the impact of fast fashion, consumption, and environmental impact (McNeill & Moore, 2015).

Consumers keep purchasing garments due to their changing needs and wants throughout their lives (Hethorn & Ulasewicz, 2015). However, people's over-

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flowing wardrobes could make them feel as though they have nothing to wear, as they confuse styles (Campbell, 2017). Being stylish is not related to the number of garments people own but rather to how people wear their limited number of garments in various ways (Campbell, 2017; Cao et al., 2014). It is important to minimize or prevent waste in the fashion industry due to the benefits of reducing costs and enhancing process efficiency (Jahan, 2017).

Thus, more fashion practitioners and scholars began to seek ways in which to enhance sustainability in fashion accordingly (Buzzo & Abreu, 2019; von Busch, 2018), and designers tried to create sustainable consumption models to minimize waste through their designs (Rahman & Gong, 2016; von Busch, 2018). Various methods exist for designing garments to be more sustainable: for example, upcycling and recycling (Bhatt et al., 2019), using eco-friendly materials (Rahman & Gong, 2016), and zero-waste patternmaking (Gam & Banning, 2018). These approaches can help to prevent the waste created in the garment production process (Bhatt et al., 2019; Hethorn & Ulasewicz, 2015; Rahman & Gong, 2016). Among the various ways of making sustainable garments, convertible garments are one of the design solutions for minimizing waste by decreasing consumption and enabling people to live sustainable lifestyles (Rahman & Gong, 2016; Zakharkevich et al., 2015).

Convertible garments are garments that can be worn in multiple ways, such as by changing the lengths, silhouettes, or details (Zakharkevich et al., 2015). If a garment can be worn in various ways, people tend to purchase fewer new garments and keep them longer (Cao et al., 2014). Convertible garments have the potential to be worn for longer periods, be frequently used, reduce waste, and ultimately enhance sustainability (Rahman & Gong, 2016; Zakharkevich et al., 2015). The convertible garments have also possibilities to satisfy consumers' various needs and wants through versatile looks and functions (Koo et al., 2014). These changes in design may also extend the boundaries of conventional fashion designs with versatility in aesthetics and functions (Quinn, 2002).

Although convertible garments offer many sustainability-related benefits, little research has been done on these garments. The previous research on convertible garments was mostly focused on fashion practices, such as developing convertible techniques, designs, and materials (Rahman & Gong, 2016; Wei, 2016; Zakharkevich et al., 2015). Martindale and Lee's (2019) research investigated observers' perceptions of people who wear convertible garments. However, there is a lack of understanding about which convertible garments people would want to wear. Among clothing items, a dress is one of the main items in females' wardrobes; but there is a lack of research on convertible dresses, which may feature versatile changeable design options. It would be meaningful to start investigating this topic with college students, who are one of the major consumer groups in the United States (U.S.)—the biggest fashion market worldwide (Deloitte, 2018; Statista, 2019).

Thus, the purpose of this research is twofold: 1) to investigate the preferred changeable design options for convertible dresses among female college students in the U.S., who are one of the major consumer groups in the U.S. —the biggest fashion market worldwide (Deloitte, 2018) —and 2) to examine how environmentally responsible apparel consumption behaviors influence these female college students' preferences for changeable design options, considering important aspects when purchasing and using convertible dresses as well as their purchase intention. The results of this research will benefit apparel designers, merchandisers, and retailers when developing and promoting convertible dresses by understanding U.S. female college students' sustainability-related behaviors and their influences on consumer preferences and purchase intentions.

II. Literature Review

1. Environmentally Responsible Apparel Consumption Behaviors

Clothing consumption is defined as an individual's activities related to the process of clothing acquisition,

inventory, usage, and maintaining, as well as discarding (Norum, 2018). Environmentally responsible clothing consumption behavior (ERC) indicates consumption of apparel products that addresses potential environmental concerns involved with using the product. Many consumers desire to protect the environment and attempt to do so through their choices of which products they purchase and how they dispose of the products (Kim & Damhorst, 1998). Fast fashion, very trend-driven clothing produced at a low cost, allows consumers to easily replace their unwanted clothing, thus leading to a larger discard rate (Norum, 2018).

According to Sadachar et al. (2016), there are many ways that consumers try to be environmentally responsible, such as recycling products and refraining from purchasing products sold by less environmentally friendly companies. Consumers as well as industries have increasing concerns about how consumption patterns would impact the environment (Norum, 2018). Norum (2018) acknowledged that consumers have begun to examine the environmental impact because they are recognizing the direct link between consumption patterns and the environment. When consumers have a positive view of environmental responsibility, their behaviors will correspond with the outlook (Cowan & Kinley, 2014).

Although consumers are being mindful, there has been a weak relationship between environmental attitudes and ERC. Kim and Damhorst's (1998) study suggested that apparel consumption was not strongly related to environmental concern and knowledge. Connell and Kozar (2012) also confirmed that increased environmental knowledge did not lead to the increased purchasing of sustainable apparel. Additionally, Kozar and Connell (2013) performed another study, suggesting that there is lower engagement in participating in the responsible purchasing of apparel.

However, other studies found that when youth are conscious of environmentally responsible behavior, they are likely to purchase sustainable clothing (Sadachar et al., 2016). Furthermore, Sadachar et al. (2016) suggested that companies should try to improve knowledge of environmental apparel and its advantages. Cowan and Kinley (2014) also suggested that consumers' purchase intention is related to the factors of environmental awareness, knowledge, and attitudes towards buying environmentally friendly apparel. Moreover, the level of consumers' concern for the environment was strongly related to their likelihood of purchasing environmentally friendly products (Cowan & Kinley, 2014).

Sproles' (1979) fashion adoption theory posits that consumers' fashion purchase behaviors and purchase intention are influenced by social and new fashion issues. According to this theory, the main variables of the fashion adoption process are a) pre-existing conditions, which include consumers' pre-knowledge and awareness of products; b) direct influences on consumer choice and use of fashion, such as identity, lifestyle, and social influences; and c) a central channel of consumer decision-making that influences decisions after the first and the second variables do (Gam, 2011; Sproles, 1979).

In this study, the fashion adoption theory guided the research questions about fashion behaviors and purchase intention for new convertible clothing products. In Gam's (2011) research, fashion adoption theory was applied to investigate the relationships among consumers' fashion and shopping orientations and consumer purchase intention for environmentally friendly clothing. Consumers who were more concerned about the environment preferred to purchase more environmentally friendly clothing (Gam, 2011).

Joshi and Rahman (2015) reviewed extant empirical studies of green purchase behaviors and found two main factors influencing such behaviors: the consumer's concern for social and environmental issues and the functioning of the product. However, people did not always purchase green products even if they had a high concern for the environment (Joshi & Rahman, 2015). Joshi and Rahman (2015) suggested that environmentally conscious consumers may be deterred from purchasing green products because many alternative products are available and green products may cost more. These findings are consistent with Gam's (2011) finding that consumers are reluctant to purchase ecofriendly clothing due to its higher price. Previous studies (Cowan &

Kinley, 2014; Gam, 2011) have acknowledged that more research is needed in order to determine how to promote the purchasing of sustainable apparel.

As previous studies have shown mixed results regarding the influence of ERC behaviors on consumers' apparel purchasing, it would be valuable to explore consumers' ERC behaviors and their attitudes towards sustainable garments focusing on convertible dresses. The dress is the one of the most common clothing items for female college students and a convertible design has potentials to encourage their sustainable fashion behaviors through its design versatility. This may help to find ways to prevent consumers from purchasing a number of similar dresses and downsize their wardrobe without limiting their needs and wants.

2. Clothing Selection Criteria and Design Elements

It is critical to understand what consumers consider when selecting clothing and what design options could be changeable in developing convertible dresses. Previous studies (Abraham, 1992; Bayraktar et al., 2015; Clouse, 2018; Eckman et al., 1990; Hopfer & Istook, 2016; Koo et al., 2014; Rahman, 2011; Schutz et al., 2005) found that women used the following criteria for evaluating clothing when purchasing in stores: a) intrinsic criteria, which included product design aspects such as color/pattern, size/fit, silhouette, length, fabric/texture, style, appearance; functional aspects such as ease of care, durability, ease of use/wearability, comfort, and ease of matching; and social aspects of modesty, and context-appropriateness; and b) extrinsic criteria related to the product that can be changed without influencing the clothing itself such as price and brand. According to the literature reviewed, the five design aspects chosen for the questionnaire included color/pattern, size/fit, silhouette, style/occasion, and design details. Design details were classified as constructive details, such as dress length, sleeve length, sleeve type, neckline type, and pocket type.

College students in the U.S. considered intrinsic attributes, such as color/pattern, styling, appearance, size/fit, and comfort, to be of higher importance than extrinsic attributes when purchasing apparel, and price was the most important among the extrinsic attributes (Hopfer & Istook, 2016). This is similar to the results of other studies indicating that intrinsic attributes influence consumers more than extrinsic attributes do (Clouse, 2018; DeLong et al., 2002; Rahman, 2011).

3. Types of Convertible Dresses and Changeable Design Options

Types of convertible dresses and their changeable design options were reviewed to understand what kinds of dresses and changeable techniques are applicable to such dresses. These types were guided by Koo et al.'s (2014) research and included in the questionnaire to understand preferred types of convertible dresses. In this study, the reversible design and the tying/folding design were divided, and the wrapping design was added because many cases were found in which the three design techniques were simultaneously applied.

1) Reversible Design

Reversible design is a commonly used technique for convertible garments, as reversible garments can be worn from either the inner, outer, front or back side. A reversible dress can be turned inside out to show different colors or patterns of fabrics. The front and back can also be worn with different necklines (Kilomet109, n.d.; Pipe and Row, n.d.). These reversible dresses are relatively simple to transform, as they do not require the use of additional usage instructions. Campbell (2019) stated that these reversible garments could be one way in which to buy less clothing.

2) Tying, Folding, and Wrapping Design

Dresses could be changed into various styles by tying, folding, and wrapping components of dresses. A popular option is scarves tied into different shapes, with larger scarves being tied into a halter, off-shoulder, or wrap dress. For instance, Valero (n.d.) is one of the representative designers who has continuously created various convertible dresses. She applied the technique

of tying/folding/wrapping to change lengths, colors, patterns, and neckline details. These garments can be worn with other items, such as tops. Wen Guo also applied similar techniques to create a "Boditecture" dress that can be unwrapped or untied to change the length, sleeve, or neckline design ("In the hotseat", 2014).

3) Modular Design

Modular clothing is made of small components that can be separated, connected, or layered to allow adaptability and versatility of garments (Bolton, 2002). Modular design can expand wardrobe options by maximizing the possibilities of each garment with various combinations (Quinn, 2002; Rahman & Gong, 2016). These modular designs can be divided into two types: 1) dresses made with components that can be detached or attached with fasteners such as buttons, hooks, and loops, and zippers (Fourtané, 2011); and 2) dresses made with small pieces like jigsaw puzzle pieces or Lego bricks to create fabrics or garments (Quinn, 2002). For example, Wei (2016) created a dress that can change lengths or convert to a top using cords that lace up through the eyelets. Meanwhile, Rahman and Gong (2016) created a modular dress using a hook and eye, as well as zippers; they found that zippers are more practical and secure when compared with hooks, loops, and buttons.

4) Smart Clothing

Smart clothing is a wearable technology that merged technologies with textiles for fashionable and functional purposes (Chen et al., 2016). Convertible smart dresses can change color/pattern, silhouette, size/fit using smart materials such as micro motors (Lee et al., 2016), shape memory alloy (SMA) (Mendoza, 2015), light-emitting diodes (LEDs) (Natividad, 2015), and e-ink (Macdonald, 2018). Designers of these types of garments need to consider how to make the garments easy to care for, durable, easy to use, and wearable for a long-term lifecycle (Dhukaram et al., 2011; Poh et al., 2010).

5) Do-It-Yourself (DIY) Design

DIY designs encourage versatility, inventiveness, personalization, and consumers' participation, which can lead to consumers' sustainable fashion behaviors (Fletcher, 2008). Consumers can personalize garments by making and customizing their own products, which can provide social distinctions (Ilmonen, 2004). Three-dimensional (3D) printing technologies can be used to easily change garment styles at home by printing details and components of garments, such as additional buttons, sequins, or collars (Baggaley, 2018).

4. Research Questions

Based on the literature review, the following research questions were generated:

RQ1. What changeable design options do female consumers prefer for convertible dresses?

RQ2. How do consumers' ERC behaviors influence their fashion behaviors, important aspects of purchasing and using garments, and purchase intentions for convertible dresses?

III. Methods

1. Sampling and Data Collection

This study employed a survey design to explore female consumers' preferences for convertible dresses, focusing on preferred changeable design attributes and purchase intentions in relation with ERC. After receiving the approval from an Institutional Review Board (IRB), the data were collected from a convenience sample of female college students (n=321) from four universities in the United States using an online survey technique. Female college students were chosen because this consumer group cohort has been receiving increased attention from fashion retailers (Deloitte, 2018). The dress was chosen since it is one of the most common clothing items and most female college students have purchased at least one dress for their wardrobe. The invitation letters were sent out to female college students over 18 years old through their university email system by the university administrator. The in-

vitation email included a link to the online survey and they voluntarily participated in the survey.

2. Measurement Scales

The items in the survey questionnaire were mostly self-developed based on the review of the literature or adopted from a previous study (Abraham, 1992; Bayraktar et al., 2015; Clouse, 2018; Eckman et al., 1990; Hopfer & Istook, 2016; Kim & Damhorst, 1998; Koo et al., 2014; Rahman, 2011; Schutz et al., 2005). The items measuring preferences for convertible dresses focused on aesthetic aspects such as color/pattern, size/fit, silhouette, style/occasion, and design details (Table 1); fashion behaviors related to wardrobe diversity (Table 3); dress preferences (Table 4)–(Table 5); purchase intentions; and demographic characteristics. For example, participants' preferred transform methods for convertible garments was measured with items such as "I like to wear (reversible types) of convertible dresses." The word "wearing" was used instead of "using" in this research, since in the clothing lifecycle, garments are not only worn but also cared for through washing, ironing, and storing, all activities which also influence sustainability (Fraj & Martinez, 2006). Specific attributes of each item are shown on <Table 1>–<Table 4>. The items capturing consumers' ERC behaviors were adopted from Kim and Damhorst's (1998) research. The questions included both open-ended questions and closed-ended items measured on a 7-point Likert scale (1=strongly disagree to 7=strongly agree).

To provide a description of a wide variety of aesthetic aspects and design options of women's dresses in the questionnaire, the researchers investigated design categories of women's dresses currently used in the U.S. market by examining the shopping websites of nine major U.S. retailers to observe how they filter women's dresses. The retailers included Nordstrom, Kohl's, Belk, Bon-Ton, Macy's, Target, Neiman Marcus, Saks Fifth Avenue, and Bloomingdales, which were chosen since they have stores in the West and Midwest areas of the U.S. and carry women's dresses in various price ranges and styles ("10 best readers", 2015). Their filtering categories were compared across companies; categories that were used by more than half of the companies were selected as an example category for the questionnaire in this study. These categories were counted individually and cross-reviewed by two researchers to minimize errors.

Colors/patterns of dresses were black (100%), brown (100%), blue (100%), beige/khaki (100%), white (89%), gray (89%), gold (89%), yellow (89%), red (89%), pink (89%), green (89%), purple (89%), and pattern (78%). Categories for size/fit included XXS (000-00) (56%), XS (0-2) (78%), S (4-6) (100%), M (8-10) (100%), L (12-14) (100%), and XL (16-18) (89%). Silhouettes were empire waist (56%), fit and flare (56%), and sheath (56%). Styles/occasions were work (100%), bridal gown (100%), formal/evening (89%), cocktail (78%), casual (56%), and bridesmaid (56%). Design details were mostly filtered by dress length and sleeve length. Dress lengths included short (78%), knee-length (56%), and long (56%). Sleeve lengths were short sleeve (78%), 3/4 sleeve (78%), and long sleeve (78%). In addition, the design details of sleeves, necklines, and pockets were categorized based on previous research on garment designs (Han & Kim, 2007; Kong & Ahn, 2003) (Table 1).

The questionnaire included definitions of convertible dresses and changeable design options, showing images from the literature to help participants who may not have been familiar these terms (Table 2). For example, the definition of convertible garment given was as follows: A type of garment in which the designs can change (i.e., color/pattern, size/fit, silhouette, and design details) to be worn for different weather, styles, or events. For example, a black dress can be changed to a pink, white, or patterned dress. A small size dress can be extended to a medium-sized dress. A mini dress can be a maxi length dress. Dress sleeves can be detached or attached. There are more changeable aspects available." After the survey questionnaire was prepared, a pilot test was conducted with six undergraduate students. Based on feedback from the pilot test, two peer researchers reviewed and modified the questionnaire to clarify wording and the sequence of questions.

Table 1. Candidates of changeable design options for convertible dresses

No.	Aesthetic	Details
1	Color/Pattern	Black, brown, blue, beige/khaki, white, gray, gold, yellow, red, pink, green, purple, and pattern
2	Size/Fit	XXS (000-00), XS (0-2), S (4-6), M (8-10), L (12-14), and XL (16-18)
3	Silhouette	Fit and flare, sheath, and empire
4	Style/Occasion	Work, bridal gown, formal/evening, cocktail, casual, and bridesmaid
5	Design details	Dress length (short, knee-length, and long), Sleeve length (short, 3/4, and long) Sleeve type (sleeveless, one-shoulder, standard set-in, raglan, dropped shoulder, cap, puff, kimono) Neckline type (V, scoop, square, surplice, round, boat, funnel, crew, Henley) Pocket type (patch, set-in, none)

The categories were identified from the reviews of literature and the filtering categories of nine major U.S. retailers' shopping websites.

3. Statistical Analysis

The data were analyzed using IBM SPSS. Descriptive statistics was computed to characterize the sample. Independent samples *t*-test and cluster analysis were employed to answer the research questions. The significance value lower than .05 was considered as statistically significant.

IV. Results and Discussion

1. Sample Characteristics

A total of 321 female college students aged 18 years or older answered the questionnaire, and 292 usable responses (91.0%) were analyzed for the study. The mean age of respondents was 19.6 years old, with a range from 18 to 54, of which 95.0% were aged below 24 years old. Most of them were freshmen (63.4%, n=185), Caucasian (73.4%), and with an income less than $1,000 per month (89.7%).

2. Preferences for Convertible Dresses: Changeable Design Options (RQ1)

The preferences for each design aspect of a convertible dress were explored using descriptive analyses. When asked about their preferences for convertible dresses, participants' preferred changeable design aspects were style/occasion (47.6%), dress length (41.4%), color/pattern (41.1%), silhouette (37.7%), size/fit (37.0%), neckline type (25.0%), sleeve type (19.5%), sleeve length (16.8%), and pocket type (14.7%). This might be because women's important criteria for selecting dresses are the appropriate dress style and dress length (Agins, 2014). The more detailed preferences for each were investigated and they are listed in the <Table 3>. Designers could consider these changeable design options for each dress component in the development process.

1) Color/Pattern

The favored changeable color/pattern options were black (78.8%), white (51.0%), blue (43.8%), and organic pattern (58.1%) (Table 3). If designers would like to create a color-changing dress, they could select colors considering the preferred colors and patterns, such as a black dress changing into a white, blue, or organic-pattern dress. A black dress is considered to be essential, as it could be worn in daily life, at job interviews, and at parties (Provo, 2013). Considering that the preferred dress lengths are short, a little black dress that can change colors and lengths in combination could be a good start. Black is preferred across all groups of society and is an appropriate color on many occasions (Bakker et al., 2015; Lamb & Bourriau, 1995). Color is also strongly tied to individual emotions (Kaya & Epps, 2004). U.S. college students preferred achromatic colors, such as white and black, and blue was also linked with positive emotions, like calmness and peaceful (Kaya & Epps, 2004). A convertible dress that can

Table 2. Images used in the survey questionnaire

Category	Sub-category		
Silhouette	 Fit and flare The bodice is fitted, and the bottom part flows	 Sheath Fitted top and bottom; a basic dress style	 Empire High waistline below the chest
Sleeve type	 Sleeveless A dress without sleeves	 One shoulder A dress with only a sleeve on one side	 Standard set-in Sleeve starts at the edge of a shoulder; a common style
	 Raglan Parts of sleeves are attached to the bodice	 Dropped shoulder Sleeves starts below the shoulder	 Cap Lengths of the sleeves are very short
	 Puff A sleeve gathered at the top or bottom of the sleeve	 Kimono Wide and flat sleeves	
Neckline type	 V-neck V-shaped neckline	 Scoop Very deep, curved U-shaped neckline	 Square Square-shaped neckline
	 Surplice One side of the garment overlapping the other	 Round Round-shaped neckline	 Boat High, wide and curved neckline
	 Funnel Wide and high neckline	 Crew Round and tight neckline	 Henley Round neckband and often with buttons on a placket
Pocket type	 Patch A pocket sewn to the outside of a dress	 Set-in Pockets are inside of the dress that only opening is visible	

Table 3. Fashion behavior on regular dresses and design preferences on convertible dresses

Category	Regular dress	%	Convertible dress	%
Color/Pattern (Color)	Black	95.5	Black	78.8
	Blue	73.3	White	51.0
	White	73.6	Blue	43.8
	Red	51.4	Gray	37.6
	Pink	51.0	Red	35.6
	Gray	41.4	Purple	27.4
	Green	32.8	Pink	25.7
	Purple	30.5	Gold	24.3
	Beige/Khaki	26.0	Green	19.2
	Gold	20.9	Beige/Khaki	17.8
	Yellow	20.2	Brown	14.6
	Others (multi-colors)	6.0	Yellow	12.0
	Brown	3.6	Others (orange)	0.3
	Other (ivory)	0.6		
Color/Pattern (Pattern)	Organic pattern	78.3	Organic pattern	58.1
	Geometric pattern	63.1	Geometric pattern	49.6
	Others (3D surface-beads, laces)	0.6		
Size/Fit	S (4-6)	55.1	S (4-6)	56.2
	XS (0-2)	41.7	XS (0-2)	46.9
	M (8-10)	33.2	M (8-10)	35.3
	L (12-14)	13.0	L (12-14)	16.4
	XXS (000-00)	7.8	XXS (000-00)	11.3
	XL (16-18)	4.5	XL (16-18)	9.2
	Others (larger than XXL)	0.9	Others (larger than XXL)	1.0
Silhouette	Fit and flare	90.1	Fit and flare	77.1
	Sheath	73.6	Sheath	64.0
	Empire waist	48.6	Empire waist	42.5
	Others (shift)	2.8	Others (shift)	1.0
	Others (body conscious)	1.9	Others (A-line)	0.6
	Others (A-line)	0.6	Others (body conscious)	0.3
Style/Occasion	Casual	94.5	Casual	77.1
	Formal/Evening	77.1	Cocktail	65.8
	Cocktail	63.4	Formal/Evening	61.3
	Work	52.4	Work	57.2
	Bridesmaid	16.1	Bridesmaid	15.8
	Bridal gown	3.1	Bridal gown	8.2
	Others	0.9		

Participants were asked to select multiple choices and the percentage of each choice was calculated by dividing a total number of each design element.

Table 3. Continued

Category	Regular dress	%	Convertible dress	%
Dress length	Short	87.0	Short	72.9
	Knee-length	75.6	Knee-length	70.2
	Long	72.6	Long	62.0
	Others (high-low)	1.5		
Sleeve length	Sleeveless	88.4	Sleeveless	67.8
	Short	77.7	Short	59.9
	3/4	57.9	Long sleeve	55.1
	Long sleeve	56.2	3/4	50.3
Sleeve type	Sleeveless	91.4	Sleeveless	77.0
	Standard set-in	75.3	Standard set-in	53.1
	Cap	62.6	One-shoulder	35.3
	One-shoulder	29.8	Cap	34.9
	Dropped shoulder	22.6	Dropped shoulder	24.7
	Raglan	16.4	Kimono	22.3
	Kimono	16.1	Raglan	17.1
	Puff	12.0	Puff	8.6
	Others (thin strap)	0.3		
Neckline type	Scoop	90.4	V	67.8
	V	73.6	Scoop	64.7
	Round	54.8	Surplice	40.4
	Crew	39.7	Boat	36.0
	Surplice	32.9	Round	31.8
	Boat	30.5	Crew	27.1
	Square	27.1	Square	26.4
	Collar	19.2	Funnel	16.1
	Funnel	12.0	Henley	8.6
	Henley	9.9	Collar	2.7
	Others (sweetheart)	0.7	Others (sweetheart)	1.0
	Others (halter)	0.6		
Pocket type	Set-in	71.4	Set-in	59.9
	None	38.7	None	51.0
	Patch	24.6	Patch	21.6

Participants were asked to select multiple choices and the percentage of each choice was calculated by dividing a total number of each design element.

change colors may encourage the more frequent use of the garments by satisfying wearers' changing emotional needs. Color changing could easily be achieved via the reversible designs of using different colors and patterns on the front and back, as well as smart clothing designs using LEDs. E-ink could also be applied to convertible garments to change colors. A dress that can change patterns with e-ink was introduced at the CES 2018 and received great deal of attention due to its flexibility and low power consumption (Macdonald, 2018).

2) Size/Fit

The wanted sizes and fit by the U.S. college female respondents were small (4-6) (56.2%), medium (8-10) (35.3%), and large (12-14) (16.4%). The size/fit of a garment has been a common dissatisfaction factor among U.S. college students, who have tried to alter garments to fit their bodies (Pisut & Connell, 2007). Designers may incorporate the transforming feature of size/fit into dresses, as the dresses can provide more comfort by accommodating wearers' changing body sizes and desired fit (Clouse, 2018; Kaplan & Okur, 2008).

3) Silhouette

The preferred silhouettes for dresses include fit and flare (77.1%), as well as sheath (64.0%). This result is similar to those from previous research reporting that American women frequently had fit problems with their garments and that women in their 20s preferred the hourglass silhouette than other age groups did (Pisut & Connell, 2007). The fit and flare dresses emphasize constrained waists, contrasting the flare of the skirts, thus making the body look like an hourglass (Verily Magazine, 2017). A knee-length sheath dress is also frequently recommended as one of the appropriate items for work (Tsui, 2017). Silhouette-changing dresses could be useful to college students, as they can wear them at job interviews or in other professional settings, in addition to their regular school settings (Cutts et al., 2015). Dresses with the silhouette-changing feature could be achieved by using fasteners, like buttons, hooks, or zippers. With Jolier's signature item, the Emma dress, the fit and flare silhouette can be converted to a sheath through the closing of fasteners, such as buttons (Fourtané, 2011).

4) Style/Occasion

The changing function of convertible dresses for U.S. female college students could start with the style/occasion changing function. Because casual (77.1%), cocktail (65.8%), formal/evening (61.3%), and work (57.2%) were preferred situations for wearing convertible dresses <Table 3>, designers could make a casual dress capable of also being worn as a cocktail or formal/evening dress, or of being worn at work.

5) Dress Length

The preferred dress lengths were short (72.9%), knee-length (70.2%), and long (62.0%). The dress length is tied to whether the dress is appropriate to wear on various occasions, and its modesty level (Workman & Freeburg, 2010). Designers are suggested to create a dress that can have a short length but also be knee length and/or long. According to literature reviews, this was possible through the tying/folding/wrapping design (Valero, n.d.); modular designs involving attaching additional pieces (Wei, 2016); or using hooks and buttons to attach the dress hemlines to the waist to turn a long dress into a mini dress (Fourtané, 2011). This versatility will enable wearers to wear the dress on various occasions with different styles.

6) Sleeve Length and Type

The desired sleeve lengths were sleeveless (67.8%), short sleeve (59.9%), long sleeve (55.1%), and 3/4 sleeve (50.3%) and sleeve types were sleeveless (77.0%), standard set-in (53.1%), one-shoulder (35.3%), and cap (34.9%) and for dresses. Valero (n.d.) and Jolier (Fourtané, 2011) created many convertible dresses that can change sleeve types and lengths by applying the tying/folding/wrapping design as well as modular designs that enable sleeveless dresses to also be short sleeved, be long sleeved, or even be one-shoulder dresses. The sleeve length and type changing options would provide consumers with the versatility needed to wear the dresses in different seasons.

7) Neckline Type

Necklines were preferred in order of V (67.8%), scoop (64.7%), surplice (40.4%), boat (36.0%), and round (31.8%). The neckline-changing dresses could be worn on various occasions with versatility in styles and modesty levels. Many designers have created neckline-changing dresses by using the reversible design. For example, the front of the dress is a “V” and surplice, and the back is a round neckline, so the dresses

can be worn either way based on the situation. The versatility in the neckline could also change the entire style of the dress; for example, the neckline could be changed into one with a design that college-aged consumers prefer, a boat neck (Provo, 2013), through tying/wrapping/ folding or detaching.

8) Pocket Type

The preferred pockets were set-in (59.9%), none (51.0%), or patch (21.6%) type (Table 3). There is a lack of convertible dresses with changing pockets. Converting pockets may be less effective for changing dress styles compared with other convertible dress components. It might be hard to make convertible dresses with set-in pockets and/or without the pockets themselves. However, patch-type pockets may be easier to detach. Fasteners, such as buttons, snaps, or zippers, could be used to make the pockets detachable, and 3D printing technologies could be more readily applied to such designs due to their small sizes and simple mechanism of detachment. Our findings of preferred changeable design options shed some light for designers to acquire ideas as to where to start in their convertible dress development processes.

3. Differences in Fashion Behaviors, Important Aspects, and Purchase Intention (RQ2)

To answer the second research question, cluster analysis was used to measure participants' level of ERC of apparel products. ERC was first tested on its dimensionality using principal component analysis, and it reveals that ERC has a unidimensional structure with the Cronbach's alpha value of .91. Based on this analysis, the respondents were grouped into low and high groups on their ERC. One hundred and twenty respondents were grouped as low ERC, while 159 respondents were clustered as high ERC group. Using independent samples *t*-tests, these two groups were compared on each ERC item, and it was found that high ERC group demonstrated significantly higher consumption behavior on each ERC item at .001 level (Table 4). Next, a series of independent samples *t*-tests were conducted to compare their considering important aspects of purchasing and using convertible dresses, as well as purchase intentions for convertible dresses by their ERC.

1) Fashion Behavior

(1) Important Aspects of Regular Dresses

Nineteen important aspects when purchasing and using regular dresses, including intrinsic and extrinsic attributes, were analyzed. According to the results, the low ERC group (Group 1: G1) (M=4.57, S.D.=1.88) and the high ERC group (Group 2: G2) (M=5.16, S.D.=1.59) showed a significantly different perception of the importance of pocket type ($t(277)=-2.307$ $p=.022$) when purchasing or using regular dresses. The high ERC group considered pocket type more important than did the low ERC group. Pockets are closely related to comfort and functionality (Zhe, 2016). Consumers who have high levels of environmental concerns perceived functionality and practicality as important needs when purchasing garments (McNeill & Moore, 2015). The high ERC group may prefer pockets more due to their benefits compared with the low ERC group. Similarly, the high ERC group (M=5.58, S.D.=1.42) valued ease of care more than the low ERC group did (M=5.01, S.D.=1.66) ($t=-3.312$, $p=.001$) when purchasing or using regular dresses (Table 4). This difference may exist because garment care, such as washing, drying, and ironing, is strongly linked to environmental impact (McLaren et al., 2015).

(2) High ERC Group

The high ERC group also considered size/fit as the most important component, followed by silhouette, dress length, price, color/pattern, neckline type, fabric/texture, and ease of use/wearability (M=6.06-6.55). Subsequently, durability, sleeve type, sleeve length, ease of matching, ease of care, context aptness, modesty, pocket type (M=5.16-5.88). Thus, size/fit was the most important aspect for both groups when purchasing dresses, with the next four most important factors being similar for both groups. These findings are consistent with those of previous studies indicating that size/fit is highly related to comfort and that people may not purchase the garments if they feel uncomfortable (Clouse, 2018; Rahman, 2011). Size/fit also influences how people see the

Table 4. Results of independent samples *t*-test on importance level of important aspects on regular dresses

Variable	Group	Mean	S.D.	*t*-value[a]	*p*-value
Important aspects: ( ) is an important aspect to consider when purchasing and using regular dresses.					
(Intrinsic attribute)					
Design					
Color/Pattern	G1	6.31	1.17	.719	.472
	G2	6.21	1.15		
Size/Fit	G1	6.57	1.07	.154	.878
	G2	6.55	1.04		
Silhouette	G1	6.31	1.23	–1.119	.264
	G2	6.46	1.06		
Dress length	G1	6.30	1.17	–.454	.650
	G2	6.35	1.04		
Sleeve length	G1	5.64	1.42	–1.104	.271
	G2	5.82	1.28		
Sleeve type	G1	5.53	1.47	–1.833	.068
	G2	5.83	1.23		
Neckline type	G1	5.91	1.29	–1.445	.150
	G2	6.12	1.14		
Pocket type	G1	4.67	1.88	–2.307	.022
	G2	5.16	1.59		
Fabric/Texture	G1	5.92	1.27	–1.312	.191
	G2	6.11	1.14		
Function					
Ease of care	G1	5.01	1.66	–3.312	.001
	G2	5.58	1.42		
Durability	G1	5.41	1.50	–2.743	.007
	G2	5.88	1.31		
Ease of use/Wearability	G1	5.73	1.35	–2.160	.032
	G2	6.06	1.21		
Comfort	G1	5.63	1.37	–2.605	.010
	G2	6.04	1.21		
Ease of matching	G1	5.45	1.45	–1.680	.094
	G2	5.74	1.36		
Social					
Context aptness	G1	4.98	1.41	–2.888	.004
	G2	5.46	1.34		
Modesty	G1	4.79	1.67	–2.096	.037
	G2	5.21	1.62		
(Extrinsic attributes)					
Price	G1	6.19	1.20	–.722	.471
	G2	6.29	1.08		
Brand	G1	4.36	1.81	–.301	.764
	G2	4.42	1.77		

Group 1 (n=120): low in environmentally responsible apparel consumption.
Group 2 (n=159): high in environmentally responsible apparel consumption.
1 being strongly disagree and 7 being strongly agree
a: denotes the degrees of freedom=277

wearer's body and comfort, one of the most important factors influencing consumers' satisfaction with clothing (Clouse, 2018; Kaplan & Okur, 2008).

(3) Low ERC Group

Among the important aspects that participants considered when purchasing or using regular dresses, the low ERC group considered size/fit as the most important factor, followed by color/pattern, silhouette, and dress length (M=6.19-6.57) (Table 4). Other important aspects included fabric/texture, neckline type, ease of use/wearability, sleeve length, comfort, sleeve type, ease of matching, durability, and ease of care (M=5.01-5.92). Context aptness, modesty, pocket type, and brand were the four least considered factors (M=4.36-4.98). Among the extrinsic attributes, price (M=6.19) was considered to be important, but brand (M=4.36) was the least important for the low- ERC group. This result is consistent with previous research indicating that price was the most important attribute among the extrinsic attributes for college students (Hopfer & Istook, 2016). The low-ERC group cared less about brand and cared more about the design aspects that could affect the aesthetics of the apparel. This confirms the previous findings that intrinsic attributes, like color/pattern, styling, and appearance, are more important than extrinsic attributes are (Clouse, 2018; Hopfer & Istook, 2016; Rahman, 2011).

(4) Comparison of ERC Groups

In general, consumers who demonstrated higher levels of ERC for apparel products were more likely to value those considering important aspects when they purchased or used dresses compared with those with lower levels of ERC (Table 4). This finding indicated that the high-ERC group reg- arded these aspects as more important when purchasing or using dresses than the low-ERC group did. The least considered factor for the high ERC group was brand, consistent with the result for the low ERC group (M= 4.42). Both groups considered design and functional aspects to be more important than brand. In addition, significantly more importance was placed on ease of use/wearability (t=–2.160, p=.010), comfort (t=–2.605, p=.010), and context aptness (t=–2.888, p=.004) by the high ERC group (M=6.06, S.D.=1.21; M=6.04, S.D.=1.21; M=5.46, S.D.=1.34, respectively) than by the low ERC group (M=5.73, S.D.=1.35; M=5.63, S.D.=1.37; M=4.98, S.D.=1.41, respectively) for regular dresses. As shown in the literature review, this difference exists because consumers who care about sustainability consider the environmental impact of purchasing and using garments (Cowan & Kinley, 2014). Aspects such as ease of use/wearability and comfort could influence the lifecycle of products (Koo et al., 2014; McLaren et al., 2015). This result is consistent with McNeill and Moore's (2015) research indicating that people who care about environmental issues care about functional and practical aspects when purchasing apparel.

2) Preferred Changeable Methods for Converttible Dress

For methods of changing dresses, tying/folding/wrapping was the most preferred among the changing methods for the low- (M=4.62) and high-ERC groups (M=5.43). The least preferred type was “do it yourself” (DIY) for the low-ERC group, and modular design for the high-ERC group. Thus, designers could apply the tying/folding/wrapping technique instead of DIY or modular designs to the design of convertible dresses to target both groups. Brands that are well known for convertible garments, such as Ximena Valero, frequently applied these techniques to make practical and wearable convertible dresses. This may because tying/folding/wrapping is a more familiar technique and is easy to change without using special methods or materials when compared with other techniques, and it enables the creation of more diverse styles than consumers would get with reversible dresses. There were significant differences between groups for all five transform types: reversible (t=–3.859, p=.000), tying/folding/wrapping (t=–4.305, p=.000), modular (t=–4.167, p=.000), smart clothing (t=–4.397, p=.000), and DIY (t=–5.958, p=.000). The high ERC group showed a higher preference for all five transform methods than did the low ERC group, as shown in <Table 5>. These findings may indicate that the high-ERC group was more open to various garment transformation methods than the low-ERC group was.

Table 5. Results of independent samples *t*-test on important aspects and purchase intention of convertible dresses

Analysis	Group	Mean	S.D.	*t*-value[a]	*p*-value
Changing method: I like to wear ( ) of convertible dresses.					
Reversible types	G1	4.55	1.76	–3.859	.000
	G2	5.33	1.53		
Tying/Folding/Wrapping	G1	4.62	1.68	–4.305	.000
	G2	5.43	1.33		
Modular	G1	4.42	1.53	–4.167	.000
	G2	5.14	1.46		
Smart clothing	G1	4.47	1.75	–4.397	.000
	G2	5.27	1.56		
DIY	G1	4.03	1.53	–5.958	.000
	G2	5.22	1.16		
Important aspects: ( ) is an important aspect to consider when purchasing and using convertible dresses.					
(Intrinsic attribute)					
Design					
Color/Pattern	G1	5.65	1.53	.086	.931
	G2	6.01	1.16		
Size/Fit	G1	5.86	1.47	–.039	.969
	G2	6.27	1.05		
Silhouette	G1	5.77	1.54	–.127	.899
	G2	6.14	1.11		
Dress length	G1	5.68	1.52	–.065	.948
	G2	5.97	1.20		
Sleeve length	G1	5.44	1.58	–.647	.518
	G2	5.50	1.44		
Sleeve type	G1	5.33	1.63	–.500	.618
	G2	5.57	1.44		
Neckline type	G1	5.48	1.57	–.145	.885
	G2	5.80	1.26		
Pocket type	G1	4.52	1.88	–1.951	.052
	G2	4.96	1.59		
Fabric/Texture	G1	5.49	1.56	–1.537	.126
	G2	6.00	1.16		

Group 1 (n=120): low in environmentally responsible apparel consumption.
Group 2 (n=159): high in environmentally responsible apparel consumption.
1 being strongly disagree and 7 being strongly agree
a: denotes the degrees of freedom=277

Table 5. Continued

Analysis	Group	Mean	S.D.	*t*-value[a]	*p*-value
Functional					
Ease of care	G1	5.16	1.64	–2.610	.010
	G2	5.91	1.22		
Durability	G1	5.45	1.51	–2.156	.032
	G2	5.99	1.18		
Ease of use/Wearability	G1	5.52	1.53	–2.017	.045
	G2	6.04	1.12		
Comfort	G1	5.53	1.44	–2.745	.007
	G2	6.13	1.06		
Ease of matching	G1	5.27	1.59	–3.325	.001
	G2	5.77	1.21		
Social					
Context aptness	G1	4.76	1.60	–4.123	.000
	G2	5.47	1.30		
Modesty	G1	4.60	1.69	–2.129	.034
	G2	5.25	1.54		
(Extrinsic attribute)					
Price	G1	5.65	1.60	–.146	.884
	G2	6.18	1.05		
Brand	G1	4.45	1.70	–.823	.411
	G2	4.67	1.78		
Purchase intention	G1	4.50	1.52	–4.753	.000
	G2	5.31	1.25		

Group 1 (n=120): low in environmentally responsible apparel consumption.
Group 2 (n=159): high in environmentally responsible apparel consumption.
1 being strongly disagree and 7 being strongly agree
a: denotes the degrees of freedom=277

3) Important Aspects of Convertible Dresses

(1) High ERC Group

Among these aspects, size/fit was also considered to be the most important aspect for the high-ERC group, followed by price, silhouette, comfort, ease of use/wearability, color/pattern, and fabric/texture, all scoring above 6.00 on average (M=6.00-6.27). Thus, designers could consider making convertible dresses washable by detaching electronic or non-fabric parts for ironing and washing (Poh et al., 2010), and making them durable enough for frequent and long-term use to encourage a sustainable lifecycle (Dhukaram et al., 2011). These findings confirm Norman's (2013) claim that a good design allows users to use the product easily without reading instructions. The other considerations included durability, dress length, ease of care, neckline type, ease of matching, sleeve type, sleeve length, context aptness, and mode- sty, scoring between 5.00 and 6.00 on average (M=5.25-5.99). Pocket type (M=4.96) and brand (M= 4.67) were the least important components.

(2) Low ERC Group

The low ERC group considered the size/fit as the most important factor, followed by silhouette, dress length, color/pattern, price, comfort, ease of use/wearability, fabric/texture, neckline type, durability, sleeve length, sleeve type, ease of matching, and ease of care, all scoring above 5.00 on average on the 7-point Likert scale (M=5.10-5.86). Context aptness, modesty, pocket type, and brand were scored lower than 5.00 on average (M=4.45-4.76), with brand being the least considered factor when purchasing and using convertible dresses. The low-ERC group showed a high tendency to consider design aspects to be more important than functional aspects and cared less about the social aspects. One of the major reasons for limiting the purchases of environmentally friendly clothing was a less fashionable design (Gam, 2011).

(3) Comparison of ERC Groups

When purchasing or using convertible dresses, the two groups showed sig- nificant differences for the following aspects: ease of care (t=–2.610, p=.010), durability (t=–2.156, p=.032), ease of use/wearability (t= –2.017, p=.045), ease of matching (t=–3.325, p=.001), comfort (t=–2.745, p=.007), context aptness (t=–4.123, p=.000), and modesty (t=–2.129, p=.034). The high ERC group was more likely to consider all of these aspects for convertible dresses than was the low ERC group (Table 5). The functional and social aspects were all considered to be more important for the high-ERC group than for the low-ERC group. This finding is consistent with the McNeill and Moore's (2015) research results indicating that people who have environmental concerns care about functional and practical aspects when purchasing apparel products. Designers are recommended to design convertible dresses that can satisfy these functional aspects for high-ERC groups, and retailers can emphasize the functional strengths of convertttible dresses when promoting them to high-ERC groups.

Moreover, considering that size/fit was the most important factor for both groups, followed by silhouette as the second factor for the high ERC group and the third factor for the low ERC group, designers can develop convertible dresses that can change size/fit and silhouette to attract both consumer groups. Since brand was selected as the least important factor for both groups, designers may need to focus on the important considering aspects rather than the brand itself for app- ealing to consumers. Regarding the prices, they were willing to pay for convertible dresses included less than $30 (42.6%), $30-59 (21.9%), $60-89 (1.8%), $90-119 (5.7%), and even more than $200 (2.1%). Considering the results, the recommended price could be less than $60 for dresses. The price was considered to be an important aspect for both groups. Designers thus need to consider how to meet the desire for a relatively low price of a convertible dress, as a high price was a reason for being reluctant to purchase eco-friendly clothing (Gam, 2011).

(4) Purchase Intention

Consumers' purchase intention for convertible dresses was significantly different for the high and low ERC groups. High ERC consumers were more likely to show purchase intention (M=5.31, S.D.=1.25) for convertible dresses than were low ERC consumers (M =4.50, S.D.=1.52), with t-value of –4.753 and p-value less than .001. Consistent with fashion adoption theory (Sproles, 1979), consumer awareness of the environment seems to be a determinant of their decision-making for purchasing environmentally responsible apparel products. This result confirmed previous findings that consumers who care more about the environment are more likely to purchase more sustainable products (Gam, 2011; Zimmer et al., 1994). Thus, a convertible dress could appeal more to a high-ERC group; still, the low-ERC group in the study showed purchase intentions. Thus, the potential exists to make low-ERC groups' fashion behaviors more sustainable.

V. Conclusions

This research investigated preferred changeable design options that could be incorporated into convertible dresses. In addition, this study analyzed the differences of considering aspects when purchasing and using convertible dresses between high and low ERC level groups. These results will help designers develop more marketable convertible dresses for different target consumers.

First, the results showed that the preferred changeable design options for convertible dresses were similar to those for regular dresses. For example, the most preferred colors for regular dresses were black, blue, white, and organic patterns, which were also the most preferred changeable color/pattern options for convertible dresses. The similarities between regular dresses and convertible dresses were also found in other design elements such as size (S, XS, M), silhouette (fit and flare, sheath, empire waist), styles for different occasions (casual, formal/evening, cocktail), length (short, knee-length, long), sleeve length (sleeveless, short), sleeve type (sleeveless, standard set-in), neckline types (scoop or V), and pocket types (set-in). Thus, instead of having convertible clothing with unique designs, consumers may want convertible dresses with changeable design options that are similar to styles they already have in their wardrobes.

Second, designers can focus more on these highly-preferred considering aspects rather than on the least preferred considering aspects when developing convertible dresses. Based on the results, designers are encouraged to make casual dresses and work/business dresses, applying methods of tying/folding/wrapping and reversible, with changing size/fit, dress length, or color/pattern. For instance, a dress could have dual colors with one side being black and the other side white. The dress could be a casual dress on one side and a formal/evening dress on the other side, each having a different color, décor, and even length. Moreover, the convertible dresses need to be reasonably priced and have superior comfort, durability, and ease of use/wearability. Based on the preferred designs of the majority of participants, it is recommended that convertible dresses have specific changeable design options: color (black, white, and organic pattern), silhouette (fit and flare, sheath), styles for different occasions (casual, cocktail, formal/evening, work), length (short, knee-length, long), sleeve length (sleeveless, short sleeve, long sleeve, 3/4 sleeve), sleeve type (sleeveless, standard set-in), neckline types (V, scoop), and pocket types (set-in, none/detachable). Moreover, size/fit was the important design factor when purchasing and using convertible dresses; therefore, convertible dresses could be size- and fit-adjustable.

Third, since this study demonstrated that participants had strong purchase intention for convertible dresses overall, there is optimism that the convertible dresses can be accepted by consumers in the market. Regarding their purchase intentions, given that participants were willing to pay around $30 for convertible dresses, the dresses could be in a fairly reasonable price range.

Fourth, overall, there were different preferences for convertible dresses between the consumers who showed more ERC behaviors and those who demonstrated less. The most preferred changing method was tying/folding/wrapping for both groups, but people with high ERC showed more openness to diverse changing methods than did those with low ERC. It is suggested to apply tying/folding/wrapping techniques when developing convertible dresses targeting both groups.

Moreover, those with high ERC cared functional aspects (e.g., ease of care, use/wearability, matching, durability, and comfort) and social aspects (e.g., context aptness, and modesty) than did those demonstrating less ERC. There was no significant difference in considering design aspects. Thus, designers are recommended to design convertible garments that are aesthetically pleasing for both groups and to consider functional and social aspects when targeting people with high ERC.

Lastly, similarly those with high ERC demonstrated a greater intention of purchasing convertible dresses than did those with low ERC, a result consistent with Sproles' (1979) fashion adoption theory and the findings of Gam's (2011) research on consumers' adoption of sustainable products. An efficient marketing strategy for promoting convertible dresses would be to target those who are conscious of the environment. People with high ERC could be the target consumers first, and then, the target could be broadened to people with low ERC to ultimately make their fashion lifestyles sustainable. It is recommended to develop marketing messages containing functional and practical benefits for people with high ERC, as well as design and price benefits for both groups.

The results of this research will benefit apparel

designers when developing convertible dresses guided by consumers' preferences and ERC behaviors. The identified consumers' preferences and purchase intention may bring insights to merchandisers and retailers in the fashion industry about consumer motivations to purchase such sustainable dresses. Moreover, college students, who will be the major members and leaders of society, are one of the major consumers in the fashion industry. They have the power to change their behaviors and to impact others to be more sustainable (Siegel, 2019). Thus, they are expected to convert college students' lifestyles to more sustainable ones so that the four dimensions will ultimately be more sustainable.

This study has several limitations. First, the study was performed with U.S. female college students, with a focus on a dress item. Future research needs to investigate consumer groups with other socioeconomic statuses, and it needs to focus on varied garment items. This will allow for an understanding of various preferences and purchase intentions with better generalizations. Second, the current study examined ERC behaviors, preferred changeable design options, and important aspects to consider when one is purchasing and using convertible dresses. More factors related to consumer purchase behaviors, such as lifestyles or personal values, can foster a more diverse understanding of the target consumers. Furthermore, this study involved carrying out an online survey, which could limit the participants' expressions of their thoughts and opinions. Therefore, it would be worthwhile to use a different research strategy for a more in-depth understanding of consumer preferences. For example, it is recommended to develop prototypes of convertible dresses and to conduct interviews or user tests for future studies.

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