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Convert one outfit to more looks: factors influencing young female college consumers' intention to purchase transformable apparel

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Abstract

Transformable apparel offers two or more functional and/or alternative aesthetic styles through various manipulative methods, which is considered a sustainable alternative in the fashion industry to reduce excess clothing consumption. The study intends to identify the influences of environmental apparel knowledge, environmental beliefs, and personal values on consumers' intention to purchase transformable apparel products. The theory of reasoned action (TRA) was applied as the foundation for the conceptual framework, which considered attitude and social factors to be crucial factors influencing the intention. Data were collected from 306 female college students in the United States through an online survey. Proposed hypotheses were tested by structural equation modeling (SEM). The results confirmed the positive influences of the tendency for creative choice, environmental beliefs, environmental apparel knowledge, and attitude on female college students' intention to purchase transformable apparel products. Furthermore, practical and theoretical implications based on the results were discussed as well.

Keywords: Transformable apparel, Attitude, Fashion consciousness, The tendency for creative choice, Environmental beliefs, Environmental apparel knowledge

Introduction

The need for novelty and newness has driven consumers to purchase new apparel products frequently and to dispose of a diverse amount of garments that are underutilized. Approximately, only about 38% of young consumers' wardrobes are regularly worn (Koo et al. 2014). More specifically, fast fashion speeds up consumer's acquisition and makes it possible for consumers to obtain more styles with lower quality and at lower cost (Cao et al. 2014), which, in turn, increases landfill waste. Transformable-designed apparel products provide an alternative option to consumers wishing to change to different styles without purchasing new products (Rahman and Gong 2016). Through various manipulative methods, such as wrapping, twisting, folding, or gathering, transformable garments provide two or more functional and/or alternative aesthetic styles. Consumers' demands have been diversifying, which makes it harder to predict due to rapidly changing trends and fashion tastes (Kang and Park-Poaps 2010). Being transformable allows the aesthetics and functionality of the items to be converted into multiple styles and

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functions to meet consumers' need for novelty and versatility (Koo et al. 2014; Rahman and Gong 2016). This trend is expected to increase the use intensity, extend the lifespan of apparel products, and reduce disposal (Koo et al. 2014), which may be a potential solution to the problem of excessive apparel consumption faced by the fashion industry today. In addition, transformable apparel can be alternative sources of revenue for the fashion industry and has been suggested as a good concept for the young consumer market (Rahman and Gong 2016).

The idea of being transformable for certain apparel products, such as clothing for individuals with movement disorders, clothing for aging people, and so forth, has existed for some time. However, the transformable concept for daily-used apparel products that are designed to provide alternative aesthetic styles is a new concept and has gained more attention in the past 10 years (Kasarda et al. 2007). Though transformable apparel design has drawn attention in both industry and academia, there is an overall lack of research concerning the influential factors on consumers' purchase intention of transformable apparel products. A qualitative study involving female college students indicated that about half of the participants have preferences on the idea of transformable clothing. However, no empirical studies have determined the motivations and barriers for young consumers to purchase transformable apparel products.

Current research mainly focuses on the design strategies of transformable apparel from the designer's perspective and most of the studies are in qualitative format. For example, Rahman and Gong (2016) conducted in-depth interviews to explore different transformable design methods, including zero-fabric waste plus transformable design, the modular approach using hook and eye fasteners, and the modular approach using zippers. Cao et al. (2014) carried out two focus groups to evaluate consumers' acceptance of two different adaptable design prototypes to determine consumers' preferences for design details of transformable apparel. Besides, Koo et al. (2014) have conducted a study with a mixed research method to explore the types of changeable functions that people desire in transformable T-shirts. These researchers found similar impressions of and preferences for transformable apparel. For instance, transformable apparel is expected to provide an enjoyable and easy way to be transformed into different styles. In addition, consumers expect those garments to be easy to match with other items. The recent quantitative research conducted by Vedhakshayini and Archana (2017) has found a positive acceptance rate of transformable apparel products, indicating that the majority of participants would like to accept the transformable clothing as an innovative fashion alternative. Ma and Koo (2016) have also conducted a study with female college students to examine consumers' preferences for transformable party dresses and to investigate how shopping orientations influence young female consumers' expectations and purchase intentions.

To date, no studies have been done to determine the influences of personal values and environmental knowledge on the purchase intention of transformable apparel products. Personal values, such as fashion consciousness and the tendency for creative choice, play essential roles in consumers' purchase decision-making process in the fashion market (Lertwannawit and Mandhachitara 2012; Lysonski and Durvasula 2013). In addition, an individual's environmental beliefs and environmental apparel knowledge also have a critical impact on one's sustainable consumption behavior (Matthews and Rothenberg 2017;

Zhang and Lang 2018). Therefore, the purpose of this study is to determine the influences of both personal values and environmental-related factors on the purchase intention of transformable apparel. The results regarding the motivations for consumers' to purchase transformable clothing and users' expectations for transformable clothing are expected to help fashion retailers to understand potential users' intentions better and may allow for the development of strategies to promote transformable apparel.

In addition, by applying Fishbein and Ajzen's (1975) theory of reasoned action (TRA), this study considers that the factors engaging in the intention are not only an individual's attitude but also social values, such as subjective norms. Specifically, personal values and behavioral beliefs are considered to be external variables and assumed to influence intention indirectly (Ajzen and Fishbein 1980). In that, the specific objectives of this study include:

1. To determine the impact of attitude and social factors on the purchase intention of transformable apparel products by applying the theory of reasoned action (TRA) as the foundation for the conceptual framework.
2. To identify the direct influences of environmental apparel knowledge, environmental beliefs, and personal values on consumers' intention to purchase transformable apparel products.

Literature review and hypotheses development

Transformable apparel

Transformable apparel is defined as, "those garments that offer two or more functional and/or aesthetic alternative styles through various manipulative methods, such as wrapping, binding, rolling, twisting, tying, folding, and gathering" (Rahman and Gong 2016, p. 234). The transformable design concept is considered several things all in one; it is a type of sustainable design (Rahman and Gong 2016), a reaction to environmental crises and an indicator of the rapid growth of economic activity and human needs (Kasarda et al. 2007). Transformable garments can be converted into at least two or more different looks that share certain characteristics and functions with the original clothing (Gam 2011), which will provide the wearer with more functional and/or aesthetic styles without unnecessary purchases. Transformable clothes are expected to increase the product use frequency and extend the products' life cycle as they can be repeatedly transformed into different styles or looks; ultimately reducing textile waste and decreasing total production volumes.

Both consumers and retailers benefit from transformable garments. For instance, transformable garments provide an alternative option to consumers who wish to change to different styles or functions without purchasing new products. Due to the product being transformable, the consumer can modify the existing garment to achieve various desired or required styles instead of buying new products for different occasions. In addition, the transformable design also provides benefits to retailers. Due to convertibility, a product can be more competitive in the marketplace. Transformable apparel has been suggested as a strategy for retailers to satisfy consumers' need for novelty and versatility and it may be a potential revenue source for the industry.

Currently, some fashion retailers in the marketplace start providing transformable clothing. For example, 180DEGREES by Maria Prastakou designs and sells transformable clothes that can be transformed into two or more looks. JOLiER, another transformable and sustainable fashion brand from Finland provides consumers with apparel products that possess innovative multi-uses that can be either transformable or reversible, based on the core value of transformability, size adjustability, and sustainable design. Ximena Valero Corporation, an international fashion brand located in Los Angeles, California also provides consumers with convertible clothing items that can be used in various ways and perform different functions. WORKHALL studio, a Canadian fashion company, commits to transformable and purposeful clothing and sells transformable garments in its online store. Y-dress?, a clothing brand located in Europe, also provides convertible, multifunctional, transformable, and reversible clothes in the market. HipKnoTies offers pregnant females with convertible maternity dresses that can be worn throughout the entire pregnancy. Ultimately for the consumer, transformable clothing offers more flexibility and options to wear different styles of garments while saving them money and time spent on shopping.

Though the concept of transformable design is an emerging trend and may offer possibilities for fashion consumption to be more sustainable, the understanding of consumers' perception of this concept is lacking. Existing research mainly focuses on the design strategies of transformable apparel from the designer's perspective. More information is required to understand whether consumers appreciate this type of garments and what factors may motivate consumers to purchase transformable garments.

Theory of reasoned action (TRA)

A variety of studies in regards to sustainable consumption (Coleman 2011; Hamari et al. 2016; Johnson et al. 2016; Paul et al. 2016; Xu et al. 2014) has used the theory of reasoned action developed by Fishbein and Ajzen (1975). This theory indicates that people's willingness to conduct a particular behavior is assumed to be impacted by the combination of both personal and social factors. Specifically, attitude toward the behavior is taken as the personal factor, and the subjective norm is suggested as the social factor (Ajzen 1991). The beliefs that performing a specific behavior may lead to particular consequences play a crucial role in deciding whether to take action. When an individual develops a positive view on a given behavior in question, they will be more willing to participate in the practice.

A number of previous studies have confirmed the positive effects of attitude on the intention of a variety of sustainable consumption behaviors. For instance, Johnson et al. (2016) have confirmed that attitude positively influences consumers' intention to participate in collaborative consumption. Lang (2018) found positive effects of attitude on consumers' intention to participate in fashion renting as well. In addition, attitude also positively influences the purchase intention of customized apparel products (Lang et al. 2018). When consumers develop a positive attitude toward transformable clothing, they are more likely to make the purchase.

Different from attitude, subjective norms refer to the perception of the social pressures placed on an individual to perform a given behavior. The opinions in regards to certain behavior from those who act as valuable references for an individual play a critical role in

his/her reactions to the behavior (Salazar et al. 2013). A number of previous studies have verified the positive effect of subjective norms on the intention toward various sustainable consumption behaviors, such as second-hand clothing purchases (Xu et al. 2014), fashion renting (Hamari et al. 2016; Johnson et al. 2016), and environmentally friendly products consumption (Paul et al. 2016). Being transformable provides consumers with more than one ways to wear the garment, which would encourage consumers to use the products for longer periods, thus reducing excess consumption due to being tired of existing garments. To this end, consumers would take transformable apparel to be an alternative option that is more sustainable when feeling the pressure from their surroundings to be more environmentally friendly. Furthermore, the intention specifies the level of endeavor an individual is willing to make in order to behave in a particular manner. In general, the higher the level of intention that people indicate to get involved in a given behavior, the more likely they will perform in that way. Hence, the two hypotheses were developed as follows.

H1 Attitude toward transformable apparel is positively related to the behavioral intention to purchase transformable apparel products.

H2 Subjective norms concerning sustainable consumption are positively associated with the behavioral intention to purchase transformable apparel products.

Fashion consciousness

Nam et al. (2006) indicate that fashion consciousness refers to the level or degree to which an individual is engaged in the latest up-to-date styles or fashion trends. Although fashion consciousness is similar to fashion leadership in that both emphasize the desire for the newest fashion styles (Lertwannawit and Mandhachitara 2012), differences do exist. Fashion leadership signifies the inner characteristic or feature of individuals who prefer to be the first accepting a new style and play a leading role in the diffusion of new trends (Kang and Park-Poaps 2010), while fashion consciousness solely indicates fashion involvement and the desire for up-to-date fashion styles (Lertwannawit and Mandhachitara 2012). In the fashion market, the value of fashion consciousness significantly influences consumers' decision-making process (Lertwannawit and Mandhachitara 2012; Lysonski and Durvasula 2013). Young consumers usually find it more important to follow the latest trends and purchase more frequently (Farsang et al. 2014).

Besides, a previous study (Gam 2011) has confirmed the positive effect of fashion consciousness on the adoption of eco-friendly clothing products. Moreover, the evidence has also indicated that fashion consciousness influences attitude (Casidy et al. 2015). Consumers having a sense of fashion consciousness are more likely to purchase clothing that reflects their style or to express their individuality (Cho et al. 2015). Transformable-designed apparel, which enables consumers to create different styles from one outfit for daily use, is a new trend in the market (Kasarda et al. 2007). This new style of fashion might draw the attention of fashion-conscious consumers and will develop positive

attitudes among consumers toward transformable garments. Therefore, the hypotheses were proposed as below:

H3 Fashion consciousness is positively associated with (a) attitude toward transformable apparel; and (b) intention to purchase transformable apparel products.

The tendency for creative choice

In the fashion industry, the tendency for creative choice indicates the preference for creating a unique personal style and identity through purchasing or creating innovative, original, or exclusive fashion items (Roach-Higgins and Eicher 1992). The tendency for creative choice is one factor of need for uniqueness (Tian et al. 2001). This inclination for unique and creative choices might motivate an individual to utilize available resources creatively in order to differentiate themselves from others. Individuals who desire creative choices are more likely to perform in an approach permitting them to leap out of the crowd (Tian et al. 2001). Innovatively wearing clothing or choosing unique clothing items are often taken as a non-verbal but noticeable means to demonstrate the individual uniqueness (Workman and Kidd 2000).

Apparel consumption is highly related to the establishment of an individual's notions and personality. To convey one's individuality and unique character, the clothing style people choose is essential. Transformable apparel, in itself, provides consumers with creative and innovative approaches to demonstrate their individuality; meanwhile, it is also able to meet consumers' constant fashion demand while not necessarily requiring more purchases. Therefore, they may have a more positive attitude toward transformable apparel. This feature of transformable apparel would appeal to those consumers who wish to obtain unique and creative fashion styles without relying on frequent purchases of new items. Thus, the hypotheses were proposed below:

H4 Tendency for creative choice is positively associated with (a) attitude toward transformable apparel; and (b) intention to purchase transformable apparel products.

Environmental beliefs

Environmental beliefs indicate individuals' point of view concerning the relationships between human beings and their natural surroundings (Scott and Willits 1994). Environmental beliefs are related to environmental concern, values or attitudes (Lee et al. 2014) and are identified as indirect predictors of specific environmental consumption behaviors (Corral-Verdugo et al. 2003), such as purchasing environmentally friendly products, extending the lifespan of existing products, reusing or recycling old items. People having environmental beliefs are aware of the importance of taking action to preserve the environment, and they tend to feel pressure to participate in more sustainable behavior. Therefore, they would be more likely to make decisions that they believe will generate environmental benefits. Evidence suggests the positive relationships between environmental beliefs and subjective norms and attitudes of consumers' sustainable behaviors

(Davari and Strutton 2014; Gadenne et al. 2011), which influence their environmental behaviors accordingly.

In addition, Farsang et al. (2014) have found that consumers who have more concerns about the environment are more likely to choose unique and less mainstream clothing to express their individuality. Transformable apparel is considered a sustainable alternative in the fashion industry (Rahman and Gong 2016). It gives consumers more options to make different looks from one outfit, which provides opportunities to people to consume less, save more and it may appeal to those consumers who intend to contribute for a better environment. Previous studies have suggested the positive relationship between environmental beliefs and environmental oriented purchasing behavior (Pickett-Baker and Ozaki 2008; Sharma et al. 2017). Therefore, the hypotheses were developed as follows:

H5 Environmental belief is positively related to (a) attitude toward transformable apparel; (b) subjective norms concerning sustainable consumption; and (c) intention to purchase transformable apparel products.

Environmental apparel knowledge

Environmental apparel knowledge refers to an individual's knowledge about the apparel products in related to the environment and awareness of the impact that consumption of apparel products has on the environment (Kim and Damhorst 1998). The knowledge in regards to the current environmental issues and problems has been identified as a critical factor and is associated with developing attitudes and behaviors reflecting environmental concerns (Kang et al. 2013). Individuals with environmental knowledge tend to have more concerns about the environment and consider the environment during the process of making purchase decisions (Kim and Damhorst 1998). For example, individuals who have more knowledge and know more about environmental issues related to apparel products are more likely to purchase second-hand apparel or apparel products made of recycled materials (Kim and Damhorst 1998).

Hustvedt and Dickson (2009) affirmed that the awareness of environmental apparel knowledge has a significantly positive effect on the consumption of apparel products. Those individuals possessing environmental apparel knowledge are inclined to consider the environmental impacts of their consumption before making the buying decision. Researchers have also confirmed the positive association between consumer attitude towards apparel sustainability and environmental apparel knowledge (Kozar and Hiller Connell 2013; Maichum et al. 2016; Oh and Abraham 2016). In addition, previous studies have also confirmed the positive relationship between consumer knowledge and subjective norms (Kang et al. 2013; Maichum et al. 2016). Transformable apparel can be repeatedly transformed into different styles or looks, which is a sustainable alternative to reduce over-consumption of clothing products and would appeal to those consumers who have environmental knowledge regarding apparel. Therefore, the hypotheses were developed below:

H6 Environmental apparel knowledge is positively related to (a) attitude toward transformable apparel; (b) subjective norms concerning sustainable consumption; and (c) intention to purchase transformable apparel products.

Method

Transformable apparel sample making

To create a more visualized idea about transformable clothing, four groups of transformable-designed apparel products were designed and utilized in this study. One female college student was invited to wear the samples. Photos were taken exhibiting the front of each garment worn by the student. The concept of transformable garments is based on clarifying potential target users' both psychological and physical needs. Specifically, the process of designing and making the transformable apparel sample included four phases. First, define the target market and narrow down the design problem pertaining to transformable-designed garments. Second, the ideat, where the researcher sought inspiration, sketched, and implemented transformational methods that met potential target users' needs. Third, the prototype, where the researcher tested designs that were selected in the ideating stage. Finally, build the collection where the researcher made apparel patterns and sewed garments (Lamb and Kallal 1992; Leonard and Rayport 1997).

Defining

The target market of the four sets of transformable garments was defined as college students who characterized themselves psychically or mentally as females, 20 to 25 years old, having a disposable income of $200 to $400 per month, and living in a college town in the Midwest. Another common theme among the target market was she cares about environmental issues and tries to live sustainably, for example, taking notes directly on their computer instead of printing on paper, knowing how to classify recycled and non-recycled garbage, and avoiding the use of excessive heat or air conditioning in her home.

Ideating

The second step of the creative process was to seek inspiration, develop a theme, sketch, and implement transformational methods. A picture from a book called Fashionable Selby (Selby 2014) inspired the inspirational spark. Bunches of buttons were placed scattered on the fabric, and each button could be moved easily from the fabric. Generally, the button cannot be moved once the button is sewn onto the fabric or the garment; therefore, the "moveable" button inspired the researchers to think outside the box. The researchers generated the idea of separating each piece of the clothing. That is, instead of sewing each piece of the garment together, each part could be attached by using buttons. When the button could be moved easily from the fabric, each part of the clothing could be considered separable. For example, the collar or the sleeve could be separated from the top. By applying this concept of transformational design, the whole garment could be worn in different ways based on the target users' styling preferences.

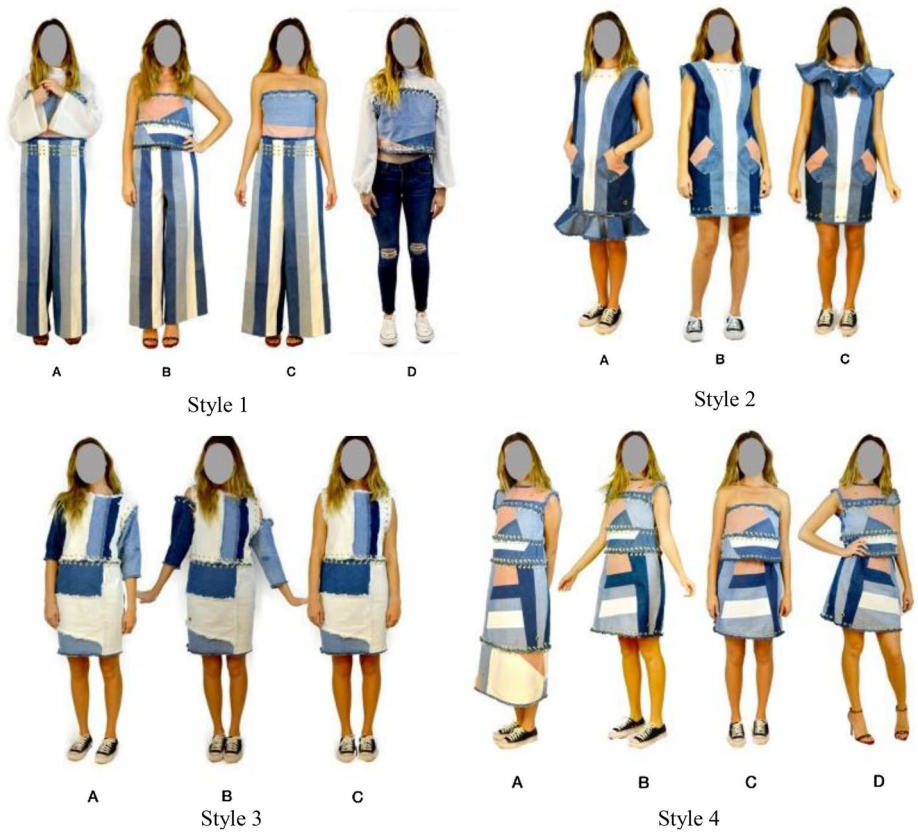

Fig. 1 Four groups of transformable garments. Instead of sewing each piece of the garment together, eyelets and cord were employed on the construction line of the garment, for example, waistline, neckline, and armhole. The researchers used a cord to connect each piece of the garment by passing the cotton cord over and through the eyelets. By re-lacing the cord, each style could be transformed and worn as different looks as depicted in this figure

Prototyping

Four transformational methods were first experimented by making prototypes to test which transformational methods would work the best. Each method was explored by creating an $8'' \times 8''$ fabric swatch of 100% cotton muslin. Muslin is an essential fabric widely used to make garment samples (Conway 1997). The four transformable methods were tested by the ease of use, style options, durability, aesthetics, and uniqueness. Two target consumers were invited to try the sample garment and requested to provide feedback. According to the test result and two target users' feedback, one transformable method was selected to make the final four groups of transformable garments.

Building

One of the researchers made the paper pattern, sewed the first sample, fit the model, made adjustments, and sewed the garments. The final four garments are displayed in Fig. 1. Eyelets were employed as the transformed method in the four prototypes. The eyelets were located along with the construction lines of the garments, for example, along with the neckline, the armhole or the hem. A 100% cotton cord passed through

one eyelet on the upper piece of the garment, then one on the lower part and so on until the end of the row. Each set of garments could be transformed into different styles by re-lacing the cord.

Style 1 was composed of three primary pieces including the shoulder with two sleeves, the middle part of the top and the pants. Three rows of eyelets were applied on the waistline of the pants of which the length could be changed by re-lacing the cord. Style 2 was a one-piece dress. By passing a cord through the eyelets, the ruffle could be attached on the hem or the neckline of the original dress. Style 3 was composed of three main pieces: a top, two sleeves, and a skirt. The sleeves connected with the top by lacing up a cord through the eyelets and the top attached with the skirt by passing a cord through the eyelets. By joining different pieces with the cord, Style 3 could be transformed into different looks, for example, a sleeveless dress and a sleeveless top. Style 4 was vertically divided into five pieces. By re-lacing the cord, the length of Style 4 could be adjusted based on the potential target users' preferences. In addition, the four prototypes could be transformed internally. For example, the skirt in style 4 could be connected with the top in style 1 by re-lacing the cord through the eyelets to create a new look. The transformation can be achieved by converting a simple, practical style to a romantic fashionable style. In addition, some skirts and sleeves (style 3 and 4) could be transformed into bags to extend the end use of the item.

Sampling and data collection

Young consumers are perceived as having high potential regarding innovation and the ability to serve as catalysts for leading the transition towards sustainability (Farsang et al. 2014). Female are usually more engaged in fashion consumption (O'Cass 2004). Besides, considering that the samples of transformable garments are all female clothing, young female consumers were targeted as our research population. A purposive sampling strategy with an online survey in Qualtrics was utilized to collect data. The survey link was sent to female college students in one public university in the Central United States. The researchers obtained the email addresses of college students from the University registrar office. Totally, 3000 emails with the survey link were sent to female college students from May 1st to May 8th, 2018. Data cleaning, including removing incomplete and invalid samples generated 306 usable responses, achieving a response rate of 10.2%.

Several procedures were applied to mitigate the common method bias during data collection as recommended by Podsakoff et al. (2012). First, a description of how to transform the garment from one style to another was provided following the image of each group of garments. This was done to help respondents better understand the transformable process and to increase the probability that respondents provide accurate answers. Second, each variable was measured by five items or fewer, and each item was kept short and easy to understand to increase respondents' motivation to provide accurate answers by reducing the level of impatience in the process of completing the survey. Finally, all items were worded in a positive way, and there were no reversed coded items involved in the measurement to decrease the difficulty of understanding each item for respondents.

Instrument development

The questionnaire was developed into three sections. In the first section, multi-items were developed to measure all the independent variables. Participants were asked to evaluate the level of agreement on each statement with 1 = "strongly disagree" to 7 = "strongly agree." Specifically, Fashion consciousness was measured by five items adapted from Matthews and Rothenberg (2017) and Parker et al. (2004). Environmental beliefs were evaluated by four items modified from Matthews and Rothenberg (2017). Five items borrowed from Tian et al. (2001) were used to measure the tendency for creative choice. A five-item scale suggested by Kim and Damhorst (1999) was utilized to measure environmental apparel knowledge. In addition, attitude was measured by a semantic differential scale (Ajzen 2002). Specifically, five groups of semantic differential adjectives were developed, following an incomplete statement in regards to transformable-designed apparel products. After reading the statement, participants were asked to select the adjective from each group that better reflects their opinion regarding transformable-designed apparel product to complete the statement. Lastly, three items modified from Ajzen (2002) were applied to evaluate subjective norms.

In the second section, participants were requested to looking at four groups of transformable-designed apparel products. Following each group of garments, a short paragraph was provided explaining how each garment can be transformed into another through wrapping, binding, twisting or folding, or removing a particular part from one place to another. After seeing the photos of each group of transformable garments and reading the description, participants were requested to evaluate their willingness to purchase each group of a transformable-designed garment by responding to the statement "I would like to purchase transformable clothing like this if they are available in the market." Last, an overall question was asked after viewing all the four groups of transformable-designed garments by evaluating the statement "Overall, I would like to purchase transformable clothing in the future." The demographic information of the participants was collected in the final section.

Results

Profile of participants

Of 306 usable responses included in the final data analysis, the majority of respondents were 18–25 years old, accounted for 90.5% of the whole sample, followed by 6.8% of participants whose age were from 26 to 30 years old. Concerning the education, there were 38.7% of participants reported that they were seniors, 22.8% were Junior, Freshman and Sophomore were 19.7% and 12% respectively, there were also 6.8% of respondents stated that they were in the graduate level. As for ethnicity, 83.5% of participants were Caucasian/white; there were also 7.1% of them were Asian or Pacific Islander, followed by 3.4% Hispanic. There were 60.1% of participants reported that they were working as part-time and 8.5% of them work full time. Regarding the annual household income, 47.3% of participants reported having $80,000 or over and 38.2% having a yearly income between $40,000 and $79,999; others were lower than $39,999.

Measurement model

Firstly, exploratory factor analysis (EFA) was employed with the Varimax rotation to verify each construct. The model of seven factors with 32 items was confirmed. The factor loading of each item for EFA was from 0.644 to 0.881. The eigenvalue of each factor ranges from 1.317 to 9.515, indicating that these factors can be retained and used for further analysis (Courtney 2013). These seven factors explained 77% of the total variance, and KMO measure of sampling adequacy indicated 0.900. All communalities ranged from 0.664 to 0.845.

Then, the results of confirmatory factor analysis (CFA) illustrated a good model fit ($\chi^2_{(df = 443)} = 952.749$, $p < 0.001$, $\chi^2/df = 2.15$; RMSEA = 0.057; CFI = 0.940; TLI = 0.933; SRMR = 0.045) (Hu and Bentler 1999; Kline 2010). The CFA loadings for each item all exceeded 0.5, which supported the convergent validity of the construct (Kline 2010). Besides, all AVEs fall into the range between 0.667 and 0.727 exceeding squared correlations between the constructs, which suggested the confirmation of discriminant validity (Fornell and Larcker 1981). Furthermore, the reliability of each construct was also established as all Cronbach's alpha estimates were greater than 0.7 (Cortina 1993). Tables 1 and 2 present the analysis results of the measurement.

Hypotheses test

A structural equation model (SEM), the multivariate statistical analysis technique that is widely used to analyze proposed structural relationships in the behavioral sciences (Hox and Bechger 1998), was then conducted to evaluate the proposed hypotheses. The statistic results reported an acceptable model fit ($\chi^2_{(df = 444)} = 953.321$, $p < 0.001$, $\chi^2/df = 2.14$; RMSEA = 0.057; CFI = 0.941; TLI = 0.933; SRMR = 0.045).

The results indicated that respondents who reported higher positive attitude towards transformable indicated stronger intention to purchase those garments ($\beta = 0.336$, $p < 0.001$), supporting H1. However, the effect of subjective norm on the intention to purchase transformable apparel was not significant ($\beta = 0.077$, $p = 0.247$). Thus, H2 was not supported. Not as predicted, Fashion consciousness was found to have no significant relationship with attitude toward transformable apparel ($\beta = 0.027$, $p = 0.575$), but the influence of fashion consciousness on the intention to purchase transformable apparel products was found to be significant ($\beta = 0.138$, $p < 0.027$). Therefore, H3a was not supported, but H3b was supported. As predicted, the positive relationship between the tendency for creative choice and the intention to purchase transformable apparel products was confirmed ($\beta = 0.159$, $p < 0.016$), but no significant association was found between the tendency for creative choice and attitude toward transformable apparel ($\beta = 0.072$, $p = 0.142$). Thus, H4b was supported, but H4a was not supported. Also, the positive effects of environmental beliefs on attitude ($\beta = 0.281$, $p < 0.001$), subjective norm ($\beta = 0.479$, $p < 0.001$) and the intention to purchase transformable apparel ($\beta = 0.233$, $p < 0.028$) were all significant. Therefore, H5 was supported. Finally, environmental apparel knowledge was found to be positively related to both subjective norms concerning sustainable consumption ($\beta = 0.187$, $p < 0.010$) and the intention to purchase transformable apparel products ($\beta = 0.206$, $p < 0.007$), but not attitude ($\beta = 0.074$, $p = 0.295$). Thus, H6b and H6c were supported, but H6a was not supported. Figure 2 illustrates the results of hypotheses.

Table 1 Measurement model results

Measures	Std. loading	t-value	α	AVE
Attitude (I think transformable clothing is…) (ATT)			0.929	0.727
Unpleasant: pleasant	0.790	35.418***		
Harmful: beneficial	0.867	53.411***		
Bad: good	0.908	71.741***		
Worthless: valuable	0.872	56.662***		
Un-enjoyable: enjoyable	0.820	40.358***		
Subjective norms (SN)			0.886	0.722
People who are important to me agree with my concern for the environment when purchasing clothing	0.827	36.950***		
People who are important to me think I should consider the environment when purchasing clothing	0.865	44.205***		
People in my life whose opinion I value consider the environment when purchasing clothing	0.856	42.599***		
Fashion consciousness (FC)			0.916	0.690
I keep my wardrobe up-to-date with the changing fashions	0.835	42.213***		
I usually have one or more outfits of the very newest styles	0.862	48.996***		
If I heard that new fashion clothes were available in store, I would be interested enough to buy it	0.830	41.928***		
I have a strong interest in new fashions	0.768	31.049***		
Fashionable, attractive styling is very important to me	0.854	47.985***		
Tendency for creative choice (TCC)			0.915	0.685
I often look for one-of-a-kind products or brands so that I create a style that is all my own	0.835	43.735***		
Often when buying merchandise, an important goal is to find something that communicates my uniqueness	0.800	36.302***		
I often combine possessions in such a way that I create a personal image for myself that cannot be duplicated	0.791	34.828***		
I often try to find a more interesting version of ordinary products because I enjoy being original	0.887	59.830***		
I am often on the lookout for new products or brands that will add to my personal uniqueness	0.822	40.279***		
Environmental beliefs (EB)			0.893	0.683
I am willing to participate in preserving the environment	0.792	34.188***		
I believe personal responsibility for environmental problems is important	0.895	59.917***		
I believe the moral obligation to help the environment is important	0.895	59.714***		
The increasing destruction of the environment is a serious problem	0.709	23.864***		
Environmental apparel knowledge (EAK)			0.913	0.684
Dyeing and finishing processes use a lot of water	0.766	31.014***		
Air pollution can occur during some common dye processes of textiles	0.883	59.120***		
Special finishes on fabrics may create problems for recycling	0.837	43.651***		
Chemical pollutants are produced during the manufacturing of synthetic or manufactured fibers such as polyester	0.858	48.718***		
Phosphate-containing detergents can be a source of water pollution	0.786	33.300***		
Transformable apparel purchase intention (PI)			0.909	0.667
I would like to purchase transformable clothing like this (garment 1) if they are available in the market	0.836	42.811***		
I would like to purchase transformable clothing like this (garment 2) if they are available in the market	0.847	45.485***		
I would like to purchase transformable clothing like this (garment 3) if they are available in the market	0.760	29.742***		
I would like to purchase transformable clothing like this (garment 4) if they are available in the market	0.834	42.104***		
Overall, I would like to purchase transformable clothing in the future.	0.802	35.913***		

***$p < 0.001$

Table 2 Correlation matrix of measurement

	ATT	SN	FC	TCC	EB	EAK	PI
Attitude (ATT)	0.727						
Subjective norms (SN)	0.039**	0.722					
Fashion consciousness (FC)	0.016*	0.013*	0.690				
Tendency for creative choice (TCC)	0.040**	0.072**	0.375**	0.685			
Environmental beliefs (EB)	0.088**	0.167**	0.000	0.031**	0.683		
Environmental apparel knowledge (EAK)	0.064**	0.106**	0.036**	0.057**	0.259**	0.684	
Transformable apparel purchase intention (PI)	0.131**	0.080**	0.098**	0.140**	0.105**	0.120**	0.667

*$p < 0.05$; **$p < 0.01$; the numbers below diagonal are the squared correlation coefficient between the variables. The numbers in diagonal are the average variance extracted by each variable

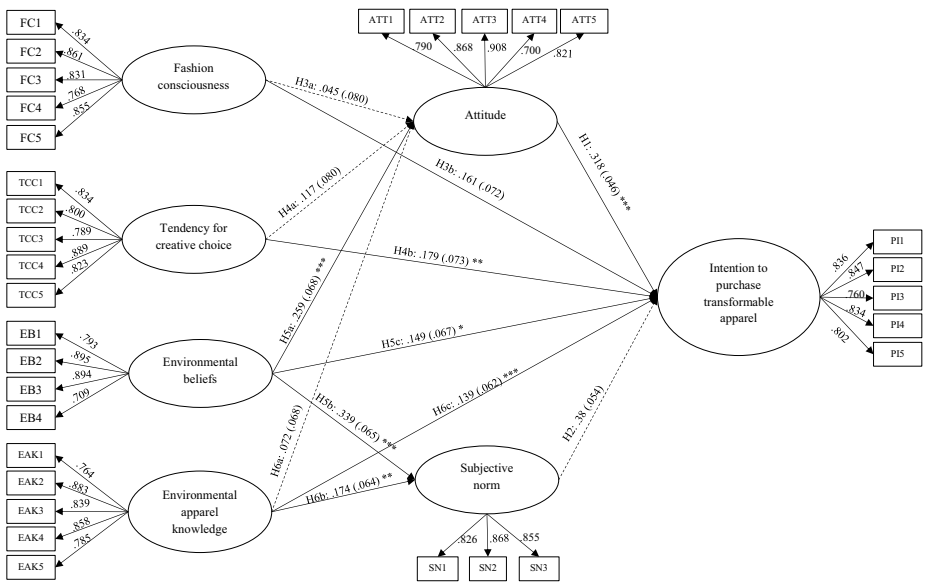

Fig. 2 Results of hypotheses testing (***p < 0.001, **p < 0.01, *p < 0.05; standardized estimates with standard errors in parentheses; the dotted line indicates non-significant relationship)

Discussion and implication

This study intends to identify the factors that have influences on young consumers' purchase intention of transformable apparel products by applying the theory of reasoned action (TRA) as the theoretical foundation. The results of the structural equation estimation confirmed the positive influences of the tendency for creative choice, environmental beliefs, environmental apparel knowledge, and attitude on female college students' intention to purchase transformable apparel products.

The influence of personal values

Not as predicted, fashion consciousness has no impact on attitude, but its effects on intention to purchase transformable apparel was confirmed to be significant in a positive way. The results are different from Ma and Koo (2016) who found that there is no difference between a high and low level of fashion consciousness consumers in purchase

intention for a transformable dress. Fashion-conscious consumers usually hold a high degree of interest in, and awareness of the latest fashions (Cho et al. 2015) and they desire to identify unique styles for self-expression and individuality (Lertwannawit and Mandhachitara 2012). Usually, transformable apparel is a unique option for some consumers, and the available styles may fulfill consumers' need for modern trends. Therefore, highlighting that transformable apparel, in itself, is a new trend and fashionable may stimulate interests among consumers. Besides, the result is consistent with previous research that has indicated the positive influence of fashion consciousness on eco-friendly consumption (Gam 2011). To some participants, purchasing transformable apparel can be considered sustainable consumption behavior and this feature would encourage them to buy transformable garments.

As for the hypotheses of the tendency for creative choice leading to the intention to purchase transformable apparel, the results indicate that the need for creative choice significantly influences consumers' purchase intention. The critical characteristic of individuals with the tendency for creative choice is the preference to differentiate themselves from others through the purchase and use of innovative and unique clothing items (Roach-Higgins and Eicher 1992). Although the style of transformable apparel may not be of the latest fashion items, the feature of one outfit being able to be worn in different ways would be attractive to those consumers who want to differentiate themselves from others. That is, when fashion retailers promote transformable apparel to young consumers, they should highlight the features of uniqueness and creativity of transformable garment. Besides, the idea of involving users in the styling process while transforming the item may also be attractive to those consumers who prefer creative choices.

The influence of environmental beliefs and knowledge

As expected, the results of this study pointed out the positive impact of environmental beliefs on the intention to purchase transformable apparel, which falls in line with the findings from the previous research conducted by Corral-Verdugo et al. (2003). Furthermore, the results also indicated the significant influence of environmental beliefs on attitude toward transformable apparel and subjective norms concerning sustainable consumption behavior. People with strong environmental beliefs are aware of the importance of taking actions to preserve the environment, and they tend to make decisions that they believe will lead to environmental benefits. The study results confirmed that environmental beliefs draw the subjective norms and attitudes of consumers (Davari and Strutton 2014), and therefore, lead to sustainable consumption activities. Although purchasing transformable apparel does not emphasize pro-environmental attitudes, knowing that one outfit can be transformed into different looks may encourage consumers to display their beliefs in reducing levels of consumption as alternative ways to preserve the environment. To promote new collections and to expand the market, designers or fashion retailers who provide transformable apparel could highlight the environmental benefits to those consumers who care about environmental sustainability. For example, the transformable garment can be converted into different styles, which will increase the use of frequency and reduce excessive purchases and ownership burden.

As predicted, the results indicated that environmental apparel knowledge has positive influences on both subjective norms and the intention to purchase transformable

apparel. This positive influence on subjective norms concurs with a previous study conducted by Kang et al. (2013); however, no studies have been done to examine the impact of environmental apparel knowledge on purchase intention of transformable apparel. Environmental knowledge is considered a critical factor in influencing consumers' behavior. People knowing the environmental impact of apparel products tend to have more concerns about the environment (Kim and Damhorst 1998), and they will be more likely to take actions to preserve the environment, such as reducing the consumption of apparel items. More knowledge in regards to the environmental impacts of the fashion products may be able to drive the interest of transformable apparel among consumers. For example, retailers can offer workshops to introduce the influence of fashion on the environment. Not as predicted, environmental apparel knowledge was found not to influence attitude. This result is different from the previous research (Kozar and Hiller Connell 2013; Oh and Abraham 2016). This difference in results may be because the measurement of attitude in this study is more specific, with a direction toward transformable apparel products, whereas in previous research, the attitude was directed toward sustainable consumption, in general.

The theory of reasoned action

Specifically, as with the previous research in regards to collaborative consumption (Johnson et al. 2016), the attitude was found to influence the purchase intention positively. This result contributes to the current literature in that there were no previous studies done in regards to the influence of attitude on the intention to purchase transformable apparel. Attitude has been confirmed to be a very important factor influencing consumers' intention toward various behaviors in the field of sustainable consumption, such as fashion renting (Johnson et al. 2016), the purchase of customized apparel products (Lang et al. 2018), collaborative consumption (Hamari et al. 2016), and green purchasing consumption (Paul et al. 2016). This positive relationship between attitude and intention affirms previous research and suggests that to decide whether purchase transformable apparel is a process in which consumers take their beliefs about these types of products into consideration.

Contrarily, the results did not find a significant relationship between subjective norms and the intention to purchase transformable apparel products. This result falls in line with the conclusion from a previous study conducted by Paul et al. (2016) on sustainable consumption behaviors but is different from a prior study by Johnson et al. (2016). This difference may be because an individual's decision-making process is complicated and influenced by different factors. For instance, participants may not link the consumption of transformable apparel to a sustainable consumption activity. In addition, the different styles shown to participants in the survey may also influence their impression of the transformable garment, for example, when they don't like the styles provided. Another explanation of this result may lay in the fact that participants were from an individualistic culture (Hofstede 1980) where people put more emphasis on personal preferences instead of social influences in their shopping behaviors.

The results of this study successfully extended the TRA model by indicating environmental beliefs as an external factor in this model. Through structural equation estimation, environmental beliefs were proved to play an essential role in the development of

consumer attitude and subjective norms, thereby influence young female consumers' intention to purchase transformable apparel products. Though the positive influence of environmental apparel knowledge on subjective norms was confirmed, the impact of subjective norms on intention was not significant, which does not support the mediated effect of subjective norms in the relationship. Besides, the external impacts of fashion consciousness and the tendency for creative choice in the TRA were not supported due to the result that neither factor had a significant impact on attitude.

Conclusion and limitations

This study identifies that both personal features and environmental-related factors foster the purchase intention of transformable apparel products among young American consumers. By taking the two individual personal values and environmental-related elements as external factors, this study extended the TRA model. It is the first time that these personal values and factors have been investigated concerning the purchase intention of transformable apparel in the fashion industry. The study provides researchers with a foundation to rationalize examining further motivations in future studies.

Several limitations exist in this study, which allow further investigation in future research. First, the method of a self-administered online survey may limit the generalization of the results. Moreover, only young college female students were included in the study; thus the results cannot be generalized to a broad population. Second, only four groups of transformable apparel products were provided in the survey. Participants were requested to review the four groups of pictures first before evaluating their purchase intention, which might influence their response to the intention to purchase transformable clothing in general. Third, participants were not asked if they are actual users of transformable apparel and whether or not they have knowledge of transformable clothing. The future study comparing how users differ from non-users would make further contributions to the literature. Besides, not having actual experiences of purchasing and wearing transformable apparel may limit their evaluation of transformable apparel. Furthermore, the items used to measure environmental apparel knowledge were borrowed from a previous study directly, which are general and elemental. Future studies may adapt the items to be more specific towards the topic in question. Additionally, the study utilized a 7-point scale with 1 = "strongly disagree" to 7 = "strongly agree," for which participants may agree rather than disagree. Future studies may adopt different measurement methods to avoid acquiescence bias. Finally, the results of this study are related to consumers' intention, instead of actual behavior. Future research considering past consumption behavior would provide more benefits to the literature.

Authors' contributions

CL designed and conducted the research, analyzed the data and drafted the manuscript. BW designed and made the transformable garment, collected data and drafted the garment sample making process. Both authors read and approved the final manuscript.

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