

**Do not throw ugly products online – Examining the effect of product aesthetics on consumers' online shopping experiences**

**Abstract**

The present study found that such product attributes as product color appeal, an important facet of product aesthetics, play an important role in consumers' online shopping experiences. This study established the product-to-website relationship. Specifically, it showed that product color appeal positively influences consumers' perceptions of website usefulness and enjoyment, as well as online trust. Consumers' perceived website usefulness and online trust subsequently influence their attitudes toward the e-commerce websites.

**Keyword:** Product aesthetics, product color appeal, perceived usefulness, perceived enjoyment, online trust, attitude

## **1. Introduction**

Over the past fifty years, product quality is one of mostly-investigated topics in the Business discipline. It plays a crucial role in determining product success and helping a firm stand out from its competitors . Given its importance, issues concerning product quality have triggered the enthusiasm of both practitioners and researchers. In academia, product quality has been approached differently by several academic paradigms.

Researchers interested in new product development have found that in seeking a new product, consumers prioritize product quality instead of product launch speed. Products that excel in quality have the potential to contribute to higher sales growth. Others with a focus on capital market have found that higher ratings of a product's quality boost stock price of the firm launching the focal product. Perhaps, more evidence concerning the power of product quality comes from the consumer studies that take the behavioral approach. Prior consumer behavior studies have found that product quality influences people's behavioral intentions (e.g., purchase intention, repurchase intention, and loyalty) both directly and indirectly through such behavioral antecedents such as customer satisfaction, and perceived value.

Marketing scholars aside, the rise of e-commerce also draws IS scholars to study product quality; the contributions of IS works are two-faceted. First, they confirmed that product quality continues to play a vital role in the Internet context, which determines the e-commerce success. Second, certain IS works found that product quality also has an effect on people's perceptions of websites, the surrogating of

vendors in the Internet context.

The review of both marketing and IS literature on product quality indicates two major gaps that yet to be filled. The first gap is a scarcity of research focuses on different dimensions of product quality. Product quality is a multi-dimensional construct, comprised of performance, features, conformance, reliability, durability, serviceability, aesthetics, customer perceived quality . Previous empirical works, however, treated product quality as a “black box”. This is understandable because the main purpose of these works was to test the effects of product quality and the “black box” view of product quality allows for a parsimonious research model. Thanks to numerous prior research efforts, the power of product quality is now well-regarded. Thus, we believe it is time for us to pry up the “black box” of product quality and to study each quality dimension individually. This is particularly true when Tellis and Johnson found that quality dimensions contribute to overall product quality differently and these dimensions have varied influences on firm performance in capital market. The second gap is little research addresses the influences of product quality at the pre-shopping stage. This gap is also understandable because previous works associated product quality more with functionalities. It seems natural that customers cannot access product functionalities until they purchase it. This is even more the case for e-commerce as many product cues are disabled online. For example, customers are not able to physically see products and touch products to assess their qualities. Product aesthetics, one significant dimension of quality, stands in stark contrast to product functionalities. Previous research has shown that people

form aesthetic impressions of a product within 1 second. This is to say people might have a sense of product quality by evaluating its appearance during the pre-shopping stage. To our best knowledge, little research has been done to address how product aesthetics drive consumers' pre-shopping behaviors in e-commerce.

To fill the forgoing void, the purpose of this study is to test how product aesthetics, one dimension of product quality, affects consumers' online pre-shopping behaviors. To this end, we created a fictional website that sells apparel online. We then conducted an experiment where subjects were given a task to browse the products of that website and were subsequently asked to evaluate the site. Given the multi-dimensional nature of product aesthetics, this paper focuses on product color, one of the most important features of aesthetics, for the sake of parsimony. Our results show that color-appealing products have direct effect on users' attitude towards e-commerce websites. In the meantime, it affects users' perceived usefulness and enjoyment of e-commerce websites, and their online trust, three critical antecedents of their attitudes toward the websites. All of these impacts occur at the pre-shopping stage.

There are at least two points to justify the importance of the present research. First, intellectual knowledge on product quality in the e-commerce context has been limited to its direct effect on people's purchase intentions. Questions concerning the relationships between product quality and users' perceptions of e-commerce websites remain unclear. This paper provides empirical evidence supporting the product-to-website relationship. Given that conventional thoughts of e-commerce success rarely

consider the role of product factors , this paper enriches IS discipline's understanding of e-commerce issues. Second, it warns e-commerce practitioners that customers might not bother to buy a product for the first time, if such product is low in aesthetics, not mention to repeated purchases. Certain e-vendors might naively believe that customer loyalty does not matter as long as they can attract a critical mass of people to buy their products just once. Our paper shows that e-vendors need to deliberately select the products that sell online. An ill-designed product even negatively influences users' perceptions of e-commerce websites which drive them away before they make any purchases.

## **2. Literature review**

To investigate the effects of product aesthetics in the e-commerce settings, we believe it is beneficial to start off by clarifying two questions: What is aesthetics? Does product aesthetics matter? An answer to the first question will help readers gain a further understanding of the notion of product aesthetics. On the other hand, aesthetics can be conceptualized by different schools of thoughts. The clarification of the aesthetic view adopted by this study serves as a foundation for the later experiment by which we can measure people's perceptions of product aesthetics. A clarification to the second question provides insights into understanding how product aesthetics matters to e-commerce practitioners.

### **Aesthetics**

Along the history of humankind developing the notion of aesthetics, there have been three major views addressing what is beauty<sup>1</sup> . The objectivist view stems from

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<sup>1</sup> Starting from this point, we will use the words "beauty" and "aesthetics" interchangeably.

the Renaissance. It attributes beauty to a function of certain properties of an object. Although these characteristics produce a sense of pleasure among individuals, the objectivist view holds that things are beautiful on their own right. The identified features that improve objects' aesthetic performance include order, symmetry, balance and proportion, novelty and prototypicality, contrast and clarity, simplicity and complexity.

In contrast, the subjectivist view attends perceivers' feelings and posits that anything could be beautiful as long as it pleases perceivers' feelings. Proponents of the subjectivist view believe that beauty is nothing more than a perceiver's sense of enjoyment and pleasure. In other words, the subjectivist view equals beauty to pleasure.

A more recent and dominant school of thought blends the objectivist and subjectivist extremes, and takes the interactionist perspectives. The interactionist view considers both properties of an object and the characteristics of the perceiver, and proposes that beauty arises from patterns of the process in which objects and perceivers interact. A better annotation of the interactionist view comes from Santayana's work. He contended that beauty is value-positive, intrinsic, and objectified. Beauty is value-positive because it pleases perceivers. Its intrinsic nature suggests that beauty has nothing to do with any reasoning about an object's functionality. The objectified nature suggests that beauty arises toward certain features underlying an object and that beauty is not the result of perceivers' pleasure. Like previous IS works that examines the aesthetics issue, this paper takes the interactionist

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view to conceptualize product aesthetics and to measure product color appeal, one critical components of product aesthetics.

### **Product aesthetics**

The mass press is replete with anecdotal stories favoring aesthetically-designed products such as Apple's iMac, iPad, and iPhone, the Volkswagen Beetle, and so on. Product designers recognized the value of product aesthetics even in 1990s. In a survey conducted in five countries of Europe and North America, 75% of the participating product designers regarded aesthetics as the key aspect of design . In addition to these practical evidence, the power of product aesthetics is also well-regarded in academia. Prior research has proposed that product aesthetics contribute to firms in five ways . First, it helps a firm's product gain customer notice, thus standing out from the cluttered market. At the firm level, product aesthetics appears as a strategic tool to gain competitive edges. Second, it allows a product to better communicate information to customers. Third, it stimulates and pleases customers' senses, improving their life quality. Fourth, it appears as a cue by which customers infer other product characteristics such as dollar value, technological sophistication, prestige, and so on. Fifth, product aesthetics have long lasting effects.

As previous works pointed out, aesthetics is a multi-dimensional construct. It consists of a sea of visual elements . For the sake of a parsimonious research model, this paper focuses on color, one of the most important components of aesthetics .

### **Research framework**

Based on the Stimulus-Organism-Response (S-O-R) framework , this study

proposed a research framework to examine how online shoppers perceive product aesthetics (see Figure 1). The framework suggests that product aesthetics triggers online shoppers' affective and cognitive reactions to the e-commerce website; and further, such psychological changes, in turn, influence their attitudes toward the e-commerce websites. As noted earlier, product color appeal is selected as the exemplar proxy of product aesthetics. Perceived usefulness and perceived enjoyment of the website are proxies of cognitive reaction and affective reaction respectively. According to Corritore et al. , trust encompasses both the cognitive and affective elements. Therefore, the framework positions trust in the overlapping area of people's cognitive and affective reactions. The choice of perceived usefulness, perceived enjoyment, and trust to represent people's reactions at different levels is also consistent with prior e-commerce research .

### **3. Hypothesis development**

Based on the forgoing research framework, we proposed our research model in Figure 2. We provide our justification for each path as follows.

#### **Product aesthetics**

In the inquiry of why people shop online, conventional IS research gives attention to the difference between the online and offline channel – the website. They are busy with identifying and validating website-related factors that influence consumers' online shopping behaviors. Such factors include website interactivity and social presence, perceived usefulness, perceived ease of use, usability, perceived enjoyment, and so forth. Online shoppers, however, assume a dual role of an IT user and a

customer. Therefore, in addition to technology factors, product also has a role in the e-commerce context just like it does in offline shopping environments. In offline environments, product quality (or product aesthetics) influences customers' purchase intention and their evaluation of the vendors (in the form of customer satisfaction). Because in the e-commerce context, websites are the agents of vendors, it is reasonable to expect that such product quality dimensions as aesthetics also influences online shoppers' purchase intention and their evaluation of the focal websites. Prior research has showed that product quality has an impact on consumers' evaluation of e-vendors. According to Chen et al. , product quality, together with system quality and information quality, contribute to e-satisfaction. Schaupp and Bélanger also found that e-commerce satisfaction is the result of product factors, as well as technology factor and shopping factor. Satisfaction is an evaluation of an e-vendor's overall performance relative to expectation. Likewise, perceived usefulness is users' evaluation that shopping at an e-commerce website will improve his or her shopping experience; perceived enjoyment is their evaluation that shopping at an e-commerce website will bring about an awareness of holistic sensation; trust is their evaluation that if e-vendors will fulfill its transactional obligations . Therefore, while the product-satisfaction flow is well established by previous e-commerce research, presumably, such product factors as product color appealing will affect online shoppers' other evaluation of the site including perceived usefulness, perceived enjoyment, and trust.

On the other hand, product aesthetics such as color appeal might contribute to

users' perceptions of website usefulness, enjoyment, and trust through halo-effect. To justify the necessity of product aesthetics, Bloch posited that product aesthetics "... can have an impact for years on users and non-users alike as products become part of the sensory environment, for good or bad". Thus it can be inferred that when people shopping online, no matter they purchase or not, the aesthetics of the products displayed on a website is a critical part of their sensory environments. Product aesthetics, together with web interface aesthetics, form online shoppers' sensory worlds and they have to live with it until they leave the site. Prior research has showed that people see computers and websites as social actors with human-traits, just like a teammate or a specialist . In their seminal paper entitled "What is beautiful is good," Dion et al. found that physically attractive persons are associated with more socially desirable personal traits than those who are unattractive. This process takes place through halo-effect. Therefore, it is reasonable to expect that product aesthetics, by helping an e-commerce website create an aesthetically-appealing sensory world for online shoppers, has the potential to allow online shoppers to perceive other qualities of the site like the website is useful, it is enjoyable to shop there, and it can be trusted.

The previous two paragraphs theoretically suggested that product aesthetics might induce people's cognitive and affective reactions to an e-commerce website. To further consolidate the potential relationships between product aesthetics, and perceived usefulness, perceived enjoyment, and trust, more work is needed.

**Product aesthetics and perceived usefulness of websites** People are genetically designed to appreciate beauty . Therefore, when online consumers browse an e-

commerce website, even if they don't have a particular product in mind to buy, they tend to regard the website as useful because the display of beautiful products gratifies their inner needs to appreciate beauty. On the other hand, Ahn et al. found that perceived product quality positively influences perceived usefulness of the e-commerce website. Presumably, product aesthetics, as a critical component of product quality, has the potential to influence perceived website usefulness. Moreover, product aesthetics also allow online shoppers to infer other product cues from it (e.g., dollar value, technological sophistication, and prestige), and higher product aesthetics leads to more positive perceptions of these cues. With more product information available, people might perceive that the website is useful in assisting them to complete the shopping task. The present paper selected product color appeal to represent a facet of product aesthetics. Thus, we hypothesized that:

**H1:** Perceived product color appeal positively influences the perceived usefulness of an e-commerce website

**Product aesthetics and perceived enjoyment of websites** It is widely recognized that aesthetics directly influences people's affect. Color also inherits such trait. Prior research has found that the right choice of color produces pleasure and excitement among viewers. Reimann et al.'s work showed that products with aesthetically appealing package get consumers more involved with the products (i.e., consumers find the focal product more appealing, interesting, and exciting). In the online shopping context, consumers experiencing higher product involvement have a more enjoyable shopping experience. Thus, we hypothesized that:

**H2:** Perceived product color appeal positively influences the perceived enjoyment of an e-commerce website

**Product aesthetics and trust** Product aesthetics is a significant facet of product information. It helps consumers create an initial impression of a product, and allows them to infer other product attributes like price does . As Bloch posited, product aesthetics emerges as a means of communicating information to consumers. In the e-commerce context, high product information quality enhances users' trust on e-commerce websites . Therefore, it can be expected that products that are appealing in color, an important visual elements of aesthetics, might contribute to high online trust. Thus, we hypothesized that:

**H3:** Perceived product color appeal positively influences the consumer's trust.

**Product aesthetics and purchase intention** Anecdotal stories are replete with how people make impulsive purchase decisions simply based on how beautiful a product is. The success of Apple's iMac and Volkswagen's Beetle indicates the effect of product aesthetics on consumer purchase decision at the macroeconomic level. The precept "Don't judge a book by its cover" vividly reflects people's tendency to make decisions by a thing's outward appearance alone. However, in consumer behavioral studies, few have examined the relationship between product aesthetics and purchase intentions. Maybe such relationship is taken for granted. Given that attitude is the antecedent of people's behaviors, based on anecdotal evidence, we hypothesized that:

**H4:** Perceived product color appeal positively influences consumer's attitudes toward e-commerce websites.

### **Perceived usefulness**

Perceived usefulness is an important construct in the technology acceptance model. It measures individual's subjective assessment of the utility offered by the IT in a specific task-related context . Gefen et al. adapted this construct to the e-commerce settings, examining how people evaluate the utility of the website in assisting them completing the shopping task. In this paper, we followed Gefen et al. 's conceptualization of perceived usefulness of e-commerce website. Prior research has shown that perceived usefulness positively influences consumers' attitudes toward e-commerce website . Therefore, we hypothesized that:

**H5:** Perceived usefulness positively influences consumer's attitudes toward e-commerce websites.

### **Perceived enjoyment**

Enjoyment has its root in the flow theory. It was defined as “awareness of holistic sensation when people are totally involved in a certain activity” . Previous research has found that like offline shopping, people shop online not only for utilitarian purposes like convenience and low cost, but also for fun and relaxation . Therefore, we hypothesized that:

**H6:** Perceived enjoyment positively influences consumer's attitudes toward e-commerce websites.

### **Trust**

Trust has long been an issue in e-commerce studies. This is because the formation of trust relies on social cues, which are inhibited in the Internet settings . In the

meantime, the Internet environment is full of risks. Generally, there are three categories of risks: (1) consumers' belief that the use of an e-commerce website might require too much time, effort, and money, (2) consumer's belief that private information revealed during the online transaction might be missed, and (3) consumer's belief that the purchased product might fail their expectations . Such potential risks render consumer trust particularly important in predicting e-commerce success. Following prior research which found that trust positively influences user attitudes , we hypothesized that:

**H7:** Trust positively influences consumer's attitudes toward e-commerce websites.

#### **4. Methodology**

##### **Experimental description**

The research methodology of this study is a free simulation experiment . According to this method, treatments are not pre-set, but are freely chosen by the subjects. The advantage of this experiment method is that it intends to create real-world scenarios, thus it solicits subjects' responses to experimental tasks as natural as possible. It maximally eliminates any confounding effects due to laboratory settings. The free simulation experiment is common in e-commerce research (e.g., Gefen and Straub, 2003).

Before the experiment begins, we created a virtual e-commerce website selling apparel. The web pages of the virtual website are the same as the real online shopping website of the university where the subjects are from. The only difference is that it

cuts off other product categories like textbook, software, and so forth. Figure 3 shows the screenshot of the website. During the experiment, the subjects were given a task of purchasing a shirt as a gift for a new coming student. Apparel was selected as the item sold online because it has long been the top selling online products (HarrisInteractive, 2004). Thus, we believe the subjects would feel familiar and comfortable with the given task. In the meantime, due to the nature of apparel, product color appeal is relative easy to engender among subjects. The experiment was conducted entirely online. Subjects could finish the study from any computer with the Internet connection to increase the realism of the online shopping task. Upon completing viewing the website, subjects were required to fill out a questionnaire regarding their shopping experiences on the experimental website.

### **Subjects**

The subjects were undergraduate students attending an IT class at a public university in the Southern region of the United States. They were given extra credit to ensure that they would take the experiment seriously. A total of 110 students participated in the study. Among them 87 successfully completed the whole experience. Therefore, our total sample size is 87.

### **Content validity**

Color appeal was measured using questions adapted from Cyr et al.'s study on e-commerce. Perceived usefulness and perceived enjoyment were measured using items adapted from Chao et al.'s study on e-commerce. Online trust was measured by the items developed by Kim et al. . The attitude measurement comes from Yang and Yoo's

work . Minor modifications were made to these scales to fit the context of the present study. All the questions were based on a 7-point Likert scale with 1 representing strongly disagree, 4 representing neutral, and 7 representing strongly agree.

To further assess the content validity of these items, we took two additional steps. First, two scholars with expertise in e-commerce research were invited to examine the items. Next, the questionnaires with revised items were further examined by six Ph.D. students in related fields to identify confusing or ambiguous items. After analyzing their feedback, a number of minor revisions were made to refine the language of the questionnaire.

## **5. Results**

Partial Least Squares (PLS) was performed to analyze data and theoretical relationships within the research model with WarpPLS 3.0 software package.

### **Reliability**

Reliability reflects the consistency of a research instrument. It can be measured by Cronbach's alpha and Fornell's composite reliability. Table 1 shows that the Cronbach's reliability coefficients of all variables ranged from 0.873 to 0.974, higher than the minimum cutoff score of 0.70 suggested by Hair et al. . Whereas Cronbach's alpha implicitly assumes that each item carries the same weight, composite reliability relies on the actual loadings to construct the factor score and is viewed as a better measure of internal consistency . Among all the constructs in this study, the lowest value of composite reliability is 0.892 (see Table 1), which satisfies the benchmark of 0.70 and indicates adequate internal consistency. Additionally, average variance

extracted (AVE) is computed to assess construct reliability . It measures the percentage of the variance of a construct explained by any individual item. All of the AVE values in this study are higher than the threshold of 0.50 (see Table 1), suggesting that more than 50% of the variance of the measurement items can be accounted for by the constructs (Fornell and Larcker 1981).

### **Construct Validity**

Construct validity examines the extent to which a construct measures the variable of interest. The items within one construct should demonstrate relatively high correlation (convergent validity) whereas the items from different constructs are characterized by low correlation (discriminant validity). Convergent validity is considered acceptable when all item loadings exceed 0.70 . Table 1 displays the computed factor analysis results. All the item loadings are greater than the cut-off value of 0.70. And they load on the factors that they are supposed to load. With respect to discriminant validity, the correlations between items in any two constructs should be lower than the square root of the AVE shared by items within a construct . According to Table 2, all of the square roots of each AVE are greater than the off-diagonal elements. In sum, all the constructs in our research model shows satisfactory construct validity.

### **The Structural Model**

Table 3 shows the results of the hypothesis testing. As we expected, product color appeal is a stimulus of online shoppers' reactions to the focal website. Product color appeal significantly influences users' perception of website usefulness ( $\beta = 0.32$ ,  $p <$

0.01) and enjoyment ( $\beta = 0.32, p < 0.01$ ), as well as online trust ( $\beta = 0.52, p < 0.01$ ). In the meantime, product color appeal directly influences users' attitudes toward the e-commerce website ( $\beta = 0.13, p < 0.1$ ) in a marginal significant way. Perceived usefulness ( $\beta = 0.45, p < 0.01$ ) and online trust ( $\beta = 0.19, p < 0.05$ ), in turn, significantly influence users' attitudes toward the website. Perceived enjoyment, however, does not significantly predict website attitude as we hypothesized. Our research model explains 53% variance of users' attitudes toward the e-commerce website.

## **6. Conclusions and discussions**

Encouraging people to purchase online is one of the top issues for e-commerce studies. Different from prior research that focuses on website interface features to enhance users' behavioral intentions, this study focuses on the choice of products. In particular, we suggested that product aesthetics is the key. To rationalize our proposition, we proposed a research framework in Figure 1 that shows product aesthetics, by pleasing online shoppers' senses, helps them create perceptions that the e-commerce website is useful, it is enjoyable to shop online, and the site can be trusted. This is because in addition to website interface, when people shopping online, the appearance of products also forms their sensory world just like it does in our offline world, for good or bad . Our empirical data confirms that products' color appeal, one facet of product aesthetics, positively contributes to online shoppers' perceptions of website usefulness at the cognition level, online shoppers' perceptions of website enjoyment at the affection level, and consumers' online trust residing

somewhere between the cognition and affection continuum. Consistent with prior e-commerce research, perceived usefulness and perceived enjoyment were found to play a predictive role in forming users' attitudes toward the website. However, the present study did not find the influence of perceived website enjoyment on users' website attitudes. We believe this is due to the experimental nature of subjects' online shopping experience. Although we maximized our efforts to ensure our experiment as close as the real world, for example, the choice of the free simulation research methodology and the establishment of the experimental website based on a real shopping website, subjects might still be influenced by their feelings that this is a mechanic experimental task. It reduces the chances of generating enjoyable shopping experience and renders enjoyment less important in predicting their website attitudes.

Despite the forging issue, a chief theoretical contribution of this paper is that we established the product-to-website perception relationship. We by no means deny the effectiveness of using website interface features to enhance users' perceptions of the website. However, given the dual role nature of online shoppers of being both a IT user and a customer, this paper suggested another avenue to enhance users' online shopping experiences, which is to focus on product attributes like aesthetics.

Our finding is also full of practical implications. The paper cautions e-commerce practitioners that customers might not bother to buy a product for the first time, if such product is low in aesthetics, not mention to repeated purchases. Our paper shows that e-vendors need to deliberately select the products that sell online. An ill-designed product even negatively influences users' perceptions of e-commerce websites which

drive them away before they make any purchases.

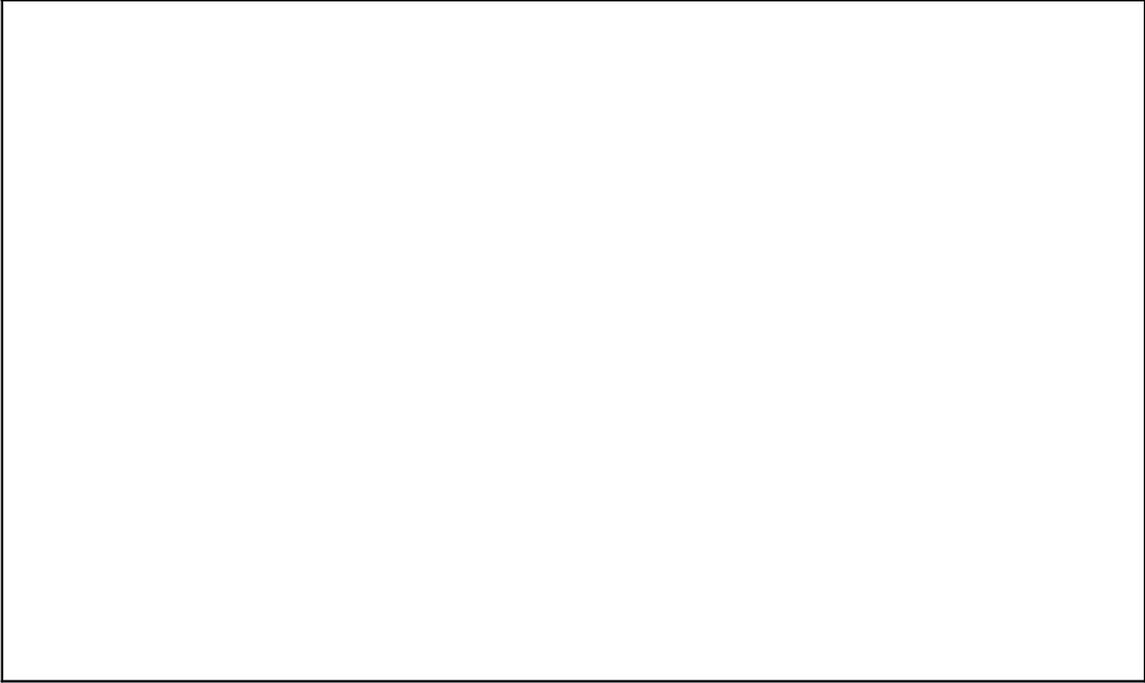
## **7. Limitations and future direction**

There are several limitations to the present study. First, we stressed on the importance of product aesthetics. However, for the sake of parsimonious research, we only picked up color appeal, one facet of aesthetics, in our study. Aesthetics is a broad concept that contains color, proportion, symmetry, and so on. We believe in contrast to color, other aesthetic elements might be less sensitive to online shoppers. Despite this, future study could test the effects of other product aesthetic facets on consumers' online shopping experiences, based on our research framework. Second, we used college students as our sample subject. Although students are representative group of online shoppers , future studies could validate our research framework in a different population.





**Figure 1. Research framework of consumer responses to product aesthetics**



**Figure 2. Research model**

Advanced Product Search

- Books
- Apparel
- Accessories
- Collections
- Supplies
- Technology

**Select one UNT sweater according to the attached instructions.**

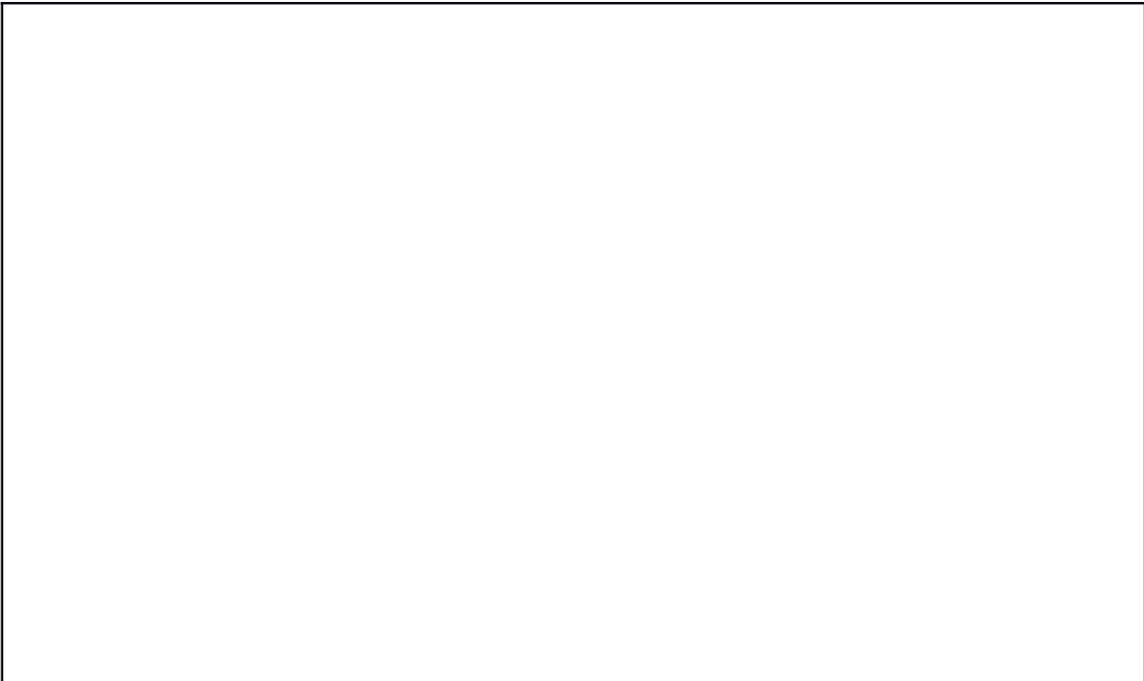


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**Figure 3. Experimental website screenshot**

**Table 1. Descriptive statistics of reliability indices and factor loadings for constructs**

**Table 2. Correlation of latent variables**



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**Table 3. PLS results**