

Investigating the Persuasiveness of E-Commerce Product Pages within a Rhetorical Perspective

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Abstract

This study investigated how design features on e-commerce product pages can influence their persuasiveness. A framework incorporating the persuasive functions of *logos*, *pathos*, and *ethos* in classical rhetoric was utilized and the factors of persuasive mean, product type, and product price were examined. The results revealed that the persuasiveness of a product page can be enhanced by applying persuasive means to the design of the product page; the effects of persuasive mean on the persuasiveness of a product page are moderated by product type rather than product price. In addition, combining multiple persuasive means lead to greater persuasiveness than using any of them individually. On the whole, the persuasive power derived from the persuasive means that appeal to users' emotions and the credibility of the product pages is greater than that derived from the persuasive mean that appeals to logic.

Keywords: web design, persuasion, logos, pathos, ethos

1. Introduction

Successful user experience design for e-commerce relies on a large number of factors. One of the important factors is its design (Cheung, Zhu, Kwong, Chan, & Limayem, 2003; Elliott & Speck, 2005; Hausman & Siekpe, 2009; Kim & Lee, 2002; Liu & Arnett, 2000). Designing a usable Web site has been traditionally recognized as a key to e-commerce success (e.g., Casaló, Flavián, & Guinalú, 2008; Lee & Koubek, 2010; Nielsen, Molich, Snyder & Farrell, 2001). However, several researchers suggested that though usability is still important for effective Web site design, it is no longer the key differentiator. A successful e-commerce Web site should be able to inspire their customers' trust, engage them, and persuade them to buy products (Chak, 2003; Jones, 2011; Schaffer, 2009; Weinschenk, 2009). Constantinides (2004) suggested that Web sites should be seen as vital instruments of persuasion rather than simply as online brochures or catalogues of the company's products. Other researchers (Fogg, 2003; Murphy, Long, Holleran, & Esterly, 2003; Kim & Fesenmaier, 2008) argued that the Internet is a particularly effective communication medium for persuading people. However, little research has been conducted to address the persuasive power, a vital element, of Web design (Ibrahim, 2013; Kim & Fesenmaier, 2008; Winn & Beck, 2002).

The purpose of this study is to investigate how design features on e-commerce product pages can influence their persuasiveness. A framework that incorporates the persuasive functions in classical rhetoric was utilized and the factors of persuasive mean, product type, and product price were examined.

2. Literature and Hypotheses

2.1 Critical Design Elements of E-Commerce Web Sites

Song and Zahedi (2005) defined e-commerce Web design elements as "the features, components, and information used in developing e-commerce websites." Web elements can affect Web consumers' purchase intentions by influencing their salient beliefs related to e-commerce, which in turn change their attitudes, external subjective norms, and perceived behavioral controls, leading to changes in their purchase intentions

(Song & Zahedi, 2005).

A large number of studies have uncovered many factors that help explain the relationship between Web site design and customer purchase intention. Examples of those factors are navigability, site content, interactivity, download speed, responsiveness, customer service, external opinions, purchase facilitation, product quality, media richness, consumer trust, playfulness, reliability, personalization, privacy, security, selection, and pricing (Boyer & Hult, 2006; Katerattanakul, 2002; Liu & Arnett, 2000; Page & Lepkowska-White, 2002; Palmer, 2002; Song & Zahedi, 2005; Thakur & Summey, 2005; Wan, 2000). Some research suggested that dividing these variables into categories allows for a better assessment of their importance (Lepkowska-White et al., 2004; Page & Lepkowska-White, 2002).

Jarvenpaa and Todd (1997) gathered consumers' reactions to online shopping via open-ended survey and identified 16 pragmatic factors that can be readily controlled by site designers. They grouped the factors into four broad categories relating to product perceptions, shopping experience, customer service, and consumer risk. Liu and Arnett (2000) suggested that Web site success in the context of e-commerce is related to four major factors: quality of information and service, system use, playfulness, and system design quality. Ranganathan and Ganapathy (2002) examined the characteristics of a B2C Web site as perceived by online consumers and concluded that information content, design, security, and privacy are four key dimensions that have an impact on the online purchase intent of consumers.

Kim and Lee (2002) presented a theoretical model that examines the relationships among detailed design factors, perceived quality level and final performance of e-commerce systems. Their results revealed that the information phase among four transaction phases was the most influential in the final performance of e-commerce systems. Among the myriad design factors related to the information phase, product-related information, depth and variety of the system structure, variety of list view for products, consistency of product and background presentation, and variety of presentation for product information were all found to be closely related to the perceived quality level.

Constantinides (2004) identified functionality factors, psychological factors, and content factors as the main constituents of the Web experience that can influence online consumer behavior. In his classification, the functionality of the Web site includes the elements dealing with the site's usability and interactivity; the psychological elements are about lowering customer's uncertainty by communicating trust and credibility of the online vendor and Web site; and the content elements include the aesthetic aspects of online presentation and the marketing mix.

In developing a conceptual framework for measuring the impact of Web design elements on the beliefs and behaviors of Web customers, Song and Zahedi (2005) examined 199 e-commerce Web sites and identified 46 Web-design elements. These elements were then grouped into five categories, including promotion, service, external interpersonal sources, ease of use and navigation, and purchase facilitation. Lepkowska-White and Eifler (2008) explored the mediating role of product types in consumers' evaluations of different characteristics of Web sites and identified seven Web design features based on past literature. Those features are navigability, quality information, product comparison, personalization, experiential nature, ease of ordering, and external subjective opinions.

2.2 Persuasive E-Commerce Web Design

Persuasion is a form of communication that is pervasive in our society (Benjamin, 1997). It not only guides our personal behavior, but also serves to establish, modify, and maintain our social system (Johnston, 1994). The topic of persuasion has been studied in various research areas, such as communication, marketing, advertising, and health-care (Kaptein, Lacroix, & Saini, 2010; O'Shaughnessy & O'Shaughnessy, 2004; Perloff, 2010; Shrum, Liu, Nespoli, & Lowrey, 2012). Aristotle defined rhetoric as "the ability, in each particular case, to see the available means of persuasion," and distinguished three means of persuasion: *logos* (appeal to logic), *pathos* (appeal to an audience's emotions), and *ethos* (appeal to credibility) (Borchers, 2005).

Early studies have linked rhetoric's persuasive properties to visual design, including technology and software interfaces (Gurak, 1991; Tovey, 1996). Since the study of computers as persuasive technologies was introduced (Fogg, 1997, 1998), various forms of persuasive technologies have been investigated, designed, and developed. One of these studies is related to designing a persuasive Web site (Fogg, 2003; Winn & Beck, 2002).

In traditional hypermedia and hypertext projects, technical communicators often make appeals based on *logos* by ensuring that there is a logical structure that the users can follow so that they won't get lost in hyperspace. They might make an appeal based on *pathos* by designing interfaces that use metaphors to activate familiar

frameworks. Moreover, they might make an appeal based on *ethos* by using language that is clear, simple, concise, and therefore understandable and credible (Hunt, 2003).

Chak (2003) defined persuasive Web design as “the art and science of designing web sites that help users to make decisions that result in desirable transactions” and expanded the definition with the statement that “persuasive web sites guide users by providing good navigational usability, they educate users on how to make an informed choice, they allow users to be motivated by eliminating any qualms about trust and security, and in some cases, they can even move users toward a goal they didn’t realize they had. In short, persuasive web sites remove barriers and motivate users toward transaction.”

Winn and Beck (2002) linked classical rhetoric and commercial Web design, and argued that e-commerce sites and the design elements from which they are built serve a classic rhetorical function: they are means of persuading potential customers to explore, to interact, and ultimately to reach the act of purchasing. They incorporated and grouped Jarvenpaa and Todd’s (1997) salient factors within Aristotle’s three means of persuasion, and examined the persuasive power of design elements on an e-commerce Web site. According to their framework, each of the persuasive means is dependent on particular salient factors, and each of the salient factors is dependent on the features of particular design elements. For example, effort is one of the salient factors that the logical appeal (*logos*) of e-commerce sites is dependent on, and design elements that clarify site structure, help customers track their position, and offer intuitive navigation contribute to decreasing mental effort (Winn & Beck, 2002). Their qualitative analyses revealed that the most persuasive factors are price presentation and recognizability and the least persuasive factor is empathy.

2.3 Product Type and Price

Since the introduction of the Internet, scholars have been trying to explore the implications of the Internet on consumer marketing. One notable implication is that the suitability of the Internet for marketing to consumers depends to a large extent on the characteristics of the products and services being marketed (Peterson, Balasubramanian, & Bronnenberg, 1997). Lynch, Kent, and Srinivasan (2001) suggested that the impact of site quality, trust, and positive affect, varies across different product types. Therefore, it is essential to consider product characteristics and incorporate a product classification into the analysis (Chiang & Dholakia, 2003).

Several classifications of products have been proposed within the domain of online retailing (Hassanein & Head, 2004; Klein, 1998; Peterson et al., 1997). One common way to classify the products is search and experience goods. According to Nelson (1970, 1974), a good is defined as a “search good” when full information for dominant product attributes can be acquired prior to purchase. On the other hand, a good is defined as an “experience good” when full information on dominant attribute can only be known with direct experience and information search for such attribute is more difficult than direct product experience. In short, a search good can be evaluated by external information obtained prior to purchases whereas experience goods need to be personally experienced (Chiang & Dholakia, 2003).

Product type has been found to significantly influence consumers’ online shopping attitudes and behaviors. For example, Girard, Silverblatt, and Korgaonkar (2002) found that consumers have greater willingness to shop from an Internet retailer for search products than experience products; Girard and Dion (2010) validated the product classification framework online and confirmed that the risk of experience goods is significantly higher than that of search goods; Huang, Lurie, and Mitra (2009) found that consumers view fewer pages but spend more time per page before purchasing experience goods than search goods.

Price is another important factor that can affect consumers’ shopping attitudes and decision-making (Shergill & Chen, 2005; Song & Zahedi, 2005). Price not only indicates the economic cost of making a purchase, but can also influence perceptions of product quality, stimulate thinking during product evaluation, trigger social needs, and even shape the consumption experience (Lee, Bertini & Ariely, 2008). Several studies reported that price influences consumer behavior in a particular manner. For example, Kim and Benbasat (2009) found that consumers tend to scrutinize more closely the content of trust-assuring arguments when the price is relatively high; Jiang and Rosenbloom (2005) indicated that consumer’s perception of price has a direct and positive effect on customer overall satisfaction as well as intention to return.

2.4 Hypotheses

Previous studies indicated that Web design features can shape users’ attitudes and behavior and, therefore, affect the persuasiveness of a Web site (Lee & Gretzel, 2012; Loda, Teichmann, & Zins, 2009; Song & Zahedi, 2005). The work of Winn and Beck (2002) implies that a persuasive mean can be applied to a Web site and increase its persuasiveness by appropriately manipulating particular design elements on it. Thus, we hypothesize:

H1: Applying any persuasive mean of *logos*, *pathos*, or *ethos* to an e-commerce product page design can increase its persuasive power.

The work of Winn and Beck (2002) exhibited different persuasive power among the persuasive means that appeal to users' logic, emotions, and assessment of credibility. Hence, we hypothesize:

H2: The persuasive effect differs among the means of *logos*, *pathos*, and *ethos*.

It has been widely recognized that the product type and the product price can affect consumers' shopping attitudes and behaviors. Thus, we have the following hypotheses:

H3: The persuasiveness of a product page derived from applying persuasive means is affected by product type.

H4: The persuasiveness of a product page derived from applying persuasive means is affected by product price.

In e-commerce Web interface design, the appeals based on *logos* are mainly related to facilitating product information gathering, which is essential for the judgment of search products. Hence we hypothesize:

H5: Persuasive mean of *logos* will produce greater persuasive effect than that of *pathos* and *ethos* for the product page that promotes search products.

The appeals based on *pathos* are mainly related to creating a positive feeling about the site and compensating for the lack of sensory experience, which is necessary for experience products. On the other hand, the appeals based on *ethos* are mainly related to reducing users' risk perceptions and establishing believability of the site. It has been confirmed that the perceived risk for experience goods is higher than for search goods (Girard & Dion, 2010). Thus, we hypothesize:

H6: Persuasive mean of *pathos* will produce greater persuasive effect than that of *logos* and *ethos* for the product page that promotes experience products.

The higher the price a consumer has to pay for a product, the higher risk a consumer perceives from the purchase (Ba & Pavlou, 2002). If a user has a perception of high credibility, that user will perceive a lower risk in interacting with the Web site (Corritore, Kracher, & Wiedenbeck, 2003). We therefore hypothesize:

H7: Persuasive mean of *pathos* and *ethos* will produce greater persuasive effect than that of *logos* for the product page that promotes high-priced products.

According to common beliefs and current marketing practice, combining multiple persuasive tactics would be beneficial for increasing persuasiveness (Kaptein & Duplinsky, 2013). Therefore, we suggest the following hypothesis:

H8: Combining persuasive means of *logos*, *pathos*, and *ethos* leads to a greater persuasive effect than using any of them individually.

3. Method

3.1 Pretest 1: Salient Factors Categorization

This study adopted the 11 salient factors of the framework proposed by Winn and Beck (2002). A pretest was conducted to group those salient factors within the three means of persuasion. The participants consisted of an associate professor in e-commerce, an assistant professor in sales practice, a senior manager in marketing and selling, an assistant professor in business planning and advertising, and a senior Web designer. All of the participants had experiences in online shopping for more than six years. The participants were asked to assign each of the 11 factors to one of three categories of *logos*, *pathos*, and *ethos*. The reliability of agreement was then calculated using the measure of Fleiss' Kappa (Fleiss, 1971). The resulting estimate of $k = 0.629$ indicated that there was a substantial agreement among the participants (Landis & Koch, 1977). These results reported consistent categorization with the taxonomy of Winn and Beck (2002). That is, the persuasive mean of *logos* is dependent on the factors of price presentation, variety, product information, and tangibility; the persuasive mean of *pathos* is dependent on the factors of effort, playfulness, empathy, and compatibility; and the persuasive mean of *ethos* is dependent on the factors of recognizability, assurance, and reliability. Although we recognized that these elements are interdependent and can appeal to logic, emotions, and credibility at the same time, as Winn and Beck (2002) suggested, they are best suited to the rhetorical categories in which they have been assigned.

3.2 Pretest 2: Product Selection

To assign products to the search-experience categories, another pretest was conducted with a convenience sample of 32 undergraduate students. We listed eight products and followed the procedure proposed by Krishnan and Hartline (2001) to categorize these products. These products are books on business, digital cameras, cookies,

package tour, health food, medical service, meal tickets, and insurance. Participants were asked to indicate their ability, before purchase, to judge the performance of each product using a seven-point scale and then to indicate their ability, after use, to judge the performance of each product using the same scale. The results indicate that books on business, digital cameras, and meal tickets can be viewed as search products because they have relatively high mean scores on the first (5.16, 5.03, 5.00) and second (6.09, 5.78, 5.81) scales. Package tour and cookies can be viewed as experience products because they have relatively low means on the first scale (4.56, 4.25) and relatively high means on the second scale (5.97, 5.81). In the main study, books on business (priced at NT\$277), digital cameras (priced at NT\$55,900), cookies (priced at NT\$237), and package tour (priced at NT\$48,900) were selected to represent low-priced search product, high-priced search product, low-priced experience product, and high-priced experience product, respectively.

3.3 Experimental Design and Procedure

A 5 (persuasive mean: control, *logos*, *pathos*, *ethos*, combination) × 2 (product type: search, experience) × 2 (product price: low, high) within-subjects design was used to test the effects of persuasive mean, product type, and product price on the persuasiveness of an e-commerce product page. All participants were exposed to 20 synthetic product pages, which were created to contain different combinations of the persuasive means and the selected products. Counterbalancing was used to control the order effects. After browsing through each product page for a maximum of 90 seconds, they were asked to fill out a questionnaire eliciting their attitudes toward the product page and the product on it.

3.4 Implementations of the Persuasive Means on the Experimental Product Pages

Based on Jarvenpaa and Todd (1997), Song and Zahedi (2001), and Winn and Beck (2002), we identified 27 design features for the 11 factors that were categorized in Pretest 1. Table 1 summarizes the categories of manipulated elements on the tested product pages. Means of persuasion were then implemented by making particular categories of design features present and others absent. For example, in the product page that appealed to logic, the price information was presented in detailed and was highlighted with larger font and different color, the shipping cost and handling fee were included, more product categories were shown in the main menu and sub-menu, the selected menu item was highlighted, the information about product and customer service was displayed in detailed, the breadcrumbs trail and links to on-line assistance as well as sitemap were displayed, while the other elements such as recently viewed items, bestselling products, security and privacy policies, and indication about financial benefits of membership, were left out.

Table 1. Categories of manipulated elements on product pages

Means of persuasion	Salient factors	Design features	Manipulated levels
<i>Logos</i> (appeal to logic)	Price presentation	• Highlight the price information with larger font and different color.	Highlighted/Not highlighted
		• Provide detail price information by presenting shipping cost and handling fee.	Detailed/Brief
		• Emphasize the potential savings by juxtaposing the manufacturer's suggested retail price, member prices, and prices for group buying.	Present/Absent
	Product variety	• Display more product categories to promote wide selection of products.	12 main categories and 10 subcategories/ 6 main categories and 5 subcategories
		Product information	• Display sufficient and detailed product information. • Provide company policies of customer service, including returns, delivery, and guarantees, apparently. • Provide links to on-line assistance.
	Effort	• Provide links to sitemap to help clarify the site structure.	• Provide links to on-line assistance.
• Provide links to sitemap to help clarify the site structure.			Present/Absent
• Highlight the selected menu items help users track their positions. • Display "breadcrumbs" trail.		Highlighted/Not highlighted Present/Absent	

<i>Pathos</i> (appeal to the emotions)	Playfulness	<ul style="list-style-type: none"> • Present additional videos/images other than main product images (e.g. photos of the author). 	Present/Absent
	Tangibility	<ul style="list-style-type: none"> • Use more visually appealing images. • Include a “Magnify” option for product images. 	Present/Absent Present/Absent
	Empathy	<ul style="list-style-type: none"> • Display 6 recently viewed items. • Present 5 to 10 items of bestselling products. • Provide products/services recommendations. • Display Web accessibility certification marks. 	Present/Absent Present/Absent Present/Absent Present/Absent
<i>Ethos</i> (appeal to credibility)	Recognizability	<ul style="list-style-type: none"> • Provide information and assurance about product quality. • Display product quality certification marks. 	Present/Absent Present/Absent
	Compatibility	<ul style="list-style-type: none"> • Offer customers the opportunity for membership. • Indicate the financial benefits of membership in the price presentation. • Allow users to write feedbacks and share product information. 	Present/Absent Present/Absent Present/Absent
	Assurance	<ul style="list-style-type: none"> • Display certification marks of secured online transaction. • Spell out the security and privacy policies and practices. • Present guarantee policy, such as warrantee and money back guarantee. 	Present/Absent Present/Absent Present/Absent
	Reliability	<ul style="list-style-type: none"> • Provide “Help” link and offer information on customer service policies. • Provide contact information including e-mail, phone number, company address, and links to customer service page. 	Present/Absent Present/Absent

We developed five versions of product pages that manifested the implementations for conditions of control, *logos*, *pathos*, *ethos*, and combination, for each of the four selected products. Therefore, a total of 20 synthetic product pages were created for testing. In the control version (i.e., no persuasive means were implemented), the price information was presented in brief and was not highlighted, less product categories were shown in the main menu and sub-menu, the selected menu item was not highlighted, the information about product was displayed in less detailed, and the other elements such as shipping cost and handling fee, breadcrumbs trail, recently viewed items, bestselling products, security and privacy policies, links to on-line assistance and sitemap, indication about financial benefits of membership, were left out. The control version was intended as a baseline and the other four versions as the treatments (i.e., persuasive means were implemented on the tested pages). Specifically, the conditions of *logos* and control differed in the design features related to price presentation, product variety, product information presentation, and navigating effort; the conditions of *pathos* and control differed in the design features related to playfulness, tangibility, and empathy; the conditions of *ethos* and control differed in the design features related to recognizability, compatibility, assurance, and reliability; and the conditions of combination and control differed in all of the aforementioned design features. All tested product pages were in the same layout and visual style. The look and feel was designed to resemble actual e-commerce product page. Example screen shots of the synthetic product pages are shown in Figure 1.

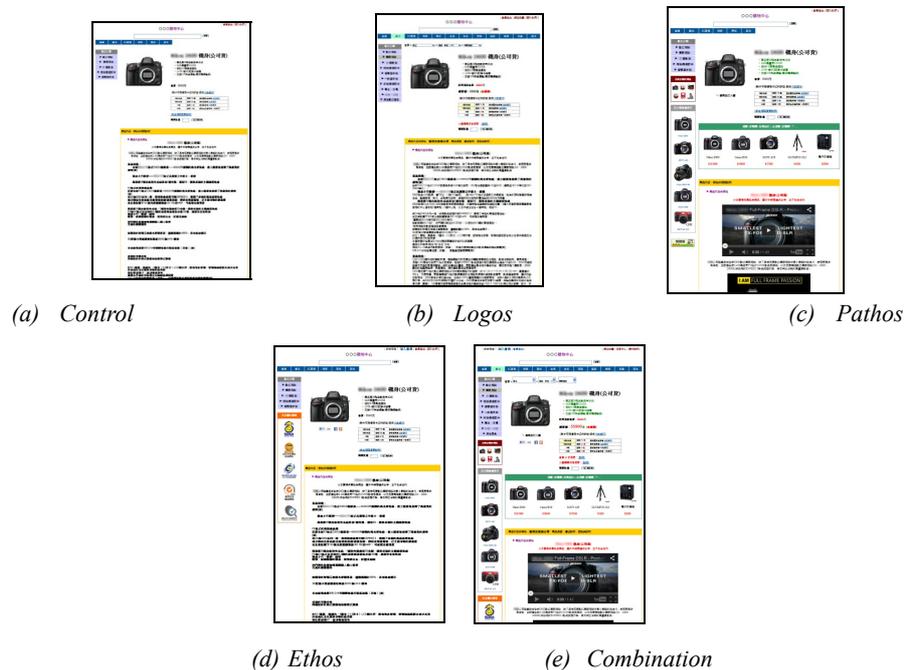


Figure 1. Example screen shots of the synthetic product pages

24 undergraduate business students participated in another pretest aimed at testing the validity of the experimental manipulations. The results of a series of paired-samples *t*-tests indicated that the manipulations were successful.

3.5 Measures and Participants

Based on Han and Shavitt (1994) and Sundar and Kim (2005), the perceived persuasiveness of a product page was measured with a scale containing four statements (7-point “strongly disagree/strongly agree” format). They were “I think this product page is credible,” “I have positive attitude toward this product page,” “I am favorable to the product shown on this page,” and “It is very likely that I will purchase the product shown in this page.” These statements addressed all levels of belief, attitude, and intention suggested by Hoeken (1994) for measuring persuasiveness. Responses to these four items were averaged.

The participants in the main study consisted of 22 female (58%) and 16 male (42%), ranging in age from 19 to 51 ($M = 25.6$, $SD = 9.11$). Average amount of their Web experience was 8.5 years and all of them had previous buying experience on the Web.

4. Results

The Cronbach’s α -values for all tested conditions were between 0.71 and 0.96, indicating satisfactory reliability of the scale used in measuring persuasiveness. Table 2 presents the 38 subjects’ means and standard deviations of the persuasiveness scores. The results of paired-samples *t*-tests indicated that the *logos* condition ($M = 4.44$, $SD = 1.07$) scored significantly higher than the control condition ($M = 3.58$, $SD = 0.79$), $t(37) = -6.47$, $p < 0.001$. The same was true for the *pathos* condition ($M = 4.86$, $SD = 0.86$), $t(37) = -11.31$, $p < 0.001$. The *ethos* condition ($M = 4.85$, $SD = 0.84$) did, as well, $t(37) = -11.08$, $p < 0.001$. Therefore, H1 was supported.

Table 2. Subjects’ means and standard deviations for persuasiveness scores (N = 38)

Product	Control <i>M</i> (<i>SD</i>)	<i>Logos</i> <i>M</i> (<i>SD</i>)	<i>Pathos</i> <i>M</i> (<i>SD</i>)	<i>Ethos</i> <i>M</i> (<i>SD</i>)	Combination <i>M</i> (<i>SD</i>)
Book	3.72 (0.58)	4.24 (0.82)	4.57 (0.87)	4.76 (0.97)	5.16 (0.90)
Cookies	3.77 (0.81)	4.80 (1.19)	5.07 (0.70)	4.89 (0.91)	5.49 (0.87)
Digital camera	3.37 (0.87)	4.29 (1.03)	4.86 (0.83)	4.91 (0.61)	5.03 (0.91)
Tour package	3.45 (0.84)	4.43 (1.16)	4.92 (0.90)	4.84 (0.85)	5.32 (1.03)
Overall	3.58 (0.79)	4.44 (1.07)	4.86 (0.86)	4.85 (0.84)	5.25 (0.93)

Table 3 illustrates the gain scores of the four treatment conditions as compared to control condition. The gain scores were used to estimate the increased persuasiveness derived from applying means of persuasion on the tested product pages.

Table 3. Mean gain scores of the treatment conditions (N = 38)

Product	<i>Logos</i> <i>M (SD)</i>	<i>Pathos</i> <i>M (SD)</i>	<i>Ethos</i> <i>M (SD)</i>	Combination <i>M (SD)</i>
Book	0.51 (0.40)	0.85 (0.84)	1.03 (1.05)	1.43 (1.10)
Cookies	1.03 (1.46)	1.30 (1.09)	1.12 (0.98)	1.72 (0.98)
Digital camera	0.92 (1.27)	1.49 (1.15)	1.54 (1.07)	1.66(1.31)
Tour package	0.98 (1.34)	1.47 (1.12)	1.39 (1.22)	1.88 (1.35)
Search products (Books & digital camera)	0.72 (0.68)	1.17 (0.73)	1.29 (0.81)	1.55 (1.07)
Experience products (Cookies & tour package)	1.01 (1.16)	1.39 (0.85)	1.25 (0.78)	1.80 (1.04)
Low-price products (Books & cookies)	0.77 (0.73)	1.08 (0.69)	1.08 (0.88)	1.58 (0.95)
High-price products (Digital camera & tour package)	0.95 (1.16)	1.48 (1.01)	1.46 (0.95)	1.77 (1.23)
Overall	0.86 (0.82)	1.28 (0.70)	1.27 (0.71)	1.67 (1.01)

A three-way repeated measures ANOVA was conducted to examine the effects of persuasive mean, product type, and product price on the persuasiveness of the tested product page. As shown in Table 4, a significant main effect was observed for persuasive mean, $F(2, 74) = 5.04, p < 0.01$, and product price $F(1, 37) = 4.33, p < 0.05$, while not for product type, $F(1, 37) = 2.00, p = 0.17$. Thus H2 was confirmed. Post hoc tests revealed that the gain scores of the *pathos* condition ($M = 1.28, SD = 0.70$) were significantly higher than the *logos* condition ($M = 0.86, SD = 0.82$), $t(37) = -3.90, p < 0.001$. The gain scores for the *ethos* condition ($M = 1.27, SD = 0.71$) were higher than for the *logos* condition with marginal significance, $t(37) = -2.09, p = 0.02$ (the alpha level was set to 0.05/3 to control the inflated alpha levels). However, there was no significant difference between conditions of *pathos* and *ethos*, $t(37) = -0.06, p = 0.95$.

Table 4. Results of three-way repeated measures ANOVA (N = 38)

Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Persuasive mean: <i>logos, pathos, ethos</i> (A)	2	8.60	5.04	0.01*
Product type: search, experience (B)	1	2.88	2.00	0.17
Product price: high, low (C)	1	11.93	4.33	0.04*
(A) * (B)	2	1.10	3.74	0.03*
(A) * (C)	2	0.61	1.72	0.19
(B) * (C)	1	4.29	1.83	0.19
(A) * (B) * (C)	2	0.16	0.79	0.46

Note. * $p < 0.05$.

As Table 4 indicates, there was no significant interaction between persuasive mean and product price, $F(2, 74) = 1.72, p = 0.19$. However, a significant interaction was observed between persuasive mean and product type, $F(2, 74) = 3.74, p < 0.05$. Therefore, H3 was supported while H4 was not. Figure 2 and 3 graph the estimates of increased persuasiveness derived from using persuasive means of *logos, pathos*, and *ethos* for different product types and product prices.

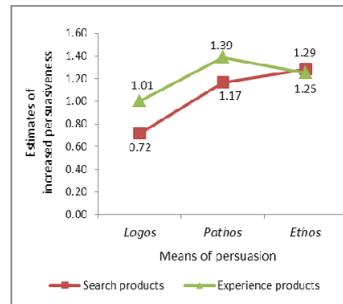


Figure 2. Estimates of increased persuasiveness derived from using persuasive means for search and experience products

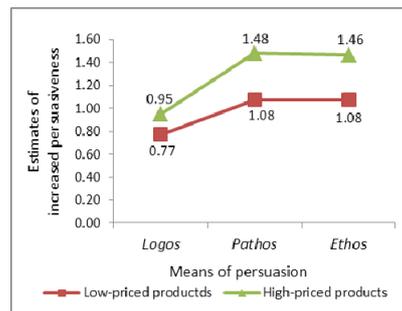


Figure 3. Estimates of increased persuasiveness derived from using persuasive means for low-priced and high-priced products

Contrary to our expectations, for search product, the gain scores of the *logos* condition ($M = 0.72$, $SD = 0.68$) were significantly lower than both conditions of *pathos* ($M = 1.17$, $SD = 0.73$), $t(37) = -3.98$, $p < 0.01$, and *ethos* ($M = 1.29$, $SD = 0.81$), $p < 0.01$. Thus, H5 was not qualified.

For experience product, the *pathos* condition ($M = 1.39$, $SD = 0.85$) scored significantly higher than the *logos* condition ($M = 1.01$, $SD = 1.16$), $t(37) = -3.20$, $p < 0.01$. However, no significant difference was found between the gain scores of the conditions of *pathos* and *ethos* ($M = 1.25$, $SD = 0.78$), $t(37) = 0.82$, $p = 0.42$. Thus, H6 was not supported.

As we predicted, for high-priced products, the gain scores of the *pathos* condition ($M = 1.48$, $SD = 1.01$) were significantly higher than the *logos* condition ($M = 0.95$, $SD = 1.16$), $t(37) = -4.37$, $p < 0.001$. In addition, the gain scores of the *ethos* condition ($M = 1.46$, $SD = 0.95$) were also significantly higher than the *logos* condition, $t(37) = -2.53$, $p < 0.01$. Therefore, H7 was supported.

As indicated in Table 3, the combination condition ($M = 1.67$, $SD = 1.01$) scored higher than the other conditions. Significant differences were reported between the conditions of combination and *logos* ($M = 0.86$, $SD = 0.82$), $t(37) = -3.68$, $p < 0.001$, between the conditions of combination and *pathos* ($M = 1.28$, $SD = 0.70$), $t(37) = -2.3$, $p < 0.05$, and between the conditions of combination and *ethos* ($M = 1.27$, $SD = 0.71$), $t(37) = -3.04$, $p < 0.01$. These results lent support for H8.

5. Discussion and Future Research

This study investigated how design features on e-commerce product pages can influence their persuasiveness. We utilized a framework incorporating the persuasive means of *logos*, *pathos*, and *ethos* and examined the factors of persuasive mean, product type, and product price. The persuasive tactics were manifested by manipulating particular design elements on the product pages. The results confirmed that applying persuasive means to the design of the product page can increase its persuasive power. Product type was found to be a moderator in the relationships between the persuasive mean and the product page's persuasiveness. As predicted, the three means of persuasion have different persuasive power in our experiment. In addition, combining persuasive means of *logos*, *pathos*, and *ethos* lead to greater persuasiveness than using any of them individually.

On the whole, the persuasive means that appeal to users' emotions and the credibility of the product pages

appeared to have greater persuasive power. Two reasons might be able to explain the lower persuasive effects of the mean that appealed to users' logic. First, many of the consumers nowadays are familiar with various e-commerce interfaces as well as how to look for the information they want and, therefore, are unsusceptible to *logos*-related features on product pages. Next, important *logos*-related design features such as intuitive navigation cannot be clearly shown on a single product page may reduce its persuasiveness. This may imply that the mean of *logos* is more effective, or even necessary, in persuading customers to frequent the Web site itself rather than affect their attitudes and/or behaviors when browsing a specific product page.

In order to avoid the possible brand bias, we purposely eliminated the brand names from the product photos and product descriptions on our experimental product pages. However, this would inevitably impact the participants' assessment of the credibility of the tested product pages since familiar product brand is one of the critical elements for the persuasive mean that appeals to credibility.

Though we did not predict the relationships between the number of the design features and their persuasive power, our data analysis evidenced that more design features does not necessarily result in greater persuasive power.

This study could be extended in several ways. First, a follow-on study would examine the effects of credence goods/services, such as legal services, financial investment, and education, on designing a persuasive e-commerce site. Second, the combinations of two of the three persuasive means, which were not tested in our experiment, should be examined to fully understand the consequences of utilizing multiple persuasive tactics. Third, more design elements, such as layout, color, and font, can be addressed in future research. Fourth, the scope can be extended to include other page types, such as category pages and shopping carts, of a commercial Web site. Finally, as mobile phone has become one of the most important platforms for changing human behavior (Fogg & Eckles, 2007), the experiment can be conducted using these highly personal and more compelling devices.

6. Conclusion

With this study, we can better understand how Web design elements carry out the rhetorical function of persuasion and how persuasive tactics can be implemented on an e-commerce Web site. Knowing that the way in which the persuasive tactics are manifested on the Web sites can influence their persuasiveness puts marketing planners and Web designers firmly in command of the persuasive process as well as how to develop a more persuasive e-commerce Web site.

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