The Impact of Infusing Social Presence in the Web Interface: An Investigation Across Product Types

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ABSTRACT: Many on-line stores have little emotional or social appeal and lack human warmth. For some products, such as apparel, increasing a firm's social presence through socially rich descriptions and pictures will have a positive impact on attitudinal antecedents to purchase. The appropriateness and need for human warmth and sociability differ across types of products or services, however. An empirical investigation compared apparel (a product for which consumers seek fun and entertaining shopping experiences) and headphones (a product for which consumers primarily seek detailed product information). Unlike apparel, higher levels of social presence on Web sites selling headphones did not have a positive effect on attitudinal antecedents. The implications of these findings are discussed, and subjects for future research are outlined.

KEY WORDS AND PHRASES: Electronic commerce, e-marketing, on-line shopper attitude, social presence, Web interface.

The Internet has provided businesses of all sizes with opportunities to expand their market base, improve operational efficiency, create new links with trading partners, and provide better customer service, among other benefits. In many cases, however, electronic commerce has failed to live up to its potential. In particular, business-to-consumer e-commerce forecasts have been overly optimistic, where transactions have not reached a point of critical mass [47, 51, 60, 66].

A significant difference between on-line and off-line shopping environments is that the latter encompass a wide range of emotions involving social interactions between humans through multiple sensory channels [14, 44, 73]. Kumar and Benbasat stress that in the present era of new retail, "shoppers have become guests, shopping has become an experience and malls have become entertainment centers with communities" [57, p. 8]. On the other hand, most on-line stores exhibit little emotional or social appeal [35]. The on-line shopping experience is primarily geared to reducing the user's cognitive burden through functional and performance-based Web site design heuristics [57, 70]. As such, e-commerce may be viewed as lacking human warmth, since it is more impersonal, anonymous, and automated than traditional person-to-person commerce [42]. Creating a virtual shopping experience that will entice the masses must engage both the cognitive and social sides of the user [57, 59, 73].

Researchers have drawn on social presence theory to explore the lack of human warmth on the Internet [35, 41, 87]. Social presence is the extent to which a medium allows users to experience others as psychologically present [30]. It can also refer to the richness of the media or the interactivity afforded by the media [19, 79, 89, 93, 94]. Some researchers stress the psychological connection, seeing social presence as concerned with "warmth." A medium is perceived as warm if it conveys a feeling of human contact, sociability, and

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sensitivity [35, 80, 84, 90, 107]. The present paper adopts the last perspective on social presence, where the medium gives the user a sense of human warmth and sociability.

In a Web environment, instilling a sense of human warmth and sociability can be accomplished by providing means for actual interaction with other humans (via virtual communities, message boards, chats, etc.) or by stimulating the imagination of interacting with other humans (via socially rich text and picture content, personalized greetings, human audio and video, intelligent agents, etc.). Many researchers have discussed the potential of Web site features to infuse a feeling of human warmth [1, 35, 57, 64, 72], but the effects of such features on perceived social presence have generally not been empirically validated.

In a recent study, Hassanein and Head examined the impact of manipulating on-line social presence through imaginary interactions, specifically focusing on the impact of picture and text content [41]. These Web site features were chosen because they are common across most commercial Web sites, thus presenting immediate and attainable recommendations for practitioners. In an apparel domain, the study showed, social presence can be infused into Web sites through socially rich descriptions and pictures, which in turn positively affect attitudinal antecedents (perceived usefulness, trust, and enjoyment). While the results of this initial work are encouraging, they cannot be blindly generalized across domains. The appropriateness and need for human warmth and sociability may depend on the types of products or services being sought. The present paper empirically explores this issue by comparing the impact of infusing social presence via the interface across commercial Web sites selling different types of products.

On-line Product Types

In the prepurchase phase, consumers go through a process of evaluating the merits of the product in question. The outcome of this process determines whether they make a purchase decision. The exact nature of the evaluation process depends in part on the attributes of the product [23, 88, 106]. Several classification schemes for categorizing on-line products have been proposed, some of which are outlined below:

- Search products versus experience products: Several researchers propose classifying products based on their search and experience attributes [38, 53, 69, 106]. Search attributes are product features that a consumer can obtain full information about and assess before purchase (e.g., size, price) [13, 86]. Experience attributes, on the other hand, are features that require a consumer to actually come into direct contact with the product (e.g., taste, fit) [13, 86]. The quality of such goods is difficult to assess prior to purchase and usage [4]. Many products possess both types of attributes. For example, apparel has the search attributes of color and style, along with the experience attribute of fit [4]. The boundary between search and experience products is fluid, because product exhibition and sampling may

enable consumers to turn experience attributes into search attributes [38]. Moreover, items that are experience products in physical channels can be transformed into search products in electronic channels [53].

- Digital versus nondigital products: Lal and Sarvary propose a classification that resembles the preceding one but with different terminology [58]. They argue that consumers need information on two kinds of product attributes: digital attributes, which can be experienced on-line at relatively low cost, and nondigital attributes, which entail physical inspection by the customer. Digital products help to overcome two major barriers to on-line shopping: fulfillment and absence of immediate gratification [63].
- Geometric, material, or mechanical products: This classification is based on the sensory dimensions used by customers in evaluating products [52, 65]. Geometric products are products that consumers mostly evaluate on a visual basis (e.g., picture frames, utensils, computer peripherals), whereas material products are typically evaluated with the sense of touch (e.g., linens, clothing, towels). McCabe suggests that geometric products are better suited to an on-line environment than material products because they can be evaluated visually [65]. Li, Daugherty, and Biocca extended this classification by proposing a third product category called mechanical products [61]. This new category comprises products that consumers are inclined to interact with in the prepurchase phase (e.g., cell phones, personal digital assistants, toys).
- Infrequently purchased durables, frequently purchased nondurables, or entertainment/apparel products: Burke performed a detailed discriminant analysis of product differences in the importance of shopping attributes (e.g., fun of shopping, privacy, convenience, service) [9]. He formulated three major categories: (1) infrequently purchased durable goods (e.g., appliances, consumer electronics, furniture), where consumers want retailers to provide detailed product information and excellent service; (2) frequently purchased nondurable goods (e.g., groceries, health items, office supplies), where consumers want to have fast, convenient shopping experiences; and (3) entertainment (e.g., books, toys, games) and apparel goods, where consumers want to have fun and entertaining shopping experiences. This classification was rigorously derived from an analysis involving more than 2,100 on-line consumers and their assessments of the importance of various aspects of the shopping experience (on-line and off-line) for various products. Based on his findings, Burke suggests that on-line stores should be tailored to meet the desired user experiences for the sought-after product category.

Product-characterization schemes have also focused on such dimensions as the cost and frequency of purchase [77], the degree of differentiation [22, 77, 82], and functionality/innovativeness [96]. For example, products that are low-priced and easily described are well suited for electronic markets [91], whereas expensive, high-risk products are less likely to be purchased on-line [38].

The purpose of this paper is to compare the impact of infusing social presence via the interface across commercial Web sites selling different types of products. Lombard and Ditton suggest that a prominent psychological impact of social presence is enjoyment or fun [64]. The present study, therefore, seeks a product-classification scheme that distinguishes products along the fun attribute. Burke's study classifies products by shopping attributes, including "fun of shopping" [9]. His infrequently purchased durable goods and frequently purchased nondurable goods categories rate low on the fun dimension, whereas his entertainment/apparel product category rates high on this dimension.

The study by Hassanein and Head cited earlier showed that social presence has a positive impact on attitudinal antecedents for a commercial Web site selling apparel (a product that rates high on the fun dimension according to Burke) [41]. The present study compares the results of the earlier study with the results obtained for a commercial Web site selling headphones (a consumer electronics product that rates low on Burke's fun dimension). As common products that all consumers would be familiar with, apparel and headphones are suitable candidates for the study.

Research Model and Hypotheses

Gefen and Straub examined the effect of social presence on purchase intentions in an e-services context [35]. In their model, they investigated the impact of social presence on trust and perceived usefulness constructs as antecedents to purchase intentions. Based on this model, Hassanein and Head explored the impact of social presence on on-line product purchasing [41]. Apart from the domain differences, the Hassanein and Head model, shown in Figure 1, expanded the Gefen and Straub model by adding an enjoyment construct, as enjoyment has been shown to be a psychological consequence of social presence and an antecedent to consumer attitudes toward Web sites [25, 44, 64, 100]. This expanded model was used to study the impact of various levels of socially rich Web site design elements (socially rich text and pictures) on the perception of social presence in an on-line shopping environment and to examine its subsequent effect on antecedents to Web site attitudes. Detailed theoretical support for the model shown in Figure 1 is provided in a paper by Hassanein and Head [41]. The study revealed that social presence can be infused into Web sites through socially rich descriptions and pictures. This, in turn, was shown to positively affect the perceived usefulness, trust, and enjoyment of a commercial Web site, which resulted in more favorable attitudes toward the on-line store. The context of this study was Web sites selling apparel, a product for which consumers seek fun and entertaining shopping experiences [9].

There is evidence to suggest that goods possessing certain evaluation characteristics can influence on-line consumers' experiences and preferences in different ways [26, 78, 104]. Burke argues that consumers seeking a product such as apparel would value a fun and entertaining shopping experience, whereas consumers seeking electronic products, such as headphones, would

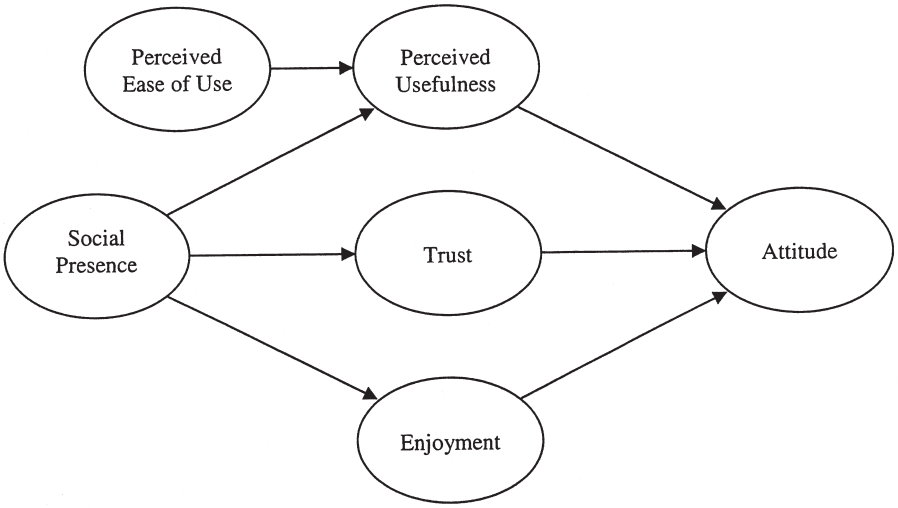


Figure 1. Research Model (after [41])

prefer detailed product descriptions and excellent service [9]. Social presence conveys human warmth and is geared to hedonic rather than utilitarian shopping motives. In other words, the infusion of social presence via the Web interface should stimulate a pleasurable shopping experience rather than an efficient one [41]. The goals of on-line consumers seeking apparel match more closely the outcomes associated with higher levels of social presence than the goals of on-line consumers seeking headphones. Thus it is reasonable to expect that attitudinal antecedents for on-line shopping will be more positively affected by higher levels of social presence on Web sites selling apparel than on Web sites selling headphones. Therefore:

Hypothesis 1: The relationship between social presence and perceived usefulness is stronger for Web sites selling apparel than for Web sites selling headphones.

Hypothesis 2: The relationship between social presence and trust is stronger for Web sites selling apparel than for Web sites selling headphones.

Hypothesis 3: The relationship between social presence and enjoyment is stronger for Web sites selling apparel than for Web sites selling headphones.

Actual usage or purchase intention is difficult to measure in a laboratory study. This is especially true when the object of the study is a fictitious on-line store. In such situations, user attitude may be a more appropriate variable. User attitude has been shown to be an important and useful outcome variable [31, 32]. Jeong and Lambert show that customers' attitudes toward using a Web site are a strong indicator for predicting their purchasing behavior [48]. This is in line with the theory of reasoned action (TRA), which proposes that

behavior is determined by an individual's intention to perform the behavior, and intention is influenced by attitude [3]. In the present study, "attitude" is defined as the user's feelings toward on-line purchasing, following Jarvenpaa, Tractinsky, and Vitale [46] and van der Heijden, Verhagen, and Creemers [102].

A number of IS studies have examined the determinants of attitude. Here we focus on three commonly cited determinants of attitude in the Web context:

1. Technology Acceptance Model (TAM) constructs: TAM holds that user attitude is directly affected by beliefs about the system, which consist of perceived usefulness (PU) and perceived ease of use (PEOU) [20]. More recently, TAM has been studied in the Web environment to explore acceptance of Internet-related technologies or to predict consumer intention to use, revisit, or purchase from a Web site [14, 33, 56, 67, 75, 85]. The Gefen and Staub model links PEOU directly to PU but does not have a direct connection between PEOU and their outcome variable [35]. An initial exploration with this model verified that there was no significant link between PEOU and attitude [41].
2. Trust: Trust reduces the complexity and vulnerability a consumer feels while engaging in e-commerce by allowing the consumer to subjectively rule out undesirable yet possible behaviors of the e-vendor [51]. Customer trust in a company's Web site has been shown to positively influence customer attitudes toward the company and customer willingness to buy [33, 46, 62].
3. Enjoyment: Davis, Bagozzi, and Warshaw classified enjoyment as an intrinsic motivation for adopting technology in contrast to the TAM constructs of PU and PEOU, which they classified as extrinsic motivations [21]. Enjoyment is an important experiential aspect in off-line shopping [7, 27, 68], and is emerging as an influential factor in on-line shopping that significantly affects consumer attitudes [14, 25, 44, 100].

While perceived ease of use is primarily linked to perceived usefulness [20, 35, 85, 102], perceived usefulness, trust, and enjoyment have been shown to positively affect attitude across product types [24, 46, 55, 75, 102, 105]. Therefore:

Hypothesis 4: Perceived ease of use positively influences perceived usefulness for Web sites selling apparel and Web sites selling headphones.

Hypothesis 5: Perceived usefulness positively influences attitude for Web sites selling apparel and Web sites selling headphones.

Hypothesis 6: Trust positively influences attitude for Web sites selling apparel and Web sites selling headphones.

Hypothesis 7: Enjoyment positively influences attitude for Web sites selling apparel and Web sites selling headphones.

Methodology

An earlier study by Hassanein and Head explored the impact of manipulating social presence through the interface of a Web site on consumer attitudes toward an on-line vendor selling apparel and provided full methodology details (e.g., validity and reliability of the measures, sample characteristics) [41]. The present study duplicates the design of the apparel study for a Web site selling headphones. Each of these two studies was designed as a one-factorial experiment manipulating three levels of Web site social presence with three independent groups of subjects. Subjects were given the task of purchasing a gift for a friend from one of the three Web sites. To increase the realism of the task, subjects were told they would have a chance to win the product they selected from the Web site in a random draw conducted at the end of each study.

Each of the three Web sites in each study displayed the same products and followed the same design. Only social presence elements were manipulated on the sites. The experiments were conducted entirely on-line, and subjects could complete the study from any computer with an Internet connection, thus increasing realism of the on-line shopping task. Subjects were asked to complete a consent form, fill in a demographic questionnaire, perform the experimental task (selecting a gift for a friend), and complete a questionnaire about their experiences on the Web site they visited. The questionnaire included measures for a manipulation check and the dependent variables. Open-ended questions were posed to allow for more in-depth explanations or clarifications.

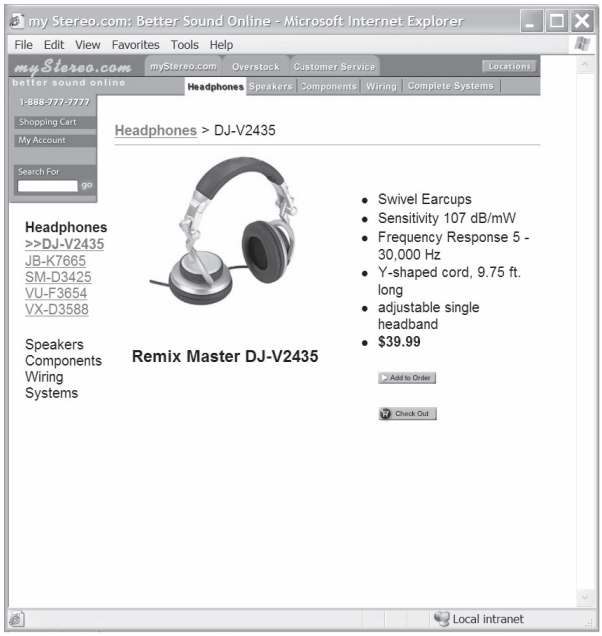
In order to isolate the impact of product type on the influence of social presence, multiple Web sites were created for a fictitious clothing company (called myCloset.com) in the apparel study [41] and a fictitious electronics company (called myStereo.com) for the headphones study. Fictitious companies were chosen to avoid any potential bias from branding or previous experiences.[1] The manipulated levels of social presence were offered incrementally, as shown in Table 1. With this approach, differences between the three groups for each product type could be directly attributed to the increasing levels of social presence. This incremental design has been adopted by similar studies, such as the ones by Schaffer and Hannafin [83], Burgoon et al. [8], and Teo et al. [97]. Sample Web pages for the headphones study are shown in Figure 2, which shows the same headphones displayed with low, medium, and high social presence. Corresponding sample Web pages for the apparel study can be found in the earlier study [41].

Subjects

The apparel study had 78 participants, and the headphones study had 90 participants. The subjects were all Canadians, and were a mix of M.B.A. students and professionals working in various industries. Each subject participated in one treatment group (i.e., one social presence level for one product-type study). Subjects were randomly assigned to the different social presence groups to

Site	Social presence level	Features
SP-1	Low	• products shown in solitary format • point form, functional descriptions
SP-2	Medium	• all features of SP-1 • socially rich text: descriptions aimed at evoking positive emotions
SP-3	High	• all features of SP-2 • socially rich pictures: products shown in use by people in emotional, dynamic settings

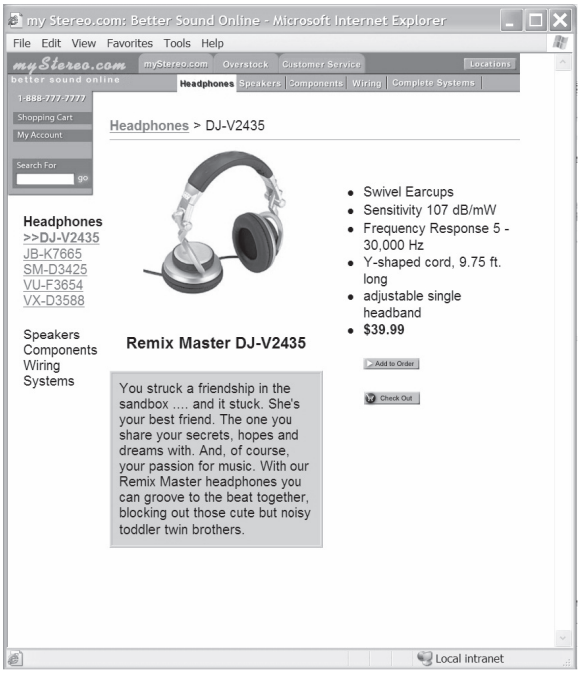
Table 1. Social Presence Manipulations on Experimental Web Sites.



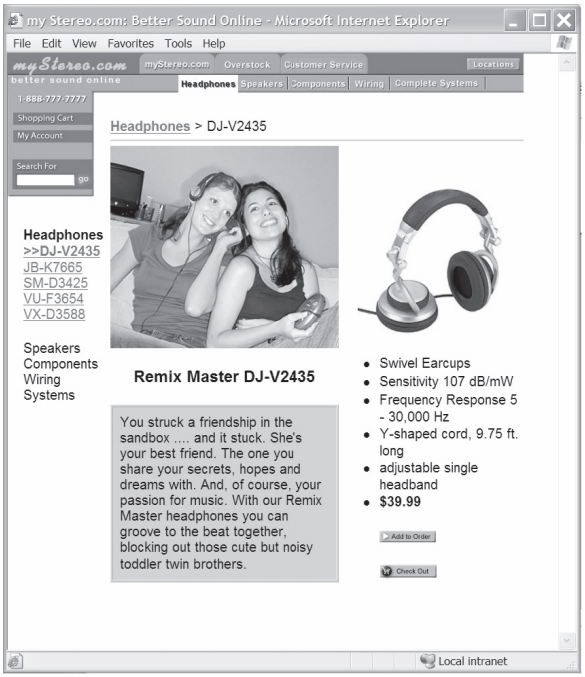
a. SP-1 Low Social Presence Web Site

Figure 2. Experimental Web Sites with Various Levels of SP

control for confounding effects due to possible variations in individual characteristics. A summary of the participant demographics for the headphones study is shown in Table 2. The demographics for the apparel study were reported earlier [41]. The data for the two studies were collected a few months apart. ANOVA tests found no significant differences for subjects in the various treatment groups in terms of gender, age, or Internet and on-line shopping experience. Therefore, randomization of assignment across social presence groups for both the headphone and apparel studies was successful in terms of subject characteristics.



b. SP-2 Medium Social Presence Web Site



c. SP-3 High Social Presence Web Site

Figure 2 (Continued)

Characteristics	
Gender	
Male	46%
Female	54%
Dominant age group	18-29
Average number of on-line purchases	7.6
Reasons for shopping on-line	
Convenience	80%
Product/service not available off-line	54%
Better price	54%
Curiosity	10%
Reasons for not shopping on-line	
Lack of trust	50%
Privacy concerns	50%
Security concerns	55%
No credit card	40%
Prefer shopping off-line	45%
Difficult to evaluate products on-line	50%

Table 2. Subject Demographics (*N* = 90).

Content Validity

Content validity examines how representative and comprehensive the measurement items are in creating the constructs in a given model. It is assessed by examining the process by which the items were generated [92]. A construct valid in content is one that has drawn representative questions (items) from a universal pool [18, 50]. In the present research, the principal constructs were based on or adapted from existing validated measures. Appendix A summarizes the construct items used in the questionnaire and provides literature sources for each construct. The same construct items were used in the apparel study [41].

Construct Validity

Construct validity examines the extent to which a construct measures the variable of interest. In other words, it should demonstrate relatively high correlations between items of the same construct (convergent validity) and low correlations between items of constructs that are expected to differ (discriminant validity) [10]. To assess convergent validity, Fornell and Larcker propose examining (1) the item reliability of each measure, (2) the composite (construct) reliability of each construct, and (3) the average variance extracted for each construct [29]. The item reliability of each measure was assessed by performing a principal components factor analysis (PCA), as recommended by Straub [92]. A construct is considered to exhibit satisfactory convergent and discriminant validity when items load highly on their related factor and have low loadings on unrelated factors. Table 3 shows the results of the varimax rotation on the original 19 items (outlined in Appendix A) constrained to five

Construct items	Item loadings	Construct reliability (α)	Average variance extracted
PU1	0.707	0.893	0.563
PU2	0.791		
PU3	0.760		
PU4	0.741		
PEOU2	0.614	0.876	0.608
PEOU3	0.852		
PEOU4	0.850		
E1	0.750	0.936	0.662
E2	0.866		
E3	0.848		
E4	0.784		
T1	0.861	0.921	0.707
T2	0.820		
A1	0.735	0.803	0.565
A2	0.768		

Table 3. Convergent Validity Tests.

factors. Hair et al. suggested that an item is significant if its factor loading is greater than 0.50 [40]. From the initial 19 items, four items (PEOU1, T3, T4, and A3) were eliminated because of cross-loadings on other constructs.

Construct reliability was assessed using Cronbach α-values. As shown in Table 3, the α-values for this study ranged from 0.803 to 0.936. All the constructs exhibited an α-value greater than 0.7, a common reliability threshold for exploratory research [71, 81]. Similarly, Table 4 shows that the average variance extracted for each construct in the model exceeded the recommended 0.5 benchmark [29]. Thus, the proposed constructs demonstrated convergent validity on all three measures proposed by Fornell and Larcker [29].

Discriminant validity was assessed to ensure that the constructs differed from each other. As per Fornell and Larcker, the correlations between items in any two constructs should be lower than the square root of the average variance shared by items within a construct [29]. As shown in Table 4, the square root of the variance between a construct and its items was greater than the correlations between the construct and any other construct in both product models, satisfying Fornell and Larker's criteria for discriminant validity. The above results, therefore, confirm that the instrument encompassed satisfactory construct validity.

Manipulation Validity

To check the validity of the manipulation of experimental treatments, subjects assessed the perceived social presence of the experimental Web sites. This manipulation check was performed before the dependent measures were taken, to prevent bias formed from responding to the dependent measures [76]. Subjects were asked to rate (on a 7-point Likert scale) the following items adapted

	PEOU	PU	TRUST	ENJOYMENT	ATTITUDE
PEOU	**0.780**				
PU	0.677	**0.750**			
TRUST	0.451	0.464	**0.841**		
ENJOYMENT	0.559	0.607	0.463	**0.813**	
ATTITUDE	0.534	0.601	0.639	0.562	**0.752**

Table 4. Discriminant Validity Tests.

Note: The diagonal elements in bold (the square root of the average variance extracted) should exceed the inter-construct correlations below and across them for adequate discriminant validity.

from a validated construct developed by Gefen and Straub for perceived social presence [34, 35]:

- There is a sense of human contact on this Web site.
- There is a sense of sociability on this Web site.
- There is a sense of human warmth on this Web site.

ANOVA tests indicated that the three subject groups within were significantly different in terms of their perceived social presence [$F(2, 89) = 23.81$, $p < 0.000$]. Table 5 shows the results of post-hoc Tukey tests, which confirmed significant between-group differences. Therefore, the three experimental Web sites for the study effectively demonstrated three different and increasing levels of social presence.

Results

Data were analyzed using a structural equation modeling (SEM) approach because it has many advantages over traditional methods, such as multiple regression. SEM does not involve assumptions of homogeneity in variances and covariances of the dependent variables across groups, it allows a more complete modeling of theoretical relations, and it can simultaneously test the structural and measurement models [6, 36]. The variance-based partial least squares (PLS) method was chosen over covariance-based methods, such as LISREL, for the following reasons: (1) PLS is relatively robust to deviations from a multivariate distribution [36]; (2) PLS is appropriate for testing theories in the early stages of development because it supports both exploratory and confirmatory research [28, 36]; and (3) PLS can be applied to relatively small samples [28, 36]. Chin and similarly Gefen, Straub, and Boudreau advise that the minimum sample size for a PLS analysis should be the larger of either 10 times the number of items for the most complex construct or 10 times the largest number of independent variables affecting a dependent variable [15, 36]. In the present model, the most complex construct has four items and the largest number of independent variables estimated for a dependent variable is only three. Thus, the sample sizes of 78 and 90 for the two studies are more than adequate for PLS estimation procedures.

Social presence group	SP-1 (Low)	SP-2 (Medium)	SP-3 (High)
SP-1 (Low)	–	0.967*	2.300***
SP-2 (Medium)	–	–	1.333***
SP-3 (High)	–	–	–

Table 5. Mean Differences Between Social Presence Groups.

*$p < 0.05$; ***$p < 0.001$.

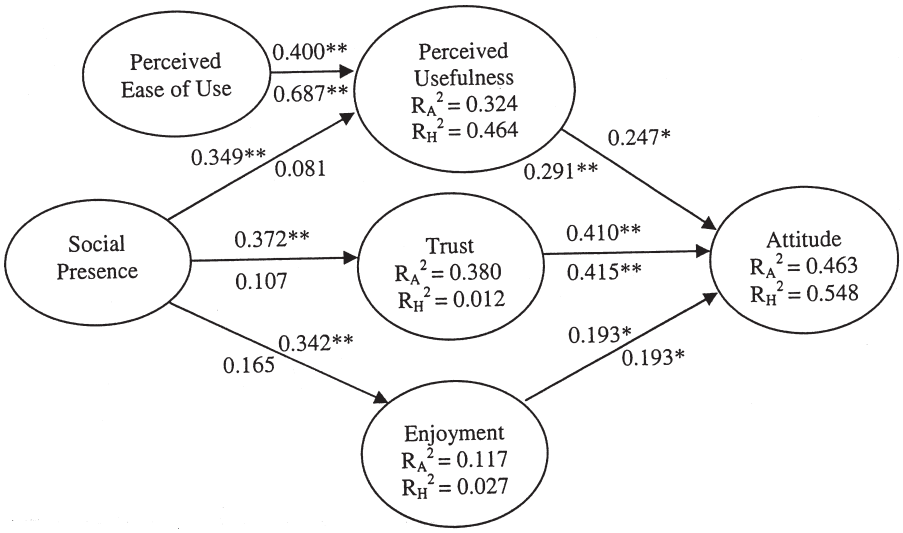


Figure 3. PLS Structural Models for Apparel and Headphones Studies

Notes: Values above the arrows refer to path coefficients from the apparel study model; values below the arrows refer to path coefficients from the headphones study model; R_A^2 refers to R^2 values from the apparel study model; R_H^2 refers to R^2 values from the headphones study model; * $p < 0.05$; ** $p < 0.01$.

As recommended by Chin, bootstrapping (with 500 subsamples) was performed to test the statistical significance of each path coefficient using *t*-tests [15]. Figure 3 compares the results of the PLS analysis of the models from the apparel study and from the present study involving headphones. The results show that increased levels of social presence have a positive and significant impact on perceived usefulness, trust, and enjoyment for Web sites selling apparel. However, no significant relationships were found between increased levels of social presence and usefulness, trust, or enjoyment for Web sites selling headphones. This means that social presence (manipulated through textual and pictorial-design elements) has a stronger and more positive impact on attitudinal antecedents for Web sites selling apparel than for Web sites selling headphones. Thus, hypotheses H1, H2, and H3 are supported.

Additionally, the results show that both apparel and headphones had positive and significant beta coefficients between (1) perceived ease of use and perceived usefulness (H4), (2) perceived usefulness and attitude (H5), (3) trust and attitude (H6), and (4) enjoyment and attitude (H7). Approximately 46 percent and 55 percent of the variance in the attitude toward Web sites was accounted for by the variables in the apparel and headphones product models, respectively. The R^2 for the trust and enjoyment endogenous constructs in both models was rather low, ranging from 0.012 to 0.138. However, this is reasonable, because trust and enjoyment are affected by a large number of factors other than social presence (especially for headphones, where no causal relationships were supported). Further, an R^2 value of less than 0.1 is not uncommon in behavioral science studies, and also in research employing structural equation modeling [16]. Many TAM-based investigations report low R^2 (e.g., [11, 20, 67]). Cohen also suggests that the amount of actual association between constructs may, in fact, be greater than the proportion of variance accounted for by measuring R^2 [16].

Discussion

Gefen and Straub showed that the perception of social presence has an effect on on-line consumers' trust and subsequent intention to purchase from a commercial Web site [35]. Hassanein and Head showed that the level of social presence can be manipulated through Web design elements (viz., text and picture presentations), and that increased levels of social presence have a positive significant effect on perceived usefulness ($b = 0.349$), trust ($b = 0.372$), and enjoyment ($b = 0.342$) for Web sites selling apparel [41]. The results presented in this paper show that this effect differs according to the type of product offered by the on-line vendor. Perceived usefulness, trust, and enjoyment of Web sites selling headphones were not influenced by increased levels of social presence. However, regardless of the product, these three constructs are significantly positive antecedents to on-line consumers' attitudes toward a shopping Web site.

Further analysis of the open-ended questions revealed some interesting insights into the study's findings. Some subjects, for instance, commented that the low-social-presence Web site selling apparel was "straight forward" and provided products in a "clear" form that was "easy to view." Many others, however, found the Web site "too plain," "dull and boring," and generally "unappealing." A few subjects said they were "not able to judge what the piece of clothing looks like when it's being worn" and felt it generally "lacked a personal touch." In contrast, for the low-social-presence Web site selling headphones, although some subjects noted that it had a "cold feeling" and "was not memorable," most stressed the "simplicity" and "uncluttered design" where the "essential information was easy to find and compare." Most subjects preferred the headphones' low-social-presence Web site to "cut to the chase without extra fluff." One on-line shopper stated that he liked the fact that this Web site "was not overly complicated" and allowed him to "view what you need and buy what you want."

For the medium-social-presence Web site selling apparel products, subjects commented that the socialized descriptions were "interesting" and "fun and imaginative," but did not necessarily "help in making a decision." In contrast, few subjects made positive remarks about the socialized descriptions on the Web site selling headphones. Some said that they gave the Web site a "warm feeling" and "a touch of personality." As with the apparel Web site, it was "entertaining to read the captions but they would not prompt [the subject] to buy the product." However, most subjects disliked the socialized descriptions for the headphones, finding them "irritating," "fake," "distracting," "too personal and almost unprofessional." Some of the reasons given for this dislike included: "it was trying to sway me into purchasing a product for a certain occasion rather than the objective practical use of it"; "stories did not add anything to the shopping experience"; "I mistrust someone who tells stories to distract you from the actual benefits of the product"; "It seemed like it was mocking my intelligence"; "I felt that they were trying too hard to convince me by using my own feelings"; "It doesn't show the quality of the product, it's too subjective," and it would be "better if the info was more factual than just entertaining."

Finally, for the high-social-presence version of the apparel Web site, subjects tended to agree that they "enjoyed seeing people wearing the clothing and the activities they were taking part in." While some remarked that "it was difficult to see the design and cut of the shirt when it was on someone else" or that the "clothing was masked by all the actions in the pictures," most agreed that "having a sense of human contact made it more appealing and helped better visualize the product." For the headphones study, some subjects also commented that the high-social-presence version "provided a warm and fuzzy feeling," that they "liked the personal aspect" and "the fact that it showed the relative size of each product." One subject commented: "I liked the picture of the product while being used as it kind of helped me to pick one for a friend . . . sporty friend, laid back friend . . . that kind of thing." However, the majority would have "preferred to see only product pictures" rather than "cheesy" and "phony" socially rich content that "tried too hard to make the product seem interesting, cool or fun." Subjects stated that the infusion of social presence "distracted from the product," "obscured the product," and was "pointless as we know how to use headphones." One subject asked, "Do you really need to be in the presence of someone else to enjoy listening to music via a headset?"

Conclusions

This paper investigates the impact of infusing social presence via the interface across commercial Web sites selling various types of products. Perceived usefulness, trust, and enjoyment were found to be important antecedents to the attitudes of on-line shoppers regardless of the type of product they were seeking. However, higher levels of social presence have varying effects on these attitudinal antecedents depending on the product being sold on-line. Web sites selling apparel (a product for which consumers seek fun and entertaining shopping experiences) benefit from higher levels of social presence. On the other

hand, Web sites selling headphones (a product for which consumers primarily seek detailed product information) do not exhibit a positive effect from higher levels of social presence.

These results confirmed the proposed hypotheses that infusing social presence through interface design affects Web sites for different product types. From the open-ended comments provided by the subjects, it was clear that apparel was better suited for socially rich on-line presentations because the product itself evoked emotion and the socially rich design induced positive feelings in addition to providing additional information (visualizing the product and obtaining ideas for situations in which to use it). In contrast, the comments on the headphones Web site stressed that the socially rich presentations did not match the information requirements (detailed product specifications) for a more technical product, and thus seemed forced and inappropriate.

From a theoretical perspective, this study extends social presence research in the e-commerce domain. Previous studies have explored the impact of social presence for e-mail, on-line stores selling apparel, and on-line digital products (i.e., airline tickets) [34, 35, 41, 49, 93]. However, this is the first study to suggest that the impact of social presence varies according to the product/service being sold on a commercial Web site.

From a practitioner's perspective, the results from this study can have direct and immediate implications for designers of commercial Web sites. On-line vendors selling apparel are encouraged to consider infusing social presence in their Web site designs, because its potential impact is positive for this category of products. Descriptions aimed at evoking positive emotions and pictures that depict products with people in emotional and dynamic settings were shown to significantly affect on-line shoppers' perceptions of social presence [41]. While some on-line vendors (e.g., L.L. Bean and Lands' End) currently incorporate a few social presence elements in their Web pages (e.g., socially rich pictures, human Web assistants, personalized avatars, "shop with a friend" features), most on-line offerings are functional, and have little or no social appeal [35]. The discussion in this paper shows that for apparel products, inducing a sense of social presence on a commercial Web site can be an immediate and attainable goal that may result in an improved on-line customer experience. On the other hand, vendors selling other types of products should be cautious about adopting such an approach because it may not match the experiential requirements for on-line customers seeking such products (e.g., headphones).

As with any research study, there are some limitations that should be noted. First, this study was conducted in a laboratory setting, where it is difficult to measure actual/natural consumer behavior. To increase the realism of the task, subjects were told they had a chance to win the product they selected. In hopes of winning the selected product, subjects may have taken the task more seriously and employed their natural purchasing behavior. Second, generalizability is an issue that applies to most studies in information systems, and this research is no exception. Future studies should determine the extent to which the findings presented here can be expanded to include other persons, settings, and times [17]. Only one product-classification scheme was used, and only one representative product from each category of this classification scheme

was studied. There are many product dimensions/attributes that can be used to differentiate product groups. Further investigation could explore the product attributes that best lend themselves to socially rich presentation. Similarly, the selection of representative products for use in this study may have led to a bias in the results because of prevailing consumer attitudes toward those products. Third, since only one research method was employed (survey analysis following an experimental task), there is a potential for bias due to common method variance [95]. Other evaluation methods, including formal usability tests, focus groups, eye tracking, and log analysis, could be employed to avoid this bias and obtain a richer understanding of the effects of social presence across on-line vendors selling various products and services.

In addition to the above suggestions to overcome the study's limitations, future research can include (1) investigation of additional socially rich design elements across product types, because only text and pictures were investigated in this study; (2) investigation of preferences for social presence across consumer groups (divisions may be based on gender, age, culture)—for example, the initial investigations suggest that the impact of social presence on Web site attitude and its antecedents may differ across cultures; (3) investigation of preferences for social presence across consumer goals (browsing vs. searching); and (4) investigation of preferences for social richness in a business-to-business and consumer-to-consumer environments.

NOTE

1. The product pictures used on the experimental Web sites may have come from existing Web sites, but all references (including logos, colors, and design elements) to known companies and Web sites were eliminated.

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Appendix A

Construct Items and Their Sources

All items were measured on a seven-point Likert strongly disagree/strongly agree scale.

Perceived Ease of Use (PEOU)

Sources: [20, 33, 39, 74, 100]

1. PEOU1: This Web site is easy to use for clothing/headphone assessment.*
2. PEOU2: I can quickly find the information I need on this Web site.
3. PEOU3: This is a user-friendly Web site.
4. PEOU4: My interaction with this Web site is clear and understandable.

Perceived Usefulness (PU)

Sources: [2, 12, 20, 33, 54, 67, 98]

1. PU1: This Web site provides good-quality information.
2. PU2: This Web site improves my performance in assessing clothing/headphones on-line.
3. PU3: This Web site increases my effectiveness for clothing/headphone assessment on-line.
4. PU4: This Web site is useful for assessing clothing/headphones on-line.

Enjoyment (E)

Sources: [2, 37, 54, 67, 99, 100]

1. E1: I found my visit to this Web site interesting.
2. E2: I found my visit to this Web site entertaining.
3. E3: I found my visit to this Web site enjoyable.
4. E3: I found my visit to this Web site pleasant.

Trust (T)

Sources: [5, 33, 46, 74, 102]

1. T1: I feel that this on-line vendor is honest.
2. T2: I feel that this on-line vendor is trustworthy.
3. T3: I feel that this on-line vendor cares about customers.*
4. T4: I feel that this on-line vendor would provide me with good service.*

Attitude (A)

Sources: [45, 100, 101, 103]

1. A1: I would have positive feelings toward buying a product from this Web site.
2. A2: The thought of buying a product from this Web site is appealing to me.
3. A3: It would be a good idea to buy a product from this Web site.*

* Dropped item to increase construct reliability in the headphones study.

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