Hedonic and utilitarian motivations for online retail shopping behavior

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Abstract

Motivations to engage in retail shopping include both utilitarian and hedonic dimensions. Business to consumer e-commerce conducted via the mechanism of web-shopping provides an expanded opportunity for companies to create a cognitively and esthetically rich shopping environment in ways not readily imitable in the nonelectronic shopping world. In this article an attitudinal model is developed and empirically tested integrating constructs from technology acceptance research and constructs derived from models of web behavior. Results of two studies from two distinct categories of the interactive shopping environment support the differential importance of immersive, hedonic aspects of the new media as well as the more traditional utilitarian motivations. In addition, navigation, convenience, and the substitutability of the electronic environment to personally examining products were found to be important predictors of online shopping attitudes. Results are discussed in terms of insights for the creation of the online shopping \textit{webmosphere} through more effective design of interactive retail shopping environments. © 2001 by New York University. All rights reserved.

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1. Introduction

The interactive nature of the Internet and Web offer many opportunities to increase the efficiency of online shopping behavior by improving the availability of product information, enabling direct multiattribute comparisons, and reducing buyer search costs (cf. Alba et al. 1997). While comparatively more has been written about these more utilitarian aspects of the web, the emergence of the web as an entertainment medium has only recently gained in momentum (Orwall 2001). Clearly, consumers have been using the web for limited entertainment applications (e.g., downloading music), but a greater variety of entertainment opportunities have more recently become available. Consumers can now use the web to track and watch movies online and participate in their production, while also watching live concerts of obscure rock bands. For instance, the Ifilm corporation (Ifilm.com) shows original films on its website, while Intertainer, Inc. (Intertainer.com) offers movies-on-demand with VCR-like features, music videos, and delayed broadcast of network TV shows through a subscription broadband service. The movie, Tom Cats, utilized a website to cast extras generating 3000 applicants who were selected by votes from over five million visitors (Mathews 2001). HOB Entertainment (hob.com) offers web-casting of six to ten pay-per-view music concerts a month for $7.99, while SFX Entertainment (SFX.com) has provided free webcasts of the Backstreet Boys concerts (Townsend 2001).

A new venture, LivePlanet, plans to make new entertainment experiences that attempt to break down the barrier between traditional media, new media, and the physical world (www.LivePlanet.com/home.html). One LivePlanet product, a TV show called, Runner, that is built around a person eluding capture for 30 days while anywhere in the U.S. will be aired next summer by ABC. The show will feature a companion website that allows visitors to track the “Runner” over a 30 day period by providing location clues and real-time video clips through hidden cameras (Serwer 2000). Consistent with these general web trends, Jeff Bezos of Amazon.com maintains that “one secret to his success is thinking of ways to make the online shopping experience more fun” (Star Tribune 1999). Thus, insight into what role entertainment or hedonic versus functional or utilitarian factors motivate consumers to utilize web forms of interactive media is fundamental to the successes potentially to be realized through electronic commerce.

These new media represent a tremendous opportunity for marketers and developers of electronic commerce, but there are important technology-based differences between conventional retail channels and these new channels that must be understood in order for companies to maximize their performance as they enter this uncharted territory (Alba et al. 1997; Van den Poel and Leunis 1999). Understanding the nature of these media gains even greater importance given the promise that electronic commerce will increase price competition and reduce seller monopoly power through a reduction in buyer search costs (Bakos, 1997). At the heart of this shift to interactive online forms of shopping is a set of global, interconnected networks such as the Internet and the World Wide Web estimated to generate upwards of $108 billion in retail e commerce sales by 2003 (Rosen and Howard 2000). While there are a number of factors that affect the use of web shopping, the objective of our research is to focus on several unique technology-based characteristics of these new media.

More specifically, this research seeks to explore several determinants of interactive forms
of shopping by integrating aspects of consumer behavior with research from the information systems domain. The outline of the article is as follows. The next section will introduce concepts drawn from research on the user acceptance of information technology. Following this, characteristics of the new media which are expected to predispose consumers toward their use will be discussed along with specific hypotheses for how they correspond to consumer use of interactive shopping. Each antecedent will be elaborated upon followed by a discussion of the components surrounding the consumer’s attitude toward shopping via these media. Following this discussion are the results of two studies designed to test the basic predictions of this model.

### 2. Consumer motivations and user acceptance of new technology

Hirschman and Holbrook (1982) describe consumers as either “problem solvers” or in terms of consumers seeking “fun, fantasy, arousal, sensory stimulation, and enjoyment.” This dichotomy has been represented in the retail context by the themes of shopping as work (Fischer and Arnold 1990; Sherry, McGrath, and Levy 1993) versus the festive more enjoyable perspective on shopping as fun (Bloch and Bruce 1984; Sherry 1990; Babin, Darden and Griffin 1994). Clearly many motivations exist as shopping goals (cf. Westbrook and Black 1985), but most typologies consider instrumental and hedonic motivations as fundamental to understanding consumer shopping behavior because they maintain a basic underlying presence across consumption phenomena (Babin, Darden and Griffin 1994). In the utilitarian view, consumers are concerned with purchasing products in an efficient and timely manner to achieve their goals with a minimum of irritation. In contrast, as one consumer noted, “I enjoy looking around and imagining what one day, I would actually have money to buy. Shopping... is an adventure (Sherry 1990, p. 27). This “adventure” reflects shopping’s potential entertainment and the enjoyment resulting from the fun and play arising from the experience versus the achievement of any prespecified end goal (Hirschman and Holbrook 1982).

This dual characterization of motivations is consistent with our perspective on the adoption of interactive shopping behavior as a new form of technology assisted shopping. As a start to our understanding of these new media we draw upon a technology acceptance model (TAM) from the information systems literature (Davis, 1989; 1993; Davis, Bagozzi, and Warshaw, 1989) developed to understand workplace adoption of new technology. TAM postulates several conceptually independent determinants of a person’s attitude toward using job-related new technology. The first determinant is perceived “usefulness” of the technology and refers to the degree to which using the system or technology will improve the user’s performance in the workplace. TAM also postulates a second determinant, the ease of technology use. While usefulness refers to the outcome of the shopping experience, “ease of use” refers to the process leading to the final outcome. When shopping on the web, ease of use can be thought of as the process of using the new media while engaging in shopping behavior. A more recent addition to the TAM model is the enjoyment construct, or the extent to which the activity of using the technology is perceived to provide reinforcement in its own right, apart from any performance consequences that may be anticipated (Davis et al. 1989).
Enjoyment has been reported to affect technology adoption for specific word processing and graphics programs (Davis, Bagozzi, and Warshaw, 1992) and for microcomputer usage (Igbaria, Schiffman, and Wieckowski, 1995; Igbaria, Parasuraman, and Baroudi, 1996).

This characterization of technology adoption is consistent with research on retail shopping behavior, which has supported the presence of both utilitarian and hedonic motivations. As noted, the instrumental or utilitarian goal-directed factor envisions the consumer as thoughtfully considering and evaluating product-related information prior to purchase versus the hedonic aspect or the pure enjoyment and fun of the shopping experience (Babin, Dardin, and Griffin, 1994). Within the TAM framework, usefulness of the interactive media can be thought of as reflecting the more instrumental aspects of shopping, while enjoyment embodies the hedonic aspect of shopping. While some consumers may be shopping primarily for instrumental purposes, others may be primarily enjoying these interactive media, and thus both factors can ultimately affect their attitude toward using interactive forms of shopping.

This leads to the following set of predictions:

\[ H_1: \text{As the usefulness of the new interactive media increases, attitude toward these media will become more positive.} \]

\[ H_2: \text{As the ease of use of the new interactive media increases, attitude toward these media will become more positive.} \]

\[ H_3: \text{As the enjoyment of the new interactive media increases, attitude toward these media will become more positive.} \]

TAM, through its empirical assessment, has been validated by Davis (1989) and further validated by several replications and applications (c.f., Davis, 1993; Davis et al. 1989; Mathieson, 1991; Taylor & Todd, 1995). The results of these studies demonstrate that usefulness is the primary determinant of behavioral intention to use a technology in the workplace, with ease of use and enjoyment acting as secondary determinants. In contrast to the prior work contexts utilizing the TAM framework, our shopping context provides an opportunity to examine these issues in a more hedonic type of environment. Thus, we expect enjoyment to play a greater role in predicting the adoption of our interactive forms of shopping than has been found in the more performance oriented settings employed in past studies. However, this distinction can be extended as some consumers may be shopping primarily for hedonic reasons while others may be motivated to achieve more instrumentally oriented goals (Huffman and Houston, 1993). Thus, context may be important to differentiating the importance of different antecedents of technology adoption across settings.

To reflect this, we examined significantly different settings to better understand the dynamics of shopping goals across different interactive shopping environments. In one context, consumers examined a set of web shopping sites that demonstrated a number of more hedonic design characteristics (e.g., sampling CD music tracks). In contrast, the second study utilized a markedly more instrumental setting in the context of an online grocery ordering and delivery system. The latter is more reflective of the performance orientation of a workplace setting and thus, we expect the usefulness of the technology to play a greater role in predicting adoption in the online grocery setting. In contrast, the expanded nature of the more inter-
active web-based environment should result in a greater role for enjoyment as a predictor of web-shopping adoption behavior. This leads to the following predictions:

\[ H_4: \text{Usefulness of the new interactive media will be a stronger predictor of attitude toward these media in a more utilitarian shopping environment.} \]

\[ H_5: \text{Enjoyment of the new interactive media will be a stronger predictor of attitude toward these media in a more hedonic shopping environment.} \]

3. Characteristics of interactive technologies

This framework delineates the attitude toward using new forms of interactive shopping by postulating the three antecedents: usefulness of the new media, ease of use of the new media, and the enjoyment of using the media. But, what determines whether an interactive environment will be perceived as “useful”, “easy to use,” or “enjoyable”? This next section examines several antecedents of the technology’s benefits and limitations for online shopping and selectively predicts whether the new media are perceived as useful, easy to use, or enjoyable.

Usage of these new media includes the consumer’s purchase of products as well as the consumer’s intention to search for product related information while experiencing the new technology (Alba et al. 1997). Consumers are seeking benefits in the marketplace and the benefits of using interactive shopping as compared to traditional channels are important in delineating whether consumers will have a positive attitude toward these interactive media. Among these benefits are the interactivity and flexibility of the media to access and control the nature of product information and the convenience of the media including, its 24-hr availability and its accessibility through multiple locations (Hoffman and Novak, 1996; Alba et al. 1997). However, another facet of this new media is that it also differs in other meaningful ways from traditional shopping channels through the absence of the actual experience of visiting the store and physically examining a product prior to purchase (Alba et al. 1997). For instance, the QVC home shopping channel has recently opened a store at the Mall of America to allow customers to see and touch jewelry and other merchandise, since as their executives said, “prospective customers are reluctant to purchase merchandise without touching it” (Advertising Age, 2000). The manner in which these characteristics will affect interactive purchase behavior is discussed in the next section.

4. Antecedents of interactive media use

4.1. Navigation

Network navigation is defined as the process of self-directed movement through the media involving nonlinear search and retrieval methods that permit greater freedom of choice (Hoffman and Novak, 1996). In the online context, navigation includes the process of “exploring” the interactive environment in alternative ways to seek out product-related information. For example, the consumer may use a browser to either search for grocery items that are low in sugar and then
compare their content on carbohydrates or may choose to link to a new nutritional site that contains a multidimensional comparison of brands along the same attributes. Both provide the same fundamental purchase information, but one may be less effortful to navigate and compile as a decision tool. Thus self-directed movements through the media carry with them potential search costs that may affect their usability. Drawing from the information search literature in an online context, Lynch and Ariely (2000) found that when information on product quality was easier to navigate, consumers were less price sensitive and purchased more expensive products. The ability to efficiently navigate an electronic versus printed directory also was reported to lead to premature search closure in an electronic medium because of the medium’s increased search costs relative to its printed counterpart (Hoque and Lohse 1999). Thus, the structure of the online environment can serve at any one point in time to both facilitate and impair navigation for product information depending upon its impact on consumer search costs.

In a physical retail store context, consumers navigate for desired products by identifying the spatial representations of the store’s layout and by understanding the logic used to organize, to categorize, and to arrange merchandise (Titus and Everett 1995). Consumers accomplish this by recognizing how products are clustered by their common characteristics (e.g., paper items, or hardware) or through orientation aids, such as aisle markers, directory maps or through questioning in store personnel (Titus and Everett 1995). Past research has demonstrated that the navigational abilities of individuals in physical stores are enhanced by simplified floor plans (Weisman 1981) and the presence of a “gridtype” pathway configuration (Evans et al. 1984). Utilization of these cues is facilitated by the relative standardization of store layouts, even across competitors, and by the stability of the physical store layouts over time. By comparison, the ability to navigate a retail environment becomes even more critical when one considers the dynamic nature of the web. For example, unlike a retail store with this learned and observable visual layout, web sites generally follow “internal schemas” which are not known a priori by the consumer (e.g., a home page may be followed by a varying layout of nonstandardized subpages). Thus, each site represents a unique navigational experience that is constantly being updated and reconfigured in this dynamic electronic environment. Therefore, along with a desire for greater navigational freedom must come a greater tolerance for disorder, since a consumer is often navigating through uncharted territory. It is thus expected that persons who possess this greater desire for choice through alternate forms of navigation will perceive the process of shopping or the ease of using these interactive media as more favorable, resulting in hypothesis 6:

**H₆**: As the flexibility in navigation through interactive media increases, perceptions of the ease of use of these media will increase.

In addition, the process of self-directed navigation through the interactive environment should also contribute to an enjoyment of the shopping experience. When individuals have an increased ability through interactivity to move through their environment, it is expected that their enjoyment of using the new media will also increase leading to hypothesis 7.

**H₇**: As flexibility in navigation through interactive media increases, the enjoyment of using these new media will increase.
4.2. Convenience

Another benefit expected to influence the adoption of online environments is perceptions of convenience as manifested by the opportunity to shop at home 24 hr/7 days a week (Hofacker 2001). In this time crunched environment of today with multiple earner households, a “person living in Florida can shop at Harod’s in London (through the web) in less time then it takes to visit the local Burdines department store” (Alba et al. 1997, p. 41, emphasis added). Since consumers rarely visit multiple physical retail stores prior to purchase (Newman and Staelin 1972), interactive shopping can lower the costs of acquiring prepurchase product information while at the same time increase search benefits by providing a broader array of product alternatives at a small incremental cost (Bakos 1991). These benefits in the reduction of search costs accrue particularly when the consumer is under time pressure (Beatty and Smith 1987) making the accessibility advantage of interactive shopping especially advantageous to consumers.

This convenience in interactive shopping increases search efficiency through the ability to shop at home, by eliminating such frustrations as fighting traffic and looking for a parking space, and avoiding long check out lines, while also offering single “stop” shopping that eliminates travel to and from a variety of stores. Thus, convenience includes both the elements of when a consumer can shop and where a consumer can shop. Persons who perceive the online environment as offering greater convenience are more likely to consider the new media as both “useful” and “easy to use.” Perceptions of the convenience of these media facilitate the accomplishment of the shopping task (making it more useful), and also make the process of shopping (the ease of use) more appealing. In addition, reductions in frustration should decrease shopping’s psychological costs, which we predict will make the interactive shopping experience more enjoyable. These result in the predictions contained in hypotheses 8–10.

H8: As the perceptions of convenience of interactive media increase, perceptions of the usefulness of the media will increase.

H9: As the perceptions of convenience of interactive media increase, perceptions of the ease of use of the media will increase.

H10: As the perceptions of convenience of interactive media increase, the enjoyment of using the new media will increase.

4.3. Substitutability of personal examination

This antecedent is designed to tap an aspect of traditional retail shopping that is generally lacking in the online environment. Among the benefits of traditional physical store retailing is the ability to personally experience a product on a multisensory basis (Alba et al., 1997; Rosen and Howard 2000). Indeed one aspect of hedonic consumption is the experience of products through their tastes, sounds, scents, tactile impressions, and visual images (Hirschman and Holbrook 1982). The importance of tactile information as one aspect of direct experience is evidenced by the finding that consumers at a grocery store that were touched on the arm and asked to sample a snack item were more likely to comply and also more likely
to purchase the item than those who were not touched (Hornik 1992). Additionally, Peck and Childers (2000) propose that for salient haptic attributes (i.e., texture, hardness, temperature, and weight) the need to personally examine products through touch is particularly critical. What’s more, they report that when a barrier to direct experience to touch was present, in this case shopping for a sweater over the web, consumers were more frustrated with their shopping experience and were less confident in their product attitudes (Peck and Childers 2000).

At some point the new media may evolve to compensate for sensory deficiencies, but in today’s interactive retail environment the lack of certain sensory elements, (particularly touch) is likely to deter individuals from engaging in online shopping behavior'¹. Thus, it is expected that those individuals, who do not value or at least utilize these sensory components of the traditional retail channels, will see the new media as an acceptable substitute for directly examining a product in-person. This results in hypothesis 11:

\[ H_{11}: \text{As the substitutability of personal examination of product information obtained via interactive media increases, perceptions of the usefulness of the media will increase.} \]

Likewise, if shoppers believe that the sensory information available via the interactive media is sufficient, they should be more likely to enjoy using the new media leading to hypothesis twelve.

\[ H_{12}: \text{As the substitutability of personal examination of product information obtained via interactive media increases, the enjoyment of using the media will increase.} \]

Next, the results of two studies designed to test these hypotheses across different settings will be discussed. This comparison of results across the two studies should enable broader insight into the nature and importance of these behavioral antecedents across varied forms of interactive shopping. The next section discusses the details for the first study that investigated the more hedonic motivations associated with web-based shopping behavior.

5. Assessing hedonic motivations for online shopping

5.1. Participants

Participants consisted of 274 students in introductory classes in the business school of a large midwestern university. Seventy-six percent of the participants were less than 25 years of age, 18% were 25 to 34, 4% were 35 to 44, and two percent were over 44 years old. The average number of years of computer experience was 5.4; the median was 4. The average number of months of World Wide Web experience was 13, median 12. The average number of hours per week spent on the World Wide Web was 4.4, median 2. Forty-seven percentage of the students were male. Ten percent of the participants had purchased products from a site on the web. Half of those who had purchased had done so more than once. Participants reported spending an average of 3.5 hr (median = 3 hr) per week on all types of shopping activities. Participants thus, were familiar with using computers and particularly interactive shopping on the web.
5.2. Procedure

The setting for stimuli presentation and questionnaire completion was a teaching laboratory commonly used for a variety of computer-based business classes. The maximum number of participants in each experimental session was 30. The instructor’s computer situated in the front of the room was connected to a LCD projector with an 8’x 8’ screen.

The total time of the laboratory session was one hour. At the beginning of each session, students were asked to sit quietly and not turn on the PC monitors in front of them until told to do so. The participants were told that they were about to take part in a study on the use of the World Wide Web for shopping. They were told that the session leader would first orient students by illustrating two web shopping environments by projecting on the screen in the front of the room. They would then be asked to access three specific web shopping sites to get first-hand exposure to the range of shopping opportunities available on the web and complete a questionnaire based on their experiences in the laboratory session.

The session leader accessed the two selected web shopping sites, reading from a prepared script and describing features related to shopping behavior (e.g., product information or a purchase button). Participants were encouraged to ask questions about the sites or shopping on the web as the initial demonstration proceeded. The demonstration web shopping sites were chosen to illustrate the wide range of shopping opportunities available on the web. The purpose was to orient participants to the web shopping purpose of the study and provide a baseline of familiarity across subjects related to the basic capabilities of web shopping. The first site was Amazon books (www.amazon.com). It contained multiple navigation options, specific book information, online purchase options, and reader postings on book commentaries. The second site was Hot Hot Hot (www.hothothot.com) for inexpensive cooking sauces. This site offered elements of entertainment with high-resolution graphics, colorful and humorous product commentary, and online purchase capabilities.

At the end of the 15 min pre-exposure demonstration, the session leader instructed participants to turn on their computer monitors, and begin to access in succession the three web shopping sites bookmarked in their browser. Participants were told to simulate shopping for a gift for a friend. Participants were given 20 min and told to pay attention to all salient aspects of the web shopping experience that might differentiate one web shopping site from another.

5.3. Stimuli

The participants were exposed to three additional sites that were selected to contain a range of experiences that reinforced the nature and capabilities of these electronic media. In some cases these sites were well known web shopping sites, and in others they were new or obscure sites selected to represent variation in the many aspects of online interactive shopping. Participants viewed the three same sites in the following order; www.walmart.com, www.kmart.com, and www.bookstore.com. The sites were selected because they represented the benefits to be obtained through web shopping by including multiple navigational alternatives, search options, product information, and product purchase capabilities. At the Wal-Mart site, participants performed a series of tasks to illustrate aspects of
navigation as well as the availability of product information by searching the site for both toaster ovens and golf clubs by brand and within a specified price range. They were also instructed to identify purchase information related to shipping policies and order tracking. At the K Mart site, participants were exposed to information that would facilitate a direct examination of the product by sampling music tracks for a named CD. After this, they searched for information to answer questions we provided on shipping policies, costs and on return policies. At this site they were also instructed to determine how to order a gift certificate. At the third site (Bookstore.com), participants were instructed to again find the price for a specified book title and compare the cost savings to a competitor’s book site. They then searched the site for a particular book title and obtained information on the author.

Taken together, these sites reflected a mixture of hedonic and instrumental characteristics. Principal among the more functional aspects of the sites were the ability to obtain in-depth product and price information and the opportunity to purchase products online. In addition, the sites were selected to illustrate the more hedonic aspects of shopping through such characteristics as high resolution product images and graphics, interesting and humorous product commentary, sampling music, and by providing interactive games. These experiences provided participants with a strong sense of the nature of web shopping before responding to the measures contained in our questionnaire.

5.4. Measures

Constructs drawn from the TAM model were adapted from Davis (1989). All constructs, with the exception of attitude, were measured through the use of multiple item 7 point Likert-type scales ranging from -3 (strongly disagree) to +3 (strongly agree) and are included in Appendix I. Usefulness of the media was measured using 3 items, ease of use through 3 items, with the intrinsic enjoyment of using interactive media scale consisting of 4 items. The consumers’ attitude toward using the media was adapted from items provided in Bruner and Hensel (1996) and consisted of 4 items and used a 7 point semantic differential. The antecedents were made operational in a similar manner to the other indicators. Flexibility in navigating the interactive environment consisted of 4 items. The convenience of shopping scale consisted of 3 items. The scale indicating the substitutability of product information obtained through the media consisted of 4 items. The same seven scales and items were administered in study 2.

6. Assessing utilitarian motivations for online shopping

6.1. Methodology

In order to obtain greater sample heterogeneity, while also examining the hypothesized relationships in a different electronic context, a second study was undertaken. The context of this study was an online grocery ordering and home delivery system. This electronic system was under trial and was the only system available in the study’s market area. Consumers could order their groceries by computer using an 800 number to connect to a proprietary
server using software provided by the vendor. As a proprietary site, consumers could not access the web and so the online experience was more isolated and not reflective of the web environment where clicking a hyperlink or typing in a new URL could take the consumer to a completely new site. Also, in contrast to the sites used in the first study, the interface was more text-oriented and was focused entirely on product selection and purchase. Using the store’s software, consumers were able to search lists of product categories and create a virtual shopping list that was submitted to the store for delivery the next day at a small charge. This list of product categories was fixed and consumers could not navigate through the site by using hyperlinks or a search engine nor could the grocery items be reconfigured in any manner (e.g., by package size or limited to a diabetic diet). The site contained no product images or in-depth product information (such as, nutritional information or recipes) nor any opportunity to link to other sites that might contain some of the more hedonic aspects of shopping available in the web sites used in the first study. Thus, the more purchase focused nature of the site along with the instrumentally driven task of grocery shopping as “work” provided a marked contrast to the more hedonic types of interactive media examined in the first study.

6.2. Participants

Customers of this home shopping system were selected because they were familiar with the nature of computer mediated shopping environments and had demonstrated an inclination to use online shopping through their subscription. These individuals thus possessed the experience and knowledge upon which to provide informed perceptions of the value and limitations of online shopping. To gauge response rates and to determine the method of questionnaire distribution, we first conducted a pretest. Questionnaires were distributed by including them in the orders of 150 customers from three stores. Within the two week cutoff, 38 or 25% were returned. Following discussion with store personnel regarding the logistics of distribution through eight stores in the full study and the importance of emphasizing the academic nature of the study apart from the supermarket chain’s sponsorship it was determined that we should directly mail the final questionnaire.

For the final study, we selected a random sample of 1,000 consumers who were not in the pretest and had used this proprietary form of online grocery shopping within the prior three months. Questionnaires were mailed under university letterhead and returned directly to the same institution. A second cover letter from the Vice-President of Retail Store Operations explained the chains’ sponsorship of the study and encouraged customers to complete the questionnaire. Two weeks following the mailing, a postcard follow-up was mailed to all questionnaire recipients. Within the six week cutoff, three hundred and sixty six (37%) consumers responded, with 100 consumers using the grocery shopping service due to some sort of physical disability, which impaired their mobility and resulted in the necessity to shop from home. While this is undoubtedly a very important group, these mobility-impaired individuals are likely to differ from the rest of the sample regarding their determinants of using the service and were dropped from the analysis. This resulted in a total of 266 respondents.

Of the eligible respondents, 23% were less than 35 years of age, 46% were 35–44, 21%
from 45 to 54, and 10% were over 54 years old. In terms of education, five percent had a high school education or less, 28% some college, 33% were college graduates, and 34% had postgraduate work. Seventy-six percent of the participants were female. For income, 18% of the households had annual incomes of less than $50,000, 31% had $50,000 to $89,999, and 51% reported $90,000 or more. The vast majority (73%) reported using a computer for more than five years. Of the participants, 39% had purchased through the web. Of those making web buys, the median number of purchase occasions was five. Again, this sample demonstrated a significant amount of experience with computers and participants were very familiar with interactive media and its product purchase capabilities.

7. Results—hedonic motivations

7.1. Measure assessment

The reliability of the multi-item scales was examined by fitting congeneric measurement models for each of the seven indicators using LISREL 8 (Jöreskog and Sörbom, 1993). Scales were purified based on several considerations including the magnitudes and standard errors of the factor loadings on each item, the item and construct reliabilities (Fornell and Larcker, 1981), significant standardized residual covariances, and several measures of model fit. Fit statistics and reliabilities are summarized in Table 1. The reliabilities are estimated by the formula provided in Fornell and Larcker (1981) and all reliabilities fall within their guidelines².

Our model was estimated through maximum likelihood estimation using the variance-covariance matrix as input. All seven constructs were represented in the model by single indicators using summated scales. Following Fisher and Price (1992), measurement error was represented in the model by setting each indicator loading, \( \lambda \), and each indicator error variance, \( \Theta_\delta \), to \( \lambda = r^{1/2}\sigma \), and \( \Theta_\delta = (1-r)\sigma^2 \), where \( r \) is the scale reliability given in Table 1 and \( \sigma^2 \) is the variance of the summed scale. This specification follows the partial aggregation approach of Bagozzi and Heatherton (1994) and as they note the summations allow for the smoothing of random indicator errors and are useful in the molar assessment of behavior as reflected in our hypotheses. Additionally, sample size and the number of total items in our study preclude using a total disaggregation approach.

7.2. Overall model—study 1

As the first step in assessing the hypothesized relationships, the structural model (Fig. 1) was evaluated by examining the (1) chi-square (2) variance explained estimates and (3) fit indices. The chi-square goodness of fit statistic for 6 degrees of freedom was 15.13, \( p = .019 \). The significant \( \chi^2 \) indicates that the hypothesized model does not mirror the pattern of covariance contained within the raw data. However, Jöreskog and Sörbom (1993) note, the \( \chi^2 \) should be regarded more as a measure of fit than as a strict test statistic, since it may not be realistic to assume that the hypothesized model holds exactly in the population. Thus, we next turn to a more complete examination of the fit indices following the recommendations of a recent simulation by Marsh, Balla, and Hau (1996) and the recommendations of Browne
and Cudeck (1993), Bollen and Long (1993), and Byrne (1998). For the hypothesized model, the standardized RMR = 0.027. The non-normed fit (NNFI) index was 0.95 and the comparative fit index was 0.99, which exceed the standards recommended by Baumgartner and Homburg (1996). The RMSEA was 0.08, which is above the standard of 0.05 recommended by Browne and Cudeck (1993), but a value of 0.08 represents “reasonable errors of approximation in the population” (Byrne 1998, p. 112). In looking at the variance explained for the structural equations, 64% of the variance in attitude toward interactive shopping was explained by the hypothesized model. For the endogenous constructs the variance explained indices are as follows: usefulness (68%), ease of use (32%), and enjoyment (45%). As a package, these indicators are consistent in pointing to an acceptable fit of the hypothesized model to the data so we next turn to an examination of the individual parameters of the model and their relation to the hypotheses proposed in our framework.

7.3. Individual model estimates and hypotheses

To test the hypothesized relationships we examined (1) the estimated coefficients and signs and (2) their associated t-values (Fig. 1). $H_1$ proposed a significant positive relationship between the usefulness of the new media and attitudes toward interactive shopping. As summarized in Fig. 1, hypothesis 1 is supported by the significant positive relationship

### Table 1
Assessment of measurement scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>No. of Items</th>
<th>Sample 1</th>
<th>Sample 2</th>
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<td>Reliability</td>
<td>Fit Indices</td>
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<td>ATTITUDE</td>
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<td>$\chi^2(2) = 2.30$</td>
<td>.890</td>
</tr>
<tr>
<td></td>
<td>p = .32</td>
<td>GFI = .99, NNFI = 1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AGFI = .97, CFI = 1.00</td>
<td></td>
</tr>
<tr>
<td>USEFUL</td>
<td>3</td>
<td>$\chi^2(2) = .55$</td>
<td>.76</td>
</tr>
<tr>
<td></td>
<td>p = .76</td>
<td>GFI = 1.00, NNFI = 1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AGFI = .99, CFI = 1.00</td>
<td></td>
</tr>
<tr>
<td>EASE OF USE</td>
<td>3</td>
<td>$\chi^2(2) = 1.12$</td>
<td>.57</td>
</tr>
<tr>
<td></td>
<td>p = .57</td>
<td>GFI = 1.00, NNFI = 1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AGFI = .99, CFI = 1.00</td>
<td></td>
</tr>
<tr>
<td>ENJOYMENT</td>
<td>4/3$^b$</td>
<td>$\chi^2(2) = .58$</td>
<td>.75</td>
</tr>
<tr>
<td></td>
<td>p = .75</td>
<td>GFI = 1.00, NNFI = 1.00</td>
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<td>AGFI = .99, CFI = 1.00</td>
<td></td>
</tr>
<tr>
<td>CONVENIENCE</td>
<td>3</td>
<td>$\chi^2(2) = 1.25$</td>
<td>.921</td>
</tr>
<tr>
<td>NAVIGATION</td>
<td>4/4$^{b,c}$</td>
<td>p = .20</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GFI = 1.00, NNFI = 1.00</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>AGFI = .99, CFI = 1.00</td>
<td></td>
</tr>
</tbody>
</table>

$^a$ Trivial fit for three item scale.
$^b$ Number of items for sample 1 and sample 2.
$^c$ Scales for sample 1 and sample 2 consist of different items.
between usefulness and attitude. \( H_2 \) is also supported with ease of use positively related to attitude. Under the proposed framework we hypothesized that shopping enjoyment should be a significant predictor of attitude toward interactive shopping (\( H_3 \)). Again, this hypothesis is confirmed as indicated by the significant positive relationship between these two measures.

The next set of relationships examined the interrelationships of the antecedents with the TAM variables. As predicted, navigation was found to be a significant determinant of ease of use (\( H_6 \)) and shopping enjoyment (\( H_7 \)). Convenience in using these new electronic media was a significant predictor of usefulness (\( H_8 \)), but convenience was not significantly related to ease of use (\( H_9 \)). However, convenience was related as hypothesized (\( H_{10} \)) with enjoyment. Finally, the substitutability for personal experience was related as hypothesized to usefulness (\( H_{11} \)) as well as to enjoyment (\( H_{12} \)). The second study contained within our article offers some additional insight into the nature of these relationships and will be discussed next.

8. Results - utilitarian motivations

8.1. Overall model - study 2

To assess the hypothesized results in the proprietary online shopping study, we follow the same method of first examining the fit of the overall model as estimated in LISREL 8 and then we further examine the individual parameters and their relation to the set of hypotheses proposed in this research.
The $\chi^2$ goodness of fit statistic for 6 degrees of freedom was 17.24, $p = .008$. For the hypothesized model (Fig. 2), the standardized RMR = 0.029. The non-normed fit (NNFI) index was 0.95 and the comparative fit index (CFI) was 0.99, which again exceed the standards recommended by Baumgartner and Homburg (1996). RMSEA was 0.087, which is above the standard of 0.05 recommended by Browne and Cudeck (1993), but within sampling error of the standard suggested by Byrne (1998). In looking at the variance explained for the structural equations, 67% was explained for the attitude toward interactive shopping. For the endogenous construct usefulness, 60% of the variance was explained, while for ease of use it was 45%, and 48% for enjoyment. As a package, these indicators provide an acceptable representation of the data and we next turn to an examination of the individual parameter estimates and the hypothesized relationships for our framework.

8.2. Individual model estimates and hypotheses

As shown in Fig. 2, $H_1$ is supported by the significant positive relationship between usefulness and attitude. $H_2$ is also supported with ease of use positively related to attitude. Within our model we proposed that enjoyment would be a significant predictor of attitude toward interactive shopping ($H_3$) and this is confirmed as indicated by the significant positive relationship between these two indicators.

The next set of relationships examined the nature of the antecedents. As predicted by $H_6$, navigation was a significant determinant of ease of use and shopping enjoyment ($H_7$). Convenience in using these new electronic media was a significant predictor of usefulness,
(H_8), ease of use (H_6) as well as shopping enjoyment (H_10). Finally, substitutability for personal experience was related as hypothesized with usefulness (H_11) and with shopping enjoyment (H_12).

8.3. Hedonic versus utilitarian motivations across contexts

As discussed, we expected differences in the strength of several of the TAM relationships between the more hedonic web-based form of interactive shopping and the more utilitarian-based online grocery shopping context of study 2. These hypotheses are based upon $\chi^2$ difference tests on parameter values across the studies using a two-group LISREL analysis (see Appendix II for a discussion of analysis issues and procedures).

Consistent with H_4, the usefulness of interactive shopping for online grocery shopping versus the web-shopping context is more strongly related to attitude toward the new media (coefficients = 0.47 vs. 0.30, $\Delta \chi^2 (1) = 6.59, p < .05$). In contrast, we predicted that the enjoyment of interactive shopping would be a stronger predictor of attitude in the web-shopping context. Again, H_5 is supported with enjoyment a stronger predictor of attitude for the more hedonic context of web-shopping versus online grocery shopping (coefficients = 0.46 vs. 0.30, $\Delta \chi^2 (1) = 8.20, p < .05$). We next turn to a discussion of the pattern of relationships across the two studies.

8.4. Summary of results for study 1 and study 2—TAM and its antecedents

Overall, the studies find strong evidence for our hypothesized model as indicated by support for 23 out of the 24 hypothesized relationships. We first discuss these results in terms of the predictions within the TAM components of the model and then turn to the results for the antecedents.

In both studies, enjoyment is a consistent and strong predictor of attitude toward interactive shopping. Similarly, usefulness and ease of use were also significant predictors of attitude across both studies. When comparing the relative effects of the TAM variables, within both studies usefulness and enjoyment are equally predictive of interactive shopping attitudes (sample 1, $\Delta \chi^2 (1) = 0.77, p > .05$; sample 2, $\Delta \chi^2 (2) = 2.49, p > .05$). However, in the hedonic environment of web shopping, enjoyment is a stronger predictor of attitude relative to ease of use ($\Delta \chi^2 (1) = 5.37, p < .05$), while in the utilitarian context of study 2 they are equally predictive ($\Delta \chi^2 (1) = 1.64, p > .05$). In contrast, usefulness and ease of use are equally predictive of attitudes when shopping through the web ($\Delta \chi^2 (1) = 1.52, p > .05$), but usefulness is a stronger predictor in the more utilitarian oriented context of online grocery shopping ($\Delta \chi^2 (1) = 6.72, p < .05$). In one sense, the results for online grocery shopping are similar to the TAM findings for past applications in a workplace setting where usefulness is a stronger predictor of technology adoption relative to ease of use and enjoyment. However in extending the framework to the consumer web shopping context, we find in contrast to past
workplace-oriented research, that usefulness and enjoyment are equally predictive with ease of use acting as a secondary determinant of technology adoption.

Among the antecedents emerging from the interactive nature of the media was the importance of convenience. The facilitation of shopping behavior in terms of time and place was a particularly strong predictor of usefulness in both studies (standardized coefficients; web shopping = 0.76 and online grocery shopping = 0.82). Navigation was also a consistent predictor of interactive shopping enjoyment in both studies. The flexibility of navigating through the interactive environment was also a determinant of consumer perceptions of the ease of using these media. Finally, for consumers who perceived that the interactive environment provides an acceptable substitute for direct product examination, this antecedent was a consistent predictor of both the perceived usefulness and the enjoyment of interactive shopping. We next turn to a discussion of the implications of these findings for future research and for electronic commerce in these new interactive shopping environments.

9. Discussion and implications

The results across the two studies suggest that, while the instrumental aspects of the new media are important predictors of online attitudes, the more immersive, hedonic aspects of the new media play at least an equal role. This is evidenced by the strong and consistent influence of enjoyment on attitudes in both studies. Alongside enjoyment, several variables that reflect perceptions of immersive, involving characteristics of the interactive experience (i.e., navigation, convenience, and substitutability for personal examination) were strong predictors as well.

Jointly, this pattern emphasizes that a technology oriented perspective that attempts to treat shopping media as cold information systems, rather than immersive, hedonic environments, is likely to be fundamentally misguided, especially for products with strong hedonic attributes. Rather, media design characteristics must be considered only in conjunction with the intrinsic enjoyment criterion and the design characteristics driving it (e.g., convenience, navigation, and the substitutability of personal examination). Indeed, many of the unique aspects of the new media (e.g., its flexibility in navigation, in particular) most likely create a novel, intrinsically enjoyable virtual environment that should be featured in the design of shopping media—even though it may appear to tax the user from a strictly instrumental point of view. Creating a more enjoyable environment may involve or require the use of more powerful languages such as JAVA, and the inclusion of images, video, color, humor, sound, music, games, animation, and all of the other aspects of interactive, networked multimedia that make it enjoyable to experience. Even in goal-driven electronic commerce environments, like online grocery shopping, with the advent of broadband access low cost additions, such as interactive menus, recipes, and product preparation videos would likely serve to increase the enjoyment of shopping while differentiating the new media from their physical retail store counterparts.

Lest we make our point about enjoyment too strongly, we note that usefulness and ease of use were strong predictors in our studies as well. Also, we must emphasize that the role
and relative importance of instrumental characteristics versus immersive/hedonic aspects will likely vary across contexts, as occurred in our research. To illustrate, shopping for food is a strongly goal-oriented instrumental behavior that is generally not thought of as an intrinsically enjoyable activity. It would follow that as we found, beliefs concerning more performance-oriented characteristics of the grocery-shopping online environment would more strongly influence attitudes and intentions to use such an environment. Many discount “big box” oriented retailers, including warehouse type grocery stores are fairly mundane in appearance and are often designed more to facilitate efficient shopping than to provide enjoyment to shoppers. Even so, enjoyment was a significant predictor of attitudes for online grocery shopping. This brings into consideration the notion that consumer’s attitudes, expectations, and preferences for interactive shopping may differ from those held in the physical retail shopping environment for identical products. Consumers may, in general, expect to find more enjoyment in interactive environments than they do when shopping in physical environments. More research is needed into this issue, and others, to which we turn briefly.

10. Limitations and future research

Limitations of our research provide the foundation for continued research to improve our understanding of the factors leading to the adoption and use of interactive retail shopping. Our study focused on only a subset of the possible determinants of new media use. For instance, interactive environments provide the consumer with a wealth of prepurchase product information that consumers may use to screen and form consideration sets (Alba et al. 1997). Related to this provision of objective product information is the interactivity of the media and the control it places in the hands of the consumer over the pace as well as order and configuration of this information (Fortin and Dholakia 1999). Additionally, the new media are relatively lacking in social forms of interaction which contribute also to shopping’s hedonic experience (Rosen and Howard 2000). Retailers, such as, Lands End now provide online access to employee personal shopping assistance and “shopping with a friend” technology, but little is known about whether these compensate for the direct in-person interaction provided by traditional retail stores. Other factors, related both to the technology (e.g., privacy and security) as well as personal characteristics (e.g., skill level and flow) are potential important predictors that were not investigated in our research. Thus, expanding the scope of antecedents is an important next step toward our understanding of the factors that hinder as well as enhance interactive shopping.

Another limitation is the breadth of web-sites and technologies that were included in our research. We utilized only five web sites in our first study and our model needs to be extended across a broader array of sites, including for example, portals and search engines (e.g., Yahoo and Lycos), where shopping is perhaps not the primary intended benefit. Our research examined two forms of interactive technology, (e.g., the web and a proprietary online environment) but research across different technology assisted shopping environments (e.g., electronic kiosks, CD-ROMS, mobile cell phones) is needed as well. For instance, does enjoyment continue to be a strong predictor of electronic kiosk use in a more time-pressured
in-store shopping context versus in a potentially more leisurely at home browsing environment? On the other hand, the in-store environment as well as mobile computing technologies may put a premium on the efficient navigation of web sites (emphasizing ease of use) while downplaying the hedonic aspects of interactive retail shopping.

Major research opportunities exist in terms of providing a better understanding of those media “design variables” characterizing interactive environments that drive perceptions of usefulness, ease of use, and enjoyment. Additional research is required into how characteristics like navigation and convenience map into more “tangible” attributes of interactive environments. In the physical retail store context, atmospheric effects, such as external architectural variables (i.e., signs, building color, etc.) interior considerations (i.e., music and lighting) and layout and design variables (i.e., space, merchandise placement and arrangement) have been reported to affect many different forms of retail patronage behavior (Turley and Milliman 2000). Additionally, Babin and Attaway (2000) found that atmospheric effects can differentially affect positive and negative affect and that the former was more positively related to hedonic versus utilitarian retail shopping values and customer repeat spending behavior. Although, providing strong evidence for the effect of the physical environment on shopping behavior, in contrast, very little is known about how the design characteristics of interactive shopping sites affect online purchase behavior and other usage indicators, such as, site usefulness and ease of use. This issue of what we term, “webmospheres” represents the virtual environment counterpart to the physical surroundings associated with the retail atmosphere. Included in the “webmosphere” are such structural design attributes as frames, graphics, text, pop-up windows, search engine configuration, “one-click” check-out or purchase procedures, and hypertext links, media dimensions (e.g., graphics, text, audio, color, and streaming video) and site layout dimensions (e.g., organization and grouping of merchandise). An example of the latter, would be an outdoor oriented web site that faces the decision of whether to organize the entry portals to its site in terms of activity (i.e., fishing, hunting, snow skiing, etc.) or by type of customer (e.g., family-oriented activities, singles’ vacations, or senior citizen events).

Each “webmospheric” dimension represents an important set of design choices that when combined comprise an electronic shopping site which can either enhance or detract from the consumer’s interactive shopping experience (Pine and Gilmore 1999). Thus, much research is required into how these elements influence consumers’ perceptions and satisfactions. For instance, does streaming video enhance user enjoyment of interactive media or do download times detract from the experience by contributing to user frustrations while inhibiting interactive flow (Hoffman and Novak 1996)? Do more dynamic web sites that allow for navigational self-configuration (e.g., more search tools, additional product attributes and information depth, or user generated product/brand attribute comparison matrices) intimidate consumers? On the other hand, perhaps dynamic -configuration provides more navigational options and greater control to continually adjust the optimal flow threshold level and longitudinally enhance enjoyment by forestalling boredom and routinization of the shopping experience? Although, the capabilities of individualized-customization of interactive shopping media will truly differentiate it from con-
ventional channels future research needs to examine their effects on both the utilitarian as well as hedonic aspects of the online shopping experience.

Notes

1. Steuer (1992, p. 86) referred to this issue as mapping, or the ability of a system to map its controls to changes in the mediated environment in a natural and predictable manner. For instance, the action of throwing a baseball while wearing a virtual reality glove controller might initiate the throwing of a virtual baseball. In limited instances consumers can experience certain multisensory aspects of products through these media, such as, visual images and sound. For example, on sites such as www.cdnow.com and www.disney.com it is possible to download portions of recorded music or videos. However, the interaction and thus the telepresence through the depth and breadth of the stimulus is shallow relative to the experience obtained through the physical environment (Steuer, 1992). Clearly, although lacking in most current forms of interactive media, future technologies may provide for some adaptation of these inputs through, for example, force feedback mechanisms that map the haptic (touch) qualities of a product (Burke, 1996).

2. Discriminant validity for all measures was assessed, but to conserve space only a summary of the results is provided. Tests for discriminant validity included both the latent variable confidence interval test and the $\chi^2$ difference test. For all seven latent variables, across both samples, none of the pairwise tests contained the value of 1.0 within plus and minus two times the standard error of the estimate (Voss et al. 1998). The more stringent $\chi^2$ difference test compared the freely estimated latent variable correlations to a model that fixed the correlation between successive pairs of factors to unity (Anderson and Gerbing, 1988). In all comparisons across the two samples, the constrained model was statistically significant at $p < .05$). Thus, the results of two different tests of discriminant validity for both samples provide strong support that each of the measures is reflective of a distinct construct.

3. Not shown in Fig. 1 are the relationships between the antecedents. The $\phi$ for convenience and navigation = 0.58, $\phi$ for convenience and substitutability of personal examination = 0.25, and $\phi$ for navigation and substitutability of personal examination = 0.36, all significant at $p < .05$.

4. Not shown in Fig. 2 are the relationships between the antecedents. The $\phi$ for convenience and navigation = 0.35, $\phi$ for convenience and substitutability of personal examination = 0.29, and $\phi$ for navigation and substitutability of personal examination = 0.69, all significant at $p < .05$.

Acknowledgments

The authors would also like to thank Doug Stansbury for his assistance in funding and conducting the second study.
Appendix I - Item used to measure the constructs in study 1 and study 2

USEFULNESS (the degree to which using the system or technology will improve user performance/outcomes)
Technology assisted shopping (TAS) would improve my shopping productivity.
TAS would enhance my effectiveness in shopping.
*TAS would be useful in buying what I want.
TAS would improve my shopping ability.

EASE OF USE (the process involved in using the system or technology)
TAS would be clear and understandable.
TAS would not require a lot of mental effort.
TAS would be easy to use.
*TAS would allow me to shop the way I want to shop.

ENJOYMENT (the extent to which the activity of using the technology is perceived to provide reinforcement in its own right, apart from any performance consequences that may be anticipated)
*Shopping with TAS would be fun for its own sake.
*Shopping with TAS would make me feel good.
Shopping with TAS would be boring.
*Shopping with TAS would involve me in the shopping process.
Shopping with TAS would be exciting.
Shopping with TAS would be enjoyable.
*Shopping with TAS would be uncomfortable.
*Shopping with TAS would be interesting.

CONVENIENCE (the opportunity to shop on a less restricted basis at home 24 hours a day/7 days of the week)
*Using TAS would be convenient for me.
TAS would allow me to save time when shopping.
Using TAS would make my shopping less time consuming.
Using TAS would be a convenient way to shop.
*TAS would allow me to shop whenever I choose.

NAVIGATION (the process of self-directed movement through the media involving nonlinear search and retrieval methods that permit greater freedom of choice)
Using TAS would allow flexibility in tracking down information.
*Use of TAS would allow me to explore the environment in a variety of ways.
*There is no set path I would have to follow in accessing information or examining products using TAS.
*Finding products and information using TAS would require a lot of exploring.
Use of TAS would offer a very free environment which I could navigate as I saw fit.
Use of TAS would allow navigation through the environment.
Use of TAS would allow me to move fluidly through the shopping environment.

SUBSTITABILITY OF PERSONAL EXAMINATION (the ability of the media to substitute for the absence of sensory inputs due to the lack of direct interaction with a physical product)
Use of TAS will offer knowledge of a product similar to that available from an up-close personal examination.
Information available through using TAS is a good substitute for that available from seeing and touching the product.
Use of TAS would allow me to form an impression about a product similar to that from up-close examination.
*Use of TAS would allow me to judge a product’s quality as accurately as an in-person appraisal of the product.
*Use of TAS would deliver information about a product’s materials and workmanship similar to that available from a up-close examination.

ATTITUDE (an overall affective evaluation that can range from extremely positive to extremely negative)

*a Eliminated during scale purification from samples 1 and 2
*b Eliminated during purification from sample 1 only
*c Eliminated during purification from sample 2 only
Appendix II - Issues and process in assessing measurement invariance

Disagreement among structural equation modeling experts (cf. Bollen 1989, Hayduk 1996) exists on the necessity and process of assessing measurement invariance as a prerequisite to the comparison of structural parameters across samples (Byrne 1998, Byrne et al. 1989, Horn and McArdle 1992, Jöreskog 1971, Little 1997, Marsh 1987). If tested, measurement invariance generally proceeds through testing multiple increasingly restrictive stages: (1) the invariance of the hypothetical factor pattern, (2) then assessing the equality of factor loadings, and (3) assessing the equality of the disturbance variances and perhaps, covariances. Current opinion suggests that the third stage is too restrictive, since as disturbances (including random error and specific variable variance), these parameters are expected to vary across samples (Byrne 1998, Byrne et al. 1989, Horn and McArdle 1992, MacCallum et al. 1994, Widaman and Reise 1997). Thus, the analysis of measurement invariance conducted in this article will consist of equality of factor pattern and factor loadings.

Two additional issues relate to, (1) the criteria for the tests of invariance (statistical vs. practical, i.e., the modeling perspective) and (2) the breadth of the cross-sample equality constraints (partial (weak) invariance versus full (strong) invariance). Two categories of criteria exist for the assessment of measurement invariance. The first category utilizes purely statistical criteria: the $\chi^2$ difference test, while the second category involves practical or modeling criteria (fit indices - Byrne 1998, Byrne et al. 1989, Little 1997, MacCallum et al. 1994). Due to extreme sensitivity to sample size and model complexity, the purely statistical $\chi^2$ difference test has given way to a more practical approach which assesses degradation in fit indices from equality constraints across samples. From a modeling perspective, a full set of equality constraints producing a difference in the NNFI (Tucker-Lewis Index) of less than 0.05 indicates practical measurement invariance (e.g., equality of factor loadings, Little 1997). The second issue involves the number of parameters that are constrained equal across samples and the method to assess equality. Partial (full) invariance is obtained when a proportion (all) of the parameters of a given type are equal across groups. The criterion for equality can influence the breadth of invariance. Some parameters may be equal by purely statistical criteria, while more or all of the focal parameters may be equal when applying modeling criteria.

The measurement invariance assessment for this study was conducted first by testing for the factor pattern across samples. When testing for invariance of factor pattern, the stacked, two-sample model estimated without cross-sample constraints yields a $\chi^2 = 934.90$, df. = 462, $p < .05$. Because non-fit-related factors such as sample size, slight non-normality, and model complexity contribute to this significance, other fit indices developed to be less sensitive to these factors were examined. The RMSEA for the stacked model was 0.066, clearly within the moderately good fit range. NNFI was 0.93, CFI was 0.94, indicating reasonably good fit for the stacked models. The contribution of the first sample to the $\chi^2$ was 50.02% indicating a balanced fit between the two samples. Thus it can be concluded that the factor structure of the model is invariant across the two groups.

The second step imposed equality constraints on the factor loadings across the two samples. For this model the samples failed to yield complete factor loading invariance ($\chi^2 = $
114.98, df. = 24, p < .05). However, subsequent analysis of each factor loading indicated that by the $\chi^2_{os}$ criterion, 16 of the 24 factor loadings were invariant across groups. Adopting a modeling perspective, the NNFI was 0.92 with full equality constraints imposed on the factor loadings. This 0.01 increase in NNFI is well within the 0.05 change suggested as a cutoff for invariance. Thus from a modeling perspective, the factor loadings are invariant across samples. This level of measurement invariance is sufficient to conclude that to within the bounds of sampling error, the constructs and their interrelationships are comparable across groups.

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