ONLINE SHOPPING INTERFACE COMPONENTS: RELATIVE IMPORTANCE AS PERIPHERAL AND CENTRAL CUES

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ABSTRACT

Empirical exploration of how online consumers interpret and value the marketing communication embedded in shopping interface components has the potential to advance knowledge of online consumer behavior and to inform design decisions concerning consumer-oriented Web sites. To date, little research has been completed regarding how interface components hinder or aid consumer perceptions of the online marketing message. This research investigates the relative importance of online shopping interface components for online consumer shopping tasks and the role they play within the context of the Elaboration Likelihood Model's central and peripheral routes of persuasion. The important and relative issues surrounding online shopping were explored, finding the core components of *convenience*, *access to information*, and *trust*. These components were then implemented in an online shopping task. Respondents considered thoughtfully (central route) marketing messages that involved issues of minimizing travel, information access, and fraud protection. The specific preference of respondents for each of these components was found to differ depending on three market segments: *time savers*, *information seekers*, and *general surfers*. A descriptive model of Web-based marketing components, their roles in the central or peripheral route, and their relative importance to the three online consumer segments was developed.

ONLINE SHOPPING INTERFACE COMPONENTS: RELATIVE IMPORTANCE AS PERIPHERAL AND CENTRAL CUES

Consumers are willing to purchase products they cannot physically inspect and then endure the risk of lost orders, dishonest traders, and products not up to expectations. Rather than a description of shopping in the new e-economy, this passage could describe consumers in the British colonies of pre-Revolutionary America where consumers of the day were importers of British finished goods (McCusker & Menard, 1991; Middlekauff, 1982; Witkowski, 1989) or early mail-order markets of the late nineteenth century (Klos, 1998). Marketing channels are products of their time, yet address issues of exchange that are persistent over generations. Today's online channels present the latest challenge to understand what consumers value in the marketing communication.

Interface components convey a fundamental marketing message about the online environment being visited. Watson, Zinkhan, and Pitt (2000) labeled this *integrated Internet marketing*, and emphasized Web design communicates a message that is more than the sum of its technical parts. Duncan and Moriarty (1998) argue that in the age of interactivity, the importance of communication in marketing is greatly increased and that communication is the integrating factor that brings together numerous marketing activities. The Web certainly has a role to play in this communication, but what exactly the components of that communication are has not been explored in the existing literature.

PRIOR RESEARCH AND CURRENT FRAMEWORK

Stevenson, Bruner, & Kumar (2000) and Bruner and Kumar (2000) asserted that components of the Web site design influence attitudes toward the underlying marketing message and that attitude-toward-the-Web site (A_{WS}) had an important role to play in the advertising hierarchy-of-effects. Attitude-toward-the-ad (A_{AD}), on which A_{WS} was derived, is based on cognitive evaluations of the ad and affective reactions to the ad (Burton &

Lichtenstein, 1988; Celuch & Slama, 1995; Miniard, Bhatla, & Rose, 1990). These two tracks of persuasion are well represented in the Elaboration Likelihood Model (ELM, Petty & Cacioppo, 1986, 1996; Petty, Cacioppo, & Schumann, 1983), which postulates that a *central route* of persuasion exists for consumers who are interested in the information presented and such consumers carefully consider the content of the message in a thoughtful manner.

Thoughtfulness is central to consumer attitudes when considering online marketing communication since the Internet is an information rich environment. Web surfers can become involved in the information they are scanning, a phenomenon labeled *flow* by Hoffman and Novak (1997). Some obstacles to involvement, such as connection speed, can be solved through technological improvements, but a number of issues are related to cognitive preferences of consumers, which require examination in the interactive context (Bezjian-Avery, Calder, & Iacobucci,1998). Cho (1999) studied this issue and presented a modified ELM that included mediating variables specific to the Web. Although the variables studied by Cho were attitudinal, rather than specifically examining Web page components, the implication was that the ELM could be used in understanding how A_{WS} is influenced by the unique aspects of Web site design.

Elaboration of Message

According to the ELM, attitudes formed under central route persuasion have a greater influence on behavior, are longer lasting, and more resistant to change. Attitude change from the central route is brought about by *effortful issue-relevant cognitive activity* (Petty & Cacioppo, 1996, p. 263). Since involvement determines whether or not the message will be elaborated on, it is important to know if certain Web interface components can be classified as inherently high involvement or low involvement.

STUDY 1: INTERFACE COMPONENTS

According to cognitive response theory, favorable thoughts result when the content of a message aligns with preexisting knowledge (Greenwald, 1968; Petty & Brock, 1981). For example, an online consumer at the checkout stage of a purchase may have a positive reaction to a detailed explanation of the server's security system due to preexisting thoughts about the importance or usefulness of such security. In order to explore what marketing messages are expected and sent through specific Web site components, the following research questions guided the exploratory research of Study 1:

Q1. Do online consumers exhibit preexisting cognitive preferences for Web page components?

Q2. Can online shopping interface components be grouped in dimensions based on consumers' preexisting preferences?

METHODOLOGY

Keeney (1999) described 26 classifications of important online shopping concerns expressed by consumers from 20 countries through a means-end objectives network. These classifications were confirmed in the Taiwan setting through a similar open ended instrument. The 26 issues of online shopping were then transformed into an online (Web-based) survey and translated to Chinese, with back translation used (Green & White, 1976). The importance of each issue, presented randomly, was rated on a seven-point scale ranging from strongly considered to not considered at all when considering shopping online.

Subjects. Email invitations were sent to randomly chosen email accounts with no repeats or follow-ups. Email has been observed as having the advantages of speed of response and low expense (Oppermann, 1995; Tse, 1995; 1998) with no signs of systematic bias (Miller & Dickson, 2001; Weible & Wallace, 1998). The 306 Respondents' demographic data (see Table 1) compared well with the sample frame of Internet users in Taiwan (Find, 2001;

YamWeb Frontier Foundation, 1999). A total of 62% of the respondents had previously made a purchase over the Web with the most commonly purchased products being books/magazines and computer software.

Table 1. Sample and Taiwan Web users' demographic comparison

	Average age	Female	Student	Married	College graduate	Grad. school graduate	Average monthly income (NT$)
Taiwan Web users*	25.3	45.6%	40.9%	29.1%	40.5%	10.1%	20-30K
Experiment Sample	26	47%	36%	34%	61%	9.6%	20-30K

*Note: Taiwan averages from Find, 2001

RESULTS AND DISCUSSION

Responses to the online survey exhibited an acceptable Cronbach's alpha of .91. A Bartlett's test of sphericity (χ^2 = 2754, p < .000) and a measure of sampling adequacy (MSA = .91) both revealed high levels of correlations among the 26 survey issues. Exploratory principal component factor analysis was undertaken using SPSS 10, with VARIMAX rotation. Five factors with eigenvalues over one emerged. Items that loaded over or near .30 (Hair, Anderson, Tatham, & Black, 1998, p. 112) on more than one factor were removed from further consideration and a purified result obtained.

Three factors with eigenvalues over one (see Table 2) accounted for 57.43% of the total variance. Both personal information and security issues dominated factor 1, which was labeled *Trust*. The second factor contained the items interaction, comparison shopping, maximizing access to information, and ease of use; this factor was labeled *Access to Information* (hereafter referred to as *Access*). The last factor component included maximize convenience, minimize travel, and maximize enjoyment; thus, this factor was labeled *Convenience*. Consumers do appear to have opinions concerning what issues should be included in an online shopping experience--positively answering research question 1 (*Do online consumers exhibit preexisting cognitive preferences for Web page components?*).

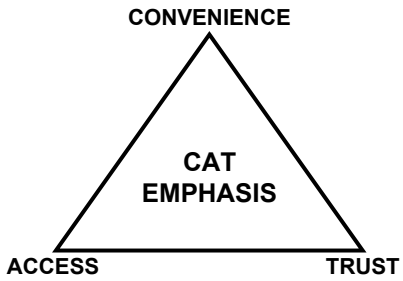
Table 2. Purified factor loadings

	Convenience	Access	Trust	Communalities	Item-to-factor correlation
Max convenience	.74	.16	.21	.61	.71
Min personal travel	.72	-.04	.23	.56	.69
Limit impulse buying	.64	.23	.05	.47	.71
Min time spent	.55	.31	.09	.41	.67
Max shop enjoyment	.54	.28	.1	.38	.68
Offer personal interaction	.07	.78	.18	.64	.75
Enhance comparison shopping	.12	.66	.23	.50	.67
Max access to info	.28	.66	-.03	.51	.72
Max ease of use	.24	.61	.07	.43	.75
Min misuse of personal info	.15	.11	.84	.75	.87
Assure system security	.2	.04	.83	.73	.85
Min misuse of credit card	-.16	.23	.81	.76	.79
Min fraud	.33	.03	.81	.73	.88
Max accuracy of transaction	.28	.19	.67	.56	.78
Eigenvalue:	1.35	2.11	6.14		
Percent of variance:	7.49	11.73	34.09		

Note: Min = Minimize, Max = Maximize

CAT Emphasis. Study 1's Web users often had some experience in making online purchases and all were frequent users of the Web. This previous experience allowed these subjects to clarify what the online experience meant to them. Convenience, Access, and Trust (CAT) formed a triangle of emphasis for further study (see Figure 1).

Figure 1. CAT emphasis model



This CAT result points to the areas in online shopping that have the greatest potential to influence likelihood for elaboration within the ELM context and also positively answers research question 2 (*Can online shopping interface components be grouped in dimensions based on consumers' preexisting preferences?*). Web users surf with these three factors in mind and are cognitively predisposed to thinking about these issues. Left unanswered is how implementation of interface components representing CAT influences online shoppers' attitudes toward the Web site (A_{WS}). Thus, Study 2 was undertaken to understand how the

components of CAT actually influence the thoughts of online consumers and specifically in what direction (positive or negative thoughts).

STUDY 2

Study 2 employed an online conjoint experiment (a simulated online product search and purchase) based on the CAT components. Relevant literature for each CAT component was first reviewed in order to inform construct creation within the shopping interface.

PRIOR RESEARCH AND HYPOTHESES

Convenience. Information about products is sought over the Internet because of the increased convenience and lower costs compared to physical searching (Burke, 1997, 1998). Factors that have contributed to the success of catalog and television shopping, namely that time-starved consumers can benefit from home delivery and shopping from home, also are important to online shoppers. Lohse and Spiller (1998) found that convenience was the top priority to meet online consumers' needs, which leads to the first hypothesis:

H_1 Minimizing travel to pick up a purchase will have a positive effect on A_{WS} for task-oriented shoppers.

Web shopping's advantage of low switching costs also means that a poor interface design can quickly drive visitors away (Nielsen & Norman, 2000a), especially when the interface design does not match preexisting schema (Satzinger & Olfman, 1998). Shoppers use all the interface information as a signal in predicting satisfaction of later consumption (Alba, Lynch, Weitz, & Janiszewski, 1997). Expectations of control in the search experience make interface accessibility a primary issue (Wolfinbarger & Gilly, 2001) and if a Web surfer cannot find the content (s)he is looking for at a firm's site, the visitor quickly leaves (Liebmann, 2000). To accomplish this, Nielsen and Tahir (2001) emphasized interface features that empower the consumer.

The most basic issue faced when designing a Web page is the amount of complexity versus simplicity (Nielsen, 2000). Research results point to contrary influences on this point. Complex and simple Web site designs display effects that oppose each other (Bruner & Kumar, 2000; Stevenson et al., 2000). A simple and clean interface helps viewers quickly find what they want, while a complex and busy interface attracts attention and interest and encourages discovery (D'Angelo & Twining, 2000; Huang, 2000). Nielsen & Norman (2000b) emphasize that reactions to specific designs can give accurate information for designing a better shopping interface, thus the complexity issue was tested in the second hypothesis:

H_2 Lower Web page complexity will have a positive effect on A_{WS} for task-oriented shoppers.

Access to Information. The Internet as a whole can be viewed as a value-added service, with the value being information (Benjamin & Wigand, 1995). Online shoppers tend to be goal-oriented, (Wolfinbarger & Gilly, 2001), so marketers must shift from being an agent of the seller to an agent of the buyer (Achrol & Kotler, 1999). Web use has been found to be dominated by search/deliberation behavior and high involvement (La Ferle, Edwards, & Lee, 2000; Moe & Fader, 2001; Singh & Dalal, 1999). This emphasis on information leads to the next hypothesis:

H_3 Increased levels of product information will have a positive effect on A_{WS} for task-oriented shoppers.

Ratchford, Talukdar, and Lee (2001) found that 38% of consumers surveyed had used the Web to gather information when considering a car purchase. Lynch and Ariely (2000) labeled this *transparency* of the Web site, which results in increased *welfare* for Web site visitors. Ability to make comparisons, specifically for price, leads to the next hypothesis:

H_4 Including price comparisons in the search result will have a positive A_{WS} for task-oriented shoppers.

Trust. Potential abuse of personal data is an issue for experienced Internet users who exhibit increasing levels of such concern (Bellman, Lohse, & Johnson, 1999; Hoffman, Novak, & Peralta, 1999; Miyazaki & Fernandez, 2001). Direct marketing has dealt with issues of trust in relation to the collection and use of personal information (Culnan, 1993; 1995; Nowak & Phelps, 1992; 1995; 1997). Milne (1997) showed that transparency of purpose made respondents more willing to supply their personal data to a mailing list. Trust grows when vulnerability is not taken advantage of (Cassell & Bickmore, 2000), thus an interchange of communication can improve trust (Olson & Olson, 2000) without the need to eliminate the potential for abuse. A promise up front to not abuse data collected during online shopping opens a window for trust to be built upon. These issues lead to the next hypothesis:

H_5 Including assurances that personal information will not be given to any third party will have a positive effect on A_{WS} for task-oriented shoppers.

Publicity surrounding hackers raises cognitive concerns (rational or not) that databases containing credit information are not safe from outside invaders. Online sellers must balance the openness of their systems with security issues (Bhatnagar, Misra, & Rao, 2000; Jones, Wilikens, Morris, and Masera, 2000). Such a balance has included pledges of consumer protection by mail-order companies as far back as 1875 (Klos, 1998). When consumers know that there is a controlling mechanism overseeing security, trust may be increased (Eisner, Jett, & Korn, 2001). This leads to the next hypothesis:

H_6 Including assurances that the most up-to-date security software is being used to protect against fraud will have a positive effect on A_{WS} for task-oriented shoppers.

Nielsen & Norman (2000b) emphasized that observing users can give accurate information for designing a better shopping interface, which may be specific to product lines,

market segments, and even culture (Simon, 2001). The last hypothesis asserts that attitudes toward CAT components, integrated into the Web site, will not be homogeneous across online shoppers.

H_7 Subsets of respondents will exhibit measurable differences in their preferences for the CAT components.

METHODOLOGY

Construct Development. A conjoint approach was chosen for its emphasis on understanding tradeoffs consumers make when evaluating competing options (Carroll & Green, 1995; Cattin & Wittink, 1982; Green, Krieger, & Wind, 2001; Green & Rao, 1971; Green & Srinivasan, 1990) while also having recently been used in e-commerce consumer behavior studies (Lynch, Kent, & Srinivasan, 2001; Tan, 1999; Wood, 2001). Manipulated variables (*attributes*), in conjoint experiments, represent clear different states (*levels*) to the subjects who rate combinations of product features.

CAT Attributes. Resulting CAT factor variables were re-examined in the context of Study 1's online survey questions in order to derive Web browser interface components that accurately represented the underlying factors. The highest loading variables were examined first, with an emphasis on the normal implementation of those variables within the browser interface. This resulted in the CAT construct being represented by six independent variables (see Table 3), the study's conjoint stimuli, with each having two value levels.

Table 3. Conjoint variables implemented in shopping interface

CAT element	Survey item	Conjoint attribute	Level	Representation in experiment interface
Convenience	Minimize personal travel	Minimize travel	High	Large text, in the checkout stage, explained the purchase will be sent directly to the customer.
			Low	Large text, in the checkout stage, explained the customer is required to pickup the purchase.
	Maximize convenience	Accessibility	High	The experiments' front page emphasized a clean interface with minimal use of graphics and text organized by topics in an outline structure.
			Low	The experiments' front page emphasized a more complex design with graphics, colors and numerous text groupings that followed no apparent structure.
Access	Maximize access to information	Information Access	High	Product description was detailed and expanded, including a picture.
			Low	Product description was condensed and lacked a picture.
	Enhance comparison shopping	Price Search	High	A range of prices indicating the current result to be the lowest price across all firms searched for the same product.
			Low	A single price displayed for each product.
Trust	Assure system security	Fraud Protection	High	A popup window, before checkout, explaining the server was running a new security system that assured credit card security.
			Low	No security system was mentioned.
	Minimize misuse of personal information	Personal Information Protection	High	Large text, in the checkout stage, explained the hosting firm would not use the customer's personal data for other purposes and would not sell or distribute the information to other companies.
			Low	No use of personal information was mentioned.

Convenience. Convenience's highest loading variables were maximize convenience and minimize personal travel. In light of the literature, it was clear that saving time is a priority for online shoppers. Saving time was represented in the interface design through *minimize travel*. Follow-up interviews showed the convenience variable (loading on the Convenience factor) and ease of use variable (loading on the Access factor) were interpreted differently within the context of the interface. Convenience was generally expressed as the ability to quickly get to the shopping activity, while ease of use was more related to the details of how the product information was shown and how the search/checkout interface functioned. Overall, the Convenience and Access factors differ in this aspect, i.e., Convenience is the general measure of using online shopping efficiently while Access is related to finding specific information, or being effective in the product search. This difference can be seen in Nielsen's (2000, p. 168) observation that the *home page* acts as the flagship of a Web site in that it answers the questions *Where am I* and *What does this site do?* This first page functions primarily as a point of departure (navigation) to more specific tasks

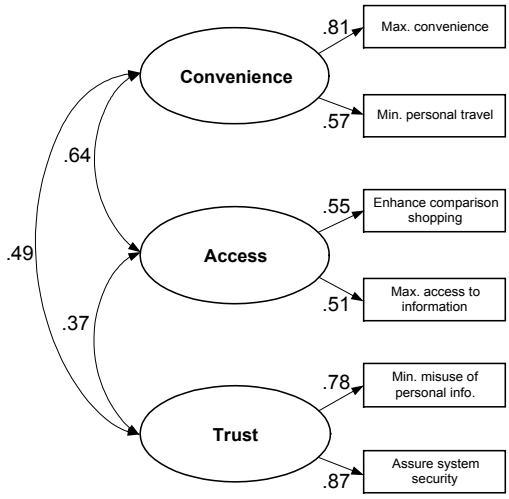
or detailed information. Thus, the first page of a Web site determines just how convenient the shopping experience will be. It is possible that convenience is high, yet the resulting information is difficult to understand or hard to manipulate (features related specifically to the ease of use variable and the Access factor in general). With this in mind, convenience was represented in the experiment's interface as *accessibility* on the first page of the shopping site.

Access. Although personal interaction was the highest loading variable in the access factor, it was excluded from the interface design because of the difficulty of including the flexibility of interaction while maintaining an experimental condition. The next two highest loading variables were included in the experiment, with the first being enhancing comparison shopping, represented in the interface design as *price search* and maximize access to information, which was represented by the variable *information access*. These variables generally emphasize the way product information is displayed in the interface.

Trust. In the case of Trust, the two top loading factors were minimize misuse of personal information and assure system security. Many of the other Trust variables appeared to fall into these two categories of interface implementation. For example, the third variable, minimize fraud, could be represented on screen through the same method as system security. Thus, Trust was represented by the two variables: *personal information protection* and *fraud protection*.

Confirmatory Factor Analysis. Validity of the attributes in describing the CAT constructs was tested with confirmatory factor analysis (CFA). The survey data from Study 1 was used in Analysis of Moment Structures (AMOS, Arbuckle & Wothke, 1999) with acceptable results (see Figure 2). The model obtained a good fit (χ^2 = 7.86, p = .25) reinforcing confidence that the six attributes well represent the latent CAT factors.

Figure 2. Path diagram for CFA



Note: All paths are significant at $p < .01$

Table 4. Fit measures for CFA

Fit Measure	Default model	Independence
Discrepancy	7.86	336.68
Degrees of freedom	6	15
p	.25	.00
Number of parameters	15	6
Discrepancy / df	1.31	22.45
RMR	.03	.24
GFI	.99	.67
Adjusted GFI	.97	.54
Parsimony-adjusted GFI	.28	.48

Proceedure. The resulting six variables were implemented within the online shopping interface based on surveying Web site designs from *PC Magazine's* (2000) top 100 Web sites. Salient levels of differences between the variables' high/low states were pre-tested with focus groups and adjustments made where the differences were not significant (a post-test also checked the manipulations, see Appendix). A cover story explained a purchase was going to be made online by the experimenter and participants were to help in evaluating different online shopping designs. Approximately half the participants were asked to search for a physical product while the remainder searched for a service. According to pre-testing results, a set of encyclopedias, with accompanying software, and an overseas tour, to Holland, were well understood and accepted as possible online purchases.

Shopping stages followed the steps common to shopping sites as shown in Table 5. Users chose from a simulated search result (see Figure 3) the product that best matched the

specifications of the search. Information required for checkout, including name, address, and credit card number, was supplied to the participant.

Table 5. Sequence in experiment

Experiment (shopping) stage	Conjoint implementation (high/low)
Front page/search portal	Accessibility high/ accessibility low
Search result	Information access high/ information access low
Search result	Price search high/price search low
After product selection	Fraud protection high/fraud protection low
Checkout	Minimize travel/include travel
Checkout	Personal information protection high/personal information protection low

An orthogonal design, for testing main effects (Addelman, 1962; Green & Rao, 1971), was generated in SPSS Conjoint 8.0, resulting in eight somewhat different shopping tasks. At the end of each shopping task, after checkout, participants scored the overall shopping experience on an eleven-point scale (0 to 10). The process began again until all eight profiles were completed.

Figure 3. Example of search result (information access low and price search low)

Subjects. A banner advertising the experiment was placed on a commercial portal Web page resulting in 506 Web site visits during a one week period with 429 respondents' data complete and usable. The sample compared well with statistics on Internet usage in Taiwan at the time (Find, 2001; YamWeb Frontier Foundation, 1999), with the experiment's participants exhibiting higher levels of education than the sample frame's average (see Table 6).

Table 6. Sample and Taiwan Web users' demographic comparison

	Average age	Female	Student	Married	College graduate	Grad. school graduate	Average income (NT$)
Taiwan Web users*	25.3	45.6%	40.9%	29.1%	40.5%	10.1%	20-30K
Experiment Sample	27.4	47%	41.8%	27.5%	67.4%	11.4%	20-30K

*Note: Taiwan averages from Find, 2001

Of the online respondents, 59% of the total sample had some online buying experience, with 77% having some intention of making an online purchase in the future and 20% stating they had no such intention. The most frequent online purchases were books and magazines (24%), electronics, computers, and software (33%), and financial securities (6%). Of those who had purchased online, 83% were satisfied, and the remainder expressing some dissatisfaction.

RESULTS AND DISCUSSION

Responses to the online shopping simulation exhibited good internal reliability with a Cronbach's alpha of .91 and a Guttman split-half reliability of .92. There was a general lack of correlation between demographic data and online buying experience, confirming previous similar findings (Bellman, Lohse, & Johnson, 1999). Part-worth utility values for information access, price search, personal information protection, and fraud protection did not significantly differ depending on product type, online purchase history data, or demographics.

Table 7. Part-worth utility values

	Min. travel	Accessibility high	Info access high	Price search high	Personal protection high	Fraud protection high
Overall results	.081*	.023	.579*	-.006	-.021	.12*
N = 428	(.486)	(.494)	(.731)	(.465)	(.435)	(.487)

Note: Values in parentheses represent standard deviation; significance level represents difference between the two levels of the utility values tested with a paired *t*-test
* $p < .05$

Minimizing travel did have a statistically significant positive effect on the shopping experience with a utility of .081, confirming hypothesis 1 (*Minimizing travel to pick up a purchase will have a positive effect on A_{WS} for task-oriented shoppers*). Interface ease of use part-worth utility showed that the simple interface was preferred over the complex, with a positive utility (.023). The difference between the high and low states for this component, however, was not statistically significant, meaning that hypothesis 2 (*Lower Web page complexity will have a positive effect on A_{WS} for task-oriented shoppers*) could not be supported. Information access displayed the highest part-worth utility level (.579) of all the

components studied and was statistically significant. Thus, hypothesis 3 (*Increased levels of product information will have a positive effect on A_{WS} for task-oriented shoppers*) was supported when the information includes expanded text descriptions and graphics. Opportunity to view price comparisons, however, exhibited a small negative utility (-.006) while not reaching statistical significance. Ability to display price ranges, in an attempt to show that Web page shopping results are *beating the competition* was included here as part of product information, but respondents did not find this attribute very important, thus rejecting hypothesis 4 (*Including price comparisons in the search result will have a positive A_{WS} for task-oriented shoppers*).

Personal information protection displayed a negative part-worth utility value (-.021) and was not statistically significant. It appears that specifically announcing the intent to protect personal information was not clearly helpful, thus rejecting hypothesis 5 (*Including assurances that personal information will not be given to any third party will have a positive effect on A_{WS} for task-oriented shoppers*). Fraud protection, the second component of security issues, exhibited the second highest part-worth utility for the online shopping bundle (.12) and was statistically significant. This supported hypothesis 6 (*Including assurances that the most up-to-date security software is being used to protect against fraud will have a positive effect on A_{WS} for task-oriented shoppers*).

Segmentation. Because part-worth utility scores are centered directly on consumer preferences (Green & Srinivasan, 1978, 1990), the scores are commonly used in market segmentation (Green & Krieger, 1991). This experiment's part-worth utility scores were used in a Ward's cluster analysis, producing a three-cluster pattern of dendrograms followed up with a K-means cluster analysis using the initial seed points from the hierarchical analysis. Independent conjoint analysis showed that each cluster contained respondents that approached the online shopping exercise with different expectations (see Table 8). This result

supports hypothesis 7 (*Subsets of respondents will exhibit measurable differences in their preferences for the CAT components*).

Table 8. Cluster part-worth utility means

	Cluster 1 (Time Savers) N = 91	Cluster 2 (General Surfers) N = 240	Cluster 3 (Information Seekers) N = 98	*F* (*DF* = 1,427)	Sig.
Minimize travel	.62*^{G,I} (.48)	-.07*^{T} (.35)	-.07^{T} (.43)	104.71	.000
Information access high	.54*^{I} (.4)	.18*^{I} (.41)	1.59*^{T,G} (.56)	343.95	.000
Accessibility high	-.08 (.47)	.05 (.49)	.02 (.54)	2.24	.11
Price search high	-.09 (.57)	.01 (.38)	.04 (.52)	2.42	.09
Fraud protection high	.46*^{G} (.52)	-.03^{TI} (.39)	.19*^{G} (.49)	40.56	.000
Personal protection high	.01 (.49)	.01 (.41)	-.10* (.43)	2.68	.07

Note: Significance of part-worth utility values tested with a paired t-test, *p<.05 on *t*-test; values in parentheses represent standard deviation; F test evaluates difference in utility score among the three clusters; subscripts indicate significant differences between clusters, Tukey-Honestly-Significant-Difference paired comparisons, p < .05, where T = Cluster 1, G = Cluster 2, and I = Cluster 3.

Examining overall patterns, Cluster 1 (Time Savers) exhibited an emphasis on the presence of minimizing travel, information access, and fraud protection. Cluster 3 (Information Seekers) stood out for their emphasis on information access with a part-worth utility nearly three times larger than any other part-worth utility value. Minimizing travel was most important for Time Savers and least important for Cluster 2 (General Surfers). Information access was an important feature for all three clusters, but especially important for Information Seekers. Accessibility and price listings were not valued by members of any of the clusters. Fraud protection was most important for Timer Savers, but also important for Information Seekers. General Surfers did not exhibit exceptionally strong part-worth utility values for any of the variables. This cluster exhibited a compromise between the other two clusters in that General Surfers valued increased levels of information but preferred to pick up the product, rather than having it sent.

Reexamination of the research hypotheses within the context of the three clusters showed that the attributes not important to the overall sample were also not important to members of all three clusters (see Table 9). These included accessibility, price search

information, and notification of personal information protection. The only attribute that was consistently valued across all three clusters was the inclusion of expanded product information.

Table 9. Summary of hypotheses results

		Results for sample segments			
		Overall N = 428	Time Savers n = 91	General Surfers n = 240	Information Seekers n = 98
H_1	Minimizing travel to pick up a purchase will have a positive effect on A_{WS} for task-oriented shoppers.	S	S	NS	NS
H_2	Lower Web page complexity will have a positive effect on A_{WS} for task-oriented shoppers.	NS	NS	NS	NS
H_3	Increased levels of product information will have a positive effect on A_{WS} for task-oriented shoppers.	S	S	S	S
H_4	Including price comparisons in the search result will have a positive A_{WS} for task-oriented shoppers.	NS	NS	NS	NS
H_5	Including assurances that personal information will not be given to any third party will have a positive effect on A_{WS} for task-oriented shoppers.	NS	NS	NS	NS
H_6	Including assurances that the most up-to-date security software is being used to protect against fraud will have a positive effect on A_{WS} for task-oriented shoppers.	S	S	NS	S

Note: S = Supported; NS = Not Supported

CONCLUSIONS & IMPLICATIONS

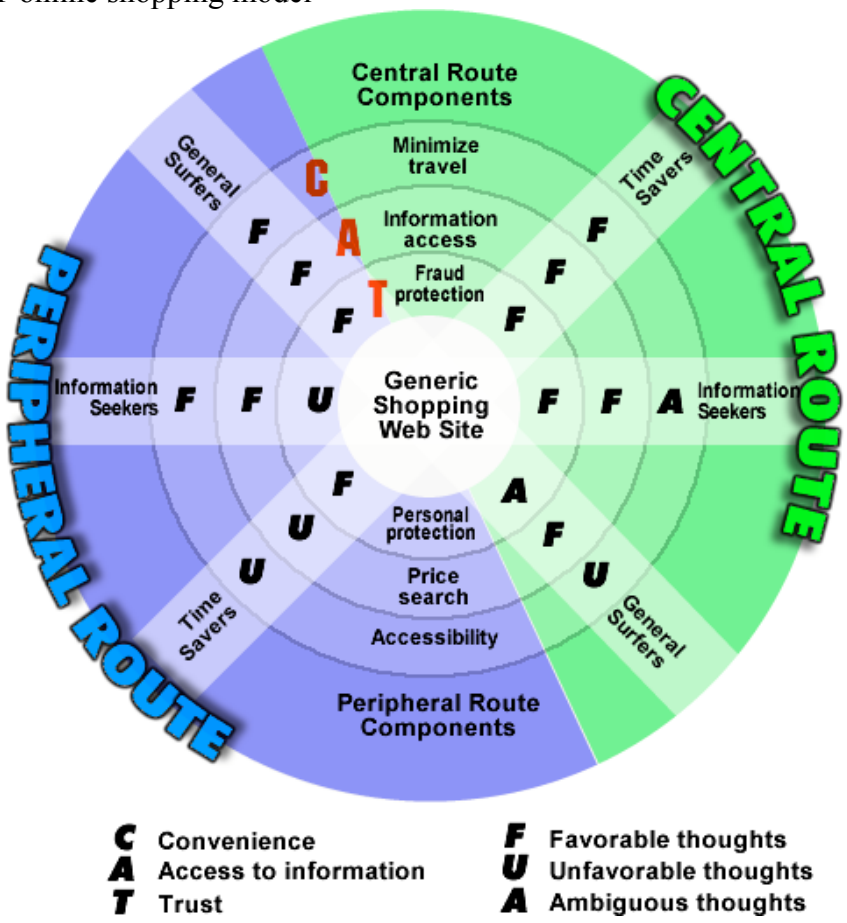
Results show that interface components can play a central role in attitude toward the shopping experience. Within the context of the CAT emphasis, this is especially true for specific market segments. Out of the six CAT interface elements, three have the potential to play a moderating role in the cognitive processing stage of the ELM (minimize travel, information access, and fraud protection). The remaining three CAT elements (Accessibility, price search, and personal protection) may be useful in moderating peripheral cues. The specific direction of the influence (negative or positive thoughts) depends on the market segment the consumer is from.

Results are combined and summarized in the online CAT model seen in Figure 4, where the central and peripheral routes split the circle, and each CAT component is concentrically represented in both routes. Market segments are displayed as straight lines crossing over the circles. Differences in attitude, among the market segments, toward the CAT components are represented by favorable, unfavorable, or ambiguous in the central

route and favorable or unfavorable in the peripheral route (the three and two cognitive processing possibilities of the central and peripheral routes, respectively).

The convenience of having the product shipped directly was only appreciated by the Time Savers segment. Thus, emphasizing the convenience of home shopping will be valued by Time Savers and increase the likelihood of elaboration for such a Web site. Elaboration likelihood for the same message is also increased for General Surfers, but in this case the result is likely to be negative, as this segment actually prefers to pick up the product. Ease of use design and displaying price search information lacked importance for all the segments when completing the online task. These elements are likely to be part of the peripheral route of persuasion, if they are to play a role at all.

Figure 4. CAT online shopping model



Expanded levels of information (product descriptions) was the only variable to elicit positive thoughts among all three segments, and most especially for Information Seekers.

This means that Web sites that do not emphasize content run the risk of activating negative thoughts of visitors who are expecting increased levels of information. When visitors find that the information content is low, the experience will be processed through the central route, leading to a negative experience that is potentially intense and long-lasting.

Trust was valued differently by the three segments, with personal data protection not valued by any segment and actually disliked by the Information Seekers. It appears that this component is best implemented through the peripheral route, by avoiding direct emphasis on the Web page. It is possible that consumers assume the presence of such protection and any specific reporting of how the data will be handled raises the issue cognitively for viewers. This may be especially true for Information Seekers who would prefer to process information rather than give any out. Fraud protection is much more likely to cause elaboration when presented to Time Savers and Information Seekers, while for General Surfers this component makes little difference.

Offhanded opinions, or even consumer surveys, concerning the importance of online shopping components may not accurately reflect online shoppers' motivations during actual online shopping task activity. Although personal data protection and price comparison were features expressed as important to online shopping in both the general literature and this study's pre-test survey, implementation in the actual interface was not valued by participants. It may be the case that certain concerns, such as personal information protection, are cognitively hard to deny as important, but actually play little role in the online shopping task. Consumers who shop online may be more concerned with the quality of the information they find about the product being searched for, such as this experiment's Information Seekers, or saving time by avoiding the travel associated with physical shopping, such as Time Savers. Online shopping interface design can be informed by such findings in order to create an environment in which shoppers feel more comfortable and satisfied.

The new marketing of the Internet may not be so new after all. Marketers will have to reevaluate consumers' preferences for marketing components that have existed for centuries. The convenience catalogs brought to rural Americans in the nineteenth century was bundled with payment systems, product delivery systems, and guarantees of quality in order to create an environment where exchange could occur smoothly. Even issues of interface design are not new. Catalogs, like those from retailers such as Sears, Roebuck & Company, included product descriptions and graphics that were relevant (central route) to the rural farmers who were suspicious of *city folks* and money scams in the early twentieth century. Those early developments of marketing communication bundles eventually led to a catalog market totaling more than 120 billion USD in annual sales for the year 2000 (DMA, 2001). Through development of the Internet and related Web technologies, the medium of marketing communications is shifting toward electronic network dependence. The good news is that online consumers do not have an endless list of prerequisites before they participate in the new medium. A few vital components, combined correctly, can facilitate an enjoyable online shopping experience and increase the effectiveness of a Web site's marketing message.

LIMITATIONS

Although the use of actual online participants, with Web experience, is helpful to more accurately sample the target population of Web shoppers, subjects joining this experiment may have had less concern with Web security issues than those who did not join the experiment. Analysis of the pre-test survey shows that respondents who have a high level of security concerns were still willing to supply their names and addresses in order to receive a gift for participation in this experiment. While sample demographics closely matched those of Web users in Taiwan, the sample's predisposition toward risk was not investigated and compared to the population of Web users.

Conjoint experiments generally simulate the choices faced by consumers better than other experimental approaches, the method still may not accurately capture real shopping behavior. This is especially true in the current experiment because the research nature of the experiment was made clear to participants through a consent form as well as repeating the same shopping task eight times. The actual level of perceived risk may also have been reduced due to an awareness of the simulation's experimental nature. Credit card and shipping information were supplied to the participants, avoiding any real associated risks. Similarly, participants could have exhibited lowered levels of product involvement, since the products searched for were predetermined, lowering the risk of receiving an inferior product.

FUTURE RESEARCH

The current research has just begun to examine the vital components of online shopping. Clearly, this is a beginning step, not an ending. Much more work can be done to clarify the components and their importance in the online shopping experience. All of the attributes included in this experiment were made up of two levels. This simple binary state may not accurately reflect the interactive ability of the Web. Allowing shoppers to choose picking up the product or having it shipped is an example of how interactivity can combine attributes. Guarantees related to risk could be displayed or hidden based on personalized Web pages. These pages would be created based on previously learned preferences of the shopper or by correlation with demographic data. Accurate predictions of online consumer behavior can be enhanced by designing experiments with more complex conjoint or conjoint-like designs that reflect higher levels of interactivity.

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APPENDIX A

MANIPULATION CHECK

In order to confirm that differences in the experiment's Web page designs (based on the six attribute's high/low states) were actually noticed by the survey respondents in a manner predicted by the pre-testing efforts, a post-test survey was administered. During the fall semester of 2001, an online survey drew 184 participants through email invitation sent through 60 night school students, attending a university class on international business culture, were asked to forward the survey invitation to people they knew or worked with.

Participants viewed 12 sets of two screens in order (not side-by-side) as graphics on a Web page that could not be manipulated with the mouse. Six of the sets represented the six attributes of the CAT emphasis, with one of the screens in each set showing the attribute in its high state and the other screen showing it in its low state. The remaining six sets were controls that showed the same screen twice, with both screens showing the attribute in its high state or low state throughout the survey (depending on a random selection at the start). Order of test and control screens, CAT attributes, and which screen of the pair was shown first, were randomized. After viewing a pair of screens, the participant scored the difference between screens and then the importance of that difference when shopping online (both on a ten point scale).

Paired *t*-test results (see Table 10) show that in all cases, the six attributes were ranked significantly higher in difference when the attribute level was manipulated, and importance patterns parallel the conjoint findings. This confirms that the CAT components, as implemented in this experiment's Web page design, were noticed by respondents as predicted in pre-testing.

Table 10. Paired *t*-test results

		Difference mean	*t*	Importance mean	*t*
Minimize travel	Difference between high/low	5.97 (3.51)	21.91*	7.43 (2.96)	26.90*
	Difference between control	0.12 (0.70)		0.60 (2.14)	
Ease of use	Difference between high/low	6.94 (2.31)	35.88*	5.86 (2.89)	21.50*
	Difference between control	0.26 (1.24)		0.70 (2.27)	
Information access	Difference between high/low	7.76 (2.47)	40.37*	7.90 (2.15)	37.66*
	Difference between control	0.13 (0.78)		0.54 (1.93)	
Price search	Difference between high/low	4.11 (2.70)	16.99*	4.37 (3.12)	11.87*
	Difference between control	0.37 (1.35)		0.98 (2.62)	
Fraud protection	Difference between high/low	6.91 (3.54)	25.51*	8.81 (2.21)	33.96*
	Difference between control	0.11 (0.64)		0.69 (2.33)	
Personal protection	Difference between high/low	5.61 (3.09)	20.96*	7.17 (2.72)	26.81*
	Difference between control	0.29 (1.14)		0.68 (2.05)	

Note: Values in parentheses represent standard deviation; $N = 184$
*$p < .001$