USER PREFERENCE FOR PRODUCT INFORMATION IN REMOTE PURCHASE ENVIRONMENTS

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ABSTRACT

While the appeal of shopping online is enormous, successful methods of attracting and keeping customers remain elusive. Product offerings, service, and price are important considerations in online shopping, and a useful and satisfying Web site is also a consideration for on-line success. This research investigates product presentation in remote purchase environments and whether to accommodate user preferences for information processing in that presentation. After simulating an on-line shopping experience, users were asked about their satisfaction with it. Results indicate that regardless of the individual information processing style, the sentential style Web site was preferred over the diagrammatic style of product presentation. However, a combination site including both pictures and text was preferred over the others. These results address a conflict between goals of fast download time and thorough product presentation. Pictures may represent confirmation of the verbal description and provides a holistic view of the product, which slightly increases satisfaction.

Keywords: E-commerce, information processing style, individual differences, product information

1. Introduction

As a merchandising outlet, the World Wide Web has enormous potential. However it faces distinct limitations, since shopping for products with a physical component is inherently more difficult when the product is not physically available. Therefore, conveying the experience of ownership through a description of the product is especially important in a remote purchase environment (Zellweger, 1997). In addition, information content has consistently shown to impact user satisfaction in on-line shopping (Lightner, 2001; Wang and Tang, 2001). One advantage the technology of the Internet affords over similar catalog sales is the ability to interact with a consumer to aid them throughout the buying process. This ability allows the system to vary the presentation to accommodate individual customer preferences. Accommodating individuals is called 'personalization' and is recognized as an important stage in Web-based commercial evolution, following the static and dynamic stages (Luedi, 1997). Personalization results in every user having a customized screen, including aspects of content, layout and structure (Mulvenna, Anand and Buchner, 2000). The technology used to provide such a personalized interaction is not without its costs, including storing and retrieving data from a database and incorporating the information gained into the screen display. In addition, research has not conclusively identified aspects of Web sites that increase user satisfaction enough to warrant the investment in such resources.

This research addresses the important issue of personalization of product descriptions for sales of physical products. As such, this study starts with the premise that adaptive Web sites are technically feasible, but involve resource costs to provide. It recognizes that while individual preferences may exist in a measurable way, not all preferences impact user satisfaction of a site to the degree that adapting to them is warranted. One area of Web usage that has documented impact on user satisfaction is access or download speed (Ramsay, Barbesi and Preece, 1998, Sears, Jacko and Dubach, 2000; Nielsen, 2001), which is greatly dependent on the number and quality of graphics or pictures displayed. While visual presentation has an intuitive appeal, identifying an actual customer preference and the source of the preference is important in deciding whether the cost in download speed is warranted by increased user satisfaction for an individual. The purpose of this research is to test a specific individual preference for acquiring product information through pictures or words and measure its impact on overall satisfaction of Web sites. Recommendations for product information are made based on the findings of the experiment. This paper consists of six sections. The next section contains the background literature describing

previous work in the area of Web design principles and personal preferences. The third section describes the research model used as a foundation for this study and the hypotheses generated as a result. The fourth section covers the methodology used to experimentally test the hypotheses, and the fifth discusses the findings of the experiment. The sixth section discusses additional findings from free-form comments collected and the seventh presents conclusions drawn from the experiment. The final section discusses some limitations of the present work and some possible directions for future investigation.

2. Background Literature

This research addresses whether users are more satisfied with product descriptions using verbal or graphical screen components. Understanding a product description is part of a pre-purchase search activity in shopping, whether on-line, through a catalog or at a physical store. Kelly (1968) defined pre-purchase search as activities involving information seeking and processing with the outcome of facilitating decision making. While obtaining information prior to purchase may occur through many channels, such as advertisements and window shopping (Bloch and Richins, 1983), one study indicates that an intention to search the Internet for product information leads to an intention to purchase on the Internet (Shim, Eastlick, Lotz and Warrington, 2001). Describing products adequately through a Web site will likely reinforce the intention to search on-line and the corresponding intention to purchase on-line.

Research has categorized consumer products in a variety of ways, from user involvement (Hirshman and Holbrook, 1982) to shopping style (Copeland, 1923; Buckland, 1962). Nelson (1970) described goods as either "search" or "experience". Search goods have qualities that consumers can ascertain prior to purchase and experience goods are those that consumers cannot judge until after purchase. The example Nelson used for describing goods that contain search qualities is a dress, while the example of an experience good is a can of tuna. The concept of a "credence" good includes those with qualities that an average consumer may never ascertain, either before or after purchase (Darby and Karni, 1973). These goods exist when the seller provides information which influences a purchase such as through advertising or a salesperson's promise or when information discovery proves too costly to undertake. An example of a credence good is an automobile repair. Darby and Karni (1973) maintain that all goods contain search, experience and credence components. A product is classified according to the weighting in each category of the mixture of qualities. This classification is admittedly subjective, with limited direction available from the original description by Nelson (1970).

The e-commerce environment is clearly consumer-driven, since ending a transaction is as easy as clicking on an 'X' icon in the corner of the screen (Tilson, Dong, Martin and Kieche, 1998). Past research has indicated that users are sensitive to on-line issues such as security and download speed (Lightner, 2001; Rees, 2001). Technical solutions, such as choosing an appropriate presentation format according to the bandwidth and user preference are in development and use (Chi, Li and Lim, 2000). However, rules or guidelines concerning specific adaptations are not currently available. Specific user characteristics, such as demographics (Lightner, forthcoming), and personality (Myers, 1974) may determine preferences for screen components.

While a well-known Chinese proverb states that “a picture is worth 10,000 words”, there is no guarantee that the words represented by a picture are accurate or that they convey the intended message. Simon (1978) indicates that whether a picture or diagram is worth 10,000 words depends on the operators that search and evaluate the information contained in it. In their investigation of the differences between textual and diagrammatic descriptions of a problem space, Larkin and Simon (1987) discovered that the correct perceptual results are found with little effort when viewing a diagram, while textual cues require additional processing to construct relationships. Their experiments used what is termed ‘informationally equivalent’ sentences (termed a sentential representation) and diagrams (termed a diagrammatic representation) to describe decision making problems based on physical components, such as geometric angles and a series of pulleys. Informational equivalence exists when all of the information in one representation is inferable from the other, and vice versa (Simon, 1978). As the network of relationships in a diagram grows, the number of words required to maintain equivalence increases.

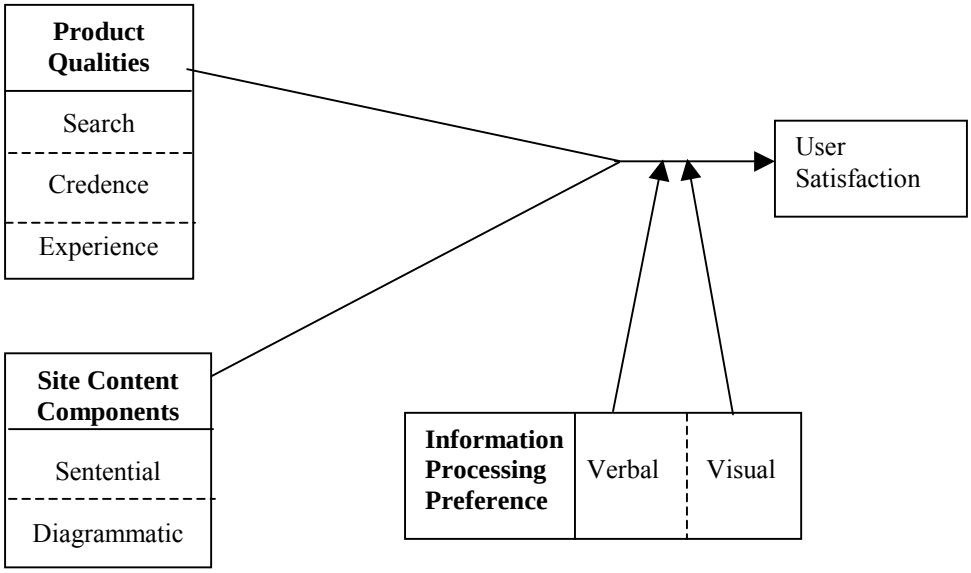
Site content refers to the information, features, or services that are offered in the Web site (Huizingh, 2000). Content quality is considered high when site content corresponds well to consumers’ informational needs and their ability to consume the information (Davern, Te'eni and Moon, 2000). Determining what content to include in a site remains an obscure area, due in part to situational impacts. Consumers gathering information about a product require different information than those that have made a purchase decision and go on-line to complete the buying process. In addition, it is possible that certain consumers, based on their tendency to gather information or buy on impulse require more or less detailed information about their purchases. While the phrase "Content is King" resounds throughout the on-line world (Stratigos, 2001), determining the proper content for the consumer in the proper format remains elusive.

Site style or design refers to the way the content is made available for Web visitors (Huizingh, 2000). Standard style elements include text, graphics and color. Text usually conveys detailed product information, while graphics, such as pictures or video clips, are used to display the product and add artistic touches. Color is used to set the mood of the site and is a way of appealing to a target audience. For example, sites targeting youth tend to use brighter colors, while those in the financial industry use muted tones. While the use of graphics is intuitively appealing, implications of their use are under dispute. Some research indicates that graphics distract users from completing their goal (Zhang, 1999), while other research suggests that users successfully ignore graphics when extracting necessary textual information (Diaper and Waelend, 2000).

3. Research Model and Hypotheses

This research investigates user satisfaction with a site when product information is conveyed either through text, graphics or a combination of both. It also investigates the moderating effect of an individual characteristic, information processing style, on user satisfaction. Figure 1 contains the proposed model of user satisfaction with product descriptions investigated in this research. The model indicates that the product qualities and how they are conveyed merge to predict user satisfaction. This satisfaction may be moderated by an individual's preference for information processing. The Internet is a powerful tool for pre-purchase information search (McGaughey and Mason, 1998; Rowley, 2000), with the expectation that its use as such will continue in the future (Dickson, 2000).

Figure 1: Proposed model of user satisfaction in product descriptions



Details concerning particular search qualities are paramount to a purchase decision. Search qualities of products are those that are easily conveyed in precise detail. These details such as size, price, and material are typically communicated using sentential representations, since the language is precise and these qualities do not rely on perceptual elements. Based on this notion, we propose that using sentential representations is more likely to result in higher user satisfaction than using diagrammatic representations for search quality descriptions. This is tested by Hypothesis One which states:

H1: Satisfaction with a Web site increases if search qualities are described using sentential design elements instead of diagrammatic representations.

Experience qualities are those that we cannot fully ascertain until the purchase is made and the good used as intended. An experience is described as an 'apprehension of an object, thought or emotion through the senses or mind' (American Heritage Dictionary, 2000). Examples are the feel of a particular fabric or the taste of gourmet foods. Dual Coding Theory (Paivio, 1986), based on work in mental imagery by Richardson (1977), presumes that humans have two cognitive subsystems, one that specializes in nonverbal objects and one that specializes in language. The underlying principle to Dual Coding Theory is that recall and recognition are enhanced by presenting information in both visual and verbal form (Clark and Paivio, 1991). Following this principle, a description of experience qualities might be more fully realized and therefore more satisfying through the use of both sentential and diagrammatic representations. This leads to our second hypothesis:

H2: Presenting product descriptions using both sentential and diagrammatic representations will result in higher user satisfaction than either sentential or diagrammatic representations alone when a product contains experience qualities.

The presence of multiple information processing channels has led to the development of a concept called student learning style (Harshman and Paivio, 1987), used when creating educational materials. As shown in Figure 1, we propose that user satisfaction is moderated by the preferred information processing style of the user. As suggested in learning literature, accommodating the student style results in more benefit to them (Butler and Mautz, 1996). This results in Hypothesis Three:

H3: The association between product qualities, site content components and user satisfaction is moderated by information processing preferences.

4. Methodology

For testing the hypotheses, an experimental task was designed and conducted to evaluate the impact of representational styles and individual preferences on satisfaction with product descriptions for remote purchase. Three Web sites were created for the experimental treatments, one considered sentential, one considered diagrammatic and one considered a combination of sentential and diagrammatic. The task that subjects performed was viewing and interacting with a Web site for the possible purchase of Girl Scout cookies. Girl Scout cookies were selected as the product to purchase since they are familiar to most, are probably not considered differently by either gender and are a tangible product with strong sensory cues. According to Nelson's (1970) definition, we classify Girl Scout cookies as experience goods, since the taste is something not known until consumed. However, Girl Scout cookies have qualities of a search good as well, since they consist of tangible ingredients and characteristics. As with any product, whether or not they actually contain the stated ingredients indicates a credence quality component.

4.1 Dependent variable

The model used in this research uses the outcome measure of user satisfaction. Previous measures of satisfaction include enjoyment and other subjective measures. End-user satisfaction is widely used as a surrogate for information technology success. See Mahmood, Burn and Gemoets (2000) for a meta-analysis of the use of end user satisfaction as a measure. The dependent variable of satisfaction was measured using a ten-question survey with each question scored according to a 7-point Likert scale, two of which were reverse coded. Questions one through five originated in Doll and Torkzadeh (1988) and question six originated in the Generic Use Interface Questionnaire (QUIS) developed by Schneiderman (1987) and refined by Chin, Li and Lim (1988). Responses from each questions of the survey were coded and added together to form an overall satisfaction score. See Appendix A for the complete satisfaction survey.

4.2 Independent variables

Information processing style is proposed as an individual characteristic that defines the propensity and preference to utilize either a verbal or a visual modality of processing information contained in one's environment. This study used the Style of Processing Scale (SOP) (Childers, Houston and Heckler, 1985) which contains 22 items, half of which reflect a visual processing style and half reflect a verbal style. Six of the items in the SOP were generated from the Verbalizer-Visualizer questionnaire (Richardson, 1977) while the remaining items were new for the SOP. The verbal component of the SOP has a reported reliability of .81 and the visual component has a reported reliability of .86. Overall reliability was measured at .88. See Appendix B for the SOP questionnaire administered for this research.

Three Web sites of one page each were created to test for product description satisfaction. The sites were considered diagrammatic, sentential, and a combination of diagrammatic and sentential. The diagrammatic site consisted exclusively of design elements that are visual in nature, such as pictures, graphics and icons. The site background contained the clover leaf Girl Scout logo with faces inside. Product descriptions consisted of a picture of the cookie box with two cookies next to it. One of the cookies was broken in half beside the box, to show the outside and inside details of the variety. The pictures were taken from a distance that did not allow subjects to read the words on the box. A drop-down list box containing dashes (-) to indicate None and asterisks (*) to indicate the number of boxes selected to order (one through four). A shopping cart on a button at the bottom of the screen was available for subjects to place their simulated cookie order.

The sentential site used text as the only design element. The background contained the words “Girl Scouts of America” repeated over the screen. Words alone described the products. A drop-down list box containing the words None, One, Two, Three and Four was available next to each description to allow a selection of the number of boxes of each cookie type. At the bottom of the verbal site, a ‘Buy selection now’ link allowed subjects to simulate placing their order.

The combination Web site used both the sentential and diagrammatic representations in the other sites as design elements. The background was a combination of the words used in the diagrammatic site and the logo used in the sentential site. Product descriptions contained both the words used in the sentential site and the pictures used in the diagrammatic site. A drop-down list box containing the words None, One, Two, Three and Four was available next to each description to allow a selection of the number of boxes of each cookie type. At the bottom of the combination site, a 'Buy selection now' link and a shopping cart icon allowed subjects to simulate placing their order. Appendix C contains portions of each of the sites.

Whether information equivalency exists between the sites is difficult to ascertain. As Larkin and Simon (1987) indicated, relationships are better judged with diagrammatic representations. An effort was made in the pictures of the cookies to not include information representing relationships. The simplicity of both representations should have reduced relational inferences about the product, creating approximately equivalent sites.

4.3 Procedure

Subjects were recruited from various undergraduate and graduate classes in Management Science in a Southeastern university in the United States and their friends and acquaintances. Students received extra credit in a course for their participation. Their friends and acquaintances received five dollars each for participation. After completing an informed consent form, the subjects responded to the SOP paper questionnaire that measures information processing style. On completion of the questionnaire, subjects were randomly assigned to either the diagrammatic, sentential or combination treatment, where they were given brief, written instructions indicating that they were simulating the purchase of Girl Scout cookies on-line. The instructions contained information about prices and delivery options. When they finished viewing the site and selecting their purchases, subjects responded to an on-line questionnaire about their satisfaction with the shopping experience. A total of 155 subjects were recruited which resulted in 147 usable responses. Of the 147, 47 were assigned to the sentential treatment, 46 were assigned to the diagrammatic treatment and 54 were assigned to the combination treatment.

5. Results

Of the 147 subjects, 100 had a higher visual processing score than verbal processing score. Forty-one had a higher verbal processing score than visual processing, and six had identical verbal and visual scores. To date, an indication of processing style in the general population does not exist, so it is not known whether these results are indicative of the overall population. Speculation exists that the youth of today are bombarded with visual cues, which may have adapted their processing preference to visual over verbal. Each subject generated a verbal and a visual score as a result of the SOP questionnaire, and their combined total was used in the analysis. The mean difference between verbal and visual scores was 5.27. The range of scores possible on each part of the measure is 11 to 44. Actual test scores ranged from 13 to 36 on the verbal portion and from 12 to 38 on the visual portion. Satisfaction rating scores ranged from 15 to 69 out of a possible 70. The 69 score was reported by a subject responding to the sentential treatment Web site.

Reliability of the SOP questionnaire results was tested using Cronbach's alpha (Cronbach, 1951), which showed an overall reliability of .69. The reliability tests also showed an alpha of .73 for the verbal preference questions and .68 for the visual preference questions. In general, values of .70 and higher are considered acceptable (Nunnally and Bernstein, 1994). The values generated by this sample were lower than the original SOP values of .81 and .86 respectively and indicate that the subjects were perhaps not sure of their information processing preference. Correlation analysis indicated that one verbal-style question was not significantly correlated with any of the other verbal questions and in fact was negatively correlated with three of them. When this question, phrased "I prefer to read instructions about how to do something rather than have someone show me" was eliminated from the sample, the verbal questions alpha increased to .75. Correlation analysis between the visual questions on the SOP indicated that one question was significantly correlated with only one other visual question and was negatively correlated with two of the visual questions. When this question, phrased "After I meet someone for the first time, I can usually remember what they look like, but not much about them" was removed from the sample, the alpha became .70, within the acceptable range (Nunnally and Bernstein, 1994), but below the reported reliability of .86 of the original SOP. Overall reliability of the SOP questions, after eliminating these two, was .74.

Reliability of the dependent variable of satisfaction was tested using Cronbach's alpha (Cronbach, 1951) and resulted in a .93 value, which is a strong indication that the individuals interpreted the satisfaction questions similarly.

Hypothesis One states that satisfaction increases if search qualities are described using sentential representations instead of diagrammatic elements. To test Hypothesis One, an ANOVA was run using the assigned treatment and resultant satisfaction score. As shown in Table 1, the treatment significantly affected the satisfaction score ($F=57.41$, $p<.0001$). Results from the Student-Newman-Keuls range test indicate that the sentential Web site

received significantly higher mean satisfaction ratings (49.49) than the diagrammatic Web site (31.70), in support of Hypothesis One.

Hypothesis Two, which states that presenting both types of product descriptions will produce higher satisfaction ratings than either representation alone, was tested using the same SNK means range test. Results indicate that while the combination treatment received higher mean satisfaction ratings (51.19), they were not significantly higher than the sentential treatment at alpha equal to .05. These results do not support Hypothesis Two.

Table 1: Results of Hypotheses I and II analysis of satisfaction. (ANOVA F=57.41, p<.0001)

Hypothesis	Treatment	Mean*	Std. Dev.
I: Words > Pictures			
Pictures	Diagrammatic	31.70	8.48
Words	Sentential	49.49	11.57
II: Combination > Words or Pictures	Combination	51.19	9.24

*connecting lines indicate means not significantly different at α<.05.

Hypothesis Three tests the moderating effect of the information processing style of the respondents. The SOP questionnaire results in two scores for each individual, a verbal score and the visual score. ANOVA results with both scores as moderating variables indicate that neither significantly affects the satisfaction rating. These results do not support Hypothesis Three, instead indicating that individual information processing style does not impact satisfaction with a Web site. See Table 2 for the results for Hypothesis 3.

Table 2: Results of analysis for Hypothesis III.

ANOVA model	F value of interaction	P-value of interaction	P-value of overall model
SAT = Main model [Trt] + Interaction [Trt * Verbal Score]	.46	.50	<.0001
SAT = Main model [Trt] + Interaction [Trt * Visual Score]	1.25	.27	<.0001

6. Discussion

The findings of this experiment indicate that during a pre-purchase search for product information, we prefer seeing sentential descriptions, or those that are presented in a sequence, true to natural language. Diagrams present a holistic description that does not contain the needed detail for investigating specific product information. Hypothesis Two was not supported, indicating that while diagrammatic representations are appreciated, they do not significantly enhance user satisfaction with the product description. The lack of support for Hypothesis Three indicates that altering product descriptions as a form of personalization does not produce a noticeable enhancement to Web site satisfaction.

Free-form comments were collected from each of the subjects. Although the results from the statistical analysis indicate that the diagrammatic treatment was not an effective means of conveying product information, these comments provide possible explanations for the results. See Table 3 for a description of the comments. Of the 46 subjects given the diagrammatic treatment, 37 submitted comments of which 45 were suggested changes to the site. Twenty-three of the comments requested product descriptions, 7 suggested names or labels for the cookies and 4 indicated that descriptions would be more helpful to those not familiar with Girl Scout cookies. Three subjects requested better pictures, one requested a description of ingredients and one suggested a link to access the opinions of others. In general, these subjects seemed most concerned about the lack of detail afforded them with the pictures.

Although analysis showed that satisfaction with the Web site was not significantly improved with the combination site, subjects in the sentential treatment overwhelmingly requested pictures (51 percent). Of the 37 subjects who commented, 24 indicated a desire for pictures. One subject wrote "… if I was to buy something, I'd have to at least look at some pictures …". Three indicated that they would purchase more products if an appealing picture were included. Eight subjects asked for the number of cookies in each box, two requested nutritional information and one asked for additional unspecified details. One subject requested more color in the site. These comments show that individuals are interested in a balance of search and credence information. Those presented with pictures only requested more detailed search information in the form of product descriptions. Those presented

with textual information only requested information that would convey the experience of the cookie, in the form of pictures. Interestingly, when presented with both pictures and text, subjects requested more and better detail in both forms of information. The requests were made by fewer of the subjects, and focused more on the search information of different product detail, including the number of cookies per box and nutritional content. Several comments were made concerning credence type characteristics. One subject in the diagrammatic treatment requested a link to others' opinions of the cookies and two subjects in the combination treatment indicated a desire for information on the Girl Scout organization.

While intuitively diagrams are preferred from a stylistic perspective, sentential descriptions convey more detailed and accurate information, which is important in the information acquisition stage of the buying process. These results are in accordance with the tables versus graphs finding that graphs convey generalized trends while tables are best for detailed, numeric answers (Blocher, Moffie and Zmud, 1986).

Table 3: Free-form comments from subjects in each treatment.

Treatment	**Product Category***	**Description of what is needed**	**Count**
Diagrammatic	Search	Product description	23
		- for those not familiar with Girl Scout cookies	4
		- names or labels needed	7
	Experience	Better pictures	3
	Search	Description of ingredients	1
	Credence	Link to others' opinions of the cookies	1
Comment count:	S=24,E=3,C=1	Total:	28
Sentential	Experience	Pictures	24
		- would purchase more if pictures included	3
	Search	Number of cookies per box	8
	Search	Nutritional information	2
		Unspecified other details	1
	Experience	More color	1
Comment count:	S=10,E=24,C=0	Total:	36
Combination	Search	Nutritional content	6
	Search	Number of cookies per box	5
	Experience	Better or different pictures	3
		Unspecified other information	3
	Credence	Organizational information - Girl Scouts	2
	Experience	Flash objects - animation	1
Comment count:	S=11,E=4,C=2	Total:	20
Overall total:	S=45,E=31,C=3	Overall total:	84

* S=search, E=experience & C=credence category.

Although pictures of products are not essential to convey detailed product information, the free-from comments show that consumers clearly prefer having them. This is evidenced by the requests for pictures from the sentential treatment group (24 requests) and for better pictures from the diagrammatic and combination treatment groups (6 requests). In the user-controlled on-line environment, supplying pictures, even for familiar products, is therefore recommended. As mentioned previously, however, adding more sophisticated technical elements has a resource cost. The cost of pictures is in download speed, frequently mentioned as a concern to on-line users.

In addition, the choice is not simply between graphics or no graphics. Pictures can be provided in different formats and in different sizes. Because different formats generally use different compression algorithms, the file sizes may differ greatly even for pictures of the same size. The file size is the major factor influencing the download speed. The research here compares different presentation styles but does not address the question of the relative merits of different image sizes and quality. In many image retrieval systems and some commercial web sites, a small thumbnail picture is provided with the option for the user to request a larger version.

7. Conclusions

Several important conclusions are drawn from the results of this experiment. The primary research question addressed in this study asks whether products are best described in a remote purchase environment using sentential or diagrammatic representations. The results of this experiment indicate that words on a Web site result in higher

satisfaction than pictures for product descriptions, although subjects expressed a strong preference for both words and pictures. These findings were consistent, regardless of the information processing style preferred by the subjects. In an environment where Web sites seem to add pictures and graphics for effect, more impact may be achieved by incorporating detailed verbal descriptions. This indicates that e-commerce site personalization should not occur on the basis of information processing style, since that construct did not significantly impact the satisfaction with a site.

The free-form comments collected revealed important considerations for a site that are product dependent. Girl Scout cookie boxes are notorious for having a different number of cookies per box, in order to maintain a constant price per box. The suggestion made by 13 of the subjects about indicating how many cookies per box indicates that product knowledge drives the informational content required by consumers. The request made by eight of the subjects concerning nutritional content indicates a sensitivity to diet, although as one subject typed "… not that cookies are nutritional!!". These findings suggest that descriptions should incorporate details specific to the product as well as basic information common to a product type.

These results have important implications to the evolving world of e-commerce. Internet devices are becoming smaller, with less screen area. The highest and best use of that reduced screen size is with textual information, as opposed to pictures.

8. Limitations and Future Directions

This study has the usual limitations of using students in a simulated environment as a surrogate for a typical e-commerce environment. The SOP and satisfaction surveys were an indication of an experimental environment and subjects were recruited for an experiment. The simplicity of the Web site in the treatments and the lack of actual buying capability limits the usefulness of the findings. The knowledge that an experiment was taking place may have altered the objectivity of the outcomes, although the nature of the experiment was not revealed.

The intention of this research was not to investigate the buying behavior of on-line consumers based on the graphical or pictorial content of the site. However, based on the findings from this study, that is a natural next step. The desire to have high-quality pictures available and the assertion of more purchases if appealing pictures were included indicates a need for pictorial elements in a Web site. Determining how the quality and number of pictures impacts buying behavior and under what circumstances may aid in providing more satisfying sites.

Accessibility considerations also enter into a decision about presentation style. Users with visual impairments may be unable to use a graphics site and may have difficulty with a combined site. Users with limited fluency in the language used in the site may be unable to effectively use a site without graphics. These considerations may require the availability of more than one option with the ability for the user to choose between them (or for the system to do so based upon a customer profile); a combined site would be an alternative approach.

If a system is to have the capability to provide customized versions of a site, there are many implementation issues that need to be addressed. Are customer preferences to be requested each time (which some may find annoying) or kept by the system using cookies (which some may consider an invasion of privacy)? To what extent is it possible to determine the capabilities of the user's system? The implementation and maintenance complexities involved in customization provide an additional argument for the use of non-customized but well designed sites that contain somewhat redundant information in multiple formats.

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Appendix A: Survey of Web page satisfaction.

Please respond to each of the following, based on your experience with the previous Web page.

Please use the following scale:

Very strongly disagree	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	Very strongly agree
1	2	3	4	5	6	7

1. The page provided the precise information I needed.

2. The information content met my needs.

3. The page provided sufficient information.

4. The presentation of the product was useful.

5. The information on the page was clear.

6. How would you describe your overall reaction to the Web page:

a. Terrible?
b. Satisfying?
c. Easy?
d. Frustrating?
e. Wonderful?

Comments: _____

Appendix B: Style of Processing Scale.

Subject number: _____

INSTRUCTIONS: The aim of this exercise is to determine the style or manner you use when carrying out different mental tasks. Your answers to the questions should reflect the manner in which you typically engage in each of the tasks mentioned. There are no right or wrong answers, we only ask that you provide honest and accurate answers. Please answer each question by indicating one of the four possible responses. For example, if I provided the statement, "I seldom read books," and this was your typical behavior, even though you might read say one book a year, you would indicate the "ALWAYS TRUE" response.

Please respond to each of the following, using the following scale:

ALWAYS TRUE	USUALLY TRUE	USUALLY FALSE	ALWAYS FALSE
1	2	3	4

1. I enjoy doing work that requires the use of words.
2. There are some special times in my life that I like to relive by mentally "picturing" just how everything looked.
3. I can never seem to find the right word when I need it.
4. I do a lot of reading.
5. When I'm trying to learn something new, I'd rather watch a demonstration than read how to do it.
6. I think I often use words in the wrong way.
7. I enjoy learning new words.
8. I like to picture how I could fix up my apartment or a room if I could buy anything I wanted.
9. I often make written notes to myself.
10. I like to daydream.
11. I generally prefer to use a diagram than a written set of instructions.
12. I like to "doodle".
13. I find it helps to think in terms of mental pictures when doing many things.
14. After I meet someone for the first time, I can usually remember what they look like, but not much about them.
15. I like to think of synonyms for words.
16. When I have forgotten something, I frequently try to form a mental picture to remember it.
17. I like learning new words.
18. I prefer to read instructions about how to do something rather than have someone show me.
19. I prefer activities that don't require a lot of reading.
20. I seldom daydream.
21. I spend very little time attempting to increase my vocabulary.
22. My thinking often consists of mental "pictures" or images.

For the next six questions, please answer each question by indicating one of the five possible responses.

ALWAYS TRUE	USUALLY TRUE	SOMETIMES TRUE	USUALLY FALSE	ALWAYS FALSE
1	2	3	4	5

23. I find it difficult to find enough synonyms or alternate forms of a word when writing.
24. I have difficulty expressing myself in writing.
25. I am able to express my thoughts clearly.
26. I am fluent in writing essays and reports.
27. I often have difficulty in explaining things to others.
28. I often have ideas that I have trouble expressing in words.

Appendix C: Web sites constructed to accommodate different processing styles.

Web site style	Cookie depiction	Number of boxes selection	Cookie depiction
Visual/diagrammatic processing			
Verbal/sentential processing	THIN MINTS Chocolate wafers dipped in rich chocolate coating with a burst of pure natural peppermint oil. A family favorite.	Select number of boxes to purchase None One Two Three Four	CARAMEL DeLITES Delicate vanilla cookies covered in caramel, sprinkled with toasted coconut and laced with dark chocolate.
Buy Selection Now			

Combination style

THIN MINTS

Chocolate wafers dipped in rich chocolate coating with a burst of pure natural peppermint oil. A family favorite.

Select number of boxes to purchase

None
One
Tw o
Three
Four

CARAMEL DeLITES

Delicate vanilla cookies covered in caramel, sprinkled with toasted coconut and laced with dark chocolate.

None
One
Tw o
Three
Four

Buy Selection Now