The Effects of Web Site Sequence: Moderating Role of Personality Difference

Chung H*

Department of Journalism and Mass Communications, New Mexico State University, Las Cruces, New Mexico

Abstract

This study examines the effects of website structures in terms of advertising effectiveness – memory, attitude, cognitive thoughts. The primary research question for this study is what type of website (web ad) structure is more effective. In the pilot study, we test the difference between two different website structures – linear vs. interactive – in terms of traditional advertising effectiveness. The results were not supportive to our research expectations. However, there were the differences in terms of memory between two structures. After re-creating the website based on subjects' comments, in the final experiment, we examine the differences among the different structures and the moderating role of personality difference on the effects of website structure. The results confirm that there were significant differences by the website structures on subjects' attitude, memory and cognitive responses. However, some research hypotheses were not supported by the current data.

Keywords: Advertsing; Marketing; Communication

Introduction

One of the most important new features the WWW can offer is "interactivity" with medium [1]. Even though the interactivity is a concept of continuum, other traditional media do not have much degree of interactivity [2]. Because interactivity is capable of enabling real-time, two-way, and fast interactions between consumers and advertisers, it will be very interesting and important for advertisers and marketers to investigate the effects of interactivity. With interactive technologies rapidly transforming the marketplace and our society, the once-passive consumers (because of traditional media) are now empowered to become active and interactive. Although interactivity is almost assumed to be the inherent and defining characteristics of the World Wide Web, there are still many other ways of defining interactivity in the context of this new medium, the World Wide Web. Because of some technological limitations, consumers still do not interact with the medium perfectly, as in face-to-face communication. However, one thing that is clear is that this interactivity has some positive effects on consumers in terms of attitude, memory, and behavioral intentions. Therefore, as these interactions have some positive impact on consumers in some perspectives, it can be reasonably argued that there should exist a relationship between interactivity and attitude, memory, and behavior.

Although useful, existing literature regarding the effects of Internet ads is limited in three ways. First, much of the evidence is based on using unrealistic materials. Second, only a few studies have explored what types of WWW ad structure is more/most useful in terms of advertising effectiveness. Finally, few studies have yet explored what variables can moderate the effects of WWW ads on consumers' attitude or memory. Consequently, the primary research question for this study is what type of WWW ad structure is more desirable in terms of advertising effectiveness. In this study, we test the difference between two different website structures – linear vs. interactive – in terms of traditional advertising effectiveness and we also examine the role of personality difference on sequence effects of website structure.

Theoretical background

In the context of WWW advertising, several structures or modes, which are similar to those of hypertext context, can also be possible. Most often mentioned or agreed among communication scholars are the so-called "hierarchically linked tree structure," "hierarchically linked linear structure," "relationally linked structure," and "mixed structure" [3,4]. Of course, though there could exist many other possible structures; in a broad sense, other structures can be placed into these four divisions [4]. Hierarchically linked tree structure literally takes the form of a tree, from broad to specific. So, in this hierarchical tree structure, consumers can traverse the information, and they decide subsequent pathways they want to follow. In this structure, the consumer should make choices at every branch point.

Hierarchically linked linear structure is somewhat similar to hierarchical tree structure in that it starts from broad category and progresses to a narrow category. However, contrary to tree structure, in linear structure users don't usually have the choice to move. Instead, users are automatically guided into the next level of structure. For example, when a user moves to the next page after he or she clicks one of hyperlinked texts, the user no longer has options to select and should follow the guide from the web ad at the bottom of the page saying "Click to move to next page." Strictly speaking, almost all companies' home pages adopt a sort of hierarchically linked tree and linear structure in their websites. Relationally linked structure is the same as that of hypertext structure. However, unlike hypertext structure, relationally linked structure is rarely used in web ad context, because it is too complex to design and so complicated that visitors are often lost during their search [5]. Mixed-type structure literally means that it mixes hierarchical and relational structures. Basically, it uses hierarchical tree or linear structure with an added relational aspect to it. According to Chung's content analysis (2000), almost 62% of companies' websites that were studied from July to October, 2000,

*Corresponding author:** Chung H, Department of Journalism and Mass Communications, New Mexico State University, Las Cruces, New Mexico 88003, Tel: 575-646-7674; E-mail: hchung@nmsu.edu

used this mixed type of structure for their home pages [6]. And the rest of the websites utilized basic hierarchical tree or linear structure. Even though they were called mixed-type structure, the most basic structure was hierarchical linear structure that consumers can traverse from broad to specific information through linear combinations.

Interactive vs. Linear Ad: Rafaeli defined "interactivity" as "a variable quality of communication settings" based on the assumption that a reciprocal, two-way communication is a common desire for both the communicator and the audience [7]. Contrary to Rafaeli's definition of interactivity, however, other scholars defined interactivity based on the notion of control. Williams et al. suggest that interactivity can be defined as a three-dimensional construct [8]. It includes control, exchange of roles, and mutual discourse. Control refers to the content, timing, and sequence of a communication act, searching out alternative choices. Similarly, Neuman refers to interactivity as the "quality of electronically mediated communications characterized by increased control over the communications process by both sender and receiver."

It can be conceptualized that the interactivity with the medium is fundamentally the ability to control information flow. Highly interactive aspects of the web ad are that consumers can choose the information flow through clicking one of many given options and consumers can actively traverse the information. Instead, the linear presentation does not give a consumer any kind of options to choose, and consumers are passively exposed to product information. Even though three web ad structures are currently categorized in the Internet context, we can also place those structures into two broad categories in terms of presenting information to consumers - linear structure and interactive structure. In this study, linear structure is defined as "the web ad structure that does not give web users any freedom to move or choose," and interactive structure is defined as "the web ad structure that gives web users control over their move or choice while they are surfing the website."

Structure effects on memory and attitude: Mohageg first addressed the issue of memory in hypertext context [5]. He found that users required the longest task completion time when the information was presented in linear linking strategy. He also found that hierarchical linking strategy was the most effective and efficient linking structure in terms of task completion time. He further found that relational linking structure was not effective compared to hierarchical linking structure. He argues that even though relationally linked structure is most often used in hypertext, that link actually can decrease users' performance (finding needed information) and memory on texts. This is because, according to Mohageg users exploring a document composed of relational hyperlinks will be more likely to get lost than users accessing a document organized linearly or hierarchically hyperlinked [5]. Furthermore, Mohageg suggests that a user exploring a relationally linked document will spend more energy navigating and have fewer resources available for remembering the document's contents than a user exploring a linearly or hierarchically organized document. Similar results were evident in advertising context regarding effect of structural difference on interactive medium [3].

Presenting information interactively has been considered as solving the difficulty of providing the right information to consumers [9,10]. Since advertisers and marketers cannot decide what information is appropriate for consumers in terms of quantity and quality, it has been suggested that providing consumers with an interactive information system that allows consumers to control information flow is the best way to solve the problem. Ariely posits that an interactive environment (defined as "information control" in his study) has both positive and negative effects on consumers' performance (finding high-quality products) [11]. Since the interactive environment allows consumers to deal with information systems that better fit their individual informational needs (called "benefits to individual heterogeneity") and are more flexible (defined as "benefits to dynamic heterogeneity"), he argues that controlling information flow has advantages over decision quality, memory, knowledge, and even confidence.

Both in advertising or consumer behavior, studies regarding the effects of interactive ads have failed to show consistent results in terms of memory. Although, on the consumer behavior side, a couple of recent studies showed that interactive-design tools in websites have favorable effects on consumers' decision making, their studies did not directly address the effects of the web ad structure on memory and attitude [11,12]. Further, the results of Ariely's study imply that interactive aspects of complicated structure have negative effects on consumers' decision making process and memory. However, interacting with a website possibly means that website users might choose certain information interesting to them instead of surfing through all the other information given to them by the website. In this sense, presenting information linearly will obviously help a person remember general information rather than providing information interactively. In contrast, interactive structure will be better liked by website users since they have full freedom to move. Interacting with the website can possibly arouse website users. Hoffman and Novak called this type of arousal "flow" and Biocca called it "presence" [13]. This type of "flow" or "presence" helps users have a different feeling while they are surfing the website since they feel like they are moving someplace else or they feel like they are already in another place. Hence, this arousal might be positively related to a user's attitude toward the site. In this sense, the interactive structure will obviously be better for obtaining a favorable attitude from the users than linear structure. Therefore, in this study, the following hypotheses are suggested regarding users' memory and attitude:

H1:   A linear structure of web ads will have superior impact on consumers' memory of the web ad contents than the interactive web ad.

H1-a: An interactive structure of a website will have superior impact on consumers' attitude toward the web site.

Sequence effects: In an advertising context, the sequence effect has been addressed in terms of context effects and clutter effects. In studies of context effects, context such as a program surrounding commercials has been found to have some impact on the effects of commercials. For example, advertising scholars have studied the impact of programming on the advertising effects of humorous commercials and non-humorous commercials, and also the impact of program arousal on the effects of commercials [14-18]. All these studies have found context has some sort of positive and negative impact, such as memory and attitude, on the effects of commercials. In studies of clutter effects, scholars usually focused on memory aspects. That is, scholars tried to find how the cluttered ad environment affects a person's memory of the contents of advertisements. Studies show that the first and last commercial would be recalled more by consumers than middle commercials [19]. Brooker studied sequence effects using mild humor and fear prior commercials, but used factual test ads [20]. He found that attitude toward the factual ad and liking significantly increased when preceded by a mild-fear ad. Aaker et al. also tested the sequence effects in terms of warm feelings created by commercials [21]. They showed the subjects two different sets of commercials. One set contained two warm 30-second ads followed by a warm test ad, the other set had two humorous 30-second ads followed by a different warm test ad. They found supportive results

of sequence. That is, the test ad was significantly better liked and received higher recall scores when it was preceded by the humorous rather than by the warm ads. The results of these studies suggest that the effects of a following commercial is influenced by the preceding commercial since the preceding commercial can be a reference point for the following commercial. That is, the consumer is usually affected by feelings he had during exposure to the prior commercial. Therefore, a prior commercial that induces lower specific feelings or experiences than a subsequent commercial should create a lower reference point. As a consequence, the subsequent commercial can create higher feelings or experiences than the prior commercial.

Therefore, it can be inferred that if consumers experience high interactivity from the previous page, the reference point will become higher, and it decreases the degree of perceived interactivity for the following page. On the contrary, if consumers experience low interactivity from the previous page, the reference point will be smaller, and it increases the degree of interactivity for the following page. Hence, the amount of attitude change will be higher when consumers are exposed to a linear advertisement and then exposed to interactive ads than when consumers are exposed to an interactive ad and then exposed to a linear ad. Therefore,

H2:   There will be a significant sequence effects on attitude change. That is, attitude change will be higher when consumers are exposed to a linear advertisement and then exposed to interactive ads than when consumers are exposed to an interactive ad and then exposed to a linear ad.

Theory of social response and role of personality difference: Social response theory posits that people tend to treat computers as social actors even when they know that computers do not possess emotions, intentions, or "selves" [22,23]. In more detail, social response theory argues that people respond to computers by exhibiting social behaviors when computers present a set of human-like characteristics such as language or interaction. Recently, Nass and his colleagues conducted a series of studies using computers to test social response theory. They found people usually react to the computers as they do to other people, people tend to believe computers have personality so that people develop relationships with computers, and they exchange intimate information with the computers [22,24,25]. If people tend to believe computers have personality and consider them social actors, and if previous interactions with the computers lead to the subsequent future interactions with the same computers, being exposed to the different type of internet website might lead to different response among web users. That is, the feelings from initial interactions with the website will impact subsequent feelings from subsequent interactions with the web site.

In consumer behavior and psychology, the concept of personality has long been a topic for researchers. However, the approaches and purposes for studying individual personality are totally different between the two areas. In consumer behavior, scholars are interested in personality differences to predict the individuals' purchasing behavior, media choice, product choice, and to predict market segmentation and attitude change [26]. In psychological literature, however, the study of personality is primarily concerned with providing a systematic account of the ways in which individuals differ from one another. Psychologists have been trying to understand personality traits from a limited set of dimensions by using cluster and factor analysis. Among those studies, the Big-Five structure of personality has been most widely used in psychology literature [27]. Those five factors of personality are usually referred to as the following: (1) extraversion (dominance or submissiveness), (2) agreeableness, (3) conscientiousness, (4)

emotional stability, and (5) culture. Of the Big-Five factors, the extraversion (dominance or submissiveness) dimension has been found to be the most psychologically important since these two dimensions provide more information about individuals and also provide ease of prediction for individuals' behavior [28]. By the theoretical definition, the submissive persons are more likely to be "self-doubting," "timid," "unauthoritative," and "undecisive" (usually following others' decisions). On the contrary, dominant persons are more likely to be "self-assertive," to like "take charge," and to lead others. Moon and Nass found that subjects are more likely to be attracted to computers that have similar personalities [24]. In their study, computer personality was manipulated by phrasing the text displayed by the computer. That is, a computer with dominant personality displayed stronger language, expressed in the form of assertions and commands. On the contrary, a computer with submissive personality displayed weaker language, expressed in the form of questions and suggestions. According to the results, subjects are more attracted to the computers displaying a similar personality.

Based on these theories and findings, we expect that consumers with dominant personalities will be more likely to have a favorable attitude toward the interactive web ads. Since they are decisive and want to take charge of what they are doing, it is obvious that consumers with a dominant personality prefer to choose the information they want to see. However, consumers with a submissive personality will have the opposite response. That is, they are more likely to prefer the linear web ad since they are "self-doubting," "timid," "unauthoritative," and "undecisive." Therefore, instead of actively looking for and controlling information, consumers with a submissive personality will like the information that is given by the web ad.

H3-a: Individuals who have a submissive personality have no significant reaction – website perception, website attitude (liking), and satisfaction – to the exposure sequence.

H3-b: Individuals who have a dominant personality have significant reaction – website perception, website attitude (liking), and satisfaction – to the exposure sequence. That is, their reaction to exposure will be greatest when they are first exposed to linear structure and then interactive structure.

A final hypothesis to be addressed in this study is the propensity of purchase (purchase in that website). Measures of website perception (as a brand), liking, and satisfaction with the website are all important for the creation of a strong website. However, for many of the online businesses today, it is the act of the final purchase that is critical. Therefore, a measure of the purchase likelihood is also included in this study. Along similar theoretical lines as those hypotheses, it is expected that subjects will exhibit a higher propensity to purchase on the interactively-structured website than linearly-structured website. In particular, it is expected that purchase likelihood will be the greatest among subjects who are exposed to the linear-interactive website structure. So,

H4: Subjects in interactively-structured website condition will exhibit greater purchase likelihood from that website than subjects in linearly-structured website.

H4-a: Subjects in linear-interactive structured website will exhibit the greatest purchase likelihood from that website.

Method

To test the suggested hypotheses for this study, 2 (personality

difference: submissive vs. dominant) x 4 (website structure: linear, interactive, linear-interactive, interactive-linear) between-subjects full factorial design was used. Before the actual experiment, a pilot study was done to test experiment materials, manipulation and measures (please see the attached appendix for detailed description for the pilot study).

Stimulus material

The similar computer website used for the pilot study was used in the main experiment for the study. This time, however, based on suggestions from subjects in the pilot study and the insignificant attitude difference discovered in the pilot study, efforts were given to make the website look more professional and real. Since most subjects suspected the reality of the website because of the relatively poor website features, care was taken to create a realistic website for the final experiment. The intro-page was used in experiment 2 to make the website look authentic. The intro-page has a so-called "intro" creative showing some laptops in diverse positions with the message of "Welcome to E-Computer. The place you can find the computer for you and your family at the cheapest price" and asked subjects to "Click here to skip intro." Once subjects click the intro page, they were led to the first page (the "homepage"). From the first page, there were ten pages on the website. We used the exact same format for the linear structures and interactive structures. For the linear structure, subjects could scroll down to the bottom of the page and then click the button placed at the bottom to move to the next page. For the interactive structure, subjects were free to click any link provided on the page. For the mixed structure, five pages were given to each structure. In other words, for the linear-interactive structure, the first five pages were structured as linear and the other five pages were structured as interactive, and vice versa for the interactive-linear structure.

Subjects and procedure

Undergraduate students in introduction courses for advertising and mass communication were asked to participate in the study from large southwestern university for the extra credit. Students were first asked to sign-up for one of 12 experiment sessions. A total of 194 students signed up and 181 students participated in the actual experiments. Those students signed for the study (194) were instructed to complete a personality questionnaire in the class. The experiment was conducted in the computer lab, where materials were shown on 17" monitors with the MS Explorer version 6. At their arrival, students were guided into computer lab. The experiment coordinator gave students a card, which had a log-in number for the study. Based on personality scores, researchers already decided the numbers for the students. Numbers 1-97 were assigned for the dominant students and 98-194 were assigned for the submissive students. Log-in numbers were randomly assigned students within each group; hence, students within each personality were assigned randomly into four different conditions based on website structures. Once they received the log-in number, students were asked to sit in any computer. And then, students were also asked to read an instruction shown on the screen. Instruction included a statement for keeping subjects' level of involvement high. Since the purpose of this study was to test the effects of structure on memory, it was important to keep subjects' involvement level constant. To do this, we decided to keep the involvement level high. Therefore, subjects were told in the instruction that they were participating in an important experiment and they were among a small and selected group of students whose opinion was being sought by the company of the new website. They were also told that their opinions were very important and would be

heavily weighted in the decision to create a new website. After they read the instruction, they were asked to type their log-in number to get access to the experimental website. The website was already minimized on the monitor. Subjects were given 10 minutes to surf the site. After they viewed the website, they were asked to move to the questionnaire and answer a series of questions regarding dependent variables, such as attitude, memories, perceptions, and purchase likelihood. Attitude, involvement, and perceived interactivity were measured using the same scales used in the pilot study. Memory, however, was measured using open-ended question regarding the contents of website. Subjects were asked to write down everything they could remember regarding the contents of the website. Three graduate students evaluated all the answers and assigned memory scores. Purchase likelihood was measured by asking whether they wanted to purchase the products described in the website.

Measures

Measures for dependent variables – website structure perception, website attitude, company attitude, and purchase likelihood – were taken immediately after subjects finished surfing. The dependent variables used to be evaluated in this study are:

Website structure

The perception of the website structure differences were evaluated to test whether our manipulation worked for the subjects. To do this, as in the pilot test, subjects' interactivity perception with the website was asked. A five-item scale among items, used in Chung and Zhao's study and Cho and Leckenby's study, was used to measure subjects' interactivity perceptions (α=.89) [29].

Attitude toward the website (Awad)

A multi-item, seven-point semantic differential scale, which was used to measure attitude toward the website in several other studies and has been proven generally reliable, were used to measure attitude toward the website [30]. Further, this study incorporated some other items, specifically developed to measure website attitude by Chen and Wells [31]. Those include the following anchors: (un)/favorable, like/dislike, (un)/interesting, (un)/appealing, (un)/satisfactory (α=.82).

Memory

Memory was measured differently from the pilot study. In the pilot study, we focused on the subjects' memory of website features and product information. Hence, we couldn't be sure whether the significant difference was caused by the difference of product memory or by website features. So, in the final experiment, we asked subjects to write down all the information about products (product name, product features, etc.), not about website features (e.g., graphics used in website, etc.).

Purchase likelihood

This purchase likelihood was measured by offering each subject three products for sale. Subject were then asked to indicate how likely they would purchase each product (α=.84) (Table 1).

Data Analysis and Hypothesis Test

The hypotheses were tested based on a 2 (personality type) X 4 (structure types) between-subjects analysis of variance (ANOVA). Before the final analysis, three covariates, personal involvement with the computer, personal involvement with the web, and self-rated product knowledge (computer knowledge), were used in each analysis.

Personality	Structure	Interactivity	Attitude	Memory	PL	Ad-thoughts	Product-thoughts
Dominant	Linear	2.78	3.79	2.62	2.53	5.10	4.76
	Interactive	4.38	4.39	1.77	4.43	5.32	5.01
	Lin-Inter	3.27	4.91	2.48	3.65	4.70	4.74
	Inter-Lin	2.86	3.64	1.65	2.63	4.59	4.54
Submissive	Linear	2.59	3.30	2.70	2.62	4.78	5.22
	Interactive	4.04	3.92	1.84	4.16	4.40	4.48
	Lin-Inter	2.91	3.70	1.96	3.27	2.61	2.70
	Inter-Lin	3.13	3.17	2.01	2.92	3.33	3.33

Table 1: Descriptive Statistics for Scales Used in the Experiment.

As a covariate, none of them was significant in the analysis.

Data screening

The data collected were examined for violations of normality and outlier contamination so that, if necessary, appropriate data transformations could be executed to correct for abnormal skewness and kurtosis levels. First, univariate normality was checked by examining univariate skewness, kurtosis, and outlying case. Further, bivariate scatterplots were used to check for outliers and relationships among variables. Some variables seemed to be slightly skewed (e.g., memory and the number of clicks by subjects), but those skewnesses were not outside +3/-3 range of ratio of statistics to standard error within each of the personality and web ad structures. Therefore, it seems to be normal. And finally, multivariate outliers were also checked by using Mahalanobis' Distance (critical value for Mahalanobis' distance $\chi^2 = 54.23$, d.f.=24). One case was identified as outlying cases in terms of Mahalanobis' Distance; however, the range seemed to be reasonable. Therefore, for the final analysis, all cases were included.

Manipulation checks

The structure manipulation was measured by a five-item perceived interactivity measurement, which was used in the previous studies ($\alpha=.89$). ANOVA analysis shows no significant main effect on perceived interactivity ($p>.35$), but cell comparisons show that subjects' perceived interactivity scores were different between the interactive structure and the rest of the structures. This means that subjects perceive the structures differently. In particular, subjects' perceived interactivity scores for mixed structures were higher than for linear structure, which suggests that subjects had a greater feeling of interaction with the website.

Hypotheses tests

Hypotheses 1 and 1-a: Attitude and memory: Hypotheses 1 and 1-a predict structure and personality main effects. First of all, an ANOVA on attitude yielded the predicted main effect of the structure and of the personality ($F=73.49$, $p<.001$) on attitude. Further, main effect of the website structure on attitude was also found ($F=33.10$, $p<.001$). In terms of attitude, subjects expressed significantly more favorable attitude toward the interactive website structure, which supports the hypothesis 1a. Also, the interaction between personality and website structure attained significance ($F=5.67$, $p<.01$). Together, these findings suggest that subjects' personality influenced attitude toward the website more when subjects were exposed to the different types of structures. Further, an ANOVA on subjects' memory also yielded predicted main effect for the website structure ($F=5.93$, $p<.01$). However, there was no significant main effect for the personality ($F<1$) on memory. Also, interaction between personality and website structure didn't attain significance ($p>.28$). Subjects in linear structure show the highest memory scores ($M=2.66$), and this score was significantly different

from those of the other structures. Together, these findings also suggest that the website structure might be the main factor influencing subjects' memories during their surfing. Unexpectedly, personality didn't show a significant main effect on memory (Figures 1a and 1b).

Hypotheses 2: Sequence effect: Hypothesis 2 expects an overall sequence effect across personality factor. We expected that subjects' attitude scores would be different by how subjects were exposed to the sequence of the website structures. In other words, we expected attitude scores would be higher or highest among subjects who were exposed to the linear structure first, then, were exposed to the interactive structure than subjects who were exposed to any other sequence of the website structures. To test this hypothesis, mean scores of each group were compared across all different sequences of the website structures.

As expected, subjects in linear-interactive sequence structure showed the highest attitude scores ($M=4.35$), followed by subjects in interactive-interactive sequence structure ($M=4.14$). Attitude scores from subjects in linear-linear sequence structure was little bit higher ($M=3.51$) than those from subjects in interactive-linear sequence structure ($M=3.43$). The difference among groups was significant ($F=22.68$, $p<.001$), and the results of group comparison showed the significant difference was due to the difference between group 2 (interactive-interactive sequence structure), 3 (linear-interactive sequence structure) and group 1 (linear-linear sequence structure), 4 (interactive-linear sequence structure). However, there was no significant difference between group 2 (interactive-interactive sequence structure) and group 3 (linear-interactive sequence structure), and between group 1 (linear-linear sequence structure) and group 4 (interactive-linear sequence structure). As expected in the hypothesis, subjects who were exposed to the linear structure and then interactive structure showed the most favorable attitude toward the website. Hence, the hypothesis expecting sequence effect on attitude toward the website was supported by the data.

Hypotheses 3-a and 3-b: Since hypotheses 3-a and 3-b test the sequence effect only by each personality (submissive vs. dominant), the main effects and interaction between two factors don't need to be tested via ANOVA. Since website structure effect is hypothesized to be equivalent in submissive personality and different in dominant personality, a priori contrast was run on the relevant means (perceived interactivity, website liking, and satisfaction). In a planned contrast, we tested whether the means for interactive structures were significantly higher than the means for other structures. As anticipated, for those with submissive personalities, a planned contrast was not significant (t (172)=1.84, $p>.10$), providing support for hypothesis 3-a. Unlike our expectation, however, a planned contrast for dominant personality condition was not significant either ($p>.25$). Therefore, hypothesis 3-b was not supported by the data.

Hypotheses 4: Purchase likelihood: We, in this study, expected that subjects surfing different website structures would express different
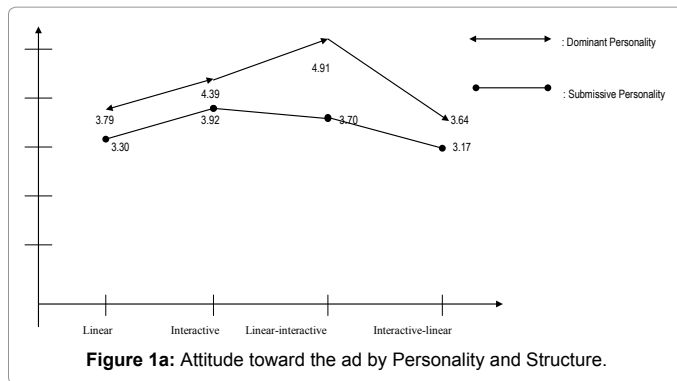
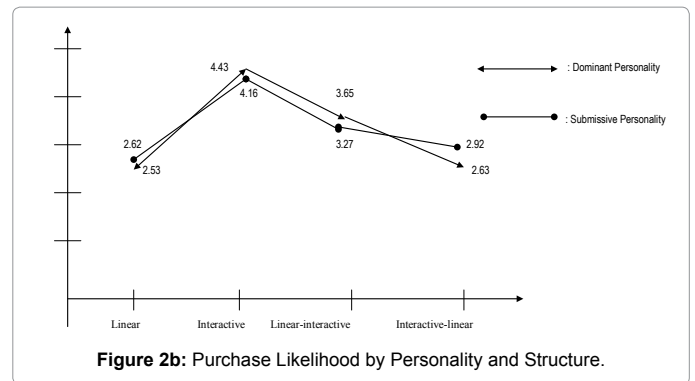**Figure 1a:** Attitude toward the ad by Personality and Structure.

Figure 2b: Purchase Likelihood by Personality and Structure.
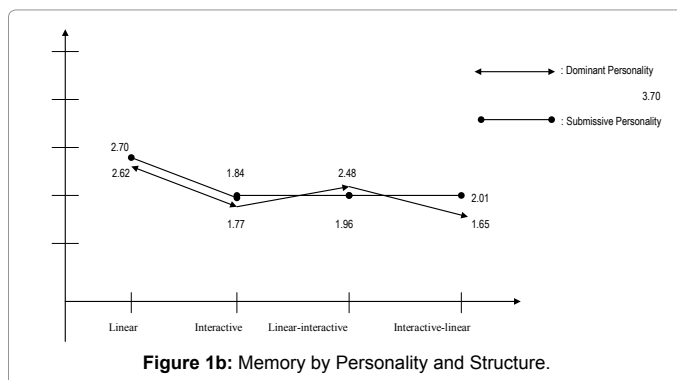

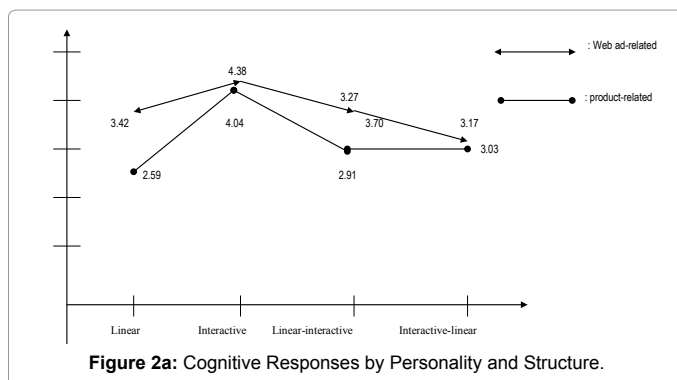**Figure 1b:** Memory by Personality and Structure.

Figure 2a: Cognitive Responses by Personality and Structure.

responses to the purchase likelihood. We, however, didn't expect the difference by personality on purchase likelihood. Purchase likelihood was measured by offering three products – a notebook, desktop computer, and printer – to subjects for purchase. Those scores were averaged for the final purchase likelihood score. Scale reliability was .84. Contrary to our expectations, an overall ANOVA on purchase likelihood yielded significant main effects by personality ($F=4.93$, $p<.05$) and structure ($F=75.49$, $p<.001$), and also significant interaction between personality and structure ($F=3.02$, $p<.05$). Subsequent analysis of the estimated marginal mean showed that subjects in the interactive structure expressed greater purchase likelihood regardless of their personality (t-test confirms this with non-significant difference between dominant and submissive personality; $t=1.65$, $p>.102$). Hence, most of the difference on purchase likelihood was due to the differences in website structures (Figures 2a and 2b).

Conclusion

This research was the first attempt to test the effects of website

structures on subjects' attitude, memory, and behavioral intentions, using the similar theoretical rationales from the hypertext communications. This study also aims to contribute to recent research in interactive advertising by documenting the different impact by an individual's personality and website structure. Although past research in hypertext communication has documented attitudinal and behavioral differences across text structures, there has been no single study on the structure effects in the Internet context. Further, the conclusion from the hypertext communications is often that it is very difficult to conclude one structure is superior over the other structures. Our findings also document significant difference among website structures. However, the results from the experiment suggest that the subjects' attitudinal and behavioral differences can also be explained by personality variations. In our study, personality variations moderate the effects of website structures on attitudinal and behavioral responses.

In this experiment, we tested four hypotheses regarding subjects' attitude, memory, and behavioral intentions (purchase likelihood), manipulating website structures and personality differences. The findings suggest similar results on attitude and memory as those from the hypertext communications. In terms of attitude, results indicate that website structure influences subjects' attitude toward the website. Different structures have different impacts on subjects' attitude toward the website. Results showed that subjects seem to prefer interactively structured websites to linearly structured websites. Other structures, such as the mixed structure, didn't show a significant impact on attitude. Further, the results indicated that subjects' attitude toward the website will also be influenced by their personality. In other words, subjects' attitude toward the website would be influenced to a greater extent for the subjects with dominant personalities when they were exposed to the interactively structured website.

In terms of memory, data also confirmed similar results as those from hypertext communications. Subjects' memory of contents was greater when they were exposed to the linearly structured website. Unlike attitude, there was no significant personality main effect and no significant interaction effect between structure and personality. Subjects' memory scores were greatest when they were exposed to linear structure over other structures. Hence, findings on memory suggest website structure is a main factor to increase subject's memory of contents. Although it was not included in the hypotheses for this study, we also tested the cognitive response by personality and structure. We found significant interactions between personality and website structures. Analysis showed that subjects with dominant personalities generated a greater number of cognitive responses when they were allowed to surf the interactively structured website. However, personality was the most important factor in generating

cognitive responses. As suggested in psychology literature, subjects with dominant personalities actively engaged in cognitive responses more often than subject with submissive personalities, regardless of website structures. In terms of behavioral aspects, data showed some expected and unexpected results. We found a structure main effect on purchase likelihood as expected, but we also found a personality main effect, with a significant interaction between personality and structures. In sum, the study documents that subjects have different attitudinal and behavioral responses to the different types of website structures, and subjects' personality moderates the effects of website structure on attitude, memory, and behavior.

Discussion

These findings provide some meaningful insights into recent findings in personality literature. For example, Moon showed that people tend to respond to computers by exhibiting social behaviors when computers present a set of human-like characteristics such as language or interaction. Moon found that people usually react to computers as they do to other people; people tend to consider that computers have personality so that people develop relationships with the computers, and they exchange intimate information with computers. So, people are more attracted by the computer having a similar personality. Moon suggests that creating a personality trait in the computer context (i.e., in the Internet context or on-line brand context) will be possible, will help a company to develop more personalized relationships with consumers, and eventually get more interactions with consumers. For dominant personality consumers, they are more likely to be attracted to the on-line brand that has a similarly dominant personality, and vise versa. Moon's suggestions were also confirmed by our study. Our study showed that a company's website could have a sort of personality by using different structures. Although we only used two structures, different structures created different feelings of interactivity for subjects. And this might be working as a different personality to the subjects. Hence, as Chung and Sung posit in their study, a company's website (i.e., on-line brand in their study) can easily manipulate personality traits using different structures, and subjects surfing the website seem to feel personality traits from the website while surfing.

Practically, this study shows marketers how they can use the website and manipulate the personality using different types of structures. Using only two types of structures, this study demonstrates that people can easily have different feelings or experiences with the website while surfing. In some sense, this study showed that creating interactively structured websites seems to be the most effective in terms of attitude. However, companies should use different types of structures based on the purpose of the website since the results of this study showed that the interactive structure was not superior to the linear structure in terms of memory.

References

1. Pavlik J (1996) New Media Technology. Needham Heights, MA: Allyn and Bacon.

2. Steuer J (1992) Defining Virtual Reality: Dimensions Determining Telepresence. Journal of Communication 42: 73-93.

3. Benzjian-Avery A, Calder B, Iacobucci D (1998) New Media Interactive Advertising vs. Traditional Advertising. Journal of Advertising Research 38: 23-32.

4. Zeff R, Aronson B (1997) Advertising on the Internet. Wiley Computer Publishing

5. Mohageg MF (1992) The Influence of Hypertext Linking Structures on the Efficiency of Information Retrieval. Human Factors 34: 351-367.

6. Chung H (2000) The Differences in Web Ad Structure: A Content Analysis of Top 100 Web Sites in USA. unpublished paper.

7. Rafaeli S (1988) Interactivity: From New Media to Communication. Beverly Hills, CA.

8. Williams F, Rice RE, Rogers EM (1988) Research Methods and the New Media. New York: The Free Press.

9. Alba J, Lynch J, Weitz B, Janiszewki C, Lutz R, et al. (1997) Interactive Home Shopping: Incentives for Consumers, Retailers, and Manufacturers to Participate in Electronic Marketplaces. Journal of Marketing 61: 233-249

10. Bettman JR (1979) An Information Processing Theory of Consumer Choice. Addison Wesley Publishing Company, California.

11. Ariely D (2000) Controlling the Information Flow: Effects on Consumers' Decision Making and Preferences. Journal of Consumer Research 27: 233-249.

12. Häbul G, Trifts V (2000) Consumer Decision Making in Online Shopping Environments: The Effects of Interactive Decision Aids. Journal of Consumer Research 19: 4-21.

13. Hoffman DL, Novak TP (1996) Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations. Journal of Marketing 60: 50-68.

14. Perry SD, Jenzowsky SA, King CM, Yi H, Hester JB, Gartenschlaeger J (1997) Using Humorous Program as a Vehicle for Humorous Commercials. Journal of Communication 47: 20-39.

15. Weinberger MG, Gulas CS (1992) The Impact of Humor in Advertising: A Review. Journal of Advertising 21: 35-59.

16. Schumann DW, Thorson E (1990) The Influence of Viewing Context on Commercial Effectiveness: A Selection-Processing Model. Current Issues and Research in Advertising 12: 1-24.

17. Broach VC, Page Jr, TJ, Wilson RD (1995) Television programming and its influence on viewers' perceptions of commercials: the role of program arousal and pleasantness. Journal of Advertising 24: 45-55.

18. Mattes J, Cantor JR (1982) Effects of Disturbing Televised Events on the Acquisition of Information from Subsequently Presented Commercials. Journal of Advertising 20: 46-53

19. Kim T, Biocca F (1997) Seeing is Believing: Effects of Telepresence on Memory and Persuasion. Paper presented to the Communication & Technology Division at the 47th Annual Conference of the International Communication Association, May, Montreal, Canada.

20. Brooker GW (1981) A Comparison of the Persuasive Effects of Mild Humor and Mild Fear Appeals. *Journal of Advertising* 10: 29-40.

21. Aaker DA, Stayman DM, Hagerty MR (1986) Warmth in Advertising: Measurement, Impact, and Sequence Effects. Journal of Consumer Research 12: 365-381.

22. Moon Y (2000) Intimate Exchanges: Using Computers to Elicit Self-Disclosure from Consumers. Journal of Consumer Research 26: 323-339.

23. Reeves B, Nass CI (1996)The Media Equation. CSLI Publications, Stanford, CA.

24. Moon Y, Nass CI (1996) How 'Real' Are Computer Personalities? Psychological Responses to Personality Types in Human-Computer Interaction. Communication Research 23: 651-674.

25. Nass CI, Moon Y, Carney P (1999) Are People Polite to Computers? Responses to Computer-Based Interviewing Systems. Journal of Applied Social Psychology 29: 1093-1110.

26. Fournier S (1998) Consumers and their brands: developing relationship theory in consumer research. Journal of Consumer Research 34: 343-372.

27. Norman WT (1963) Toward an Adequate Taxonomy of Personality Attributes: Replicated Factor Structure in Peer Nomination Personality Ratings. Journal of Abnormal and Social Psychology 66: 574-583.

28. Williams JE, Munick ML, Saiz JL, Formy Duval DL (1995) Psychological Importance of the "Big Five": Impression Formation and Context Effects. Personality and Social Psychology Bulletin 21: 818-826.

29. Cho CH, Leckenby JD (1999) Interactivity As a Measure of Advertising Effectiveness: Antecedents and Consequences of Interactivity in Web Advertising. In Robert, M. S. (ed.), *Proceeding of the 1999 Convention of the American Academy of Advertising*, University of Florida, Gainesville, Florida.

30. MacKenzie SB, Lutz RJ (1989) An Empirical Examination of the Structural Antecedents of Attitude toward the Ad in an Advertising Pretesting Context. Journal of Marketing 53: 48-56.

31. Chen Q, Wells WD (1999) Attitude Toward the Site. Journal of Advertising Research 39: 27-38.