

HOW CONSUMERS GENERATE CLICKSTREAMS THROUGH WEB SITES: AN EMPIRICAL INVESTIGATION OF HYPERTEXT, SCHEMA, AND MAPPING THEORETICAL EXPLANATIONS

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ABSTRACT: When consumers navigate Web sites, they are said to generate a clickstream, i.e., engage in clicking from Web page to Web page. With respect to these clickstreams, hypertext, schema, and mapping theories provide a conceptual framework for their construction. To examine these perspectives, an interpretive study of 60 Internet consumers was conducted which revealed that they map very specific ideas of what they expect to encounter in interacting with various Web sites. In this regard, the results of this study suggest that the effective use of mapping, text and hypertext in generating a good navigational experience is an important way to help advertisers build a consumer Internet brand.

The way consumers navigate web sites is called a clickstream, i.e., the clicks they make from page to page (Chatterjee, Hoffman, and Novak 1998). Metaphorically, the clickstream may be seen as a trajectory in which one moves from a beginning point through different points along the way toward a goal and engages in various actions which facilitate that movement (cf. Lakoff and Johnson 1999). In this case, the consumer starts from a Web search and/or web page through a web site with various goals of exploring, being entertained, seeking information, purchasing a product, or some other behavior. Much variation may occur during the generation of a clickstream. For instance, the goal may change when web content inspires goal changes or when obstacles, such as slow loading pages, are encountered.

Although web sites are increasingly important as advertising media (Burke 1997; Chatterjee, Hoffman, and Novak 1998; Rodgers and Thorson 2000; Wassmuth and Thompson 2000), surprisingly little is known about how consumers navigate through them. This dearth of research exists despite survey findings suggesting that difficult site navigation and poorly designed sites are major obstacles to consumer acceptance of Internet shopping as a viable purchasing channel (Jarvenpaa and Todd 1997; Krantz 1998; Lohse and Spiller 1998). Closely related, Jarvenpaa and Todd (1997) discovered that another major obstacle is difficulty in finding specific items. Indeed, usability experts (Hamilton 2000; Nielsen 2000) complain that many web sites are so complicated that users have difficulty achieving their online goals, and that a simpler design is a much better design.

A related problem is that designers are uncertain about how to create a compelling web presence using new technologies. Iacobucci (1998, p. 8) concluded that "interactive systems have

not yet made use of the excitement potential to a great degree, and novelty only goes so far." Another group of researchers conducted a content analysis of Fortune 500 web sites and concluded that "most of today's interactive media marketing applications are uninspiring and, we would argue, fall far short of the potential of interactive media" (Parsons, Zeisser, and Waitman 1998, p. 31). Yet, these new technologies, important for creating an enjoyable and/or productive navigational experience through smart web site design, may help a company build its brand (Coyle and Thorson 2001; Sather, Ibanez, and Grunspan 1997; Strauss and Frost 2001). Marketers face the challenge, then, of creating a site that is both easily navigable and compelling.

Given these potentials and concerns, this paper draws on hypertextual, schema and mapping (new media) theories and research to investigate the attitudes, beliefs, and behaviors of Internet users as they generate self-directed trajectories through various web sites. Previous research has examined clickstreams from a web site as consumers clicked on a web site's banner ads (Chatterjee, Hoffman, and Novak 1998). However, to our knowledge, this paper is the first to analyze the clickstream of consumers as they proceed through actual web sites. To engage in this analysis, we will use a hypertextual-schema-mapping theoretical perspective on an *a priori* basis to see how well it captures consumer clickstream activity. Such a perspective postulates how consumers set up expectations regarding the web and behave in accordance with them.

Theoretical Perspectives: Hypertext, Schema, and Mapping

Prior research has shown a number of theoretical perspectives which are important for understanding the interactive process

and how website navigation through the clickstream unfolds (Novak, Hoffman, and Yung 2000). Here, we consider the hypertext, schema and mapping approaches.

Hypertext and Schema

Hypertext is a central theoretical construct in conceptualizing Internet phenomena. It involves the linkages made in electronic media among various verbal and non-verbal forms of information (Landow 1997). Such hypertext is crucial in the Internet where links are instantly clicked and various degrees of linear (typical of offline perspectives) and non-linear (more dispersed and random) patterns emerge. Hypertext is one of the most widely used building blocks users access as they generate their clickstreams. Whether and how these hypertext patterns are influenced by Web site marketers and advertisers, and how consumers perceive and act with regard to them, remain areas for inquiry.

One way to consider hypertextual phenomena is through schema theory. A schema can be defined as "a cognitive structure that represents knowledge about a concept or type of stimulus, including its attributes and the relations among those attributes" (Fiske and Taylor 1991, p. 98). It has been found that when a schema is activated so too is the affect associated with that schema, and is, thus, referred to as schema-triggered affect (Fiske 1981; Fiske 1982). In other words, it is not only the knowledge learned from a previous experience, but also the feelings associated with that experience that are stored and subsequently recalled upon exposure to new experiences. Overall then, schema research suggests that we have certain expectations that are due to the information and affect stored in schemas. If a new experience closely matches those expectations, the appropriate schema will be activated more quickly than when a novel experience fails to tap into such expectations (Fiske and Taylor 1991).

The findings of schema research may be readily applied to new media research, especially to the extent that consumers' offline experiences are seen by them to be transferable in some fashion to their online experiences. Indeed, it has been reported that consumers very much compare virtual and real phenomena and construct everyday narratives of the two on an interpenetrating basis (Gould and Lerman 1998). This may be likened to a hermeneutic process in which consumers go back and forth between the two realms and form perceptions, concepts, interpretations, lay theories, schemas, and scripts concerning the Internet versus offline reality. These narratives help to comprise schema and influence behavior in such a way

that while the Web experience retains various elements of novelty, it is not without strong links to other aspects of life.

The expectations that schemas both encourage and discourage may greatly influence a user's web experience. In other words, "it is assumed that consumers first formulate expectations (or implicit predictions) for the experiences that they have during each event" (Dellaert and Kahn 1999, p. 43). Expectations of waiting for site content to download, for example, can negatively affect evaluations of web sites, although these expectations can be managed to minimize the negativity (Dellaert and Kahn 1999). Not only will expectations affect a user's experience, but the discrepancy between these expectations and what actually occurred during the site visit may also affect a user's decision to return to that site again (Dellaert and Kahn 1999). As Kahneman, Kirchner and Selten (1994, p. 27) emphasize, "Retrospective evaluations of the experienced utility of past episodes are undoubtedly the most important source of predictions of the hedonic quality of future outcomes." Thus, schemas formed by today's web experiences will dictate clickstreams that emerge tomorrow.

Mapping

These narratives or schema also lead to the consideration of the specific features that the Internet offers web designers. Such features "can provide a focus to extend or to create theory, methodologies, and the discovery of new phenomena" (Coupey 1996, p. 2). Understanding the impact of these unique features may be especially helpful to marketing and advertising researchers hoping to study the business of the Internet (Hoffman and Novak 1996). One such feature is mapping. It is a powerful tool that designers, whether of interfaces or offline objects, have in their kit. Mapping is the relationship between an object's controls, the controls' movements, and the results of activating the controls (Norman 1990). An important attribute that predicts a mapping strategy's effectiveness is how natural the mapping is. Natural mapping means "taking advantage of physical analogies and cultural standards," and "leads to immediate understanding" (Norman 1990, p. 23). For example, the button that we press to take an elevator up is placed above the down-button and suggests that it is the proper button to press in order to go up. An arbitrary mapping strategy would have found the buttons placed side-by-side, and a misleading mapping strategy would find the up-button placed below the down-button. A user's clickstream may be influenced by an effective mapping strategy. For instance, if the user is trying to accomplish a

specific goal, mapping may streamline the clickstream by making the path to accomplishment more clear.

Steuer (1992, p. 86) defines mapping in interface design as an extension of natural mapping: "the way in which human actions are connected to actions within a mediated environment." An effective interface will employ mapping that exploits users' knowledge from other areas (MacLean et al. 1991). Indeed, the assumption among interface designers, "is that making the interface look and behave like familiar external objects will make the interface more intelligible, more predictable, and generally easier to use" (MacLean et al. 1991, p. 168). Similarly, researchers of virtual reality write that effective mapping will closely mirror human actions. As Steuer (1992, p. 87) writes, "Since our perceptual systems are optimized for interactions with the real world, mapping is generally increased by adapting controllers to the human body." Although the technology is not yet in place to make real-world mapping a reality for most Internet users, the use of metaphors to match controls with subsequent actions is an appropriate alternative (Steuer 1992). Mapping in this sense is also a learning process via analogical transfer in which product and procedural knowledge is transferred from a more familiar situation to one that is less familiar (Gregan-Paxton and John 1997). In this respect, Web designers have pointed out how the use of metaphors is a part of good design (Siegel 1997).

An example of a web site that uses a metaphor as mapping strategy is Alligator Records' Blues Town (www.classic.cz/katalogy/alligator/Alligator.htmwww.alligator.com). The main image on the page is designed to resemble a street lined with blues and jazz bars and nightclubs. As a visitor to Beale Street in Memphis or Bourbon Street in New Orleans would navigate, so too does the visitor to Blues Town. If she wants to find out where her favorite artist is playing she goes to the concert poster hanging from the wall and clicks on the poster. If she wants to buy a record, she moves the cursor and clicks on the Record Shop.

Importantly, mapping may be a way of increasing the level of consumer participation with Internet marketing communications content. The trail that such participation leaves, whether through accessed hypertext, images, or a combination of both, is the clickstream. Such participation may be very goal-directed (e.g. a search for a specific product) or more experiential (e.g. going online to surf) (Iacobucci 1998). "For an interactive system to be truly useful to the consumer, it must be designed so that either type of search may be executed within the same system" (Iacobucci 1998, p.

8). In this regard, Kraft Foods has designed an interactive kitchen (www.cheezwhiz.com) in which users can engage in either type of participation. In one case, a goal-directed user who visits the kitchen often for last-minute recipe ideas can go immediately to the cookbook laying on the kitchen counter to search for recipes. Other users, regardless of their level of experience with the site, may enjoy spending time in the kitchen doing a variety of things. They can click on the grocery bag marked "What's New" to find out about seasonal recipes. Then they can click on the steaming pot sitting on the stove to find out what the recipe of the day is.

Previous research suggests that mapping can be effective in accomplishing two important marketing goals: persuading site visitors to spend extensive time at a site and getting those visitors to return to a site (Berthon, Pitt, and Watson 1996). By increasing the levels of interactivity (MacLean et al. 1991; Steuer 1992) and flow (Hoffman and Novak 1996) that a site visitor experiences, that visitor may be inclined to stay at the site longer than otherwise. This is because interactivity and flow increase feelings of telepresence, "the mediated perception of an environment" (Steuer 1992, p. 37). Such an engagement holds promise for advertisers, for as Stern (1994, p. 13) notes, "When an actual consumer becomes interactive, s/he goes somewhat farther, not only agreeing to cooperate with the communicator, but also responding to the message in real-time by means of seeking information or making a purchase." Mapping may then increase site and brand equity if it helps satisfy a user's desire to explore. As McAdams (1995, p. 40) notes, "Information users expect to be able to explore and discover, to seek and find. Otherwise, they go back to being information consumers."

In addition, education researchers have described how interactivity transforms static instruction. Interactivity is "a necessary and fundamental mechanism for knowledge acquisition and the development of both cognitive and physical skills" (Barker 1994, p. 1, cf. Gregan-Paxton and John 1997). In his 11-item typology of interactivity, Sims (1997) does not use the word mapping, but describes something like it in discussing two of the highest-level kinds of interactivity: nonimmersive contextual interactivity and immersive virtual interactivity. In training materials that include nonimmersive contextual interactivity, trainees "are transported into a microworld which models their existing work environment, and the tasks they undertake reflect those of the work experience" (Sims 1997, p. 167). And in a world personified by immersive virtual interactivity, the "learner is projected into a complete computer-generated world which responds to

individual movement and actions" (Sims 1997, p. 168). Overall, it has been suggested that an intuitive interface will help engage the user, thus generating interest and participation in a site's content (Parsons, Zeisser, and Waitman 1998).

While natural or real-world mapping is the site designer's goal because it improves navigation and increases levels of interactivity and flow, less natural mapping can have a negative impact on a user's experience. In her discussion of interface design, Laurel (1986, p. 83) writes, "A trait should not be included in the representation unless it either eventuates in some action or sets up an important line of probability." Similarly, if a metaphor is used in a site and that metaphor is misleading, it has failed (Erickson 1990).

These issues underlying consumers' behavior on the Web, represented by the clickstream, require an investigation that captures it in their own terms. We note in particular that some interesting theoretical ideas concerning mapping have been advanced in consumer research by Gregan-Paxton and John (1997), but that there have been no follow-up studies. To engage in this endeavor, we conducted an interpretive, real-time study, based on the written narratives described below. The main perspective is to consider on an *a priori* basis the salient aspects of mapping, hypertext, and schema theories, while accounting for possible emergent aspects of these theories or others that might be discovered. In applying this perspective, we will also be guided by Peterson, Balasubramanian, and Bronnenberg (1997), who proposed that considering how consumers navigate the Internet, how they make decisions regarding moving from page to page, and how these decisions are affected by the nature of a site's products or services are important for our overall understanding of the impact of the Internet.

METHOD

To collect the data for this study, an open-ended protocol using written narratives was applied. This narrative approach has been used previously to draw on the rich, revelatory stories of consumers' experiences (Gould 1997; Helgeson 1994; Rook 1987). It has also been characterized as a solicited narrative (Bogdan and Taylor 1975), as a written essay (Donmoyer and Yennie-Donmoyer 1995) and as phenomenological (Bogdan and Taylor 1975; Helgeson 1994; Rook 1987). It is phenomenological in that it limits preconceptions on the part of the investigator in the response process and instead encourages the consumer to be expressive and revelatory with minimal researcher guidance or bias (Bogdan and Taylor

1975; Hoffman and Novak 1997; Hunter 1983; Thompson, Pollio, and Locander 1994). By affording consumers this time and freedom to follow their own experiences and construct their own narratives, this approach aims to maximize the contribution of raw consumer perception to the development of researcher insights and understanding of phenomena. In particular, the written aspect allows for consumers to take their time in doing this exercise and to account for it without the presence of researchers as bias-inducing distracters.

The major advantage of this methodology, and one that governed our choice to use it in this study, is that it also allows the study participants to engage in a self-directed effort that reflects our original concern with the clickstream as a self-directed trajectory. In this way, the participants choose a web site of their own interest and start their own trajectory in a way that reflects their own concerns, as opposed to one constructed by researchers in a laboratory setting. This real-time and real-space approach also allows us to obtain lived experiences of consumers with respect to the interactive process as emphasized by Heeter (2000). As such, it is a field study taking place in a context and environment of each participant's own choice. In this regard, we also seek to escape the limitations or confinement of limiting participants to a specific site or set of sites, and instead to allow for as many elements influencing web site navigation and trajectories as possible to emerge. Also, by allowing participants the freedom to build their own clickstreams, we are more likely to find opportunities to see how the online and offline realms in which consumers and producers act collide to create the Great Web (Gould and Coyle 1999). The Great Web is the vast space encompassing the totality of behaviors consumers exhibit in moving back and forth through the sphere of bricks and mortar stores and virtual websites (Gould and Coyle 1999). Considering this construct, we may offer insights into the world of clicks and bricks, as well as the narrower domain of website clickstreams.

In the study, the following instructions were given: We are interested in your opinions about using the Internet to search for and/or shop for products and services. In the following exercise, we would like you to go on the Internet and use it to explore any product or services site for a minimum of 15 minutes. Choose just one site. It can be any one you wish to see. We would also like you to write down what you did there. You may write this either during this experience and/or immediately after this experience. We are particularly interested in where you went in this process, i.e., the steps and

clicks you followed and why. Later, you are to write a 2-3 page essay regarding this experience and your feelings about it.

We collected 62 essays from undergraduate business students enrolled in a marketing course at a Northeastern university. Two of these were eliminated because they were suspiciously similar to other essays, leaving us with 60 essays that were analyzed. We gathered the following demographics: age, gender, ethnic group and years living in the U.S. (asked because some study participants were foreign-born). In addition, we captured informants' perceptions of their skills and experience with the Internet by asking them to respond to the following 7-point Likert-type items: (1) My Internet skills are at what level: (1=Not Very Skilled, 7=Very Skilled) and (2) My experience with the Internet is: (1=Not Very Extensive, 7=Very Extensive).

Seven respondents failed to turn in the demographic and Internet skills/experience information. Based on the 53 informants who provided this information, the mean self-reported level of Internet skills was 5.23 and the mean self-reported level of Internet experience was 5.26, indicating a sample well-versed in the ways of new media. Respondents chose a range of sites that reflected their individual interests, as well as the typical product and service interests of many Internet users. For instance, some of the more unique sites visited included www.tradersofbabylon.com, a wedding band jeweler, www.sanrio.com, home of "hello kitty" cartoon characters and merchandise, and www.uol.com.br, a Brazilian news site. Yet, more than 25% of our respondents went to online bookstores and portals, destinations popular with the average Internet user. Taken together, the skills and interests of our sample suggest a group of experienced Internet users.

The analysis generally proceeded by first considering the *a priori* theoretical themes of schema and mapping and further reflecting on any emergent themes or aspects of themes that might result (cf. Belk and Coon 1993). This process also involved a hermeneutic, iterative procedure in which the authors read the consumer texts, interpreted them, referred to relevant literature, conferred with each other, and then continued the process until a reasonably exhaustive rendering of the data was completed.

THEMATIC RESULTS

Based on our analysis of the consumer narratives, four major themes emerged: (1) clickstream expectations; (2) text and hypertext expectations; (3) image and mapping expectations; and (4) analogies and distinctions between online and offline

shopping. A list of the four major themes and their subthemes that emerged from the analysis can be found in Table 1. These findings very much support our original theoretical perspective, while the emergent properties with respect to each enhance and amplify our conclusions.

Table 1. Major Themes and Subthemes

Major Theme	Subthemes
Clickstream Expectations	Site design should convey logic.
	Information should be organized similar to its offline organization.
	Redundancy in design must be functional, not be perceived as haphazard.
	User's expectations about clicking text or hypertext must approximate reality.
Text and Hypertext Expectations	Expectations are determined from online and offline experiences.
	Company names are expected to be incorporated into their URLs.
	Hypertext is taken for granted, until it is missing or not used to enhance the experience.
	Large portions of text are work to read, except when the product is information-intensive (i.e., requires a lot of pre-purchase research).
Text and Hypertext Expectations	Hypertext leading to more information is preferred over large portions of text.
	The appropriate amount of site text is expected.
	Hypertext is still novel, considered more creative than simple text.
	Links to additional information is expected even at commercial sites.
Text and Hypertext Expectations	Links are perceived as additional information.
	Consumers determine quickly how well text and hypertext are incorporated into overall design.

	Consumers determine quickly how well images are incorporated into overall design.
	Consumers are aware that designers use images that recall offline experiences and, thus, facilitate online navigation.
	If images can convey information, they are expected.
Image and Mapping Expectations	The appropriate number of site images is expected. Unnecessary images detract from downloading speed. Carefully considered images can enhance site aesthetics. Web atmospherics are potentially powerful, but currently constrained by technology. Web iconics are plentiful, useful, and may produce positive affect.
Analogies and Distinctions Between Offline and Online Shopping	Consumers use the language of offline shopping to describe online shopping. > Online retailers facilitate the blurring of offline and online shopping experiences through the use of images and text. Sophisticated use of rich media has led consumers to expect the online shopping experience to be more efficient than offline.

I. Clickstream Expectations

As suggested by schema theory, the consumers in our study came with and/or developed sets of expectations with regard to their web shopping experiences. These expectations governed the trajectory they followed through a site and ultimately influenced the degree of satisfaction they felt with it. Often, words like "intuitive," "logic," and "rational" were used to describe what they found or what they wish they had found on a site. Sentiments for finding items in "logical order please," and phrases like "without a surprise," used by a 22-year-old female to describe her feelings of where she was directed after clicking on an image, were also common. We look here at

expectations as the consumers in our sample framed them, namely in terms of fulfilled and unfulfilled expectations.

Fulfilled Expectations. The perception that a site was designed efficiently can result in a rewarding experience for the visitor, and, in turn, the advertiser. Such expectations may be seen to reflect a smooth journey through a trajectory and to facilitate the achievement of the goal the consumer sets. A 24-year-old male wrote of his site visit:

I find that the way I perceive a company's site will have an effect on my decision to buy their product [regardless of whether I liked their product while reading on it]. I found this site to be fairly well organized with some logic behind it. This logic saved me time and directed me towards my desired purchase.

A car shopper, a 27-year-old female, was pleased with the way a car Web site, the Volkswagen Beetle site, was able to provide a virtually real car-shopping experience. She wrote, "There were angled shots of the car from both the interior and exterior, which actually gives you an idea of what the car really looked like and a feel of the size."

Internet marketers trumpet the effectiveness of using a brand name as URL to help consumers quickly find a site (Strauss and Frost 2001). The comments of one of our consumers, a 20-year-old female, suggests that this is more than just a helpful aid, but that this too has become an ingrained expectation:

Most every well-known company has its own web site, so I didn't have to search for the address with a search engine because I assumed that Panasonic has its own web site. I assumed right, because it did.

Unfulfilled Expectations. Unfulfilled expectations tended to impede consumers from following their trajectories toward a goal. Many consumers were unpleasantly surprised when they visited a site that did not organize information the way they normally encountered it offline. A 22-year-old female visited a site and concluded that it needed improvements. For instance, she wrote, "I found the question and answers to be poorly organized in which the answer appeared first then the question appeared second when I scroll down." In addition, she seemed puzzled when she clicked a link, "Opportunities," and found the following message, "There are no opportunities." Another informant, a 29-year-old female, seemed puzzled when she encountered a classification system that was neither what she typically experiences offline, nor like any system she is familiar with. She wrote, "As I further browse this section I cannot

discover the logic behind the arrangement of the books; they are neither in alphabetical order according to title nor author." A 21-year-old female searching for camcorder information seemed disappointed at her experience. She wrote:

There was also a box in which I could write what I was searching for. In this box I wrote "camcorder" and pressed the "seek" button. I was sure that after that I would see what I was looking for. On the next page, titled "camcorder," I had to choose again.

The 27-year-old female, quoted above as pleased with the real aspects of the Volkswagen Beetle site, was less impressed with the information found there and described a headline at the top of the page as "misleading." Finally, the BarnesandNoble.com site left a 29-year-old female shaking her head. She wrote, "You can also browse the subjects and search. I don't know why they have that link to the search engine since there already is one search engine on the main page."

The frustration that results from being, literally, misled or surprised is consequential. One 24-year-old male wrote,

When I clicked on 'interactive tour' I thought I was going to watch a movie, but I was mistaken. It was a simple 'click on this and more info will appear.' I guess I was a bit disappointed.

A 22-year-old female seemed surprised when she clicked "send" to send an e-greeting card to someone but was not able to do so. She wrote, "After I finished the process and clicked 'send,' all of a sudden I was asked to enter my password." Another informant, a 29-year-old female, ran into a designer's careless, but certainly not harmless, oversight:

Before purchasing this book, I decided to examine the two hyperlinks associated with that book. To my astonishment both of them led to almost identical areas. The only difference between the two links is that one of them has an extra option: author's biography. This makes me question why the designer of that site bothered to put both links there since only one would have sufficed.

As another example, one consumer, a 22-year-old male, noted a picture of a "get well" card at the Hallmark site did not enlarge when he clicked on it.

A different type of unfulfilled expectation resulted when users' experiences on one site did not match their expectations based on other sites. Although one 21-year-old female was generally pleased with her visit to Amazon.com, she said the site could be improved:

When I submitted some forms, if I forgot to put data in a required field, they don't tell me exactly where I am wrong. Instead they indicate small star signs. Can't they prompt me with a message telling me what I am missing? I am sure they can do that as I have seen it done on other sites.

II. Text and Hypertext Expectations

The user's clickstream and the trajectory that it represents are not only defined by images, but also clickable words and phrases. Despite its ubiquity and necessity, hypertext is not taken for granted although the word "hypertext" is not generally used by consumers. For example, a 20-year-old female simply described the usefulness of hypertext in the following terms, "The Internet is easy to use, with its concise descriptions of links and product descriptions."

Likewise, many users are savvy to how hypertext is used to guide site visitors. A 21-year-old female analyzed the intentions of a site designer this way:

The site was information heavy, but organized very well. They were smart enough to break up the information so that I did not get overwhelmed by a text-heavy page. Instead, they made me click more to get more. The site was visually bland, but it made for a very fast page. The waiting time was limited. The purpose of the site was to obtain information, and there's nothing more annoying than having to wait for it.

Another 21-year-old female was pleased with the way hypertext links improved navigation of the State of Florida's High Schools site. Describing a framed menu with hyperlinks that remained available to her wherever she traveled in this site, she wrote, "It's a small, insignificant detail, but it was one of the devices that facilitated navigating the site."

Overall, the young consumers in this study appear to have mixed preferences and expectations for the amount of text they think contributes to effective web sites. Some seemed averse to too much text or hypertext in the online shopping experience. As one 26-year-old female wrote, "I had to read the entire paragraph." Another participant, a 27-year-old male, wrote about his site visit, "It would take three to five minutes to read all the titles/topics that the site links to." Still another consumer, a 22-year-old female, complimented the Disney site for providing "short, detailed summaries about what they had to offer, unlike some of the other web sites I have been to where there are long paragraphs describing their materials."

While some prefer economical use of text, others were disappointed when the amount of text was deemed

insufficient. A 31-year-old female visiting a site that sells rings and other jewelry wrote, "I found Metalsmiths quite talented at jewelry making, but the one-line descriptions next to the links turned out to be of little use to me."

The amount of preferred text probably varies by the level of technical information needed to make a smart product purchase. A 23-year-old female searching sites as part of gathering information for a car purchase wrote:

From there if I had liked a car, I clicked on it, which led me to a very brief description of the car. I thought it was too brief to be very useful.

Regardless of the amount of text a consumer prefers, violated expectations are met with harsh criticism, but creative, functional use of hypertext evoked praise. The visitor to the jewelry site discussed above, a 31-year-old female, concluded, "No thumbnails, no description, just plain text on what half-round, comfort-fit and flat style rings are. Boorringg."

Importantly, expectations of the amount and kind of text, regular or hypertext, have taken root quickly. As one 23-year-old female wrote, "The browse-by-subject section is organized like most web browsers, a familiar format to anyone with minimum web experience." A 20-year-old female consumer described her "disappointment" when the Benjamin Moore Paint site did not provide hypertext links to other sites. She wrote, "Links are a nice thing to have, for it supplies one with more information, and isn't that what most are interested in?"

III. Image and Mapping Expectations

As discussed above, mapping is an important *a priori* theory or theme, based on past research. It is expected that mapping can alter a user's clickstream by improving a user's ability to accomplish goals and/or enhances the richness of the user's experience by increasing levels of telepresence and flow. In these respects, although not using such technical terms, the consumers in our study revealed a great deal of evidence concerning their awareness of design strategies, mapping in particular, and the importance of mapping and images.

Design Awareness. As with text and hypertext, several consumers seemed quite aware that smart web designers use images and develop interfaces that take advantage of offline experiences. One wrote:

I recently bought books from the Internet. Shopping on the Internet is very easy. All you need is a credit card and some patience to hunt for bargains. It doesn't require training at all, because most web sites' user interfaces are very intuitive.

A 22-year-old female had this to say about the reasons for the particular design of the site she visited, "It has a colorful background with graphics, which attracts the audience and drives them to continue to explore the site." Another consumer, a 27-year-old male, visiting salon.com wrote this:

The clean-looking site is divided in three columns: the first one is the site map, the second and main column is today's articles, and the third is an ad-based column. The site's main feature is good structure with very interesting and "click-appealing" stories about the most controversial news of the day/week.

More simply, if images can convey information, they are expected to be used. As one 22-year-old female wrote, "Pictures do tell a lot about a place, it gives you an idea about how and where you are going to is like." The frustration of not meeting those expectations is clear in the comments of another car shopper, a 28-year-old male, who wrote:

There wasn't a picture of the car that they were offering. How can a person make a decision of buying or not without seeing what he/she is buying?

Levels of Mapping. The consumer narratives in this study indicate that mapping involves a great deal of complexity that may be seen in terms of levels. The first level of mapping, web atmospherics, describes the use of salient images that are used to create an exciting, stimulating environment where consumers will want to spend their time. This is retail atmospherics as applied to the virtual store. Typically, these images also attempt to comprise or capture all possible navigational choices within one grand image. For example, a 22-year-old female visited the Tabasco web site. When a user types in www.tabasco.com, she is dropped off at "Pepperfest: A livin' breathin' festival on the World Wide Web." This visitor, describing the site as "warm, humorous but friendly" and the navigation as "simple," was able to explore the Festival by clicking on various areas of an image that looked like a New Orleans-style outdoors party on a bayou. For instance, one area of the image shows an accordionist standing in front of a microphone on a makeshift stage. She writes, "I decided to click on the Music Stage thinking there might be live Mexican music." The mapping was effective because her expectations of what would happen if this area were clicked were met.

This site is also an example of how far technology has to advance before the average web site can approximate virtual reality. Ideally, some of the areas of the Festival should not need descriptive words to convey what will happen if they are

clicked. However, currently narrow bandwidth makes it unwise to use audio and video cues in site navigation. Thus, the designers of the Tabasco site saw fit to include words underneath each clickable area in the Festival. Even the most sophisticated applications of web atmospherics often involve using words with the images to communicate more clearly what will happen when an image is clicked.

While it is tempting to incorporate web atmospherics into sites, some consumers may be sensitive to images that stretch the boundaries of the imagination too much. A 21-year-old female consumer scoffed at an unrealistic image that was the main visual in the site she visited. She wrote:

The main visual was a cheesy illustration of a kid sitting on a beach with a laptop. Really? [If] I was at the beach there would not be a laptop next to me, but a six-pack of beer, a radio and some suntan lotion.

While the use of rich media tools has been relatively rare in Internet sites (Cho and Leckenby 1997), and web atmospherics may be considered such a tool, the simpler icons like the shopping cart and the mailbox to contact the content provider are ubiquitous. This second level of mapping we refer to as web iconics. When consumers click on those icons they expect to see certain content and to be able to perform certain activities. At an even broader level than images and simple icons, the expectations and rules of conduct that consumers apply when they manipulate items in the offline world drive their expectations of what they should find and should be able to do in Internet sites.

Most often, it was the presence of small icons that suggested a familiar, offline object and its use that students relied on to help them explore a site or purchase a product. For instance, a 20-year-old female described her use of the shopping bag:

The shopping bag is for when you are looking through the items and you see something that you would like to buy, you just click on that icon and it will add to the bag. At the end the bag would have all the items that you have selected.

The language and comments of the following consumer also suggest how the schema of what an offline shopping bag is used for facilitates online shopping:

When making purchases, a simple click to add to bag informs the system that the customer is buying the product. Clicking *into* (italics added) the shopping bag allows the customer to see all that he is purchasing.

Similar to the shopping bag is the shopping cart. A 29-year-old female described how a site allows her to place an item in her shopping cart or move through an express lane.

I can either place it in the cart or go to an express lane. If I place it in the cart, I can remove it later and I can also use coupons and certificates. The express lane doesn't have the above options because it is meant for a quick checkout."

In addition to the "shopping bag" and the "shopping cart," which were mentioned several times, other icons that were mentioned include the "search catalog" and the "bargain bin." In some of the essays, we noticed that the ability of these familiar cues to facilitate shopping transfers to positive affect. Of her visit to Amazon.com, one 21-year-old female simply wrote, "I like their shopping cart." Regarding buttons, she wrote, "I am a lover of buttons and I always like to use them."

Clearly, many of the participants in this study look for and rely on site cues, often embedded in images like web atmospherics and web iconics that activate their knowledge of how they operate efficiently in the offline world.

Simple mapping with simple movements and text directions requires less downloading time than using rich media tools like audio and video. However, many of the study informants were wary of the downloading time of sites that relied on the heavy use of graphics. Impressed by the efficient design of the site she visited, one 21-year-old female wrote:

The site was visually bland, but it made for a very fast page. The waiting time was limited. The purpose of the site was to obtain information, and there's nothing more annoying than having to wait for it.

Similarly, many study participants perceived that arbitrary use or overuse of images detracts from a site visit. As one 20-year-old female wrote:

When I am on the Net, I am looking for a substantial amount of information from comprehensive sites, not a quick little tease. I have found this to be the problem with most sites that I have visited; the superficiality is astounding. Neatness and flow are very important to me, for I detest flowery, muddled sites where one wastes a lot of time searching around. It is nice when information can be obtained quickly so one does not have to stare at a computer screen for too long.

While the above consumers seemed to prefer few, if any, images, another, a 20-year-old female, was impressed by the site she visited because its graphics were aesthetically pleasant:

The graphics were clean, done in nice, inoffensive colors and spaced out enough so they didn't look like a horrid collage made by a preschooler. This is the main reason why the site seemed easy to navigate through. Excess is always the worst offense in advertising or webpages...It was not busy [excess of words, pictures, special effects, colors, etc.], It was easy to move through and provided a decent amount of information.

IV. Analogies and Distinctions between Online and Offline Shopping

The consequences of sophisticated use of images, text, and hypertext are many. Consumers blurred, seemingly easily, the distinction between Internet shopping and offline shopping while often analogizing or using offline metaphors to describe their online shopping. This was often observed in the language that they used to describe their experiences. One 31-year-old female bemoaned spending "two days of trudging through what were the most unrelated pages" before she finally found a wedding band for her fiancé. A 20-year-old female came up with the following metaphor: "While on the Internet or World Wide Web, I decided to 'window' shop for video cameras because I plan to buy one in the near future." And a 23-year-old female, viewing a page in Yahoo Classifieds, wrote, "I strolled down and saw options to narrow down my search." A 23-year-old female described the top of a site she visited as the "entrance" to the site. Regarding timing, a 21-year-old female, wrote, "When you are done with your shopping, you can checkout at any time." Of course, most major e-commerce sites have incorporated into their sites many of the phrases, like "shopping bag," "express lane" and "checkout," that our participants mentioned often and that we are likely to encounter in our offline shopping experiences.

Designing a site to resemble its offline counterpart was sometimes the reason for this blurring of experiences. Regarding the Hallmark web site, a 22-year-old female wrote,

Like any Hallmark store the web site has different departments where the consumer can find the particular item that they are looking for. The site, also like the Hallmark Store, has different categories of cards that the consumer can buy any day of the year, which makes it convenient for the consumer. The consumer can also see the card that they will purchase.

This consumer's experience illustrates one way in which a web site improves a user's visit: making navigation easier. The Hallmark web site, by mirroring an offline Hallmark store, triggers our schema of what we find in and how we proceed through Hallmark stores.

However, although mapping may enhance the online shopping experience in the ways we have discussed, for many, there is still no substitute for visiting brick-and-mortar stores for the reasons one would expect. As one 22-year-old female wrote:

I like seeing what I'm buying and feeling if possible. I might walk around the store with it and change my mind at the last minute. Online you can't do that...I feel that consumers should buy the rare products online and regular products in stores.

And although consumers may use traditional shopping "talk" to describe online experiences, they expect the online shopping experience to be more efficient than offline. Specifically, consumers expect that sites will help them be more efficient in their shopping by prompting them to apply their offline knowledge to a site, and they expect to benefit from the time-savings that result. As one 22-year-old male wrote,

The operation of buying on-line shouldn't take anyone long. With Lands' End it doesn't matter whether buyers are skilled in using the Internet or inexperienced. The option of buying on-line is really easy. Just add products to your 'Shopping Basket' as you browse Lands' End. In the end you make a final checkout. In other words you just click on the 'Send it in' button and the order will be submitted to the store...At any point, you can check what you've chosen, including a subtotal of the cost (by clicking on the Shopping Basket icon). Lands' End is assuring their customers that it is secure to buy on-line and they already have taken thousands of orders over the Internet. Lands' End is also proving that online ordering system is simple and straightforward to use, and a real time-saver.

DISCUSSION

Summary and Limitations

This study has investigated the theoretical perspectives of hypertext, schema, and mapping with respect to the clickstream. It also considered, in relation to these theories, the questions of Peterson, Balasubramanian, and Bronnenberg (1997) concerning how consumers navigate the Internet, make decisions about going from page to page, and how these decisions interact with the type of site. The results of this research reveal that consumers have developed very specific and sophisticated notions of what they expect to encounter as they interact with various Web sites and navigate the Internet, and that this is a powerful factor in how clickstreams form. Perhaps, most importantly, it was found that when marketers

and advertisers violate these expectations, they may severely hurt their ability to keep consumers from moving on to some competitor whose interface design is more transparent and offers a more pleasant online experience. In other words, this research suggests that the use of effective mapping, text, and hypertext may be ways to extend site visits, generate return visits, encourage site registration, and induce other desirable behaviors. Creating a site that leads to a good navigational experience is an important way to contribute to building a brand. The following reaction, from a 24-year-old male, pleased with his visit to the Dell web site, represents the potential of a well-designed site:

Since Dell left me a good impression then subconsciously [by now it has become consciously] I will probably buy a notebook from Dell. I will get into other PC's sites but I will quietly look for their flaws, for reasons to choose my beautiful Dell notebook.

Mapping is a variegated process that involves various levels of complexity. The goal of many designers is to make it easy to use and navigate a site. It is to have visitors say, as one 25-year-old male wrote, "Their home page was very to the point and simple to navigate," or as a 22-year-old male wrote, "The web site is very friendly and people can find easily what they came to look for." Thus, a mapping strategy, as we have demonstrated, can enhance a visit by making navigation easier.

A second way, which is less frequently employed, perhaps because it is more difficult to execute, is to create a place where a person can immerse or lose oneself, or put another way, experience telepresence or the vividness of a site. Here the goal is to have a visitor, upon leaving a site, say, as one 20-year-old female did, "After browsing for 45 minutes and feeling as if I was immersed in another world, I had to stop browsing and head home." Just as the use of games have been a popular way for site designers to attract first-time and return visitors, mapping that is used to create a fantastic place may be effective too.

One limitation of this study is its use of students. However, at the same time, students are especially appropriate for Internet research since they comprise a major and relatively homogeneous target market for e-advertisers and marketers. Indeed, such a sample of 20-somethings, like the ones we used here, tends to include consumers whose Internet use is remarkably sophisticated. Moreover, while people who grew up with television most likely never put together a television show, many of the young consumers in our study are on the

Internet constantly, purchase numerous products over the Internet, and some even maintain and design their own web sites. In these respects, research with consumers from other age groups, such as cyberseniors (McMellon, Schiffman, and Sherman 1997) might produce different results, although we expect that many of the expectations and mapping issues we identified here will be relevant, albeit with different emphases, across most marketing segments. Other limitations relate to the choice of method since other methodologies might be applied and other settings considered, such as those in a laboratory setting as opposed to a field setting, might reveal other information. However, while we fully expect other methods might reveal other aspects impacting the clickstream, we tend to feel these would be complementary to our approach.

Implications

The foregoing results may be considered in terms of their clickstream implications for both current e-commerce activity and for the future development of Internet marketing and advertising on the web. As with new product design, in which consumers increasingly provide feedback and insight throughout the product development process, and in market research, where questionnaires are rigorously pre-tested, it is suggested that Web site designers incorporate consumer feedback and testing throughout the development process. In particular, the results of this study strongly suggest that web designers need to consider consumers' goals and expectations in their design so they may better predict and understand clickstream generation by their target audiences. These may be broken up into two categories: (1) expectations of quick in-and-out navigation such as for shopping and (2) expectations regarding sticky sites, which involve a great deal of complex activity such as virtual worlds and gaming where immersion is desired. Indeed, we see here two potentially competing consumer tendencies or traits, need for simplicity and need for complexity.

If it is determined that most visitors only want basic information, graphics-heavy design should be avoided. From a practical standpoint, of all the rich media or broadband tools available, including audio, video and animation, mapping is one of the most viable options for marketers and advertisers who want to extend and enhance the navigational experience that their site offers but who are worried about prohibitive download times. Unlike the degree of bandwidth demanded by many design tools, mapping is comparatively economical. Thus, where consumers' expectations are that there should be

easy, quick use of a site, seamless navigation is a *sine qua non*. For instance, if site visitors rely heavily on the site to complete transactions, then mapping strategies should be developed and improved on to make purchases go through as smoothly as possible. However, where the goal of most site visitors is to visit a new virtual world, expectations will be different. Thus, if a more important goal is to design a virtually real place for users, images should be developed that help conjure up a new world or place. The fact that consumers in our study are very aware of how design can facilitate or interfere with their goal-directed behavior makes it even more crucial that designers take goals into account.

However, the two competing desires for simplicity and complexity are not completely separate. Indeed, they may merge as Internet and broadband technology advances. For instance, some consumers realize the potential that online shopping holds as it advances technologically. A 22-year-old male wrote, "I believe that once web sites that want viewers to purchase their products online introduce virtual reality then the number of people who shop online will increase." This research suggests that an understanding of mapping and its proper application can be very helpful in creating an effective virtual environment. Mapping is a strategic tool that marketers can use to persuade consumers to go to and use a site. In the future, further thought will have to be given as to how much the web experience will resemble other media experiences, such as the television, and how much it will develop or take on its own characteristics.

With respect to mapping and its analogical and comparative functions, the results of this study may be said to exemplify and support the ideas of analogical transfer theorized by Gregan-Paxton and John (1997). Clearly, the transfer of schema content from the more familiar offline realm to the online one influences online consumers' behaviors and, thus, clickstreams. A major implication of this appears to be that, for the foreseeable future, consumers' views of their online shopping experiences are informed by those offline. How this will evolve as consumers both shop and spend more time online or, in the case of younger consumers, have many of their formative shopping experiences online, is unknown at this time, but at least we can identify connections between these sets of experiences and use them as benchmark descriptors for characterizing and investigating clickstreams.

Finally, the effective mapping strategies explored and articulated in this study have implications for product and website branding. Regarding Internet marketing, Wurster and

Evans (1999) write that it is generally more effective to create a brand through a rich product experience than relying on product attribute descriptions. This is especially the case "wherever consumers welcome evangelism, enthusiasm, and a strong connotative context" (Wurster and Evans, p. 93). The findings of this study provide support for the assertion that web atmospherics may be a way to create such context and to add depth to the experiential aspects of a brand. In addition to enhancing the product or service by creating a rich context, mapping has the potential, as we have seen, to make potentially troublesome online tasks, whether making a purchase, registering at a site or requesting a catalog, simpler. However, usability experts caution that there may be a critical tradeoff between added media richness and unnecessary complications (see Nielsen columns located at www.useit.com/alertbox/). In other words, if a site designer wishes to use mapping to improve a user's ability to request a catalog, he or she must be sensitive to inadvertently increasing complexity. Clearly, testing new sites and site revisions are crucial to marketing and advertising effectiveness on the Internet.

FUTURE RESEARCH

Very little empirical research exists on the effects of mapping, text, and hypertext in commercial web sites. While this exploratory study sheds some light on these concepts, other methods of inquiry may further our understanding. Possible techniques could include cognitive response studies and experiments. Cognitive response studies in which consumers are followed, their comments recorded, and their reactions videotaped as they traverse an online shopping site in real-time would be useful in investigating their perceptions and use of mapping tools, text and hypertext, and relating them directly to clickstreams. Further experimental studies, perhaps in conjunction with cognitive response, could help determine the possible clickstream trajectories that consumers follow in response to specific mapping, text, and hypertext stimuli. New tracking software programs could also be helpful as a way of monitoring exactly where people go in traversing a site. While such software would not have uncovered most of the insights we discuss in this paper, it should certainly be a useful tool for experimental researchers wanting to track how their manipulations affect user-browsing patterns. It could also be used in correlating site navigation behavior with cognitive responses over time.

One important area that we have already briefly discussed is how consumers' online goals may interact with the mapping

strategy that is employed. This requires matching web site type with navigation type and investigating mapping in these terms. In this regard, for instance, researchers might consider how the two major types of poor mapping strategies, (1) arbitrary mapping and (2) misleading mapping, affect users. Arbitrary mapping occurs where a user is faced with an image and can develop no expectation based on the information it provides. Misleading mapping results when a user clicks on something expecting to find one thing but instead finds another. It may be that the effects of these two poor mapping strategies vary. The little research that has been done on navigation tools has found surprising, sometimes unwanted, effects of popular design elements like hyperlinks and site maps (May, Sundar, and Williams 1997). Despite a web designer's best interest, what might be expected to be the most effective approach may not always be (May, Sundar, and Williams 1997).

There are other aspects of clickstream generation that are not explored here, but provide important opportunities for future research. For instance, a person's demographic profile is likely to be an important factor in clickstream generation. Similarly, whether a person is a first-time or return visitor to a web site may be important. In this regard, longitudinal studies would be appropriate for better understanding.

Finally, as the Internet becomes a larger part of consumer culture, consumers will develop more of their clickstream expectations from their online shopping experiences as opposed to their offline ones. Already we are seeing that consumers expect their new online shopping experience to be at least as good as their best past online shopping experiences. What are some of those expectations that develop through online consumer experiences? How are they similar to and different from the expectations that consumers bring from their offline experiences? Do these two types of expectations affect consumer attitudes and behaviors differently?

CONCLUSION

The Internet shopping experience is informed by the constantly evolving aspects of schema, hypertext, and mapping in the clickstream trajectory. These aspects may be viewed from two perspectives, i.e., consumer and marketer. From the consumer side, they involve the expectations, understanding, and experience consumers bring to each Internet shopping "trip." On the marketing side, they involve design mix issues in which more than the elements of the traditional marketing mix of product, place, price, and promotion must be addressed. In this regard, site atmospherics in the form of

hypertext, graphics, and streaming media that reflect those aforementioned aspects of consumer Internet shopping experiences need to be given top priority. In one sense, we are suggesting that marketers should engage in their own form of mapping between consumers' understandings of the Internet shopping experience and their own Web designs. In doing so, one major element both online and offline (or clicks-and-bricks) retailers and marketers need to juggle is a balance between the apparently novel aspects of the Internet and the more embedded aspects of tacit understandings of the shopping experience informed by conventional store shopping. Marketing and communicating online, we find, quite strongly comprises a mix of both the old and new paradigms.

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