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The Website Schema

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Abstract

The *website schema* is conceptualized as the consumer's set of beliefs about information locations, and routes to those locations, on a website. A meta-analysis of three studies, one of them with a student sample and two with consumer samples, provides evidence that congruence between a consumer's website schema and the actual structure of a particular site is associated with the site being rated easier to navigate, a more favorable attitude toward brands advertised on the site, and higher quality brand decisions. These studies provide evidence of the importance of the website schema for understanding consumer response to websites.

Introduction

Websites are an increasingly important component of most companies' integrated marketing communications (IMC) strategies. It has become a fact of doing business that all major companies and organizations, in addition to solely on-line companies, have to have websites (Salam, Rao, and Pegels 1998). For example, General Motors spent $47.9 million on online advertising in 2000, the bulk of it directed at its website (Saunders 2001). Mass media lead-in ads (Roehm and Roehm 2001), search engines (Bradlow and Schmittlein 2000), and the use of brands as Web addresses (Murphy, Raffa, and Mizerski 2003) will almost always lead consumers to major brands' sites. In the United States, the number of consumers who are on-line is still increasing, with the top three U.S. web properties each attracting more than 100 million visitors (comScore Networks 2002). However, although a number of practitioners and consultants offer practical advice on the optimization of website communication to consumers, very little of this advice is based on experimental evidence. This paper reports a series of studies that document how consumer learning of the structure and content of the website can affect consumer decision-making. Some consumers are better than others at finding relevant information from any particular website. Our thesis is that these consumers have acquired a *website schema* that is more useful because it is more similar to (more congruent with) the layout of that site.

In this article, we first define and argue for the necessity of the website schema concept, which was first proposed by Rossiter and Bellman (1999). We then use meta-analysis to summarize the results of three studies examining the effect of having a congruent website schema on a number of dependent variables that are of interest to brand managers. In the last section of the paper, we discuss theoretical and managerial implications of the website schema concept.

The Website Schem

When consumers view advertising in traditional media, they have a good idea of where to find the information that interests them in the ad, because the location of content in an ad tends to conform to a predictable structure (see Rossiter and Percy 1997, p. 279-319). For example, someone intrigued by a television commercial knows to pay attention to the final frames of the ad, because that is where the name of the brand is usually communicated. Consumers know where to find the coupon in a direct response print ad (the bottom corner), and where to find detailed information about attribute levels in a multi-page brochure (in a specifications table towards the back). In other words, consumers have well-developed *schemas* for finding useful information within advertisements in each of the traditional media.

Schemas are cognitive structures that guide information processing (Fiske and Linville 1980; Schank and Abelson 1977). Schemas "organize perception by organizing expectations" (Speck, Schumann, and Thompson 1988, p. 70). Consumers have schemas for products and for marketing tactics (e.g., advertising). These "schemer schemas" may include "message appeals" (or content) schemas and "message format" (or structure) schemas (Wright 1986). Generally, brand attributes that are moderately incongruent with a product schema attract greater attention, more extensive processing, and are more favorably evaluated (Campbell and Goodstein 2001; Goodstein 1993; Meyers-Levy and Tybout 1989; Ozanne, Brucks, and Grewal 1992; Peracchio and Tybout 1996; Stayman, Alden, and Smith 1992; Sujan and Bettman 1989). Similarly, for any product category, consumers have an exemplar ad or typical ad execution schema for each medium (Stoltman 1991), and atypical ads are viewed longer, elicit more thoughts, and generate the recall of more ad claims (Goodstein 1993; Sengupta and Gorn 2002), provided that the unusual execution does not distract from the message content (Alden, Mukherjee, and Hoyer 2000; Areni and Cox 1994; McDaniel 1999; Russell 2002).

On the web, however, the situation could be very different. On websites, information can be laid out idiosyncratically over multiple pages. The sheer number of pages compounds the problem of locating information when consumers have to physically find it for themselves. Just as they develop schemas for ads in each of the other media, it seems likely that, over time, on-line consumers will develop a generalized website schema that "averages" the information-location schemes adopted by the websites they have visited in the past. However, whereas moderately atypical executions in traditional media need not impair information processing and may even enhance it, a website that does not match general expectations may significantly reduce the ability to navigate the site and search for information effectively (Coyle and Gould 2002; Hoffman and Novak 1996). Such unusable sites are more likely to be considered "poorly designed" and this lack of usability will "irritate most users, but particularly those who are highly goal-directed" (Rodgers and Thorson 2000).

Others have noted the effect of practice (repeat visits) on the efficiency with which visitors use websites (Bucklin and Sismeiro 2003; Johnson, Bellman, and Lohse 2003), and others have found in experiments that training on one interface can be usefully transferred to improve performance with another interface (Murray and Häubl 2003). We suggest that one of the things that is being learned during this practice, and transferred across interfaces, is a schema for locating and using information.

Our main interest is in the effects of heterogeneity in website schemas, both across individuals and across websites. The content of website schemas should vary with the experience of individual consumers. If websites were all alike, a generalized website schema, acquired after a minimum period of experience, would be useful for any new site encountered. However, because websites "differ greatly from each other" (Q. Chen, Clifford, and Wells 2002, p. 43), a schema that was useful for previously visited sites may impair information search on a new site. In these situations, consumers may rely on the limited information they are able to find, and make worse decisions based on inaccurate perceptions (Ariely 2000; Häubl and Trifts 2000; Lynch and Ariely 2000).

We therefore postulate the existence of an important hypothetical construct unique to explaining the effectiveness of websites, called the *website schema*. A website schema is defined as *the consumer's set of beliefs about information locations, and routes to those locations, for a specific website*. In the next section we develop a series of hypotheses about the effects of having a website schema that is congruent with a specific website.

Hypotheses

People often give positive evaluations of the navigability of websites that, by objective criteria, they are unable to use (Spool et al. 1997). However, we expect that website visitors should find it easier to navigate a site on which information is laid out according to their expectations:

H1: The more congruent an individual's website schema is to the structure of a particular website, the easier it is for them to navigate that website.

Attitude toward the site (Bruner and Kumar 2000; Q. Chen and Wells 1999) has been a popular variable in website research, being a natural extension of attitude toward the ad in conventional media. The organization dimension of Q. Chen and Well's (1999) attitude toward the site scale, measured by items such as "I feel comfortable navigating in this site," correlates positively with overall attitude to the site, and negatively with emotional adjectives such as "messy," "confusing," and "irritating" (Q. Chen, Clifford, and Wells 2002). Unfavorable emotions, such as "feeling lost," are also associated with high website complexity (Stevenson, Bruner, and Kumar 2000; Bruner and Kumar 2000) and with difficulty using a site and recalling how it was structured (Edwards and Hardman 1989). We suggest that a favorable overall attitude toward a website is a consequence of having a website schema that is congruent with that site:

H2: Individuals with a more congruent website schema will have a more favorable attitude toward the site (A_{ST}).

Attitude toward the website, like attitude toward the ad, has a direct relationship with attitude toward the brand (Brown and Stayman 1992; Bruner and Kumar 2000; Stevenson, Bruner, and Kumar 2000). A positive experience when using the site should transfer to a positive attitude toward a new brand mentioned or advertised on the site:

H3: Individuals with a more congruent website schema will have a more favorable attitude toward the (new) brand (A_b).

As well as this direct effect of positive affect transfer, attitude toward the website, like attitude toward the ad, may also have an indirect effect on attitude toward the brand by generating stronger, favorable, brand-related cognitions (Brown and Stayman 1992; Lutz, MacKenzie, and Belch 1983; MacKenzie, Lutz, and Belch 1986). A visitor with a website schema that is incongruent with a particular site will probably have difficulty finding information about a brand mentioned on the site and therefore weaker brand beliefs (if information search strengthens beliefs):

H4: An individual with a more congruent website schema will have stronger, favorable brand attribute beliefs.

Similarly, a more effective information search, resulting from website schema congruency, should be associated not only with stronger brand beliefs but less uncertainty about those beliefs (Hagerty and Aaker 1984; Moorthy, Ratchford, and Talukdar 1997; Simonson, Huber, and Payne 1988), that is, greater confidence in brand attribute beliefs (Moran 1985):

H5: Individuals with more congruent website schemas will have more confidence in their brand attribute beliefs.

As well as stronger, favorable brand beliefs that are more confidently held, more effective information search resulting from website schema congruency should also improve factual learning about the advertised product or service, namely, brand knowledge (e.g., Keller 1991):

H6: Individuals with more congruent website schemas will have more accurate beliefs about the brand's attribute levels.

A consequence of having more accurate beliefs about a brand should be that consumers with more congruent website schemas make better quality brand choices. Since tastes, or evaluation weights on attributes, differ, decision quality has to be measured on an individual basis (Jacoby, Speller, and Kohn 1974). Consumers with more congruent website schemas should make brand choices that more closely reflect their maximum personal utility (Payne, Bettman, and Johnson 1993):

H7: Individuals with more congruent website schemas will make higher quality brand decisions.

Our final two hypotheses are concerned with objective indicators of website schema congruency. Previous research has found that

more knowledge about how to find information is associated with greater efficiency, in terms of number of pages viewed or task duration (Brucks 1985; C. Chen and Rada 1996; Johnson, Bellman, and Lohse 2003; Raman and Leckenby 1998; Symons and Pressley 1993). We expect, therefore, to find support for the following two hypotheses:

H8: An individual with a more congruent website schema will view fewer pages during a visit. **H9**: Visits made by individuals with more congruent website schemas will be shorter in duration.

We tested these hypotheses using realistic websites for which we made subtle manipulations similar to the differences between actual websites, in field situations, including Internet browsing in participants' homes, rather than controlled laboratory experiments. This severely limited our ability to find significant effects in any single study. However, we combined the results across three studies, using meta-analysis. The chances of randomly finding effects in the predicted direction across three studies are vanishingly small. The next section describes these studies and how we measured website schema congruency in each study.

Descriptions of the Three Studies

Study 1

Study 1 was a pilot test for the other two studies. In this study, website schema congruency was not manipulated; instead, we assumed that congruency for the site would naturally vary across visitors, depending on both prior experience and current learning of the structure of the site during the first visit. Therefore, w*ebsite schema congruency* was measured using a proxy measure: search efficiency for an information-search task following completion of the first visit. Participants were asked to review a new brand website. After freely visiting this site for as long as they thought necessary, participants were given the task of locating three specific pages from separate branches of the site's structure. The inverse of the total number of pages viewed during this search task was used as the measure of search efficiency (C. Chen and Rada 1996). The site, specially constructed for the study, was for a digital camera, the brand name of which was invented (new). The website, a questionnaire that measured reactions to the site, and software that tracked pages seen and time per page, were stored on a 1.4MB floppy disk. Viewing conditions were not controlled: students could view the site at home or at the university, using any computer. Only responses to the first visit to the site were recorded on the disk, which students handed back on completion of the task. This study used a sample of 33 students from a large university in Sydney, Australia. Participants ranged in age from 25 to 34 years. Six (18%) were female.

Study 2

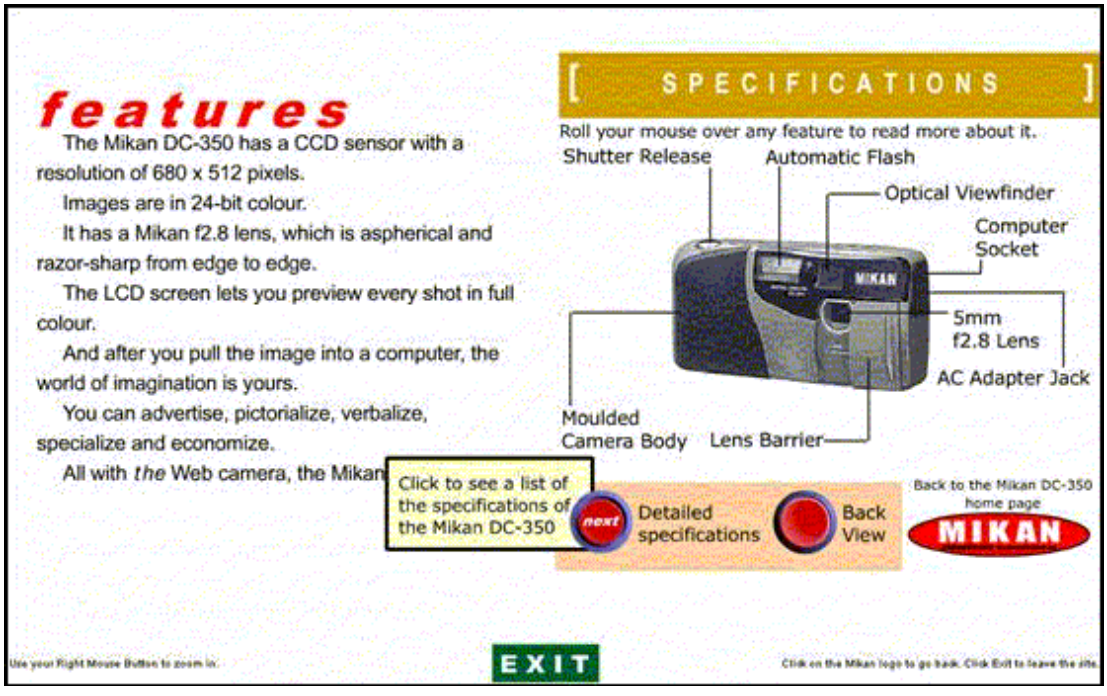
In study 2, we manipulated *website schema congruency* by training participants to expect a certain site structure and then showing a target site that either reversed or repeated the structure of the site visited in the training phase. Positive transfer, or practice, should result in a more congruent schema for participants in the repeat condition. The experiment was a between-subjects, full factorial 2 * 2 design. The two factors were *training*, congruent vs. incongruent, and website *format*, which consisted of brand benefits (advertising copy) displayed on the first page, followed by a page of brand attributes (a list of technical specifications), vs. these same pages in reverse order. Product category expertise, known to affect information search (Moorthy, Ratchford, and Talukdar 1997), was included as a covariate. In this study, participants were asked to choose a PDA (personal digital assistant), from among six available on a shopping site, once during the training phase and once again during the test phase. Disguised brand names (A, B, C, etc.) were used and brand order was randomized across participants. Again, viewing conditions were not controlled, as the site was delivered over the World Wide Web. The participants in study 2 were 310 members of a web survey panel associated with a Northeastern U.S. university. The mean age of the sample was 36.8 years, 72.1% were female, and only 9.9% were full-time students.

Study 3

In study 3, *website schema congruency* was manipulated by providing multiple in-site navigation aids to one set of participants and no navigation aid to the other set. We expected that participants with an incongruent website schema would have their schema rapidly modified to be more congruent with the current site if navigation aid was provided. This would effectively raise the

average level of website schema congruency for the participants in the navigation aid cell. Figure 1 illustrates the navigation aids provided, which comprised interactive menus and pop-up information about the other pages accessed by the links available on a page. Experimental instructions were simple: participants were asked to review a new website that utilized Macromedia Flash animation. As in Study 2, product category expertise was controlled for as a covariate. Study 3 was based on a different set of 73 consumers from the same panel used in Study 2. The average age of the sample was 34 years, and 51% of participants were female.

Figure 1.
A page from a site providing navigation aid
(reducing website schema incongruency)-Study 3



NOTE.-Rolling a mouse over any button would reveal a pop-up window (such as the one illustrated here) describing the target page in more detail.

Measures

Table 1 lists the dependent variables measured in the three studies, along with means and standard deviations, and, where applicable, reliability coefficients (Cronbach's a). The order of measurement was as described below, and was fixed rather than random to avoid contamination of measures. For example, overall brand attitude was assessed before measuring beliefs about individual brand attributes, because the reverse order could alter brand attitude (Rossiter and Percy 1997).

Category expertise, a covariate in Studies 2 and 3, measured before visiting the site, was the sum of four 7-point items (range 0-28): self-rated experience, absolute knowledge, relative knowledge, and understanding of the important attributes in the product category (Mitchell and Dacin 1996: coefficient a was .85 for Study 2, and .87 for Study 3, although internal consistency is not really relevant for a composite index such as this one, see Rossiter 2002).

Visit pages and visit time were recorded in log files during the visit to the site.

Ease of navigation was measured in Studies 2 and 3, immediately after exiting the site, on a 7-point scale ranging from -3 ("very difficult") to +3 ("very easy").

Attitude toward the site (A_{ST}) was the mean of four 7-point (-3 to +3) items: bad/good, dislike/like, irritating/enjoyable, boring/interesting, and, additionally for Studies 2 and 3, ease of navigation, and long vs. short page download time.

Attitude toward the brand (A_b), for the only brand shown in Studies 1 and 3, and the individual's final brand choice in Study 2,

was measured by the mean of three 7-point (-3 to +3) items: unfavorable/favorable, low/high quality, and poor/good quality.

Brand attribute beliefs (b_{bi}) were measured using 7-point (1 to 7) scales, one for each product category attribute (six for digital cameras, and eight for PDAs). In Studies 1 and 3, each participant's stated evaluative weights (e_i) for these attributes were also measured, on a 7-point (-3 to +3) scale. In Study 2, each attribute was deemed to have an evaluative weight of +1, with the exception of price, which was given a weight of -1. The overall brand attribute belief *strength* score was the sum, across attributes, of the evaluatively weighted beliefs ( ).

Confidence in brand attribute beliefs (0% to 100%) was assessed immediately after each brand attribute belief was rated (Moran 1985). The overall confidence measure was the average confidence rating across attributes (arcsine transformed to normalize its distribution).

Learning, that is to say, *accuracy* of brand attribute beliefs, was measured in Studies 1 and 3 by 10 randomly-ordered true-false questions, half of which were true (theoretical range from -10 to +10). For Study 2, learning was assessed by the mean squared error between actual and perceived attribute levels for the chosen brand (reverse scored).

Decision quality was assessed in Study 2 by the ratio of the personal utility of the chosen brand relative to the highest-utility brand available for the person, expressed as a percentage (theoretical range 0% to 100%; again arcsine transformed). Personal utilities were imputed from the zero-order correlation of the eight attributes with each individual's rank ordering of the brands shown in the training phase. In Studies 1 and 3, a higher quality decision was deemed to be one based on information about the actual price of the advertised brand. Decision quality equaled 1 if a participant viewed the page on the site displaying price information, 0 otherwise.

Analysis

The *F*-statistics and c^2-statistics from Studies 2 and 3 were converted to zero-order correlations using the following formula (Hunter and Schmidt 1990):

$$r = \sqrt{\frac{F}{F + df(e)}}, \text{ and } \quad r = \sqrt{\frac{\chi^2}{n}}$$

The zero-order correlations from Studies 2 and 3 were combined with the zero-order correlations from Study 1, using the program META (Kenny 1999) to calculate the sample-weighted mean correlations and variances across the three studies, the average *Z*-statistics, and the significance level of each overall mean correlation. Each study's correlation was weighted by the square root of the study's sample size.

Results

Table 1 shows the means, standard deviations, and zero-order correlation of website schema congruity with each dependent variable. The table also lists the mean correlation across studies. Seven of the nine mean correlations were in the predicted direction, but only three were significant at $p<.05$, 1-tailed. The significant relationships were as follows. First, visitors found it easier to navigate a website if it was more congruent with their website schema, consistent with H1. Second, website schema congruity resulted in a more favorable attitude toward the brand (A_b), confirming H3. Third, visitors with a more congruent website schema made better quality decisions, as predicted by H7. When these three significant correlations were converted to Cohen's *d* statistics, the average *d* was .24 and, according to Cohen (1988), a *d* of .2 is a small effect. The effect of website schema congruity on website visit efficiency, in terms of number of pages visited and visit duration, was not significantly different from zero.

Table 1. Meta-analysis of 3 studies of the effects of website schema incongruency on several variables

Variables	*Study*	*Mean (SD)*	*Reliability*	*df*	*r*	$\bar{r}$
Navigation Ease	2	1.64 (1.39)		305	0.06	0.11**
(–3 to +3)	3	0.96 (1.64)		61	0.23***	
Attitude toward the	1	0.77 (1.3)	0.86	31	0.06	0.08
Site (A_{ST})	2	1.47 (1.01)	0.87	305	0.00	
(–3 to +3)	3	0.83 (1.26)	0.86	61	0.26*	
Attitude toward the	1	0.90 (0.86)	0.74	31	0.14	0.12**
Brand (A_b)	2	1.85 (0.71)	0.71	305	0.06	
(–3 to +3)	3	1.84 (0.78)	0.44	61	0.23**	
Brand Belief Strength	1	36.73 (20.85)		31	–0.02	0.09*
(b_i = 1 to 7; 6 attributes	2	18.29 (3.92)		305	0.03	
e_i = –3 to +3)[a]	3	38.32 (23.64)		61	0.29**	
Confidence in Brand Beliefs	1	59% (16%)	0.82	31	0.27	0.07*
(0% to 100%)[b]	2	65% (19%)	0.87	305	0.08*	
	3	63% (27%)	0.96	61	–0.09	
Learning of Brand Attributes	1	1.79 (1.45)	0.81	31	0.10	0.07*
(–10 to +10)[b]	2	23.01 (4.28)		305	0.09**	
	3	–.77 (1.16)		61	–0.01	
Decision Quality	1	.45 (.51)		31	0.30**	0.13**
(Saw price = 1, 0 otherwise)[c]	2	59% (22%)		310	0.10**	
	3	.08 (.28)		1	0.06	
Visit Pages	1	22.33 (19.26)		31	0.26*	0.02
	2	15.56 (5.38)		301	–0.01	
	3	11.17 (17.85)		61	–0.07	
Visit Time (seconds)	1	374.28 (282.79)		31	0.24*	0.02
	2	97.85 (53.11)		298	–0.03	
	3	550.14 (350.51)		61	–0.04	

NOTES: r = zero-order correlation for a particular study, $\bar{r}$ = average correlation across studies.

a. For Study 2, e_i = +1 for all 8 attributes except price = -1.

b. Arcsine transformed.

c. For Study 2, learning = mean squared error between perceived and actual brand attribute levels (reverse coded so that higher scores = more accurate learning).

d. For Study 2, decision quality = individual's utility for brand chosen/utility of the best brand for that individual (expressed as a percentage, theoretical range 0% to 100%, arcsine transformed).

*** = p<.01 (1-tailed)

** = p<.05 (1-tailed)

* = p<.10 (1-tailed)

Table 2 lists the sample-weighted correlations *among* the dependent variables, and their significance (p<.05, 2-tailed, as the directions of these correlations were not hypothesized *a priori*), across the three studies. There were significant correlations between ease of navigation and attitude toward the site (A_{ST}), between A_{ST} and A_b, brand belief strength, and confidence in brand beliefs, and between confidence and A_b, and between number of pages visited and decision quality and time on site. Most other correlations, while not significant, were in the direction that would be expected. For example, decision quality is positively, though not significantly, correlated with strength of brand beliefs, confidence in brand beliefs, accuracy of learning the brand's

attributes, and time spent making the decision (time on site). Although no model relating these variables was hypothesized, a plausible model is illustrated in Figure 2, which shows the significant"paths" in solid lines and the directional but nonsignificant paths in dashed lines.

Table 2. Sample-weighted correlations among dependent variables across 3 studies.

Variables	1	2	3	4	5	6	7	8	9
1. Navigation Ease	—								
2. Attitude toward the Site (A_{ST})	.69***	—							
3. Attitude toward the Brand (A_b)	.25	.36**	—						
4. Brand Belief Strength	.14	.34**	.28	—					
5. Confidence in Brand Beliefs	.20	.31*	.35**	.18	—				
6. Learning of Brand Attributes	−.02	−.01	.10	−.20	.21	—			
7. Decision Quality	.10	.07	.16	.14	.24	.17	—		
8. Visit Pages	.05	.12	.13	.14	.22	.02	.30*	—	
9. Visit Time (seconds)	.08	.13	.11	.05	.21	.15	.28	.45**	—

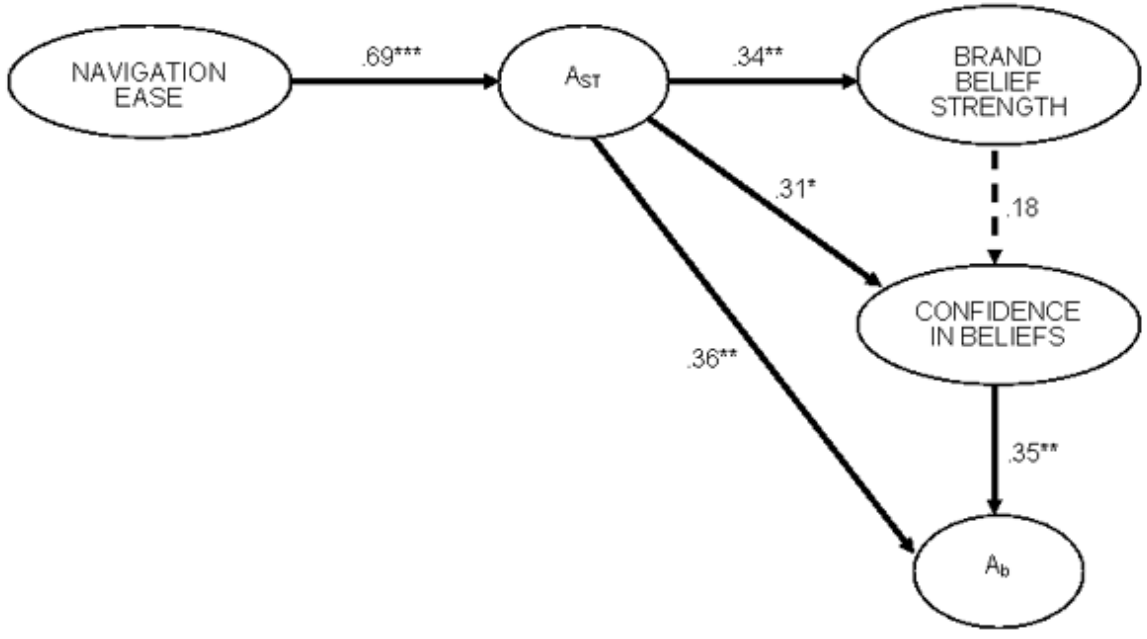
*** p<.01 (2-tailed)

** p<.05 (2-tailed)

* p<.10 (2-tailed)

Figure 2.

"Path" diagram of correlations between dependent variables across 3 studies.



General Discussion

Three independent tests provide consistent evidence that an important new construct, website schema congruity, influences perceived ease of navigation of the website, attitude toward a new brand advertised or mentioned on the website, and the quality of the consumer's brand choice. The three significant results, coupled with other directional results, seem consistent with the underlying theoretical expectations that motivated our hypotheses. An individual consumer who has developed a website schema that is congruent with a particular site will find it easier to navigate that site, and therefore easier to locate information (even if that was not the purpose of the visit), which will result in the development of stronger, favorable brand beliefs (about brands mentioned on the site), that are more accurate and more confidently held, culminating in a more favorable brand attitude and a higher quality brand decision.

We also hypothesized that when an individual has a congruent website schema, there should be a transfer of positive affect from perceived ease of navigation to a more favorable attitude toward the site, and from attitude toward the site to a more favorable attitude toward the (new) brand. We did *not* find a significant relationship between website schema congruency and attitude

toward the site. This may be because website schema congruency was related only to one cognitive component of attitude toward the site, navigation ease, whereas the overall attitude toward the site measure was weighted toward affective reactions. The relationships between website schema congruity and affective and *cognitive* reactions to the site, and perhaps the brand, need to be clarified through controlled laboratory studies.

Among the dependent variables, that is,"internally," there was evidence for a model in which ease of navigating the website strongly influences attitude toward the site, which in turn increases the strength of beliefs about the new brand's attributes and also, fairly independently, overall attitude toward the brand. However, we are inferring directionality from cross-sectional data here and this, too, requires time-ordered experimental manipulations to confirm.

Finally, we expected to find evidence that website schema congruity affects the objective measures routinely gathered by web server log files, which are number of pages visited and duration of visit. If the"footprints" left by website visitors in web server log files were accurate indicators of navigation difficulty, then website designers would have information about the congruity of their sites with the website schemas of all their website visitors, not just the ones who respond to a survey. However, there was no relationship between these log file measures and schema congruity. We suspect that this is because schema *in*congruity could have two contrary effects on the length of a visit, depending on the goal or motivation of the visitor. If the visitor is highly motivated to search for information, the visitor will persist in the search even if his or her schema is incongruent with the site and the search is inefficient in terms of number of pages viewed and time spent. However, if the visitor has other information sources to choose from, or low motivation to search, a website that is incongruent with his or her website schema will be quickly abandoned. We note that website schema incongruency cannot be inferred from clickstreams, as there are many other factors contributing to number of pages visited and time on site, such as file download time (Dellaert and Kahn 1999; Weinberg, Berger, and Hanna 2003) and consumers' motives and modes (Rodgers and Thorson 2000). We further speculate that schema incongruency may be a significant source of error for clustering methods based on clickstreams (e.g., Moe 2003).

Limitations and Future Research

The effect sizes that we observed in this research were small, and this may be due to the fact that we used natural field experiments, with volunteer online consumers, with less control than would be possible in laboratory research. Our findings need replication using controlled laboratory experiments and more homogeneous samples, in which we would expect larger effects and stronger confirmation of the hypothesized relationships. A controlled experiment could employ more extensive manipulations of website schema congruity than we used, perhaps adapting the training manipulation from our second study to train expectations about sites with a more complex structure than the two-page depth that our sites had. Consumers did not spend much time visiting our experimental websites, a median of just 87 seconds in Study 2, which probably explains why the decision quality we observed was quite low (59%). Our measure of attribute utilities for individuals in Study 2, based on zero-order correlations with brand ranking, was also not wholly satisfactory because it did not control for the potential simultaneous effects of other attributes (e.g., Neter and Wasserman 1974). Future studies should use better measures of individual consumers' stated or revealed preferences.

Despite the limitations of the field research method, the findings are strong enough, we believe, to conclude that consumers' expectations about a website's structure-the website schema-have important consequences for marketers. Future research should investigate the content and complexity of website schemas, and whether individuals' website schemas are general or in a more complex manner include different styles of websites, just as different ad styles set expectations about ad schemas in other media (Rodgers and Thorson 2000). Of particular interest are the effects of analogical transference (Gregan-Paxton and John 1997) from sites visited previously, especially competing sites. Murray and Häubl (2003) show that new websites can benefit from using interface elements that visitors have already learned to use efficiently. Successful online stores have used metaphors that are familiar from offline stores, such as the"shopping cart" (Coyle and Gould 2002).

Heterogeneity in individuals' website schemas is presumed to be due to differences in experience. However, there may be individual differences in the way that equal experience is translated into a schema, for example, between consumers with a verbal as opposed to a visual processing preference (Childers and Houston 1984). Also, the lack of correlation between schema congruity

and visit length suggests that visit goals substantially affect the use made of website schemas (Coyle and Gould 2002). For random browsing, an incongruent schema may be only a mild annoyance, and a fully developed schema may not be necessary for the successful exploration of a site. On the other hand, for goal-oriented searching, website schema congruence is likely to be critical to the decision about whether to visit a site in the first place. The investigation of individual and situational moderators of the effects of website schema congruity could be a very interesting avenue for future research.

Most previous research into navigation in hypertext environments such as websites (e.g., Coyle and Gould 2002) has investigated whether visitors make use of cognitive maps (Tolman 1948), and tried to recover the structure of these maps using recall tasks (Edwards and Hardman 1989; Simpson and McKnight 1990). Recent research suggests that human and animal navigation is instead based on processes that are more localized than global, and less available for recall (Engelkamp and Zimmer 1994; Engelkamp et al. 1994; Gillner and Mallot 1998; Maguire et al. 1998; Sutherland and Rudy 1989; Whishaw 1991). It is highly likely that the expectations that guide website navigation will be similarly difficult to discover unless the individual is given the task of applying his or her website schema to a new website. Protocol analysis can usefully reveal an individual's thought processes while using a website (Benbunan-Fich 2001). Representative samples of all the segments targeted by the website should be used, although fortunately these samples need not be large. Nielsen (2000) claims that 80 percent of website problems can be identified by a sample of just five users.

Another useful avenue of research would be the investigation of practical solutions for alerting visitors to the fact that a website's structure is incongruent with their expectations and educating them rapidly about its unfamiliar layout (C. Chen and Rada 1996; Gupta and Gramopadhye 1995; McDonald and Stevenson 1998; Wright, Likorish, and Milroy 2000). In our third study, we found that dynamic menus (Hofacker 2001; Tognazzini 1998) and pop-up information (Nielsen 1998) made a website significantly easier to navigate.

Overall, then, we claim to have identified an important construct for website marketing communications **-** the website schema. The website schema is an instance of the more general theory of psychological schemas, and was first suggested as a useful concept in relation to websites by Rossiter and Bellman (1999). The results of our empirical studies point to the usefulness of the website schema construct for understanding consumer response to websites, and the need for further research into the nature of this new construct.

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