The Role of Sensation Seeking and Need for Cognition on Web-Site Evaluations: A Resource-Matching Perspective

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ABSTRACT

The Internet theoretically enables marketers to personalize a Web site to an individual consumer. This article examines optimal Web-site design from the perspective of personality trait theory and resource-matching theory. The influence of two traits relevant to Internet Web-site processing—sensation seeking and need for cognition—were studied in the context of resource matching and different levels of Web-site complexity. Data were collected at two points of time: personality-trait data and a laboratory experiment using constructed Web sites. Results reveal that (a) subjects prefer Web sites of a medium level of complexity, rather than high or low complexity; (b) high sensation seekers prefer complex visual designs, and low sensation seekers simple visual designs, both in Web sites of medium complexity; and (c) high need-for-cognition subjects evaluated Web sites with high verbal and low visual complexity more favorably. © 2005 Wiley Periodicals, Inc.

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Many researchers have predicted that the Internet may change the nature of advertising (Hofacker & Murphy, 2000; Hoffman & Novak, 1996). Unlike other mass media, the Internet potentially enables advertisers to tailor messages to individual consumers (Quinn, 1999). However, to date, only a few studies have produced empirical findings that can guide marketers in the design of effective Web sites (e.g., Dreze & Zufryden, 1997; Zhang, 2000).

Importantly, many Web sites now include tracking devices, called intelligent agents, that follow Web surfers and analyze patterns of behavior, such as which sites consumers have visited before arriving at a target site (Maes, 2000). LaBarbera (1999) suggests that this tracking software could be equipped with a personality component, which could predict users' preferences based on the links they have selected. Because multiple designs of a Web site are relatively easy to achieve, such agents could segment users and expose them to a site version that is best suited to their personality type.

The purpose of this study is to address this personalization issue by investigating the influence of relevant personality traits, in conjunction with the cognitive difficulty experienced by Web surfers in processing Website stimuli. Specifically, sensation seeking and need for cognition are studied and these traits are considered in relation to the visual and verbal complexity of the Web sites in a laboratory experiment. The following sections outline relevant literature. Next, research hypotheses, method, and results will be presented. Finally, the results will be discussed and future research directions presented.

CONCEPTUAL DEVELOPMENT

Sensation Seeking

People engage in certain behaviors with the purpose of increasing their level of sensory stimulation. This need for sensory arousal, called sensation seeking, varies across individuals, with some people having a generally higher preferred stimulation level than others (Raju, 1980; Zuckerman, 1994). Berlyne (1971) suggested that stimuli vary in their capacity to increase arousal, a phenomenon that can be induced by stimulus complexity. Complexity, as defined by the number of independent units in a stimulus, can heighten arousal by increasing the cognitive demands that are necessary to appraise it (Zuckerman, 1994). Thus, based on the notion that high sensation seekers have higher levels of optimal arousal, they should show a greater liking for stimuli with high complexity.

Consistent with this perspective, Zuckerman, Bone, Neary, Mangelsdorf, and Brustman (1972) found that high sensation seekers liked visual designs that were complex and asymmetrical, whereas low sensation seekers preferred symmetrical and simple figures.

Research has also found that high sensation seekers like ambiguous and abstract paintings (Furnham & Bunyan, 1988; Zuckerman, Ulrich, & McLaughlin, 1993). Thus, with regard to the Internet, a high sensation seeker may find a Web site stimulating because it possesses arousing qualities. He or she may attach great importance to the sensory experience of the site, such as provided by complex graphic animations, whereas a low sensation seeker may prefer a graphically simple site.

Need for Cognition

Need for cognition (NFC) refers to an individual's tendency to seek and engage in effortful thinking (Cacioppo & Petty, 1982). People low in NFC prefer to avoid cognitively demanding activities, whereas those high in NFC possess an intrinsic motivation to think. A substantial stream of research has shown that NFC can be an important antecedent of attitude change (Cacioppo & Petty, 1982; Cacioppo, Petty, Kao, & Rodriguez, 1986; Zhang, 1996). For high NFC individuals, attitude change is a function of the strength and merit of the message. Conversely, low NFC individuals are more likely to prefer more heuristic strategies (Haugtvedt, Petty, & Cacioppo, 1992).

Further, high NFC individuals are also more likely to favor information-orientated media, and a verbal over a visual processing style (Ahlering, 1987; Heckler, Childers, & Houston, 1993). Owing to the Internet's capacity to provide information, it may be of particular appeal to high NFC individuals who are likely to be more interested in the quality of the verbal information presented, than in execution characteristics like graphics or sound effects (Cacioppo, Petty, Feinstein, & Jarvis, 1996). Conversely, low NFC individuals may be more prone to the influence of symbolic cues in Web sites given that they will avoid elaborative processing. Hence, low NFC individuals may base their attitudes not on the actual informational content of the site, but on the attractiveness of the execution characteristics (e.g., graphics, sound effects).

Resource-Matching Theory

The final theoretical concept to be reviewed is resource-matching theory. This states that the persuasive impact of a message is maximized when the resources allocated to processing the communication match those required for the task. Stimuli that demand too much or too little of the resources that an individual makes available should undermine persuasion (Peracchio & Meyers-Levy, 1997).

Previous consumer research has studied resource matching in the context of promotional stimuli. For instance, Meyers-Levy and Peracchio (1995) examined the effects of color in terms of resource matching. They found that color ads, being more difficult to process than black-and-white ads, were more persuasive when the resource demands of the ad copy were low.

Because the low demands of the ad copy did not occupy all available resources, color had a beneficial impact by communicating sensory information that reinforced the ad claims. Yet for high resource demands, color undermined persuasion by directing attention away from the advertising claims. Although this research has furthered the understanding of resource matching, no published study to date has examined the relationship between stable individual differences, such as NFC, and resource-matching theory.

However, it seems plausible that perceptions of complexity, and the evaluation of sensory information such as color, may vary across individuals. Given that a high sensation seeker is more prone to sensory processing, he or she might be able to extract more relevant information out of sensory cues, in which case the use of color is more important for high sensation seekers. Conversely, the potentially distracting effects of color may be greater for low sensation seekers and may have a negative impact on attitudes. Similarly, high NFC individuals are likely to favor complex ad copy, and since they are more prone to employ a verbal processing style, the use of sensory information may be of limited use. Yet low NFC individuals may prefer simple verbal information and should attach greater importance to executional characteristics.

Resource-matching theory is applicable to the Internet, as individuals may evaluate visual and verbal elements in Web sites differently. A Web site that displays complex visual and verbal information may be too complex even for high sensation seekers or high NFC. Equally, a site that is visually and verbally simple may provide too little stimulation for even low sensation seekers or low NFC. However, trait differences may be more evident when stimuli complexity is at a medium rather than an extreme level (Cacioppo et al., 1996). This does not imply that high NFC individuals are unable or unwilling to process complex visual information. What it does imply is that they should show more positive attitudes toward a Web site with a modality that matches their processing style. In this study, by combining visual complexity (high, low) with verbal complexity (high, low) it is possible to create three broader levels of complexity—high, low, and medium. For example, combining static images (low visual complexity) with a spacious text version (low verbal complexity) should result in a low level of complexity. Conversely, animation (high visual complexity) paired with a crammed text version (high verbal complexity) is expected to be high complexity, with the two remaining conditions representing medium complexity (i.e., high visual–low verbal or low visual–high verbal). Thus, in accordance with resource-matching theory it is postulated that:

H1: Consumers will form more favorable brand attitudes, Web-site attitudes, and purchase intentions after being exposed to a Web site of a medium level of complexity rather than high or low complexity.

Further, it is posited that certain combinations of design features will have unique appeal for the trait types. For sensation seeking, the arousal-

inducing qualities of complex animations should mainly appeal to high sensation seekers (Zuckerman, 1994), whereas low sensation seekers should prefer static images to minimize arousal. This leads to the following hypotheses:

H2a: Subjects high in sensation seeking will exhibit more favorable brand attitudes, Web-site attitudes, and purchase intentions toward a Web site that combines high visual complexity with low verbal complexity.

H2b: Subjects low in sensation seeking will exhibit more favorable brand attitudes, Web-site attitudes, and purchase intentions toward a Web site that combines low visual complexity with high verbal complexity.

For need for cognition, high NFC subjects should prefer a complex verbal format, and the reverse should occur for low NFC subjects. However, these predicted effects should be subordinate to the effects of resource matching outlined in H1. Hence it is proposed that:

H3a: Subjects high in need for cognition will exhibit more favorable brand attitudes, Web-site attitudes, and purchase intentions toward a Web site that combines low visual complexity with high verbal complexity.

H3b: Subjects low in need for cognition will exhibit more favorable brand attitudes, Web-site attitudes, and purchase intentions toward a Web site that combines high visual complexity with low verbal complexity.

METHOD

Research Design and Sample

The main study employed a 2 (visual complexity: high, low) $\times$ 2 (verbal complexity: high, low) factorial design. The hypotheses were tested with Web sites created for the study. The data collection involved two separate phases: the collection of trait scores and the main study. These took place 6 weeks apart to avoid respondent fatigue and demand effects, which allowed a more precise evaluation of the impact of trait variables (Steenkamp & Baumgartner, 1992). Two hundred thirty-four undergraduate students enrolled in marketing classes (105 males, 129 females, age range: 20–23) participated in the collection of the personality scores, and 117 from this group participated in the main study (49 males, 68 females, age range: 20–23).

Subjects in this group of 117 rated their Web expertise in response to the statement "With regards to the Internet, I consider myself" on two 7-point items anchored by *inexperienced–experienced* and a *novice–an expert* (r = .90). Results of the averaged scales yielded a mean of 4.68 (SD = 1.35), with 69.2% of subjects rating their Web expertise above the midpoint. Thus, subjects may be considered as reasonably familiar with the Internet.

Stimuli Development

Product Category Selection. The product to be advertised on the Web site was determined after an extensive screening process. First, a focus group of 10 students was conducted to derive an initial list of product categories subjects were familiar and involved with (cameras, personal computers, running shoes, energy drinks, and mobile phones). A survey of 23 undergraduate marketing students excluded from the main study was then performed to determine the most appropriate product category for the experiment. Subjects rated involvement (Cronbach's alpha = 0.89) and familiarity (Cronbach's alpha = 0.86) using scales adapted from previous studies (Mittal, 1995; Oliver & Bearden, 1985). Results indicated that two products, energy drinks and personal computers, were the most familiar and involving to subjects. However, relative to energy drinks, the range of product attributes of computers that can be portrayed in a sensory manner appears limited, whereas more experiential products seem better suited to visual and verbal descriptions.

Further, two expert judges (one assistant professor, one associate professor of marketing) agreed that energy drinks were a more appropriate choice for visual and verbal representation, resulting in energy drinks being chosen. Energy drinks are commonly marketed as aiding reaction speed, concentration, and stamina levels through a product that often contains ingredients such as caffeine and vitamins. Examples of prominent energy drink brands include Red Bull, Shark, and V.

Web Sites. Web sites containing verbal and visual complexity manipulations for an energy drink called Dark Dog were then developed. By using images from a foreign brand (i.e., Austrian) it was possible to create a more realistic Web site. Researchers have highlighted that amateurish ads can undermine the external validity of findings (e.g., Mitchell, 1986). Pretests also revealed that the target population was unfamiliar with the brand, so the impact of prior brand knowledge was deemed minimal (Gardner, 1985).

Visual complexity was manipulated through the use of *animations* (high complexity) versus *static* images (low complexity). The animations included graphical elements that vibrated and bounced when clicked on, short storyboard movies, themes that appeared automatically, and an extensive introductory sequence. In the low complexity treatment all the images were static (see Appendix A).

Verbal complexity was manipulated by the amount of text that was included on a single page. Some advertisers prefer to crowd their Web pages with the maximum amount of text, whereas others limit the amount of information presented. Where the information is essentially the same, a crammed Web page should be more cognitively demanding because more information needs to be processed simultaneously. For low verbal complexity, all text pertaining to a topic was presented on a Web page. For high verbal complexity, information was grouped on the one page with subjects frequently having to use scroll-down buttons in order to read all of the information (see scroll-down feature in Appendix B). Web-site stimuli were loaded locally onto laboratory computers. Using standardized computers controlled for two potentially biasing effects: first, variety in the age and type of browser software, which may not be able to display advanced animations, and second, any temporal effects associated with variability in waiting times for information to download (see Davis & Hantula, 2001; Rajala & Hantula, 2000, for a discussion of the effects of longer download times) Thus, loading onto the hard drives resulted in comparable download times across conditions (i.e., 1.29–1.65 s).

Pretest

A pretest among 38 marketing undergraduate students excluded from the main study was conducted to verify the intended manipulations. Between 8 and 12 subjects were exposed to each of the four experimental Web sites and asked to browse through them as they normally would. Following this, subjects completed a questionnaire that contained various measures about perceived visual and verbal complexity. To measure visual complexity, subjects indicated on two 7-point scales anchored by *difficult to understand–easy to understand* and *complicated–simple* ($r = .62$). These measures were also used to measure verbal complexity ($r = .85$) and were adapted from Meyers-Levy and Peracchio (1995). As anticipated, a 2 (verbal complexity: high vs. low) $\times$ 2 (visual complexity: high vs. low) analysis of variance (ANOVA) revealed a significant interaction; $F(3,34) = 3.28$, $p < .05$. Specifically, the low verbal–low visual complexity version ($M = 6.08, SD = 0.44$) was rated as less complex than both of the medium complexity conditions. Namely, the high verbal–low visual ($M = 5.58, SD = 0.51$) and low verbal–high visual conditions ($M = 5.56, SD = 0.22$). The high complexity condition (i.e., high verbal–high visual complexity) was also rated as the most complex ($M = 5.19, SD = 0.54$). Hence, the complexity manipulations were successful.

A second prerequisite for the Web sites was that they had to appeal to certain personality types. It was believed that high sensation seekers, due to their liking of visually complex stimuli, would prefer Web sites that displayed animations. Hence, a second test ascertained that the animations were more imagery eliciting and led to greater amounts of sensory processing relative to the static images. To this end, the data were

collapsed into two categories depending on whether respondents had seen stimuli of high or low visual complexity. Three 7-point scales adapted from Burnkrant and Unnava (1995) assessed to what extent subjects formed mental pictures while looking at the site (e.g., "I found myself thinking of images or pictures when I browsed through the site," Cronbach's alpha = 0.86). As expected, subjects reported higher degrees of sensory processing [$t(36) = 0.46, p < .05$] when exposed to complex animations of high visual complexity ($M = 4.80, SD = 1.28$) relative to static images of low visual complexity ($M = 3.73, SD = 1.02$). Last, a series of items determined that the Web sites did not differ in comprehensibility, relevance, and appropriateness.

Procedure

For the measurement of the personality traits, 234 undergraduate marketing students participated voluntarily with a cash draw offered as an incentive. Subjects completed a booklet containing trait measures and demographic variables and provided their 7-digit ID number. This process took approximately 20 minutes. Six weeks later, these subjects were invited to participate in an experiment on Web-site effectiveness. To avoid demand effects, no indication was given that this experiment was connected to the trait measurement. The researcher invited students to come to a computer lab at certain times to participate in the experiment. Subjects were seated individually at a computer and asked to browse through the site as they normally would. Subjects viewed the stimuli on 667-MHz Pentium III-class IBM-PC compatible computers with monitors, keyboards, mice, and hard disk drives. These machines ran Windows 2000 and were situated at separate desks seated in rows. Each computer had a 17-inch color monitor with true color (24 bit) screen resolution and the screen area set at 1024×768 pixels. Subjects viewed the Web sites under Internet Explorer 5. The navigational functions of the Web browser had been disabled so that subjects could not access any Web site other than the experimental ones. After browsing through the site using a mouse, subjects filled out a questionnaire that contained several attitude scales and manipulation checks. By providing their ID number, subjects could be matched to the trait scores from the first stage. The entire procedure took less than 20 minutes to complete.

Measures

Need for cognition was measured with the use of the 18-item scale of Cacioppo, Petty, and Kao (1984). This consists of 18 items, such as "I would prefer complex to simple problems," of which half are reverse scored (Cronbach's alpha = 0.86). For sensation seeking, subjects completed the 40-item scale of Steenkamp and Baumgartner (1992). Responses to items such as "I like to explore a strange city or section of

town by myself" were scored on a 7-point scale anchored by *extremely uncharacteristic–extremely characteristic* (Cronbach's alpha = 0.87). For manipulation checks, two 7-point scales anchored by *difficult to understand–easy to understand* and *complicated–simple* for both visual ($r = .63$) and verbal complexity ($r = .64$) were presented. Attitude toward the Web site, brand attitudes, and purchase intentions were selected as the dependent measures. Attitude toward the Web site (A_{ws}) and brand attitudes (A_b) were rated on four 7-point items anchored by *very bad–very good, unfavorable–favorable, unappealing–appealing, not at all likeable–very likeable* (Cronbach's alpha $A_{ws} = 0.93$, $A_b = 0.88$). Purchase intentions were rated on two 7-point items anchored by $r(r = .93$; items from Miniard, Bhatla, Lord, Dickson, & Unnava, 1991).

RESULTS

Manipulation Checks

A manipulation check for Web-site complexity was conducted by summating and averaging the two 7-point visual-complexity and two 7-point verbal-complexity items that were identical measures to those used in the pretest to form a composite measure (Cronbach's alpha = 0.71). An ANOVA revealed significant differences between the treatments [$F(3,108) = 2.54, p < .05$] with subjects rating the low complexity treatment (i.e., low verbal–low visual site) as being the least complex of the four treatments ($M = 5.62$, $SD = 0.93$). This was followed by the medium-complexity treatments of low verbal–high visual ($M = 5.02$, $SD = 1.12$) and high verbal–low visual ($M = 4.78$, $SD = 0.74$). The high complexity treatment (i.e., high verbal–high visual site) received the highest complexity ratings ($M = 4.52$, $SD = 0.62$), suggesting that the manipulation was successful.

Resource-matching Theory

H1 predicted that Web sites of medium complexity are more persuasive than those of very low or very high complexity. Consistent with this expectation, the 2 (verbal complexity: high vs. low) × 2 (visual complexity: high vs. low) between-subjects multivariate analysis of variance (MANOVA) revealed a significant verbal × visual interaction effect [$F(3,108) = 6.81, p < .001$, Wilks's lambda = 0.84] across all dependent variables. Specifically, in order of effect size, brand attitudes [$F(1,108) = 5.46, p < .01, \omega^2 = 0.11$, see Figure 1], purchase intentions [$F(1,108) = 4.77, p < .01, \omega^2 = 0.09$] and Web-site attitudes [$F(1,108) = 3.10, p = .03, \omega^2 = .05$]. As expected, the main effects for verbal and visual complexity were not significant (Fs < 1). Table 1 displays the means across each treatment and dependent variable.

Sensation Seeking

For H2a and H2b, trait data were split into high and low categories with the use of median splitting. Although this results in lost data, this approach follows past research that has examined high and low categories of these traits (e.g., Batra & Stayman, 1990; Schoenbachler & Whittler, 1996). It was expected that sensation seeking would interact with visual complexity but not verbal complexity. High sensation seekers should favor Web sites of high visual complexity, and low sensation seekers should prefer simple graphics.

As expected, the 2 (sensation seeking: high, low) × 2 (visual complexity: high, low) MANOVA revealed a significant interaction [$F(3,106) = 5.29$, $p < .01$, Wilks's lambda = 0.87) across all three dependent vari-

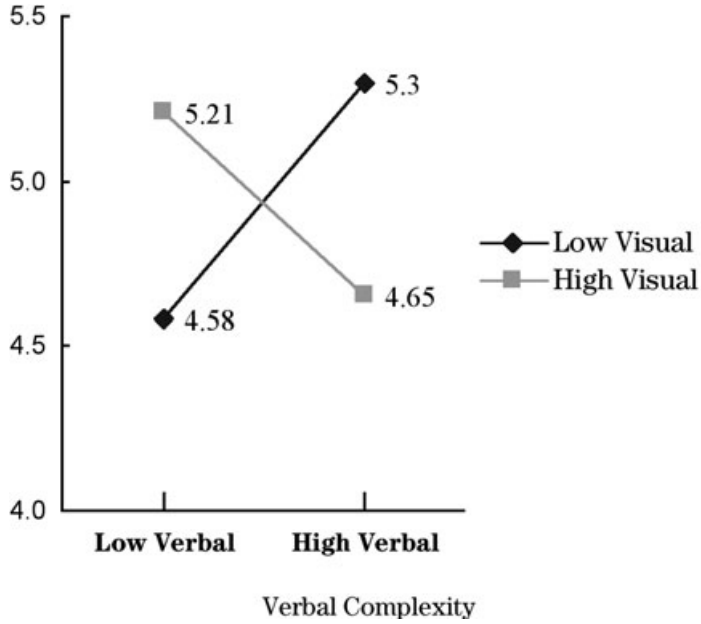

Figure 1. Plot of the interaction of verbal and visual complexity on brand attitudes.

Table 1. Means and Standard Deviations for Verbal and Visual Complexity.

	Brand Attitudes		Web Site Attitudes		Purchase Intentions	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*
Low verbal complexity						
Low visual complexity	4.58	0.16	4.77	0.18	4.72	0.26
High visual complexity	5.21	0.15	5.31	0.17	5.45	0.24
High verbal complexity						
Low visual complexity	5.30	0.15	5.34	0.17	5.43	0.24
High visual complexity	4.65	0.15	4.85	0.17	4.36	0.25

Note: All items scored on 7-point scales.

ables: brand attitudes [$F(1,106) = 7.91, p < .01, \omega^2 = 0.06$], Web-site attitudes [$F(1,106) = 15.29, p < .001, \omega^2 = .12$], and, to a lesser degree, purchase intentions ($p > .06, \omega^2 = .02$). Table 2 shows that high sensation seekers were more persuaded by Web sites that contained complex graphics and that they disliked simple graphics, whereas the reverse was true for low sensation seekers. Next, planned contrasts were performed within each of the four experimental cells between high and low sensation seekers. As anticipated, the sensation seeking–visual complexity interaction was only significant in conditions of medium complexity. High sensation seekers in the high visual–low verbal complexity condition expressed more favorable brand attitudes (Ms = 5.46 vs. 4.80 for high and low sensation seekers, respectively; $t = –2.05, p < .05, r = .37$) than low sensation seekers, but not for Web-site attitudes or purchase intentions (ps > .09), which were correlated across all conditions ($r = .43, p < .001$). Conversely, stronger effect sizes were evident for low sensation seekers. Specifically, the low visual–high verbal complexity condition revealed more positive brand attitudes (Ms = 5.56 vs. 4.92 for low and high sensation seekers, respectively; $t = 2.57, p < .02, r = .44$) and Web-site attitudes (Ms = 5.68 vs. 4.83, $t = 2.91, p < .01, r = .48$) for low sensation seekers. The other results were not significant, with the exception of the high visual–high verbal complexity condition, where high sensation seekers rated more favorable purchase intentions relative to low sensation seekers (Ms = 4.91 vs. 3.73, $t = –2.28, p < .05, r = .40$).

Need for Cognition

As anticipated, for H3a and H3b, a 2 (NFC: high, low) × 2 (visual complexity: high, low) MANOVA was not significant [$F(3,106) < 1, p > .62$]. Further, a 2 (NFC) × 2 (verbal complexity) MANOVA revealed a significant interaction effect [$F(3,106) = 4.64, p < .01$, Wilks's lambda = .88]. The main effects for NFC and verbal complexity did not reach significance ($F < 1$). Table 3 displays means for NFC across the verbal treat-

Table 2. Means and Standard Deviations for Sensation Seeking and Visual Complexity.

	Brand Attitudes		Web Site Attitudes		Purchase Intentions	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*
Low verbal complexity						
Low sensation seeking	5.14	0.15	5.40	0.16	5.08	0.24
High sensation seeking	4.68	0.18	4.59	0.19	5.09	0.29
High visual complexity						
Low sensation seeking	4.67	0.17	4.78	0.18	4.33	0.28
High sensation seeking	5.13	0.15	5.30	0.15	5.33	0.24

Note: All items scored on 7-point scales.

ments. This shows that high NFC subjects preferred complex verbal layouts. On the other hand, low NFC subjects preferred simple verbal layouts to complex ones.

As expected, planned contrasts revealed that high NFC subjects in the low visual–high verbal complexity condition rated more positive brand attitudes (Ms = 5.57 vs. 4.90 for high and low NFC, respectively; $t = -2.74$, $p = .01$, $r = .46$) and Web-site attitudes (Ms = 5.65 vs. 4.88 for high and low NFC, respectively; $t = -2.61$, $p < .02$, $r = .44$) than low NFC subjects, although this effect was not significant for purchase intentions ($p > .35$). In addition, in the low verbal–high visual complexity condition, the more favorable ratings for low NFC subjects were not significant (ps > .09). However, low NFC subjects in the low visual–low verbal condition expressed more favorable Web-site attitudes than high NFC subjects (Ms = 5.09 vs. 4.35 for low and high NFC; $t = 2.08$, $p = .05$, $r = .41$).

DISCUSSION

The data from this study lend support for resource-matching theory. Specifically, Web sites of medium complexity are evaluated more favorably than those of low or high complexity. Although this effect is small, in relation to the guidelines for effect sizes of Cohen (1977) for ω^2, it was observed for all three dependent variables. Moreover, Fern and Monroe (1996) suggest that for experimental research, interactions typically produce smaller effect sizes. Presumably, subjects in the low or high complexity conditions were either bored or overwhelmed by the cognitive demands of the Web sites.

For the traits, the anticipated interaction between sensation seeking and visual complexity was confirmed for two of the dependent variables, brand attitudes, and attitudes toward the Web site. High sensation seekers expressed more favorable brand attitudes when exposed to complex visual

Table 3. Means and Standard Deviations for Need for Cognition and Verbal Complexity.

	Brand Attitudes		Web Site Attitudes		Purchase Intentions	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*
Low verbal complexity						
Low need for cognition	5.15	0.16	5.33	0.17	5.44	0.26
High need for cognition	4.61	0.17	4.73	0.18	4.70	0.27
High verbal complexity						
Low need for cognition	4.73	0.15	4.88	0.17	4.67	0.25
High need for cognition	5.27	0.16	5.34	0.17	5.18	0.26

Note: All items scored on 7-point scales.

elements relative to simple ones. Stronger effect sizes were evident for low sensation seekers, who exhibited the reverse pattern in support of H2b across brand attitudes and purchase intentions. As expected, this interaction was only significant when the cognitive demands of the Web site were at a medium level of complexity and was not significant for either of the extreme treatments. Thus, the stimulation provided by the low complexity version (i.e., low verbal–low visual complexity) was too low even for low sensation seekers, so that both groups evaluated the site less favorably. Likewise, the high complexity treatment tended to provide too much stimulation for either group.

The predicted effects did not emerge for the last dependent variable, purchase intentions. This may have been caused by the product category itself. Sensation seeking is significantly related to early stages of alcohol and drug abuse (Zuckerman, 1983). Although not as severe as drugs, energy drinks are a product designed to increase one's energy level or wakefulness. Since low sensation seekers are arousal avoiders, they may be less likely to buy this class of product (Zuckerman, 1983). Hence, whereas they may have liked the Web site and the brand, the actual inclination to purchase was low. This rationale also helps to explain an unexpected effect that was significant. High sensation seekers in the high complexity treatment expressed greater purchase intentions than low sensation seekers. High sensation seekers may have associated the high level of arousal they experienced during Web-site exposure with the product. Given that high sensation seekers are more prone to use substances or drinks to increase sensory arousal levels (Zuckerman, 1994), this may have enhanced their purchase intentions.

As anticipated for H3a, high NFC subjects expressed more favorable attitudes toward a Web site that combined complex verbal with simple visual elements, relative to low NFC subjects. However, this effect did not materialize for purchase intentions. This may have occurred because the demand characteristics of a laboratory experiment may have prompted both high and low NFC subjects to engage in more detailed processing, despite their inherent trait predispositions.

Contrary to expectations for H3b, low NFC subjects did not evaluate a Web site with high visual and low verbal complexity more favorably than high NFC subjects. This suggests that high NFC subjects found this condition equally persuasive. From a resource-matching perspective, the less relevant peripheral visual cues may have influenced high NFC evaluations. Specifically, cognitive resources that high NFC subjects had available for Web-site processing may have been greater than that needed to process the verbal information (Peracchio & Meyers-Levy, 1997). Hence, although they are predisposed toward verbal information (Cacioppo & Petty, 1982), high NFC subjects may have utilized the visual stimuli as a central cue to aid their evaluations, rather than simply disregarding them in favor of verbal information (Meyers-Levy & Peracchio, 1995). However, a significant medium-sized effect (Sawyer & Ball, 1981) emerged in the low com-

plexity treatment, where low NFC expressed more positive site attitudes than high NFC. This low verbal–low visual preference by low NFC subjects would appear intuitive, because this condition was the least difficult to process and should thus be preferred by people who generally avoid demanding cognitive stimuli.

Given the results of this study, an interesting avenue for future research would be to consider the potential interactive effects of complexity and download delay. Although this study suggests that medium complexity can enhance consumer attitudes, recent research on temporal effects suggests that longer download times can negatively influence attitudes (see Davis & Hantula, 2001; DiClemente & Hantula, 2003; Rajala & Hantula, 2000). Because greater complexity (e.g., more visual information) can be associated with more information to download, it would be useful to examine if and how consumers trade off between downloading time and levels of Web-site complexity.

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APPENDIX A. VISUAL COMPLEXITY EXAMPLES

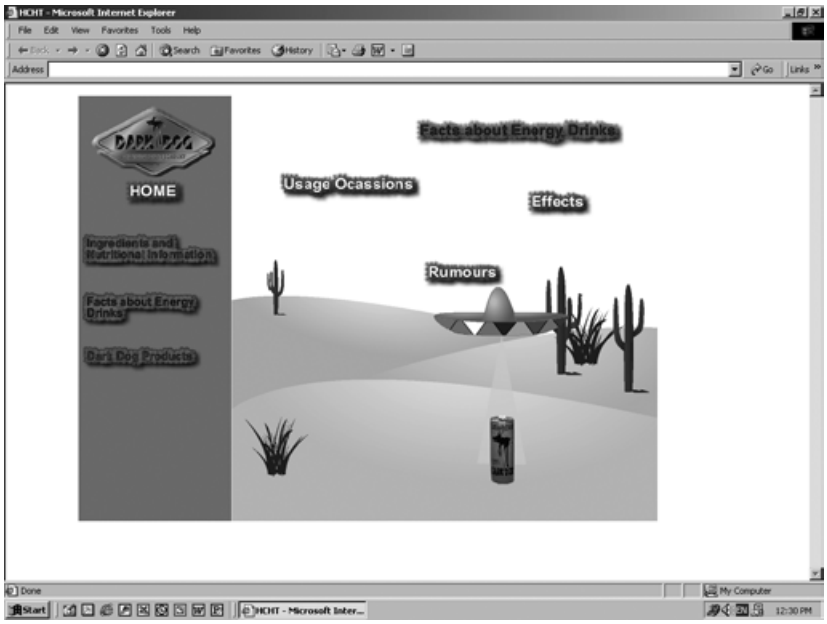

Figure A-1a. High visual complexity.

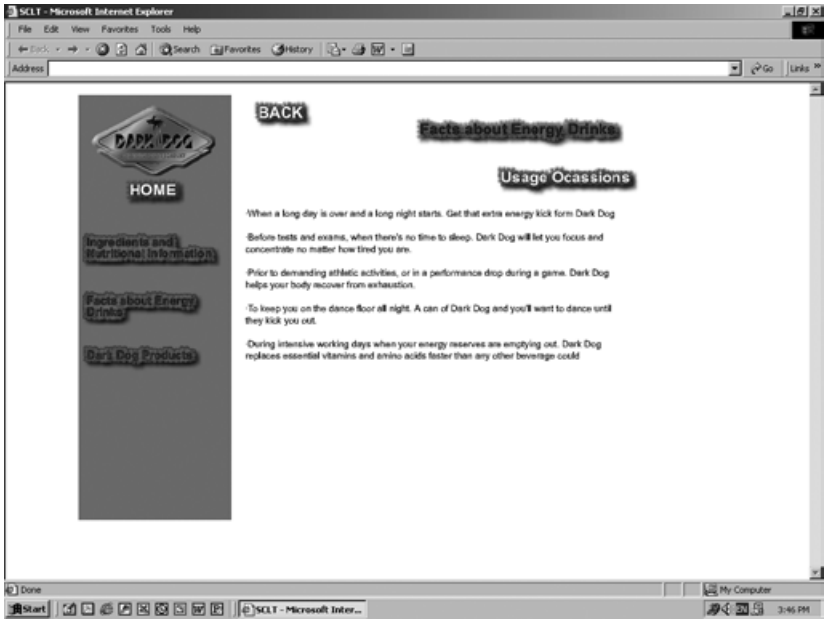

Figure A-1b. Low visual complexity.

APPENDIX B. VERBAL COMPLEXITY EXAMPLES

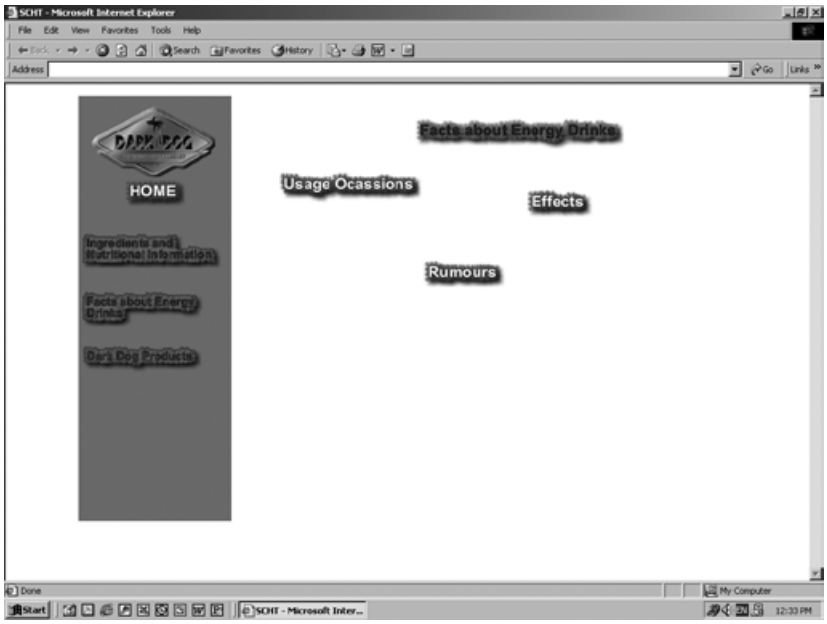

Figure B-1a. Low verbal complexity.

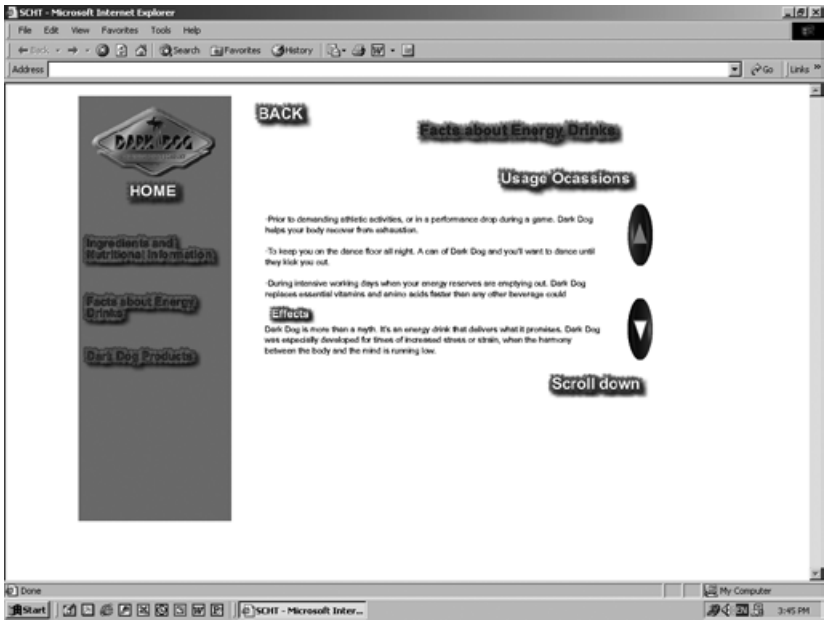

Figure B-1b. High verbal complexity.