

The Effects of Cognitive Thinking Style and Ambient Scent on Online Consumer Approach Behavior, Experience Approach Behavior, and Search Motivation

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ABSTRACT

This study evaluates the effect of the interaction between cognitive variables and the presence of scent on online search motivation, purchase characteristics, and telepresence. An interaction between consumers' type of thought process and the presence of scent was identified as influencing search motivation (attention focus and challenge) and telepresence experience. Ambient scent influenced the search motivation of consumers possessing systematic cognitive thinking style (SCTS) and the telepresence experience of consumers with intuitive cognitive thinking style (ICTS). In addition, much in the same way that ambient scent affects consumer behavior in traditional stores, in online settings consumers exposed to scent were found to demonstrate a higher degree of approach behavior. The results suggest extending the S-O-R model by emphasizing cognitive thinking style as a mediator of environmental stimuli. © 2011 Wiley Periodicals, Inc.

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INTRODUCTION

Over the last three decades, studies have indicated that consumers process information by two qualitatively different cognitive thinking styles: one that has been variously referred to as intuitive (Jung, 1964/1968), natural (Tversky & Kahneman, 1983), and automatic (Bargh, 1989; Higgins, 1989) and the other as analytical–rational (Epstein, 1983) and systematic (Bargh, 1989; Chaiken, 1980; Higgins, 1989; for more detail see Epstein et al., 1996). Various studies demonstrate the significance of compatibility between thinking style and task or activity characteristics (Epstein, 1994, 2003; Hammond, 1996; Hammond et al., 1987; Hogarth, 2002; Kahneman, 2003; Kahneman & Frederick, 2002; Fabrigar & Petty, 1999; Petty & Cacioppo, 1986; Petty, Wheeler, & Bizer, 2000; Pham & Avnet, 2004; Novak & Hoffman, 2009) and that the nature of the task influences the degree to which each thinking style is embraced (Epstein, Donovan, & Denes-Raj, 1999; Isen, Daubaman, & Nowicki, 1987; Schwarz & Bless, 1991). However, although the different thinking styles are well established, relatively few studies have analyzed their effects on consumer behavior. Thus important questions remain unaddressed (Novak & Hoffman, 2009).

What aspects of thinking style affect consumer behavior and what are the limits of this effect? How are consumer search and consumer experience affected by the interaction between cognitive thinking style and shopping environment factors?

This study examines the effect of interpersonal differences in thinking style on online consumer experience. The online purchase process, similar to regular purchasing processes, is a learning process during which consumers study product characteristics, examine different alternatives, and make a purchase decision. This is a learning process that may be characterized according to consumers' thinking style. In addition, the current research investigates the interaction between cognitive thinking style and shopping environment. It examines the conclusions drawn by a number of studies showing that the shopping environment in regular stores (Caldwell & Hibbert, 2002), and specifically the scent in the store environment, affect consumer behavior and decision making (Fiore, Yah, & Yoh, 2000; Turley & Milliman, 2000; Matilla & Wirtz, 2001; Spangenberg, Crowley, & Henderson, 1996).

While the marketing literature includes evidence regarding the impact of environmental factors on shopping processes within the physical store, few if any studies examine the effect of environmental factors on consumer behavior and experience during online shopping processes. Two factors affect the online scent environment: high-level access to the Internet and technological developments. High-level access to the Internet enables users to access different environments characterized by different scents. For example, consumers performing transactions on the Internet at work are exposed to different scents than consumers surfing at home, who may be exposed to such scents as those produced by baking and home cooking. Then again, these two scents are different from those to which someone sitting in a coffee shop may be exposed. In addition to accessibility, technological developments may affect the surfer's environment as well. For example, based on a technology developed by the American company TriSenx, lab scientists at the U.K.'s broadband provider, Telewest, recently built a hi-tech air-freshener that plugs into a PC and sprays a smell linked to the message, thus making it possible to use scents on the Internet.

COGNITIVE THINKING STYLE

Cognitive style is defined as the different ways people receive, organize, and process information (Hunt, 1991; Messick, 1972, 1984). Cognitive style acts as a mechanism controlling attention, thought, and actions (Messick, 1984) and represents the person's internal preference for using a unique type of thinking (Sternberg, 1998; Furnham & Stringfield, 1993). This pattern tends to be stable over time and situations, and is independent of the person's capacity or level of intelligence (Perkins, 1981). Thinking types are characterized by traits, attitudes, and preferences (Kirton, 1976; McCauley, 1999), which have different effects on the decision-making process (Mitroff & Kilmann, 1975; Nutt, 1993). Varied terminology is employed in the literature to describe the concept of cognitive style, such as learning style, strategic style, and cognitive thinking style. Researchers suggest that these terms represent the natural duality of human thinking. This duality probably stems from differences between the hemispheres of the brain that control thinking (Armstrong, 1999). Early studies demonstrate that the left cerebral hemisphere specializes primarily in analytic, rational, and sequential information processing, while the right cerebral hemisphere specializes primarily in intuitive and simultaneous information processing (Armstrong, 1999).

In the current study, cognitive thinking style is demonstrated by distinguishing between *systematic cognitive thinking style* (SCTS) and *intuitive cognitive thinking style* (ICTS). Systematic thinking is related to a person's tendency to analyze information and reality in a rational, consistent, and multilevel manner. Rational systems operate primarily at the conscious level and are intentional, analytic, logical, primarily verbal, involve slower processing, and are relatively free of affect (Epstein, 1991). Thus, people possessing systematic thinking traits spend more time searching for and analyzing information. Systematic thinking deals particularly with objective information and is characterized by the processing of new information based on existing information. The decision-making process of a person possessing SCTS would be based on known standards (Scott & Bruce, 1995; Tharp, 1989; Perkins, 1981; Epstein, 1991).

Contrary to the above, intuitive thinking is related to the individual's tendency to organize information globally and to make decisions after he/she has already formed, developed, and understood the entire context of the required decision (Tharp, 1989).

The intuitive system is assumed to be preconscious, automatic, holistic, associational, primarily nonverbal; encodes reality in concrete images, metaphors, and narratives; oriented toward immediate action; more crudely integrated, dissociative, emotional complexes; context-specific processing, experienced passively, and intimately associated with affect (Epstein, 1991). In addition, ICTS tends to occur more often when a person is in a positive mood (Bless & Schwarz, 1999). This occurs without activating any thinking process and without paying any attention to the source of information or to the way information is organized (Perkins, 1981; Sternberg, 1998). This type of global understanding at an early stage of the decision-making process guides the person throughout his/her decision-making process even though he/she may not be aware of it.

SEARCH MOTIVATION: CHALLENGE AND ATTENTION FOCUS

In the context of online shopping, search motivation seems to have been specifically examined by perceiving the challenge experienced by consumers during their purchase and their focus on the medium. Online shopping challenge can be defined as the degree to which the shopping task represents a personally demanding situation requiring a substantial amount of cognitive or other effort in order to develop the learner's knowledge and skill levels. Consumers are challenged when they come across a task/situation that demands skills, knowledge, or behaviors beyond their current capabilities (Van Velsor & McCauley, 2004). Focus attention during online shopping can be defined as the degree to which the consumer's mind is narrowed to the limited computer screen until other stimuli seem irrelevant.

Researchers who have examined consumers' experience during surfing note that the sense of challenge and attention focus coming from consumers' involvement affect consumers' interaction with the medium, which facilitates online flow experience (Hoffman & Novak, 1996; Novak, Hoffman, & Yung, 2000) and attitude toward the site (Luna, Peracchio, & de Juan, 2005). Ryan and Deci (2000, p. 56) note that people's sense of challenge is a factor demonstrating their intrinsic motivation throughout the task. On the other hand, consumers' focus on the medium describes their motivation to use available resources and focus on the task at hand (Ghani, 1995).

Challenge and attention focus may be affected by the amount of systematic cognitive style consumers have and operate during the shopping task. As noted above, systematic cognitive style is characterized as analytic, logically connected, intentional, and an effortful process. By nature, SCTS demands more information gathering, which advances consumers' perceived challenge and attention focus.

Thus the first hypothesis is that:

- H1:** There will be a positive correlation between SCTS and attention focus and between SCTS and challenge experience.

The Environmental Effect as a Boundary Condition for the SCTS effect

Studies in various disciplines suggest that the compatibility between tasks' cognitive or affective characteristics and cognitive thinking style has a significant effect (Epstein, 1994, 2003; Hammond, 1996; Hammond et al., 1987; Hogarth, 2002; Kahneman, 2003; Kahneman & Frederick, 2002; Fabrigar & Petty, 1999; Petty & Cacioppo, 1986; Petty, Wheeler, & Bizer, 2000; Pham & Avnet, 2004; Novak & Hoffman, 2009). In the context of regulatory focus theory, fitness between task and cognitive process was found to make an important contribution (Higgins, 2000; Higgins et al., 2003), and this fit effect was suggested to extend beyond regulatory focus theory to other theories (Higgins et al., 2003). Hogarth (2002) found that the process of judgment will be more valid when fitness between task characteristics and cognitive thinking style is employed. In the context of marketing theory, Ruiz and Sicilia (2004) suggest that persuasive appeals tend to be more effective when the nature of the appeal matches, rather

than mismatches, the individual personality-type preferences for processing information. Thus, people who possess an intuitive thinking style are more affected by holistic information such as pictures than people who possess a systematic thinking style. One factor that characterizes the shopping task and was found to affect consumer behavior is the shopping environment. The following paragraphs summarize the literature that deals with the environmental effect on consumer behavior, followed by its effect on the online experience.

The Environmental Effect on Consumer Approach Behavior

The most common theoretical framework for explaining the effect of the shopping environment on consumer behavior is the Environmental Psychology Model (Turley & Milliman, 2000; Matilla & Wirtz, 2001; Spangenberg, Crowley, & Henderson, 1996). This model is based on the Stimulus–Organism–Response (S-O-R) paradigm. It suggests that the environment and the cues (S) defining it affect people’s internal evaluation (O). People respond (R) with one of two contrasting behaviors: an approach behavior or an avoidance behavior¹ (e.g., Craik, 1973; Mehrabian & Russell, 1974; Russell & Pratt, 1980). *Approach behavior* includes all positive behaviors employed in order to realize the wish to visit the store and explore its contents. *Avoidance behavior* includes the wish and behaviors employed in order to avoid visiting the store. Various studies in the marketing field have demonstrated how consumer behavior is affected by different environmental variables such as color, lighting, space, music, and scent, and the effect of these variables on consumer behavior while shopping at the store. For an extensive, recent literature review, see Turley and Milliman (2000).

While the above literature mainly utilized the Environmental Psychology Model in order to explain consumer behaviors in “brick and mortar” environments, scant attention was devoted to examining the S-O-R paradigm in an online store environment. The present study suggests an expansion of the S-O-R paradigm to include the impact of external factors existing within the physical purchase environment on consumers’ approach behavior as demonstrated by consumers’ behavior and consumers’ experience while shopping via the Internet. Moreover, this study suggests that there is another mechanism underlying the S-O-R paradigm and proposes that it may be mediated by cognitive thinking style.

The Effect of Ambient Scent on Consumer Behavior and Online Consumer Experience

Spangenberg, Crowley, and Henderson (1996) defined ambient scent as “scent that is not emanating from a particular object but is present in the environment.” Studies show that scent present in the purchase environment has a significant effect on consumers’ emotional state, attitudes, and behavior.

¹ Similar to the Stimulus–Organism–Response (S-O-R) paradigm, the current study uses the terms approach behavior and avoidance behavior in the context of the consumer’s likelihood to engage in a task in the retail environment, as measured by in-store consumer behavior variables such as shopping duration, number of brand inspections during shopping, and intention to return (as in Spangenberg, Crowley, & Henderson, 1996). Note that this interpretation differs from that manifested in other current contexts, in which these terms appear to be related to more recent theories on consumers’ orientation goal (i.e., promotion vs. prevention and self-regulatory theory).

The Effect of Scent on Attitudes and Approach Behavior. The presence of scent in the purchase environment was found in many studies to have an effect on consumers' attitude toward the store and its products (Laird, 1932; Morrin & Ratneshwar, 2003; Spangenberg, Crowley, & Henderson, 1996; Hirsch, 1995; Mitchell, Kahn, & Knasco, 1995; Bone & Ellen, 1999). Morrin and Ratneshwar (2003) demonstrated that pleasant scents promote a favorable perception of the store environment and indirectly promote a more favorable perception of product quality. In addition, researchers suggest that scent affects consumers' approach behavior. Studies demonstrate that consumers exposed to pleasing scents spend more time in the store (Lipman, 1990; Spangenberg, Crowley, & Henderson, 1996; Spies, Hesse, & Loesch, 1997; Donovan & Rossiter, 1982; Donovan et al., 1994) and that pleasing scents have an effect on consumers' overall expenditures as well as on the number of brand names purchased at the store (Spangenberg, Crowley, & Henderson, 1996; Bone & Ellen, 1999). Hirsch (1995) examined the effect of pleasant scent on gamblers' behavior in Las Vegas at different times. Gamblers exposed to pleasant scents spent larger sums than gamblers who were not exposed to scent.

The Effect of Scent on Emotions and Online Telepresence Experience.

The effect of scent on positive mood and alertness has been identified in several studies (Spangenberg, Crowley, & Henderson, 1996; Lorig & Schwartz, 1988; Ellen & Bone, 1998). Hirsh (1995) explained the effect of scent as the location of the sense of smell in the brain and its direct connection to the hemisphere responsible for emotional response (Spangenberg, Crowley, & Henderson, 1996). Different scents produce different emotions (Ehrlichman & Bastone, 1992). Thus, pleasant scents promote a pleasant mood. Scents such as nutmeg and lavender promote relaxation, while scents such as jasmine and peppermint cause people to be more active and aroused. However, the extent of arousal experienced by consumers was found to be affected by scent but not necessarily by a particular scent (Lorig & Schwartz, 1988; Ehrlichman & Bastone, 1992).

In the context of online surfing, many studies suggest that online telepresence experience involves emotions (Roberts, Smith, & Pollock, 2000; Freeman et al., 1999, 2000; Stacy & Jonathan, 2002; Broach, Page, & Wilson, 1995, 1997; Ravaja et al., 2004; Lee, 2007). Telepresence is the surfer's feeling of being inside the computer's virtual space (Sheridan, 1992). Sheridan (1992) defines this "being inside" as a feeling of existence in computer-generated surroundings wherein time and space are condensed and have no true meaning (Tambyah, 1996). In this way, use of the Internet and its supporting technology allows for travel through space and time to a different place (Schloerb, 1995). In terms of approach, telepresence is approach behavior by virtue of its mood. Telepresence suggests play, exploration, and immersion in virtual space (Turkle, 1984), and the experience of telepresence is intrinsically rewarding and fun (Hawkins, 1995). Previous studies found interactivity and vividness to be direct factors that increase the telepresence experience (Hoffman, Novak, & Lee, 2000). In the context of the current study, these two variables were reported to be enhanced by the presence of scent. Scent increases exploratory behavior, which may enhance perception of interactivity (Lorig & Schwartz, 1988; Ehrlichman & Bastone, 1992). In addition, scent may increase the perception of vividness by activating the sense of smell, thus enriching the extent of the information gathered (Steuer, 1992).

In summary, the literature indicates that ambient scent affects consumer behavior in traditional shops. Studies show that the presence of positive ambient scent increases the state of arousal and has positive effects on consumers' attitudes toward the shop and on approach behavior as well as telepresence.

Thus the second hypothesis states that:

H2: Chocolate scent promotes approach behavior and online approach experience. Consumers exposed to chocolate scent while surfing the Web will demonstrate an approach behavior and approach experience that will be manifested in a number of variables: (a) spending more time in the shop, (b) greater number of brands selected, (c) spending more time examining each brand, (d) larger number of brands purchased, (e) higher total expenditure, and (f) higher level of telepresence.

The Effect of Interaction Between Cognitive Style and Ambient Scent on Search Motivation

Studies demonstrate that excitement and mood affect the ability to process information and concentrate. Using MRI, researchers found that emotional stimuli and attention operate within the brain on parallel routes until they are united at a location involving a wide range of thought processing and emotional reactions (Yamasaki, LaBar, & McCarthy, 2002). Researchers suggest that subjects who are emotionally aroused will lose focus on the decision-making process. In addition, people in a positive mood will tend to acquire less new information to avoid overloading their cognitive activities at the expense of their positive mood (Isen, 2000). Another clue regarding the possible effect of scent may be located in the work of Menon and Kahn (2002). These researchers suggest that the arousal level of consumers during a shopping task affects their behavior during the advanced stages of the purchase process. Thus, consumers who experienced a high level of arousal during the first purchase stages or were required to process information in an intense manner during these stages will tend to demonstrate a lower level of aroused behavior during the later purchase stages in order to balance their effort throughout the task. This would be manifested in a lower level of search, a lower tendency to examine new products, and less response to advertising messages during the later purchase stages.

Another clue regarding the possible effect of scent comes from the uncontrollable nature of scent emergence within shopping environments. Deci and Rayn (1985) suggest that people's motivation diminishes when they feel that they have no control over the events or situations in a task. In this case consumer motivation to engage with the task and allocate cognitive effort will be reduced.

The research review up to this point indicates that there are two implications for the presence of scent in the purchase environment. One is a rise in consumer arousal and positive mood and the other is a restriction of motivation to activate and operate the systematic thinking style that demands higher cognitive effort.

The overall findings indicate that the contribution of the systematic cognitive thinking style depends on the presence of scent. Therefore, subjects' search motivation when possessing higher levels of SCTS will be more sensitive to environmental changes as opposed to subjects with a higher level of ICTS. In addition, people who possess an identical level of SCTS and ICTS will demonstrate no effect due to their contrasting implications.

The third and fourth hypotheses are that:

- H3:** Consumers' challenge is affected by the interaction between scent and systematic cognitive thinking style. In a store with no chocolate scent, subjects possessing a higher level of SCTS will be more challenged by the shopping task than people possessing a lower level of SCTS. The reverse will not occur in a store with chocolate scent. Moreover, no interaction will be found between scent and intuitive cognitive thinking style and no interaction will be found between scent, systematic cognitive thinking style, and intuitive cognitive thinking style.
- H4:** Consumers' attention focus on a task is affected by the interaction between scent and systematic cognitive thinking style. In a store with no chocolate scent, subjects possessing a higher level of SCTS will be more focused on the shopping task than people possessing a lower level of SCTS. No effect will be found in a store with chocolate scent. In addition, no interaction will be found between scent and intuitive cognitive thinking style, and no interaction will be found between scent, systematic cognitive thinking style, and intuitive cognitive thinking style.

The Interaction Effect Between Intuitive Cognitive Thinking Style and Scent—and Online Experience—Telepresence

While the above suggests that systematic thinking style increases customer motivation as manifested by a greater focus on the task and treating obstacles as challenges, this is impeded by the appearance of scent in the shopping environment. It seems that the intuitive cognitive thinking style, which is characterized as holistic, hedonic activity, and based on emotions, may interact with scent in the opposite way and may increase consumers' telepresence experience.

The literature review indicates that scent has an effect on exploratory behavior and positive experience. Thus, in a scented shop consumers will predictably report a higher rate of perceived interactivity and a higher rate of perceiving information as vivid than in a non-scented environment. In addition, the literature review on intuitive thinking style indicates that this style promotes associative thinking and pleasure. Thus, the higher consumers' rate of intuitive thinking style, the better they can utilize the interactive capacity of the Web site and the higher their perception of its interactivity. In contrast, systematic thinking style promoting an organized careful process of decision making will not promote exploratory behavior nor consumers' perception of interactivity. The literature review above proposes that the experience of telepresence is promoted by perceived interactivity and the vividness of the information. Moreover, this is an essentially holistic experience, characterized by playfulness and pleasure. Thus, the hypothesis is that in a scent environment consumers with intuitive thinking will be inclined to embrace a higher experience of telepresence than consumers with a systematic thinking style. Another indication of the effect of the interaction between scent and thinking style on telepresence stems from the association between the presence of scent and pleasure and the pleasure component accompanying the experience of telepresence. This hypothesis is confirmed

by Epstein et al. (1996), who suggest that messages consisting of emotions and personal experience are better suited to people with an intuitive thinking style than to those with a systematic thinking style.

The fifth hypothesis is that:

- H5:** Consumers' telepresence is affected by the interaction between scent and intuitive cognitive thinking style. At a shop with no chocolate scent, subjects possessing a higher level of ICTS will perceive more telepresence during the shopping task than people possessing a lower level of ICTS. The reverse will not occur in a shop with chocolate scent. In contrast, no significant interaction will be found between scent and SCTS, and no significant interaction will be found between scent, systematic cognitive thinking style, and intuitive cognitive thinking style.

METHOD

Interfaces and Stimuli

The Store. The store was developed and installed on a UNIX server using a Silicon Graphics computer. The Web site was based on technology allowing representation of three-dimensional images and browsing through the cyberstore (see Figure 1). To guarantee a high response time considering the heavy graphic components in the highly vivid interface, the study was conducted on the Web server itself. The store consisted of two active aisles with shelves carrying a variety of breakfast cereals. In order to simulate an actual store environment, background images of a traditional store, including checkout counters, vegetables, and other products, were depicted. Using a Netscape browser, subjects entered the store Web site. The initial screen displayed a 3D depiction of the store and a control panel. Subjects browsed by using a mouse and control panel keys displayed in the lower portion of the browser dialog box.

By pressing either the up or down arrow key, subjects began by adjusting their "height" in the store. Then they proceeded to move around the store by pressing the mouse (once) and moving it according to the desired coordinates and speed. Selection of appropriate keys on the control panel during the search enabled consumers to raise or lower their eye level, allowing them to focus on the desired contents on the shelves. When interested in focusing on and further examining a brand on the shelf, a double-click on the brand would afford a close-up view. A new window would open, displaying the brand and enabling 3D rotation in order to take a closer or longer look at the product. To terminate the action, subjects indicated whether they wanted to "buy" or "not buy" the brand, thereby returning it to the shelf by pressing the appropriate keys. This sequence constituted a brand "pick-up." Subjects could continue their shopping tour until they decided that they had purchased all the necessary breakfast products.

This software tracked and recorded browsing, purchase activities, and relevant time intervals. The data was stored in a tracking file later decoded in a graphic format (see Figure 2). The main recorded characteristics are as follows:

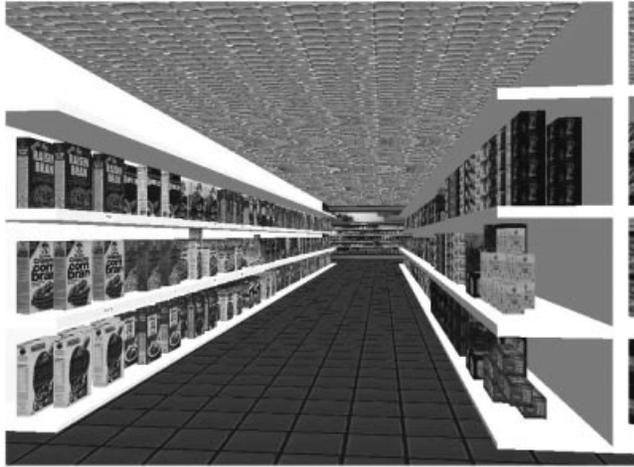


Figure 1. 3D interface environment.

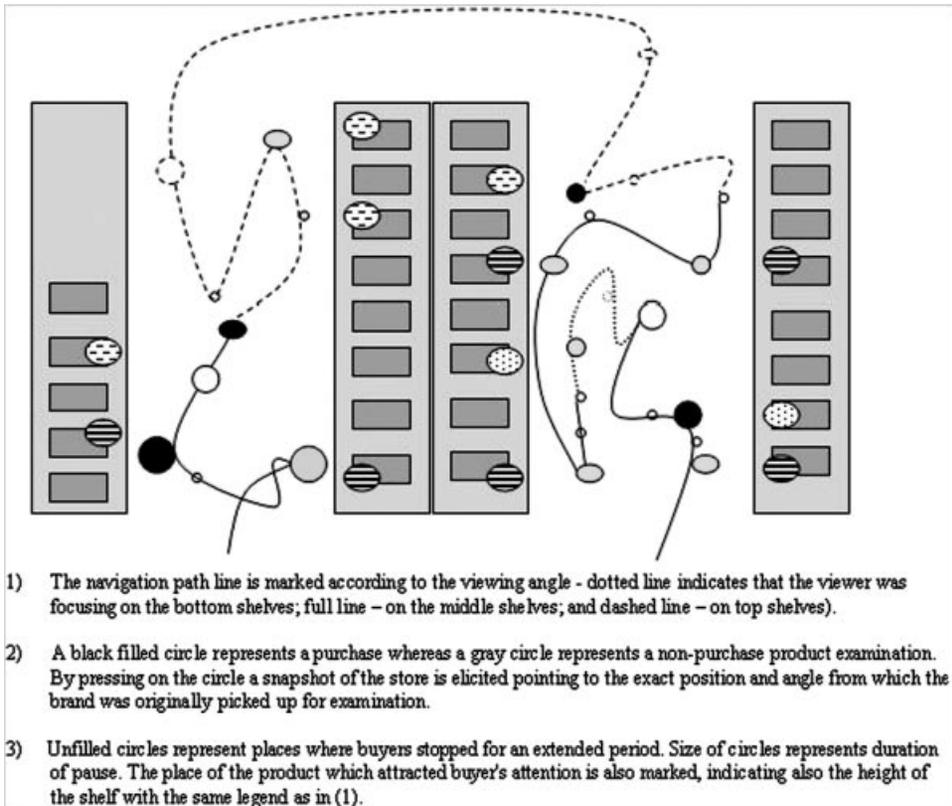


Figure 2. 3D interface log.

- Colored lines between the shelves represent buyers' movements. Different colors represent buyers' viewing angle during navigation (red—bottom shelves; green—middle shelves; blue—top shelves).
- Colored circles represent a product picked up by the buyer. A yellow circle represents a purchase, while a purple circle represents a non-purchase

pick-up. When a circle is chosen, a snapshot of the store is elicited, recalling the exact position and angle from which the brand was originally picked up for examination.

- Unfilled circles represent places where buyers stopped for an extended period of time. Circle size represents duration of stay in the store. The point on the shelf that attracted the buyer's attention is marked as well.

Scnt. This paper examines the effect of ambient chocolate scent on consumer behavior. Chocolate scent was found to possess qualities that affected the mood and arousal of those exposed to it (Sweeney & Wyber, 2002; Baker, Levy, & Grewal, 1992). Knasco (1995) found in her study that subjects exposed to chocolate scent experienced a higher level of positive mood and were able to engage in more positive behaviors than subjects who were not exposed to chocolate scent. Knasco attributed this finding to the caffeine present in chocolate, which increases arousal and satisfaction levels.

Chocolate scent was created by melting 100 grams of chocolate with 25 grams of buttermilk in a pot placed on a concealed stove within the room. To ensure chocolate scent distribution, the melting process began 30 minutes before the first subject began in the experiment. The chocolate was stirred every hour during the experiment.

Pretest

The purpose of the pretest was to examine whether subjects participating in the study noticed the ambient scent of chocolate. The pretest included two groups, each consisting of ten students. The subjects were asked to report if they noticed any specific smell in the lab room. All participants reported noticing the scent of cooked chocolate on the day the chocolate was melted. In contrast, there were no reports of smelling chocolate on the day without chocolate.

Procedure

A total of 57 subjects (40 male, 17 female) participated in the study. The subjects were undergraduate students who participated in the experiment as part of their first-year requirements.

Subjects were randomly assigned to two groups. The first group, consisting of 30 students, was directed to make a purchase in a cyber-store characterized by ambient chocolate scent. The second group (27 students) made its purchases at the same cyber-store with no ambient chocolate scent. All subjects were required to carry out an identical purchase task. The subjects were required to purchase breakfast products in accordance with their regular breakfast budget. All subjects operated individually during separate sessions, minimizing the chances of interaction between subjects.

Following a brief warm-up task and the completion of the actual online task, all subjects were requested to complete a questionnaire regarding their shopping habits and prior shopping experiences (see below). Finally, records of subjects' actual and prior shopping experiences were analyzed for the purpose of comparing behavior patterns.

Measurements

While the parameters of the search process were drawn directly from the log file that tracked the search process, other measurements of prior shopping habits were performed via a questionnaire completed by each subject.

The following parameters were drawn from the online purchase log file: overall time lapse between task initiation and online shopping termination, number of brands examined, duration of brand examination, actual purchases, and cost of products purchased.

A questionnaire proposed by Sagiv et al. (in press) was used for the purpose of measuring cognitive thinking style. Subjects were required to answer ten questions. Following factor analysis, five items were found to be related to SCTS (alpha = 0.86), and three items were found to be related to ICTS (alpha = 0.82). For each question, subjects were required to mark a value, on a range from 1 (representing "untrue") to 5 (representing "very true"). Questions analyzing SCTS were as follows: (1) Before doing anything important, I plan carefully in advance; (2) Before performing a task, I collect all necessary information; (3) I usually make decisions in an organized and systematic manner (4) When I must decide between several options, I analyze each and then choose the best one; and (5) When I do something important, I try to work according to a plan. Questions for analyzing ICTS were: (1) I often act according to my instincts; (2) I know that a certain action suits me when it "feels" right; and (3) When choosing how to act, I follow my inner emotions and feelings.

The questionnaire prepared by Novak, Hoffman, and Yung (2000) was adjusted to measure the extent of focus (alpha = 0.89), challenge (alpha = 0.85), and telepresence (alpha = 0.89) in which subjects engage when surfing the store. Subjects were required to state their attitude toward the following statements on a scale of 1 (completely untrue) to 7 (very true): (1) When surfing the store I am focused; (2) When surfing the store I concentrate fully; and (3) When surfing the store I navigate deliberately and thoughtfully. On the issue of challenge: (1) Using the store challenges me; (2) Using the store challenges me to perform to the best of my ability; and (3) Using the store provides a good test of my skills. On the issue of telepresence: (1) When browsing the site I felt that I was in a world created by the site; (2) When browsing the site, my mind was in this room, not in the world created by the site; (3) When browsing the site, I was physically in this room but my mind was in the world created by the site; and (4) When I exited the Web site I felt as if I had returned to the "real world."

In order to rule out subjects' alternative explanations for search motivation, they were asked to report their age, satisfaction, and Internet experience. Perceived satisfaction was measured by using a standardized "satisfaction questionnaire" constructed by Hoffman, Novak, and Lee (2000). Subjects were required to state their attitude toward the following statements on a scale of 1 (completely untrue) to 7 (very true): (1) When surfing the store I feel happy; (2) When surfing the store I feel satisfied with the store; and (3) When surfing the store I feel pleased (alpha = 0.89). Internet surfing experience was measured by asking subjects to choose one of six options: I have been surfing the net for: (1) Over 3 years; (2) Over 2 years; (3) Over 18 months; (4) Over 1 year; (5) Over 6 months; or (6) Less than 6 months. In addition, subjects were asked to choose one of six options: On average, I surf the net: (1) No more than half an hour a week; (2) No more than 1 hour a week; (3) No more than 1.5 hours a

week; (4) No more than 2 hours a week; (5) More than 2 hours a week; or (6) Not at all.

RESULTS

Table 1 presents the Pearson correlation between the research variables. The first hypothesis (H1) predicted that SCTS will be positively correlated to attention focus and challenge experience. The results indicate that people who possess high SCTS demonstrate significantly higher challenge ($p < 0.05$) and marginally higher attention focus ($p < 0.1$).

The second hypothesis (H2) deals with the effect of the ambient scent of chocolate on subjects' approach behavior as well as on their search and purchase behavior on the Internet. Table 2 presents the effect of chocolate scent on the search and purchase variables of the subjects. An ANCOVA with age as covariate reveals that chocolate scent has a marginally significant effect on shopping duration [$F(1,54) = 2.79, p < 0.1, \eta^2 = 0.01$]. Thus subjects remained longer in a store with chocolate scent than in a store with no chocolate scent. Chocolate scent also affects the number of brands examined by consumers [$F(1,54) = 4.25, p < 0.05, \eta^2 = 0.02$]. The number of brands picked up by subjects at the store with the chocolate scent was greater than the number of brands picked up for examination at the store with no chocolate scent. The results suggest that chocolate scent affects the examination duration of brands picked up by consumers [$F(1,54) = 8.73, p < 0.01, \eta^2 = 0.07$]. Subjects searching at a store with chocolate scent spent more time examining and reaching decisions regarding brands picked up than subjects at a store with no chocolate scent. However, although the number of brands purchased and total expenditure were found to be greater at a store with chocolate scent than with no chocolate scent, the results were not significant ($p > 0.1$). In addition, no significant effect was found for telepresence experience. This finding partially supports the first hypothesis.

Subsequent analysis was intended to examine the interaction between cognitive thinking style and the effect of scent on consumer search motivation and telepresence experience. Specifically, three hierarchical multiple regressions were used to test the extent to which cognitive thinking style moderates the effect of scent on search motivation (focus and challenge) and telepresence experience. The following predictors were entered in the given order: (1) covariant (age, Internet use, and satisfaction); (2) scent and cognitive thinking style; and (3) the predicted interaction (Scent \times SCTS, Scent \times ICTS, and Scent \times SCTS \times ICTS; the latter interaction was examined because subjects may possess both ICTS and SCTS). The entry order of the variables permits examination of whether the variables of interest account for any additional variance in the criterion variable that is not explained by previously entered predictors. The results of the hierarchical regression analyses are shown in Table 3.

H3 suggested that SCTS would decrease subjects' challenge in a store with scent in contrast to a store with no scent. Hierarchical multiple regression indicated that all variables together explained 54% of the variance of perceived challenge in a store [$F(8,43) = 8.51, p < 0.01$]. The majority of the variance measured (43%) was accounted for by the first entry (age and satisfaction). Satisfaction was found to be a significant predictor of challenge, while age was found to be only a partially significant ($p < 0.1$) predictor of challenge. The main

Table 1. Pearson Correlations for Study Variables.

	SCTS		ICST		Challenge		Attention Focus		Telepresence		Shopping Duration		Number of Products Picked Up		Duration Time per Examined Product		Number of Products Purchased	
	No Scent N = 30	With Scent N = 27	No Scent N = 30	With Scent N = 27	No Scent N = 30	With Scent N = 27	No Scent N = 30	With Scent N = 27	No Scent N = 30	With Scent N = 27	No Scent N = 30	With Scent N = 27	No Scent N = 30	With Scent N = 27	No Scent N = 30	With Scent N = 27	No Scent N = 30	With Scent N = 27
ICST	-0.25	-0.20																
Challenge	0.37**	-0.18	-0.02	-0.06														
Attention Focus	0.31*	0.08	-0.19	-0.05	0.71***	0.39**												
Telepresence	0.13	-0.26	-0.13	0.27	0.76***	0.59***	0.64***	0.48***										
Shopping duration	0.41**	-0.25	-0.24	0.1	0.15	0.33*	0.16	-0.04	0.17	0.33								
Number of products picked up per examined product	-0.09	-0.16	-0.20	-0.04	-0.08	0.43**	-0.02	0.06	0.14	0.32*	0.53***	0.84***						
Duration time	0.29	-0.18	-0.38*	0.08	0.23	0.43**	0.36	0.13	0.45**	0.3	0.40*	0.79***	0.41*	0.78***				
Number of products purchased	-0.11	-0.06	-0.36*	-0.10	0.05	0.25	0.02	-0.09	0.14	0.28	0.43**	0.51**	0.73**	0.64***	0.19	0.25		
Expenditure	-0.18	0.21	-0.27	-0.03	0.12	0.09	0.09	-0.21	0.24	0.07	0.44**	0.35**	0.61**	0.40**	0.15	0.07	0.89***	0.84***

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 2. Effect of Chocolate Scent on Consumers' Search Process.

Environmental Effect	Without Chocolate Scent	With Chocolate Scent
Shopping duration (in seconds)*	541 (248)	634 (384)
Number of products picked up***	4.33 (2.09)	5.3 (3.31)
Duration time (in seconds) per examined product**	50.41 (33.53)	72.46 (89.05)
Number of products purchased	3.44 (1.6)	3.93 (1.23)
Expenditure	32.21 (18.01)	37.49 (15.23)
Telepresence	3.25 (2.19)	3.00 (1.7)

Difference between presence and non-presence of chocolate at:

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

effect of scent was found to be partially significantly ($p < 0.1$), while no main effect was found for either cognitive thinking style. However, the observed main effects were qualified by the predicted Scent \times Cognitive style interaction. Thus, the effect of scent on challenge was moderated by systematic cognitive thinking style. In addition, no significant effects were found for Scent \times ICTS or for Scent \times SCTS \times ICTS. To facilitate interpretation of the interactions, simple slope analysis was conducted (Aiken & West, 1991). As shown in Figure 3, the effect of ambient scent on challenge was greater when people possessed a less systematic thinking style. The analysis of slopes is identical to examining simple main effects in ANCOVA split by scent. As hypothesized, differences in systematic cognitive thinking style had a substantially greater effect on subjects' challenge in a store without scent than in a store with scent [for store without scent, $F(1,22) = 5.6, p < 0.01$, and $F(1,22) = 5.8, p < 0.05$ for store with scent]. This finding supports the third hypothesis.

H4 suggested that SCTS would decrease subjects' attention focus in a store with scent in contrast to a store without scent. Hierarchical multiple regression indicated that all variables together explained 67% of the variance for attention focus in a store [$F(8,43) = 13.473, p < 0.01$]. The majority of the variance (61%) measured was accounted for by the first entry (age and satisfaction). While only satisfaction was found to be a significant predictor of attention focus, no significant effects were found for age. Interestingly, no main effect was found to be significantly related to the dependent measure of focus. However, the observed main effects were qualified by the predicted Scent \times Cognitive style interaction. Thus, the effect of scent on attention focus was moderated by systematic cognitive thinking style. In addition, no significant effects were found for the interaction of Scent \times ICTS or for Scent \times SCTS \times ICTS. To facilitate interpretation of the interactions, simple slope analysis was conducted (Aiken & West, 1991). As shown in Figure 4, the effect of ambient scent on attention focus was greater when people had a lower systematic thinking style. The analysis of slopes is identical to examining simple main effects in ANCOVA split by scent. As hypothesized, differences in systematic cognitive thinking style had a substantially greater effect on subjects' attention focus in a store without scent than in a store with scent [for store without scent, $F(1,22) = 6.6, p < 0.01$; no effect found in store with scent]. This finding supports the fourth hypothesis.

H5 suggested that ICTS would increase subjects' telepresence in a store with scent in contrast to a store without scent. Hierarchical multiple regression indicated

Table 3. Regression Analysis of Focus, Challenge, and Telepresence.

	Focus			Challenge			Telepresence					
	R^2_{adj}			R^2_{adj}			R^2_{adj}					
	β	t -Value	(R^2_{cha})	F_{cha}	β	t -Value	(R^2_{cha})	F_{cha}	β	t -Value	(R^2_{cha})	F_{cha}
Control variables												
Age	-0.09	1.06			-0.18	-1.67 ^a			-0.24	-2.14		
Satisfaction	0.82	8.97 ^d			0.59	5.31 ^d			0.55	4.88 ^d		
Δ Step 1			0.61	41.95			0.431	20.35			0.42	19.45
Main effects												
Chocolate scent	-0.26	-0.07			0.21	1.75 ^a			-0.01	-0.05		
SCTS	0.34	0.12			0.07	0.67			-0.11	-0.98		
ICTS	-0.15	-0.05			0.01	0.12			0.09	0.8		
Δ Step 2			0.62	0.988			0.438	1.17			0.41	0.63
			(0.02)				(0.038)				(0.02)	
Interaction term												
Chocolate scent \times SCTS	0.09	-2.68 ^c			-0.3	-3.05 ^d			0.22	2.06 ^b		
Chocolate scent \times ICTS	-0.23	1.08			-0.015	-0.15			-0.00	-0.00		
Chocolate scent \times SCTS \times ICTS	-0.61	-0.71			0.19	1.86 ^a					0.46	2.56
Δ Step 3			0.67	3.32			0.54	4.45			(0.08)	
			-0.07				-0.12					

^a $p \leq 0.1$; ^b $p \leq 0.05$; ^c $p \leq 0.01$; ^d $p \leq 0.001$.

After step 1 (2,54); after step 2 (5,51); after step 3 (8, 48).

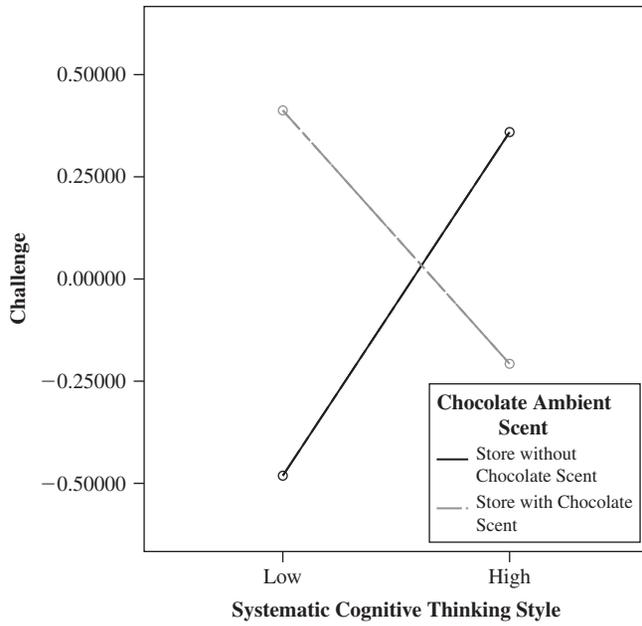


Figure 3. Challenge as a function of systematic cognitive thinking style \times ambient scent interaction.

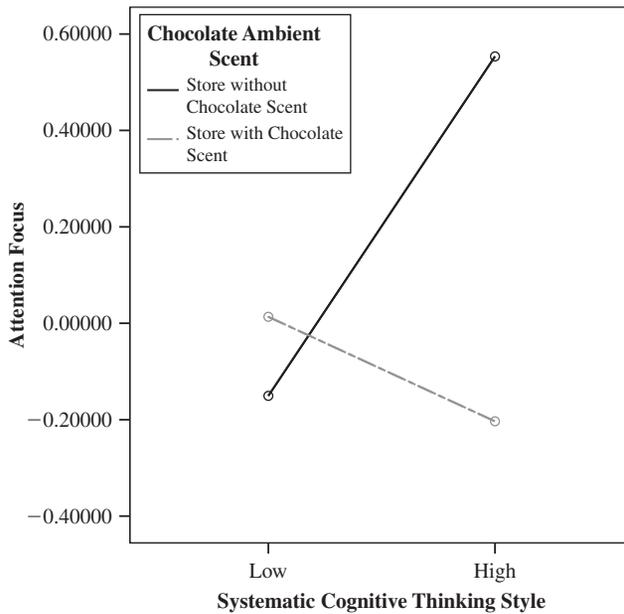


Figure 4. Attention focus as a function of systematic cognitive thinking style \times ambient scent interaction.

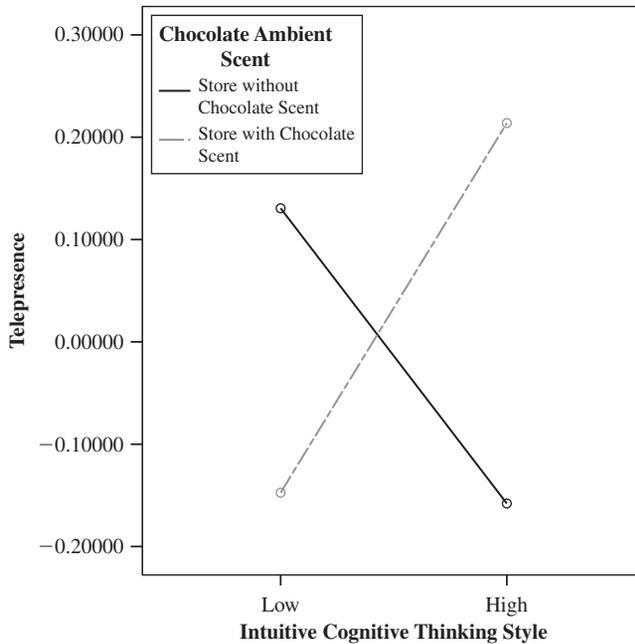


Figure 5. Telepresence as a function of intuitive thinking style \times ambient scent interaction.

that all variables together explained 46% of the variance of telepresence experience in a store [$F(8,43) = 6.45, p < 0.01$]. The majority of the variance measured was accounted for by the first entry (age and satisfaction). Satisfaction and age were found to be significant predictors of challenge. No main effect was found to be significantly related to the dependent measure of telepresence. However, the observed main effects were qualified by the predicted Scent \times Cognitive style interaction. Thus, the effect of scent on challenge was moderated by intuitive cognitive thinking style. No significant effects were found for Scent \times ICTS or for Scent \times SCTS \times ICTS. To facilitate interpretation of the interactions, simple slope analysis was conducted (Aiken & West, 1991). As shown in Figure 5, the effect of ambient scent on telepresence was greater when people possessed a more intuitive thinking style. The analysis of slopes is identical to examining simple main effects in ANCOVA split by scent. As hypothesized, differences in systematic cognitive thinking style had a substantially greater effect on subjects' telepresence in a store without scent than in a store with scent [for store with scent, $F(1,22) = 5.6, p < 0.05$; no effect was found in store without scent]. This finding supports the fifth hypothesis.

DISCUSSION AND CONCLUSIONS

The purpose of the study presented in this article was to expand existing knowledge on the effect of cognitive thinking style on consumer behavior and to suggest that barriers to this effect exist in environmental shopping.

The findings indicate that SCST is correlated with search motivation (H1). Thus, in a store with no environmental distracter, people who possess high SCST

demonstrate higher challenge and marginally higher attention focus. In addition, the findings indicate that scent has an effect on the behavior of online consumers. However, this effect was found only in some of the behavioral variables (H2).

Similar to many earlier studies on the traditional shopping environment (see review by Turley & Milliman, 2000), this study found that the atmosphere of the shopping environment promotes an approach behavior toward the store. Specifically, subjects shopping in an atmosphere with chocolate ambient scent exhibited a higher rate of approach behavior than buyers in an environment with no scent, in relation to the different dimensions of approach behavior. Buyers in an environment with chocolate scent remained at the store longer, examined more brands for a longer period of time, and spent more money than subjects in a store with no chocolate scent. However, in contrast to the study's hypothesis, telepresence experience, which may represent the approach state of mind, was not found to be affected by scent.

Another interesting finding arising from the study was the support for hypotheses H3–H5, according to which personal differences in cognitive thinking style interact with the effect of scent. The validation of hypotheses H3 and H4 demonstrates that subjects possessing high-level SCTS are affected by the presence of scent within their shopping environment, which reduces their ability to perform an effective search process. This type of distraction among subjects possessing SCTS was demonstrated in two dimensions: focus and challenge. However, while in regard to attention focus the interaction effect was found only in a store with no scent, in regard to challenge the interaction effect was demonstrated for both environments, thus emphasizing the validity of the interaction effect.

The final hypothesis, H5, examined the effect of the interaction between intuitive thinking style and scent on subjects' approach-related state of mind during the shopping task. Specifically, H5 suggests that subjects possessing a higher intuitive thinking style have higher perceived telepresence in stores with scent than in stores without scent. The results were found to confirm the fifth hypothesis. While no main effect of scent was found for telepresence, the study indicates that ICTS has an effect on consumers' experience only in stores with ambient scent.

Beyond the effects of interaction with the Web site medium or the effects of the information format display on consumers' behavior (Novak, Hoffman, & Yung, 2000; Mazursky & Vinitzky, 2005), the findings suggest an additional factor affecting consumers' behavior and experience related to external variables in the online store. By emphasizing the interruption effect of environmental variables on the cognitive shopping process, the findings extend the current paradigm of approach behavior. The findings of this study have implications that could be used by Internet site designers and content managers. The study emphasizes the need to consider consumers' shopping environment and personal differences in their cognitive thinking styles. Adjusting the structure of the site, its contents, and its advertising information in regard to consumers' shopping environment could raise consumers' satisfaction level and their loyalty to the site, and ensure that consumers return to the site. Over the past few years, technological efforts have been made to enrich consumers' experience through the use of scents. Such attempts are being made by the Japanese film industry. Based on a new technology developed by the American company Trisenx, British Telewest Labs built a type of hi-tech air freshener that plugs into a PC and

sprays a scent related to the message, making it possible to use scents on the Internet. This could enrich consumers' experience by spreading scents during surfing. The findings of this study demonstrate that the addition of scent is not always desirable and that there is a need to examine the cognitive effects of scent.

The study shows that scent present in the surfing environment has an effect on processes activated during shopping. Moreover, if it is possible to identify the consumers' location and have messages adjusted to that location, it will be possible to provide better messages for the various processes activated by different consumers depending on their surfing location.

Site builders and content developers tend to focus on technological and content considerations in their decision-making process (Amichai-Hamburger, 2002). Marketing research on consumer behavior while shopping via the Internet has so far concentrated on the content presented on the site and on the people-machine interaction occurring during surfing, as well as the effect of the medium on surfers' experience (Novak, Hoffman, & Yung, 2000). The present study expands the field of research that should be explored regarding the evaluation of consumer behavior and consumer experience on the Internet. It demonstrates possible external influences on purchase processes. Thus, site builders can design and transmit contents according to the location of consumers and their type of cognitive thinking. In general, the findings of this study support the claim that consumers at Internet cafés would behave differently than consumers in the lobby of a hotel or at home. The findings suggest research directions aimed at developing theories dealing with the effect of the environment on the behavior of Internet consumers as well as examining the effect of personality on the surfing experience and the online search process.

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