Online information search and decision making: Effects of web search stance

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ABSTRACT

A naturalistic online information search exposes individuals to multiple sites and conflicting perspectives. In this study, we evaluated how the holistic stance of a web search toward a product influences purchasing decisions. We recruited 109 participants who completed an initial product choice task regarding bottled water, a brief Internet search, and then a second post-search product choice task. Internet searches were analyzed to identify query terms, site visits, and stance. Results show that query terms influenced the types of sites obtained in a search, which in turn shaped the overall search stance. Participants were more likely to buy bottled water when they visited websites that emphasized environmental, economic, or health benefits for bottled water (i.e., positive stance). Participants who were asked to focus on environmental issues were less likely to buy bottled water unless packaged in recycled plastic.

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1. Introduction

The Internet has emerged as a widely used tool for information seeking and decision making regarding consumer goods (Darley, Blankson, & Luethge, 2010; Johnson, Moe, Fader, Bellman, & Lohse, 2004; Peterson & Merino, 2003), health (Cline & Haynes, 2001; Eysenbach & Köhler, 2002; Kammerer, et al., 2013), news and politics (Althaus and Tewksbury, 2000; Kruikemeier, van Noort, Vliegenthart, & de Vreese, 2014), and other topics (Chevalier, Dommes, & Marquié, 2015). This popularity of online search stems from the perceived utility of the Internet for accessing information quickly, easily, and effectively (Peterson & Merino, 2003). However, such information is not necessarily neutral—site publishers can influence people by presenting product attributes as desirable or undesirable. Moreover, a naturalistic search likely exposes people to multiple sites that express divergent or conflicting perspectives (Barzilai, Tzadok, & Eshet-Alkalai, 2015; Bhatnagar & Ghose, 2004; Cline & Haynes, 2001; Johnson et al., 2004). Thus, across information seekers, the holistic *stance* of a search (i.e., positive, neutral, or negative toward a product) may vary as a function of the overlapping and unique sites visited.

In this paper, we consider how the aggregate stance of sites encountered during an online search affects individuals' decisions about product purchases. In the following sections, we discuss research suggesting that information seekers tend to employ weak search strategies that may negatively affect the quality of their findings. In addition, research on online advertising and decision making argues that these search experiences can have a significant impact on how individuals make decisions about product purchases. We conclude by summarizing research questions and the

content area (i.e., bottled water) for the current study.

1.1. Depth and quality of search behaviors

Many individuals lack strong digital information literacy skills (van Deursen & van Diepen, 2013; Klein & Ford, 2003; Monchaux, Amadieu, Chevalier, & Mariné, 2015; Van Deursen & van Dijk, 2009), resulting in online searches that may overlook key information or obtain inaccurate data. For example, analyses of large samples of Internet users have observed limited searching. Johnson et al. (2004) tracked site visits from over 10,000 households for music CDs, books, and travel purchases over 12 months. Households visited less than two unique sites per month and category on average, and many households focused on a single retailer. Similarly, Bhatnagar and Ghose (2004) surveyed over 1100 individuals regarding their average duration and number of product-related web searches per month. Most participants (60%) spent less than 20 min in any one search, and 63% conducted two or fewer searches per month. Individuals searched more when making price comparisons or seeking information about product features and availability. Finally, Zhang, Fang, and Sheng (2006) examined searches for music, computer, and air travel purchases. Overall, searchers visited only two to three sites per category, although more expensive items (i.e., computers and travel) were associated with more search depth.

Another problem may be superficial strategies that result in unproductive searches (van Deursen & van Diepen, 2013; Ford, Miller, & Moss, 2005; Klein & Ford, 2003; Kulviwat, Guo, & Enhchanil, 2004; Walraven, Brand-Gruwel, & Boshuizen, 2008; Zhang & Quintana, 2012). Tu, Shih, and Tsai (2008) asked middle school students to find information about energy during a 20-min search. On average, students used fewer than five unique keywords and visited about a dozen websites. When visiting these sites, students often focused on the first URL in the search results and infrequently clicked through embedded hyperlinks to gain deeper information. Such search behaviors were only weakly correlated with correct answers to target questions. Guinee, Eagleton, and Hall (2003) observed that approximately 44% of students' queries used a single key term or phrase, although 37% used a more sophisticated strategy of combining a general term with a more focused topic. When searches failed to return useful results, students relied on haphazard strategies such as abandoning the current search topic or switching search engines.

College-age adults are more skilled but nonetheless demonstrate search-related problems. Wiley et al. (2009) analyzed navigation behaviors for 110 undergraduates asked to learn about volcanoes. Students sometimes failed to distinguish between reliable and unreliable sources, and revisited unreliable sites multiple times, resulting in less successful learning. Similarly, Hargittai and colleagues (Hargittai, Fullerton, Menchen-Trevino, & Thomas, 2010) found that undergraduates also expressed inflated trust in popular search engines—they assumed that the results were valid and paid little attention to sites' credentials. College students with deeper prior domain knowledge can be somewhat more successful by using their knowledge to reformulate challenging queries and use more precise search terms (e.g., Monchaux et al., 2015).

These fundamental search processes and challenges are comprehensively described within the Information Problem Solving on the Internet (IPS-I) framework (Brand-Gruwel, Wopereis, & Walraven, 2005, 2009; Walraven et al., 2008). This model comprises defining the problem and search task, searching for information to answer questions, scanning search results, and then synthesizing and applying the obtained information. Importantly, these stages draw upon challenging and complex cognitive skills and self-regulation (Walraven et al., 2008). For example, early stages of IPS-I require individuals to activate prior knowledge and articulate queries that will guide later information seeking activities. When individuals lack core knowledge or the ability to formulate the right questions (e.g., choosing appropriate search terms) then their searches are less productive. Similarly, evaluative processes (e.g., judging the validity of information or credibility of sources) are critical for understanding when obtained information is useful or should be disregarded. Information seekers must also integrate information from multiple sources to arrive at a conclusion or answer to their queries. Finally, self-regulatory processes operate throughout information seeking to guide and fine-tune the search. Self-regulated searchers plan their search (e.g., prioritize queries), monitor their progress, and adapt their queries (e.g., reword search terms) to target more valid information. Unfortunately, across several reviews and evaluations, researchers have found that individuals of all age levels demonstrate deficiencies across most phases (van Deursen & van Diepen, 2013; Brand-Gruwel, Wopereis, & Walraven, 2009; Walraven et al., 2008; Walraven, Brand-Gruwel, & Boshuizen, 2013). Children and teenagers have demonstrated weaknesses in using prior knowledge to generate meaningful questions, and learners of all ages have difficulties with selecting relevant search terms, evaluating search results and information, and with regulating the entire process smoothly.

In sum, prior research finds that both the extent and quality of online information search may be lacking. Such concerns provide further impetus for understanding the impact of web searches on decision making. Flawed searches may result in biased or uninformed decisions, reduced satisfaction, or other undesirable consequences (Darley et al., 2010).

1.2. Online advertising and site design

A naturalistic online search exposes individuals to both obvious and subtle efforts to sway their perceptions and choices. For instance, advertising exemplifies explicit efforts to guide decision making (Goldfarb, 2014; Karson & Fisher, 2005; Rodgers & Thorson, 2000) via positive claims about product features to encourage purchasing. Research on online advertising has extended foundational work on persuasion to specifically address the online context (Darley et al., 2010; Goldfarb, 2014; Ha, 2008; Karson & Fisher, 2005; SanJosé-Cabezudo, Gutiérrez-Arranz, & Gutiérrez-Cillán, 2009). For example, the Elaboration Likelihood Model (Petty & Cacioppo, 2012) argues that ads sway attitudes by engaging individuals in rational processing about information or by emphasizing heuristic emotional and perceptual cues. Messages eliciting rational processing about bottled water might display the results of water quality studies. Consumers are encouraged to review the data and make a rational choice (i.e., to drink "clean" water). By contrast, heuristic ads might present the product along with a celebrity endorsement. Celebrity opinion has little to do with the utility of a product, but nonetheless might trigger positive associations. Importantly, both modes of persuasion are effective in influencing consumer choice (Petty & Cacioppo, 2012). In the Dual Mediation Hypothesis (Karson & Fisher, 2005; see MacKenzie & Lutz, 1989), rational and heuristic cognitions about online ads and sites influence attitudes about the ad (e.g., perceived truth), which in turn influence cognitions (e.g., product evaluations) and attitudes (e.g., perceived utility and appeal) about the brand. Ultimately, consumers' attitudes toward the online brand guide their purchase intentions.

Darley et al. (2010; see Blackwell, Miniard, & Engel, 2005, and see Punj, 2012) offer a broader descriptive model of online consumer behavior from the perspective of decision making. At the core of this model are five stages: defining questions, information-