



## Inside-outside: Using eye-tracking to investigate search-choice processes in the retail environment



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### ABSTRACT

In the retail environment, attention is requisite to purchase, attention being the collection and assessment of stimuli from our senses (visual stimuli are generally the most important) for cognitive processing according to the needs of the moment. Visual attention is easily and affordably measured today using eye tracking technology. This paper reviews the “state of play” of the use of eye tracking technology as a research tool in retail and retail marketing. The review is timely as during the last decade many non-proprietary eye tracking studies have been published in marketing, consumer behavior, and retail journals, and additional work is expected as the technology gains adoption in consumer research. We reviewed studies that contributed to an understanding of consumer behavior in the gold standard of consumer interface: the retail store. The goal of the paper is to provide a synthesis of retail-focused eye tracking study findings. We present the managerial and theoretical significance of the research as well as an agenda that considers the use of eye tracking from pre-shopping through point of sale.

### 1. Introduction

Attention is the process by which stimuli are selected and integrated for cognitive processing (Phaf et al., 1990) and is an important element of the purchasing process, if only to locate an item in a display or on a shelf. While information is gathered from all our senses, a significant part of the brain is devoted to visual processing (Hagen, 2012), and understanding how visual information is obtained and cognitively processed is useful in many contexts. Attention is often necessary to complete a task, and for the retailer, the essential task is to capture and direct consumer attention to cues or information that ultimately lead to purchase.

Eye tracking (ET) technology has made investigations of consumer shopping and decision making more accessible and affordable. ET has been used to investigate a variety of topics in retail marketing, including packaging (Chandon et al., 2009), display elements (Behe et al., 2015), and in-store signage (Otterbring et al., 2014). Despite the prevalence of online shopping, the retail store remains an extremely important consumer interface; our goal was to synthesize how ET technology is being and could be used to inform the understanding of consumer behavior in the real environment of a retail store.

Intriguingly, a number of online retailers are recognizing the importance of a physical presence and are developing a physical retail presence—Amazon and Shoes of Prey are two examples from opposite ends of the size spectrum. Clearly the days of “realtail” are not yet over.

In comparison to a laboratory setting, a store is complex and full of stimuli deliberately integrated by the retailer. Displays, sounds, and even scents are all designed to attract and often compete for a customer's visual attention to a category, temporary display or product range. There is a myriad of other potential sources of stimuli in-store that can compete for attention. These include other shoppers who invariably (and annoyingly) always seem to complicate the environment; the task itself, which may require the identification of a particular category that will satisfy the underlying motivation; pre- and post-shopping activities that may be competing for attention; electronic devices, and finally retailer-placed stimuli for other categories that are unrelated to the particular task. Thus, visually, a retail store can be enormously complex and the number of stimuli cognitively taxing. ET technology has made it possible to see exactly what a customer is looking at, for how long, and in what sequence. The ability to analyze objective data about what customers look at in store has a consequence of changing the research agenda for academics studying retail and retail

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marketing because it provides some of the most objective measures that may be linked to cognitive processes.

The purpose of this paper is to review and synthesize ET studies related to retailing that have been conducted using ET technology in order to set a research agenda. We provide a summary of the findings of selected research published in major marketing, psychology, retail, and consumer behavior journals. We highlight key findings of benefit to retailers and academics and propose theoretical frames and topics for further study.

We begin with a background and highlight the significance of this review (Section 2) from the perspective of the retail industry and of the use of ET technology as a methodology. The methods by which we identified the studies are discussed in Section 3. The literature is synthesised to reveal a diversity of themes including retail display elements (signage, complexity), study environment (retail or laboratory), consumer involvement, category related expertise, familiarity, decision process, time pressure, and shopper motivation. The synthesis of the review is discussed in Section 4, which frames the paper with a discussion of the link between visual attention, cognition, and information processing. In this section, we also discuss attention to advertising because advertising can serve to prime the consumer prior to the shopping experience (Kwang et al., 2014; Mandel and Johnson, 2002; Otterbring et al., 2014). The three sections that follow report ET studies pertaining to the three categories of retail environments: Section 4.1 identifies pre-shop studies, Section 4.2 focuses on situational influences; Section 4.3 examines the retail shopping environment at the macro-level (store complexity and store environment); and Section 4.4 examines micro-elements in the retail environment including point-of-purchase, display complexity, and product selection. We then move to the identification of a research agenda and end with some limitations of the paper in Section 5.

## 2. Background of problem

In contrast to the usually assumed ‘rational’ consumer engaging in a comprehensive information search, research has demonstrated that typically very little information is required to make a purchase decision (Hansen, 1969; Olson and Jacoby, 1972). Brand recognition has been shown to influence purchase behavior (Hoyer and Brown, 1990), and the brand can be a salient cue that is an important driver in the decision to buy (Chandon and Wansink, 2002; Ehrenberg et al., 1997; Keller, 2013; Nedungadi, 1990), because brands save the shopper valuable cognitive energy and time. Other work supports the notion that the most used cues are brand and price (Dodds and Monroe, 1985; Jacoby et al., 1974; Kardes et al., 2004; Olson and Jacoby, 1972). Collectively, these findings suggest that very little information is processed prior to making a purchase decision, making visual cue selection at the point of purchase of critical interest from both the academic and practitioner perspectives.

Retailers control, combine and use elements of visual marketing (e.g., displays, advertising) to create a retail environment that is easily distinguished to capture consumer attention and assist purchase. Understanding which factors attract visual attention and how these are related to purchase intention or actual purchase will assist retailers in creating an optimal shopping environment. These factors may also have the indirect benefit to the consumer in making the shopping environment more pleasurable and the shopping process more efficient.

More portable and affordable ET devices have revolutionized the consumer research arena with their potential to produce objective evidence to support the link between visual contact, cognition, and product purchase. We reviewed relevant bodies of literature regarding the visual attention-cognition-purchase decision sequence and found few published studies related specifically to the retail environment.

### 2.1. Eye movement and tracking

Eye movement is the fastest movement the human body can make, with approximately 170,000 movements per day (Wedel and Pieters, 2008a) and an average resting time (or fixation) of only 200–500 ms (Rayner, 1998). Eye fixations interact with specialized areas in the brain to process information collected during these fixations. This interaction directs eye movement to stimuli areas that are salient to consumers, the result being purposeful and goal directed eye-movement (Wedel and Pieters, 2008b). That is, fixations do not occur at random, rather the type of information sought, and its relevance to the task at hand, guide eye movement.

ET was developed in the medical field, and rapidly found its way into the consumer research arena. The majority of the early peer-reviewed studies using ET technology investigated the process of reading by following eye-movements (see Rayner's, 1998 article for a 20-year review). In consumer research, peer-reviewed eye tracking studies are growing, but are still sparse (see Wedel and Pieters, 2008a for a comprehensive consumer research review). Linking visual data with consumer behavior theory, especially through cue utilization and information processing, could substantially advance our understanding of the shopping process and the cognitive processes that underpin it.

We found that much of the ET research was motivated by marketing academics seeking to test packages, brands, and advertising theories which may be characterized as study on a micro-level. As retail academics, we wanted to provide a synthesis of the findings for retailers and to note the contributions being made to theories of in-store retail marketing and their underlying practical implications by investigating eye movement at a more macro-level. Useful starting points are Purucker et al.'s (2013) overview of marketing papers using ET technology and Yang and Wang's (2015) review of 28 ET articles published in business journals.

### 2.2. Problems identified in assimilating ET study results

In seeking to understand the use of ET as an instrument to study consumer behavior in retail stores, we encountered two problems. First, there are presumably many proprietary ET studies not published in the public domain. For example, the annual National Retail Federation “Big Show” has featured the results of proprietary studies conducted by Fast Moving Consumer Goods (FMCG) companies in retail settings (Taylor, 2014), but with few details about study methods and findings. There is a lack of transparency about proprietary study findings, and this lack of transparency makes it difficult to assess which store environment cues and aspects of the shopping process have been investigated and thus impossible to place these findings into the current body of literature. Consequently, the lack of transparency hampers establishing an efficient research agenda.

Second, we considered the practical and managerial significance of the findings of the studies. While it is valuable to know and understand consumer focal cues when viewing shelves, displays and other POP (Point of Purchase) cues, the last piece of the puzzle is how that attention translates into product sales. We identified only five studies to date that linked research to actual purchase in the retail environment (Clement, 2007; Clement et al., 2013; Harwood and Jones, 2014; Otterbring et al., 2014; Russo and Leclerc, 1994), and all used packaged goods as stimuli.

These issues led us to further refine our search strategy to include some studies that were not focussed in-store, but dealt with matters such as visual complexity.

## 3. Methods

We began the search for articles by using key words “in-store,” “retail” and “eye tracking studies” on Business Source Complete, Proquest, PsychInfo, Expanded Academic ASAP, Science Citation Index,

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