Eye Tracking for Visual Marketing

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Eye Tracking for Visual Marketing

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Abstract

We provide the theory of visual attention and eye-movements that serves as a basis for evaluating eye-tracking research and for discussing salient and emerging issues in visual marketing. Motivated from its rising importance in marketing practice and its potential for theoretical contribution, we first review eye-tracking research for visual marketing. Then, we discuss the structure of the eye, the visual brain, eye-movements, and methods for recording and analyzing them. Next, we describe our theory and review eye-tracking applications in marketing based on it. We conclude with an outlook on future theory and method development and recommendations for practice.

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1

Introduction

The importance of auditory, gustatory, olfactory, and kinaesthetic stimuli in marketing to consumers can hardly be overstated, but visual stimuli have dominated research, and people are primarily visually oriented. As consumers, we are exposed every day to several hundreds of advertisements on television, in newspapers, magazines, the yellow pages, retail feature ads, and on internet sites, and we experience even more, implicit ads in the form of product packages in stores and at home, visual messages on the side of trucks, road signs, food wrappers in restaurants, on service provider uniforms, t-shirts, CDs, and electronic devices. And the eyes guide consumers across shelves, through aisles, stores, malls, and websites when exploring, searching, and making decisions on products and brands. In all these situations "visual marketing" is relevant, that is, the strategic utilization by firms of commercial and non-commercial visual signs and symbols to communicate with consumers in order to establish and maintain mutually profitable relationships. If indeed "seeing is believing," and "believing is buying," it is important to manage closely what consumers see, and to track this to optimize profitability. This is increasingly recognized in business practice.

In the last decade there has been a rapid growth in commercial applications of eye-tracking technology in the United States, Europe, Asia, and Australia to assess the effectiveness of visual marketing efforts. Firms such as Kraft Foods, Microsoft, Google, Yahoo, IBM, Pepsico, Pfizer, P&G, and Unilever are leading users of the methodology in product and communication development, and in pre- and post-tests of their visual marketing activity. With the increasing demand from marketing practitioners, global providers of eye-tracking data have emerged, conducting hundreds of studies each year. Such commercial research companies include, for example, Colmar Brunton, Eye-Square, the Japanese Institute of Consumer Marketing Research, LC Technologies, the Pretesting Company, Perception Research Services, the Siegfried Vogele Institut for Direct Marketing, Verify International, VisionTrack SR-Research, and Tobii.[1] The growth of eye tracking is partly driven by technological innovations in the development of unobtrusive and precise eye tracking devices and sharp declines in the costs of these devices. Until recently, the commercial use of eye tracking was limited, because it was cumbersome for the participants, time consuming for researchers, and expensive. Moreover, erroneous beliefs in marketing academia and practice about the role and importance of stimulus- and memory-based processes and their interactions hindered progress.

That is, in marketing the study of visual attention through eye tracking was hampered by the view that attention is only a gate through which information enters on its ways to higher-order cognitive processes of more interest, that gaining and retaining attention is easy through contrast and repetition, and that measuring attention with eye tracking is difficult. Moreover, theories of consumer decision making were strongly memory-based, emphasizing the off-line processes well after information intake, rather than the on-line, moment-to-moment

[1] Colmar Brunton (www.cbr.com.au/), Eyetracking.com (www.eyetracking.com), Eye-Square (www.eyesquare.com/), the Japanese Institute of Consumer Marketing Research (www.jmrlsi.co.jp/english/), LC Technologies (www.eyegaze.com), the Pretesting Company (www.pretesting.com/), PRS (www.prsresearch.com/), Psyma (www.psyma.com). The Siegfried Vogele Institut for Direct Marketing (www.sv-institut.de), Verify International (www.verify.nl), VisionTrack (www.visiontrack.com), SR_Research (www.sr-research.com) and Tobii (www.Tobii.com).

processes that co-occur with and are reflected in eye movements across the marketing stimuli of interest. More generally, visual and perceptual processes were neglected in marketing research in favor of a focus on higher-order cognitive processes. That is, marketing theory and practice assumed that information acquisition and decision making were temporally separated, that information acquisition was not a key challenge, and that decision making was rooted in more or less complex manipulations of abstract constructs, that could be assessed by consumers' verbal self-reports and choices. It has become increasingly clear that such views are flawed.

That is, eye movements are tightly coupled with visual attention which makes them eminent indicators of the covert visual attention process. Psychological research reveals that visual attention is not only a gate, as suggested by hierarchical processing models such as AIDA (Strong, 1920; Starch, 1923), but reflects higher-order cognitive processes (Rizzolatti et al., 1994) and is closer to actual behavior than intuition informs us (Russo, 1978; Steinman, 2004). Gaining and retaining attention is difficult, because it is difficult to break through high levels of visual clutter in various media (Burke and Srull, 1988; Keller, 1991; Kent, 1993; Mulvihill, 2002; Schwartz, 2004). Finally, measuring visual attention is now easy with modern eye-tracking equipment. Bettman et al. (1991, pp. 74–75) already lauded the advantages of eye tracking over other methodologies to gain detailed insights into moment-to-moment ad processing and consumer decision making, but pointed out the — then — operational difficulties that prevented the technology to reach its full potential for marketing. This situation has changed in recent years due to new generations of infra-red eye trackers, which enable eye-movement recordings for large quantities of stimuli and consumers under natural exposure conditions at high precision and low cost.

With the current ease of eye-movement recordings and the emergence of a body of theory of visual attention and stimulus-based decision making,[2] the door is open for further research on visual

[2] Here and in the sequel the term stimulus-based decision making obviously does not preclude memory-based processes. Stimulus- and memory-based decision processes jointly

marketing, building on and extending what has already become known in recent years through eye-tracking research. These developments not only provide richer opportunities for marketing practitioners, but also for rigorous academic research on the value of such practices. The history of academic research in this area started in the early 1900s, when Nixon (1924), Poffenberger (1925) and Karslake (1940) applied eye-movement research to determine the attention capture value of magazine and newspaper advertisements with varying sizes, and color and black-and-white ads. After a period of relative silence, in the 1970's there was a revival of the interest in the methodology through the work of Van Raaij (1977), Russo (1978), Treistman and Gregg (1979), and Kroeber-Riel (1979). The 1990's and 2000's have seen a surge of the interest in eye tracking, in part driven by advances in technology. Now a sizable and growing body of literature exists on attention to visual marketing stimuli, including out-door advertising, point-of-purchase material, print ads, catalogues, DM letters, television commercials, shelves, web-pages, and yellow page ads.

Recently, summaries of eye tracking research were provided by Duchowski (2002), and Wedel and Pieters (2007). This survey goes beyond these summaries by (1) providing the foundations of visual attention and eye tracking, (2) providing a conceptual framework for eye-tracking research in marketing, and (3) reviewing the marketing literature within that conceptual framework. We begin with a review of the anatomy of the eye and the visual brain, and of visual and attentional processes.

shape consumer choice. Memory-based decision processes, however, do not require direct stimulus-based input and processes, and we strive to open new roads to understanding the latter in the present work.

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