



JOURNAL OF THE INSTITUTE FOR OPERATIONS RESEARCH AND THE MANAGEMENT SCIENCES

MARKETING SCIENCE

Volume:

Number:

Year:

Title:

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Marketing Science Homepage

<http://bear.cba.ufl.edu/centers/MKS>

Eye Fixations on Advertisements and Memory for Brands: A Model and Findings

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Abstract

The number of brands in the marketplace has vastly increased in the 1980s and 1990s, and the amount of money spent on advertising has run parallel. Print advertising is a major communication instrument for advertisers, but print media have become cluttered with advertisements for brands. Therefore, it has become difficult to attract and keep consumers' attention. Advertisements that fail to gain and retain consumers' attention cannot be effective, but attention is not sufficient: Advertising needs to leave durable traces of brands in memory. Eye movements are eminent indicators of visual attention. However, what is currently missing in eye movement research is a serious account of the processing that takes place to store information in long-term memory. We attempt to provide such an account through the development of a formal model. We model the process by which eye fixations on print advertisements lead to memory for the advertised brands, using a hierarchical Bayesian model, but, rather than postulating such a model as a mere data-analysis tool, we derive it from substantive theory on attention and memory. The model is calibrated to eye-movement data that are collected during exposure of subjects to ads in magazines, and subsequent recognition of the brand in a perceptual memory task. During exposure to the ads we record the frequencies of fixations on three ad elements; brand, pictorial and text and, during the memory task, the accuracy and latency of memory. Thus, the available data for each subject consist of the frequency of fixations on the ad elements and the accuracy and the latency of memory. The model that we develop is grounded in attention and memory theory and describes information extraction and accumulation during ad exposure and their effect on the accuracy and latency of brand memory. In formulating it, we assume that subjects have different eye-fixation rates for the different ad elements, because of which a negative binomial model of fixation frequency arises, and we specify the influence of the size of the ad elements. It is assumed that the number of fixations, not their duration, is related to the amount of information a consumer extracts from an ad. The information chunks extracted at each fixation are assumed to be random, varying across

ads and consumers, and are estimated from the observed data. The accumulation of information across multiple fixations to the ad elements in long-term memory is assumed to be additive. The total amount of accumulated information that is not directly observed but estimated using our model influences both the accuracy and latency of subsequent brand memory. Accurate memory is assumed to occur when the accumulated information exceeds a threshold that varies randomly across ads and consumers in a binary probit-type of model component. The effect of two media-planning variables, the ad's serial position in a magazine and the ad's location on the double page, on the brand memory threshold are specified. We formulate hypotheses on the effects of ad element surface, serial position, and location.

The model is applied in a study involving a sample of 88 consumers who were exposed to 65 print ads appearing in their natural context in two magazines. The frequency of eye fixations was recorded for each consumer and advertisement with infrared eye-tracking methodology. In a subsequent indirect memory task, consumers identified the brands from pixelated images of the ads. Across the two magazines, fixations to the pictorial and the brand systematically promote accurate brand memory, but text fixations do not. Brand surface has a particularly prominent effect. The more information is extracted from an ad during fixations, the shorter the latency of brand memory is. We find a systematic recency effect: When subjects are exposed to an ad later, they tend to identify it better. In addition, there is a small primacy effect. The effect of the ad's location on the right or left of the page depends on the advertising context. We show how the model supports advertising planning and testing and offer recommendations for further research on the effectiveness of brand communication. In future research the model may be extended to accommodate the effects of repeated exposure to ads, to further detail the representation of strength and association of memory, and to include the effects of creative tactics and media planning variables beyond the ones we included in the present study.

(Brand Advertising; Visual Attention; Brand Memory; Hierarchical Bayes)