

Eye Tracking as a Research Method in Social and Marketing Applications

Mike Horsley

Human behaviour is incredibly complex and astoundingly broad. As a result, many disciplines have been developed to study it in great detail. Each discipline develops its own unique shared understandings and common discourse and professional community of researchers. Each discipline also develops various research paradigms and assumptions which create boundaries between other disciplines in exploring and investigating human and physical phenomenon (Kuhn 1962). Central to developing research paradigms are research methodologies—the accepted and foundational ways that researchers in a discipline support—to more deeply understand and investigate the world.

Although individual disciplines develop unique and different research methodologies and processes that pertain only to their own discipline, many research methodologies are shared across disciplines. This sharing is an increasing phenomenon in cross-disciplinary and multi-disciplinary studies. Eye-tracking research methodologies have existed for a considerable time (Wade and Tatler 2011). However, spurred on by developments in eye-tracking technologies and analysis software, and increasingly mobile and low-cost eye tracking, the applications of eye tracking are continuing to spread from discipline to discipline.

Eye movements are at the core of many human behaviours (Wade and Tatler 2011). So examining eye movements during behaviour is providing a new and powerful opportunity to develop a new research methodology across disciplines. This is the focus of this section, to present a series of research studies that utilise eye-tracking technologies and research methods in a wide range of social applications—from investigating forged signatures (Dyer, Found, Merlino, Pepe and Sita 2013) to using saccades to assess cognitive decline in ageing (Bowling and Draper 2013). The centrality of eye movement to so many human behaviours means that the application of eye-tracking research approaches to social and marketing research problems will continue to both expand and deepen.

M. Horsley (✉)
Central Queensland University, Noosaville, Australia
e-mail: m.horsley@cqu.edu.au

1 Core Eye-Tracking Research Methods in Social and Marketing Applications

Concomitant with the increasing application of eye-tracking methodologies to a range of social and marketing research is the development of some core research processes in investigating eye movements in these applications. Increasing use of fixation and saccade analysis through heat maps, AOI, and descriptive and inferential statistical procedures provide new ways of approaching the measurement of cognitive processes and information requirements during behaviour. The development of benchmarks and measures, comparison of different groups in relation to their eye movements and explanations of the relationship between the visual and underlying cognitive and physiological processes are beginning to constitute a new research paradigm (Kuhn 1962). This paradigm has a common core of eye-tracking research elements. This common core of research elements is increasingly being deployed across myriad social behaviours. This can be seen in Table 1.

Table 1 illustrates a core set of research methodologies, based on eye tracking that are increasingly seen at the core of social and marketing applications.

2 Area of Interest Analysis in Social and Marketing Applications

Area of interest (AOI) analysis involves the use of eye-tracking software to explore fixation duration, frequency and return between the different elements, parts or components in any visual scene or visual display. AOI analyses are increasingly used in social and marketing applications to investigate the differences between various groups. As a result, AOI analysis is present in three of the chapters presented in Part 3. AOI analysis is a key research procedure in use when researchers wish to examine and investigate the differences between novice and expert groups. The use of AOI methods and novice and expert comparisons reveals rich insights into learning and development. AOI and expert and novice analysis can also be useful in understanding the nature and visual structure of expertise.

3 Gaze Plots, Heat Maps and Scan Plots in Social and Marketing Applications

Gaze plot, heat map and fixation analysis explore the structure and development of gaze. Fixation analysis allows researchers to explore and investigate the structure of attention and distraction in scenes and visual displays. Gaze and scan path analysis provide a new ways of investigating and exploring the actual structure of

Table 1 Disciplines, research problems and eye-tracking research methods used in research applications given in Part 3

Authors	Discipline	Research area/problem	Eye-tracking research methods
Grigg, Griffin	Accounting	Understanding what readers see in financial report	AOI analysis, gaze plot analysis, novice and expert comparisons
Harwood, Jones	Marketing	Consumers visual attention in a retail environment	Content analysis, coded fixations, saliency analysis, groups comparisons
Li, Breeze, Horsley, Brierly	Marketing	Efficacy of retail marketing tools, reading direction and efficacy of brand motions	Stimulated recall, AOI analysis, fixation analysis: – counts duration
Dyer, Found, Pepe, Merlino, Rogers, Sita	Writing	Evaluating signature forgeries	AOI analysis scan path and gaze plot analysis novice and expert comparisons
Bowling, Draper	Aging	Impact of ageing and eye movements	Saccade analysis, older and younger comparisons
Chen	Social anxiety disorders/mental illness	Psychosocial stress simulation	Fixation analysis, fixation detection algorithms

looking and eye movements. Eye movements are not conscious and are extremely rapid (Wade and Tatler 2011). In addition, the visual system is highly automated (Kahneman 2011), and attention requires significant cognitive energy. How vision is structured through eye movements over scenes and displays can be investigated through gaze plot and scan path analysis, saccade data and algorithms and forms of saliency analysis. These types of eye-tracking research methods form the basis of three of the research projects and studies in three of the chapters in Part 3.

4 Stimulated Recall in Social and Marketing Applications

The inclusion of video playback for subjects being eye tracked and the ability for subjects to observe their own gaze plots is now a feature of new eye-tracking technologies and software. Sometimes called think aloud or stimulated recall, this feature of recent eye tracking provides a new way for researchers to investigate social and marketing phenomena by linking the thoughts of subjects to the underlying processes guiding the structure of their eye movements and gaze plots. A number of new studies are beginning to use the power of the simulated recall methodology to investigate the social and cognitive process underlying eye movements. This section includes one chapter that employs this important research method.

References

- Kuhn, T. (1962). *The structure of scientific revolutions*. Chicago: University of Chicago Press.
- Wade, N. J., & Tatler, B. W. (2011). Origins and applications of eye movement research. In S. Liversedge, I. D. Gilchrist & S. Everling (Eds.), *Oxford handbook on eye movements* (pp. 17–46). Oxford: Oxford University Press.
- Kahneman, D. (2011). *Thinking, fast and slow*. Macmillan