EYE MOVEMENT RESEARCH METHODS

Editorial

“The eye is window to the soul.” This familiar proverb is (according to a recent Google search) variously attributable to a number of unverifiable sources. (The Bible, at least, can be ruled out, along with Shakespeare.) A more concrete “earliest” reference to a description of eye movements comes to us via Carpenter (1977, p. 1), who directs our attention to the 1599 work of Andreas Laurentius:

If the eye stooode fast, and immoveable, we should be constrained to turne our head and necke (being all of one peece) for to see: but by these muscles it now moveth it selfe with such swiftnes and nimblenes, without stirring of the head, as is almost incredible . . .

These swift and nimble movements of the eye were first formally recorded by Delabarre in 1898, who tied a silk thread between a corneal ring (plaster of paris fit to a cornea anesthetized with cocaine) and the recording lever of a smoked-drum recorder. To achieve more precision (and comfort), shortly thereafter Dodge and Cline focused a corneal reflection onto a moving strip of film to track horizontal saccades (Woodworth, 1938). Ever since, the tracking of gaze has provided a fertile dependent variable for studies of reading and cognition in the psychology laboratory. Tracking reflections from the cornea remains one of the most commonly used methods of determining where foveal vision is directed.

In recent years, the study of the direction of the gaze has provided researchers with a convenient, and increasingly sophisticated, window on the mechanisms of perception and cognition. In recognition of this progress, the current issue of *BRMIC* has followed up on the Eye Tracking Research & Applications (ETRA) Symposium 2002, held in New Orleans on 25–27 March 2002 under the auspices of the Association for Computing Machinery (see <http://www.vr.clemson.edu/eyetracking/etra/2002>).

A half dozen of the papers in this special issue are expanded versions of work reported at that conference. Another dozen were received in response to the Call for Papers for this special issue of *BRMIC*. All accepted papers have undergone external review and careful revision. I am grateful to all the authors who submitted papers for the special issue; for the energy, wisdom, and generous commentaries contributed by the expert reviewers; and for the inspiration and assistance of Andrew T. Duchowski, Roel Vertegaal, and John W. Senders, organizers of the ETRA conference.

The present collection of articles begins with a survey (Duchowski) of research that exploits eye tracking. The next four papers explore interactions between speech perception and reading (Inhoff, Connine, & Radach); the time course of information processing during fixations (McConkie & Loschky); cognitive processing of peripheral information (Reingold & Loschky); and the perception of isoluminant stimuli by monitoring pursuit tracking (Collin & Chauduri).

Acquisition of data in specific performance situations is the topic of the next four papers: the automated acquisition of eye-tracking data from the general population (Wooding et al.) and the reduction and presentation of the large corpus of data that resulted (Wooding); eye movement patterns during automobile driving with secondary tasks (Sodhi, Reimer, & Llamazares); and scanpaths during Web viewing (Josephson & Holmes).

Technically innovative papers describe the high-speed tracking of eye movements (including torsional rotation), either by using CMOS sensors (Clarke et al.) or by using a laser scanner (Irie et al.); Duchowski et al. describe the use of eye tracking in 3-dimensional virtual environments.

Several papers address the technical challenges of experimentation and data reduction. They include methodological techniques to help maintain equipment calibration during experiments (Hornof & Halverson); MATLAB routines both for the postexperimental processing of eye-tracking data (Gitelman) and for real-time data acquisition using the Psychophysics Toolbox (Cornelissen et al.); and an algorithm for measuring the curvature of saccade trajectories (Ludwig & Gilchrist). Finally, Hartnegg and Fischer describe an apparatus for the convenient evaluation of oculomotor function in clinical diagnosis.

I am grateful to all the authors for sharing their work with *BRMIC*, and trust that the papers collected here will prove to be useful to the many researchers interested in the movements of the eyes.

REFERENCES

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