Eye Tracking, Individual Differences, and Attention in Associative Learning

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Abstract

Previous research has suggested that people learn to selectively attend to specific cues, in the associative learning phenomena of *blocking* and *highlighting* (Kruschke, 1996, 2003b; Kruschke & Blair, 2000). A connectionist model that implements attentional shifting and learning has fit a variety of detailed choice data (Kruschke, 2001a, 2001b, 2003a). In all that research, however, attention is assumed to be a covert cognitive process that corresponds to certain intervening variables in a mathematical model.

The research described here is based on two additional hypotheses: First, overt eye gaze reflects covert attention. Second, the degree of attentional shifting and learning varies across individuals, but is relatively stable within individuals. We measured eye gaze (see Figure 1) while people learned both blocking and highlighting procedures.

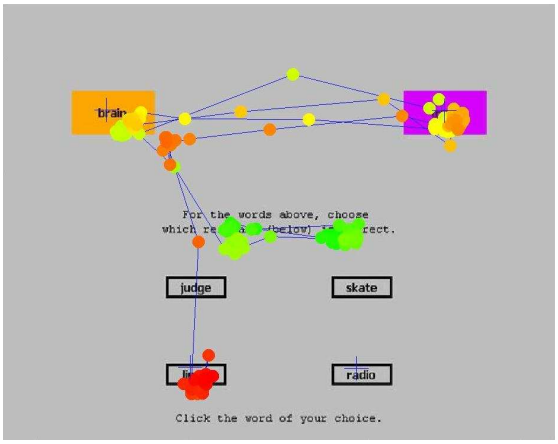

Figure 1. Example of a stimulus display with an eye-gaze trajectory superimposed.

The results revealed differential gaze duration corresponding to differential covert attention, confirming hypothesis 1. The magnitude of the blocking and highlighting in choice preferences varied across individuals, as did the magnitude of differential gaze. These magnitudes were reliably correlated across individuals (see Figure 2), confirming hypothesis 2.

Correlated individual differences in choice and gaze are accounted for by a connectionist model (see Figure 3) in which the attentional parameters are set higher or lower. Other parameters in the model do not predict the results, nor do various other non-attentional models of blocking or highlighting.

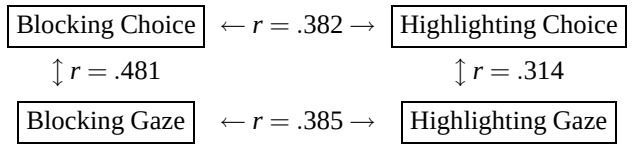

Figure 2. Correlations, across individuals, of magnitude of blocking or highlighting, assayed by choice or gaze preference.

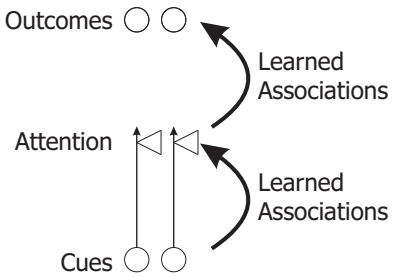

Figure 3. Architecture for connectionist models of attention.

Acknowledgments

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