

Models of Eye-Movement Control During Reading

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Models of eye-movement control during reading can be classified along two theoretical dimensions: (1) the degree to which cognitive processes (e.g., word identification) influence the moment-to-moment decisions about when to move the eyes; and (2) whether attention is allocated serially, from one word to the next, or allocated in parallel, across more than one word. This symposium will provide a forum to review four of the models that represent four distinct positions along these theoretical dimensions. The models that will be discussed include: (1) the *Competition-Inhibition model* (Yang & McConkie, 2001); (2) *E-Z Reader* (Reichle, Rayner, & Pollatsek, 2003); (3) *Glenmore* (4); and *SWIFT* (Engbert, Longtin, & Kliegl, 2002). A comparative analysis of the models will then examine how these models account for a variety of independent variables that are known to affect eye movements during reading, including: word length, word frequency, word predictability, orthographic regularity, morphological complexity, and strategic modulation of eye movements (e.g., careful reading vs. skimming). This comparative analysis will examine how the models account for each of the preceding variables and their effects on a number of dependent measures, including: various commonly used word-based measures (e.g., first-fixation duration, gaze duration, probability of skipping, number of fixations), measures of saccade amplitude, and fixation locations. Finally, the comparative analysis of the models will also include a discussion of various phenomena (some of which are currently disputed to exist) that have been predicted by and used to evaluate the models of eye-movement control. These phenomena include: (1) the general shape of the landing-site distributions and how they are affected by saccade length (i.e., systematic range error) and launch-site fixation duration; (2) the effect of the optimal-viewing

position on the probability of making a refixation; (3) the inverted optimal-viewing position effect on first-fixation durations; (4) the effects of parafoveal preview on fixation durations; (5) the attenuation of the parafoveal preview effect due to foveal processing difficulty; (6) parafovea-on-fovea preview effects; (7) the lagged (spill-over) effects of word difficulty; and (8) the fixation duration costs that have been associated with word skipping. This discussion will focus on how—rather than how well—the models explain these phenomena, and will emphasize unique predictions so as to provide points of maximum contrast among the models.

References

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