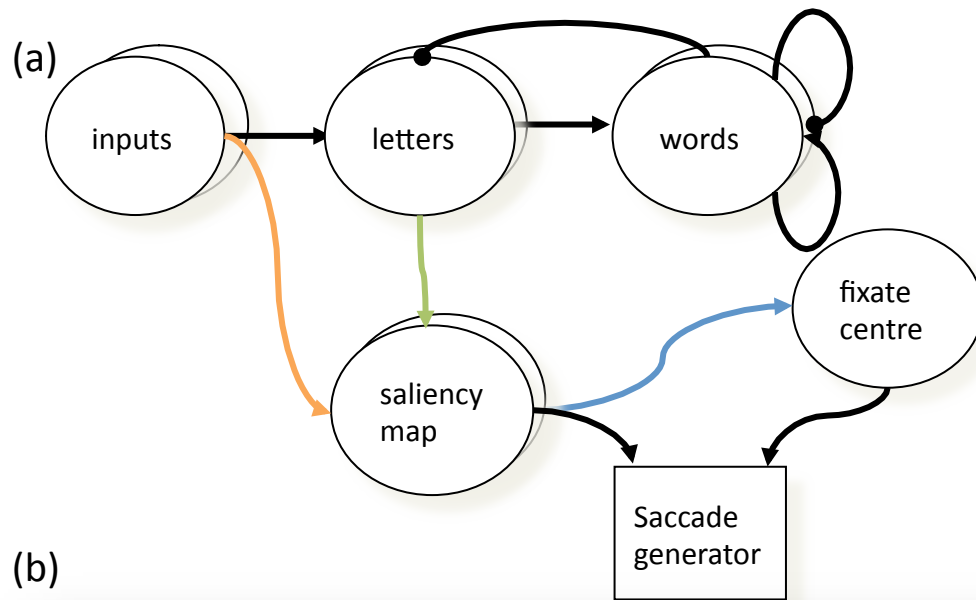


The Glenmore Model



A central assumption of Glenmore is that at the beginning of each fixation low-level visual information, coded as a saliency vector, is available that allows for target selection and the triggering of a saccade without any cognitive influence. During a fixation, the saliency values will change in response to incoming information about linguistic processing. Figure (a) illustrates the overall architecture of the model and Figure (b) represents an instance of the model processing the text fragment “an open box.”

In addition to the saliency map, other key elements are a visual input module, a competitive word-processing module where several words can be simultaneously active during a fixation, a fixate centre, and a saccade generator, which produces the actual saccadic movement. The visual input vector is basically a representation of the current perceptual span and codes the visual configuration around the fixation position. The relatively sharp drop-off in processing performance as a result of letter eccentricity is accounted for by implementing an asymmetric input processing function. From the input units, visual information is transferred to the saliency map and to a linguistic processing module that implements processing on the letter and word level within an interactive activation (IA) framework. In the saliency map, saliency values for individual positions within the vector are calculated as an additive function of bottom-up visual activation from the input units and top-down letter and (indirectly) word activation. At the letter level, initial activation from the input units decays unless slowed by top-down inhibition from the word level.

The time course of activation at the word level is a function of both competitive inhibition from neighboring words and a word's frequency; high frequency words reach activation and are removed from competition more rapidly than low frequency words. Frequency effects are implemented as a recurrent link weighted by the word's log frequency. Competition is implemented by inhibitory connections between words. Words feed back to the letter level with inhibitory links that serve to slow the decay of the letter units. The vector of letter unit activation is transmitted to the saliency map, where it is used to continuously modulate the saliency values of potential saccade targets. Feedback on the global level of excitation in the saliency network is transferred to the fixate centre. The actual triggering of a saccade is based on activity in a fixate module that operates in conjunction with the dynamics of spatial saliency. The saccade will be executed by the saccade generator after a latency period and will always be directed to the word target with maximum saliency at the time of commitment.