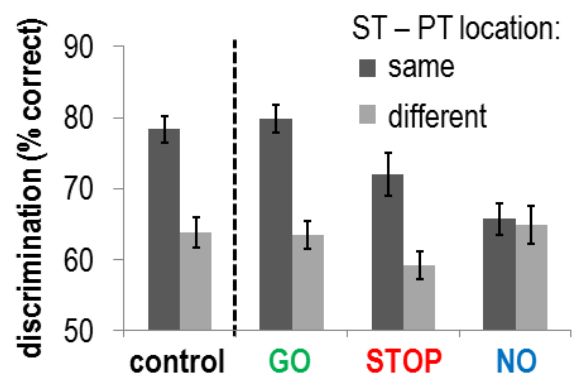
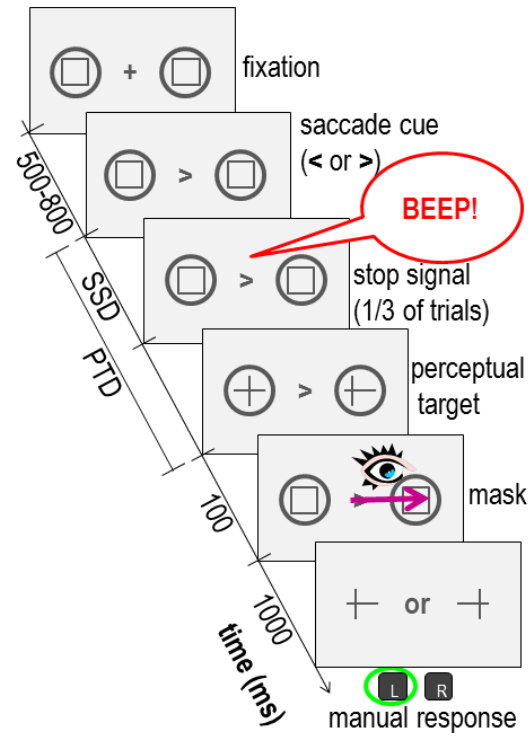


Pre-saccadic perceptual facilitation effects depend on saccade execution: evidence from the stop-signal paradigm

Born S, Mottet I, Kerzel D. (2014) Pre-saccadic perceptual facilitation effects depend on saccade execution: evidence from the stop-signal paradigm. *Journal of Vision*, 14(3):7, 1–10.

Prior to the onset of a saccadic eye movement, perception is facilitated at the saccade target location. This has been attributed to a shift of attention. To test whether pre-saccadic attention shifts are strictly dependent on saccade execution, we examined whether they are found when observers are required to cancel the eye movement. Subjects made saccades as quickly as possible to a cued location while discriminating a perceptual target (PT) either at the saccade target (ST) or at the opposite location. The typical finding indicative of an attention shift in this task is a spatial congruency effect: Discrimination is substantially better when the perceptual target is presented at the saccade target location compared to when the location of the saccade and the perceptual target do not coincide. In our setup, an acoustic stop signal was presented on a subset of trials, asking subjects to cancel the eye movement. When saccades were successfully inhibited (NO saccade), no spatial congruency effects were found. Thus preparing an eye movement without subsequently executing it does not result in an attention shift. When a saccade was erroneously made despite a stop signal (STOP saccade), a strong spatial congruency effect was found that did not differ in magnitude from the one found for correct saccades on trials without stop signal (GO saccade) or from the one found in the CONTROL blocks. This suggests that pre-saccadic attention shifts are obligatory for all saccades. The results point to a potential difference between what one may call saccade *preparation* and saccade *programming*. While the *programming* of saccades, which is the last step before saccade execution, entails obligatory shifts of attention, saccade *preparation*, which does not necessarily result in a saccade, is relatively independent of attention. The tight link of pre-saccadic attention shifts to actual saccade execution and their robustness against ongoing cancellation processes might speak for the involvement in processes for maintaining visual stability across eye movements.



Participants made a left or right saccade. A perceptual target (PT) was presented either in the circle targeted by the saccade (ST) or opposite. On some trials, an acoustic stop signal instructed participants to withhold their saccade. Spatial congruency effects indicative of attention shifts (i.e., better perceptual discrimination on *same* location trials) were found for all saccades, even if the saccade was meant to be inhibited (STOP). No spatial congruency effect was found when the saccade was successfully cancelled (NO).