



AB048. Pre-saccadic attentional facilitation is influenced by irrelevant post-saccadic changes

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Background: Many studies have shown that attention is shifted toward the goal of the upcoming saccade. It has been suggested that the purpose of this attentional shift is to aid in trans-saccadic integration by acting as a 'pointer' (Cavanagh, Hunt, Afraz & Rolfs, 2010) for remembering, processing and updating objects across saccadic eye movements (Rolfs, Jonikaitis, Deubel & Cavanagh, 2011). We tested this hypothesis that pre-saccadic attentional facilitation acts as a pointer for trans-saccadic integration by investigating how irrelevant post-saccadic changes influenced pre-saccadic attentional discrimination. On one hand, if pre-saccadic attentional facilitation is an independent process involved only in enhancing peripheral information before the saccade, then manipulating visual information (absence or shift) after the saccade should have no influence on discrimination. On the other hand, if pre-saccadic attentional facilitation is involved in trans-saccadic integration, changes in visual information should influence discrimination of the pre-saccadic information.

Methods: We tested different conditions involving different post-saccadic changes. In the baseline condition, participants made a saccade at the appearance of an arrow and discriminated a symbol (DS) that was presented briefly before the saccade at one of six peripheral locations. The symbol was masked thereafter with a figure 8, which remained till the end of the trial. Importantly, the DS was always presented while participants were fixating at center, and only the figure 8 was present at the end of the saccade. Participants were instructed to make the saccade then report the identity of the DS (4AFC). We then tested how blanking post-saccadic information [blanking of the saccade goal (SG) location, DSOFF condition; of the entire visual scene including or excluding the SG location, AllOff and DSOFF conditions] and how displacement of the figure 8s after the saccade would affect performance.

Results: We observed that discrimination performance was significantly lower when the SG location disappeared during the saccade and was no longer present when the saccade was completed (DSOFF, -6.9%). This decrease in performance cannot be attributed to changes in the visual scene that may have drawn attention, as this was the case for all conditions; performance was not different when the entire visual scene was blanked (AllOff, -0.0%) or when only the DS remained (DSOFF, -1.6%). We also found that the performance decreased as a function of the displacement of the figure 8 from the SG location, particularly if it was displaced outside of the saccade landing zone.

Conclusions: Based on these pattern of results, we suggest that pre-saccadic attentional facilitation is indeed involved in trans-saccadic integration by acting as a location marker or pointer. The lack of a visual target at the saccade goal, even if it is irrelevant to the pre-saccadic discrimination task, disrupted performance.

Keywords: Saccadic eye movements; trans-saccadic integration

doi: 10.21037/aes.2018.AB048

Cite this abstract as: Bleau M, Laurin AS, Malienko A, Tran T, Pisella L, Khan AZ. Pre-saccadic attentional facilitation is influenced by irrelevant post-saccadic changes. *Ann Eye Sci* 2018;3:AB048.