

## Perisaccadic perception: temporal unmasking or spatial uncrowding?

Antimo Buonocore<sup>1</sup>, Alessio Fracasso<sup>2</sup>, David Melcher<sup>1</sup>

<sup>1</sup>Center for Mind/Brain Sciences, University of Trento, Rovereto, Italy

<sup>2</sup>Experimental Psychology, Helmholtz Institute, Utrecht University, Utrecht, the Netherlands.

Stimuli briefly presented around the time of saccades are often misperceived in terms of their spatial or temporal attributes. Recently, evidence for a peri-saccadic reduction in crowding was reported, interpreted in terms of remapping of receptive fields (Harrison et al., 2013). However, that study used forward and backward masks and weak (always vertical) flankers, creating a “super-crowding” paradigm rather than “pure” spatial crowding (Vickery et al., 2009). We investigated whether these effects are better explained by spatial (pure crowding) or temporal factors (masking), as well as investigating the role of the pre-saccadic shift of attention (van Koningsbruggen & Buonocore, 2013).. In two experiments, we independently varied the distance from target to flankers, the presence of forward and backward masks and whether or not participants made a saccade. Moreover, we controlled for the orientation of the flankers (all vertical or randomized orientation). First, we replicated the pattern of crowding during fixation using masked stimuli but we also found that much of the decrement of performance with the super-crowding display was explained by temporal masking rather than only spatial crowding. Moreover, the level of crowding obtained with random rather than vertical flanker orientations was stronger than the super-crowded display alone, reinforcing the hypothesis of a greater temporal than spatial effect. Second, we replicated the finding of a small peri-saccadic improvement in performance with super-crowding displays as in the original study but found a different pattern in the pure crowding version without masking. Overall, our pattern of results was consistent with a general benefit from the well-known pre-saccadic shift in attention towards the saccade target. These results are consistent with models of peri-saccadic shifts in receptive fields towards the saccade targets rather than spatial remapping.

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