Authors: Adam P. Morris, Charles C. Liu, Simon J. Cropper, Jason D. Forte, Bart Krekelberg & Jason B. Mattingley

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Abstract: Saccadic eye movements are crucial for exploring the visual world, yet little is known about how information from sequential fixations is combined in the visual system. A recent report claimed that perceptual stability across saccadic eye movements is achieved by temporally integrating sensory signals in *spatial* rather than *retinal* coordinates. This conclusion was drawn from psychophysical data in which perceptual sensitivity for a weak motion signal presented shortly after a saccade is enhanced when it is preceded by a second, 'priming' motion signal prior to the saccade at the same spatial position. We tested an alternative hypothesis in which this 'preview advantage' is attributed to factors that reduce the influence of noise at a post-sensory stage of the perceptual decision process. Three experiments examined the effect of varying the temporal uncertainty associated with the onset of motion signals on the magnitude of the preview advantage. When the onset of motion was anticipated by a tone, which allowed the temporal allocation of attention and exclusion of flanking noise from the decision process, the preview advantage was obliterated. Two further experiments examined the spatial and directional selectivity of the integration mechanism. A similar preview advantage was observed irrespective of whether the two motion signals occupied the same or different spatial locations, and whether they contained the same or opposite directions of motion. Taken together, these findings are inconsistent with a sensory-summation explanation for the trans-saccadic perceptual advantage. Instead, the data are consistent with a model in which the individual motion signals are processed independently at the sensory stage, but combined at the level of decision-making either by (near) optimal statistical inference, or by probability summation (e.g., a max rule). This alternative explanation accounts for the preview advantage without positing the existence of novel sensory-level mechanisms such as spatiotopic temporal summation. Moreover, the absence of spatial and directional selectivity revealed by these experiments suggests that the integration mechanism is not suitable for stabilizing visual perception across eye movements.