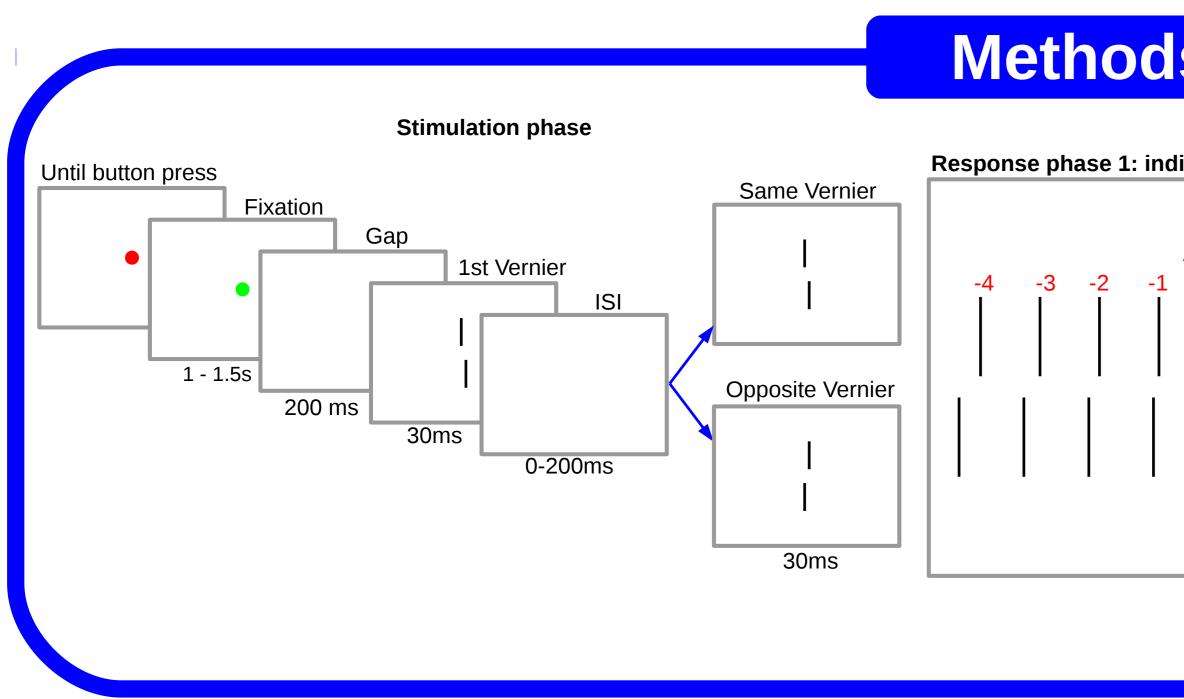
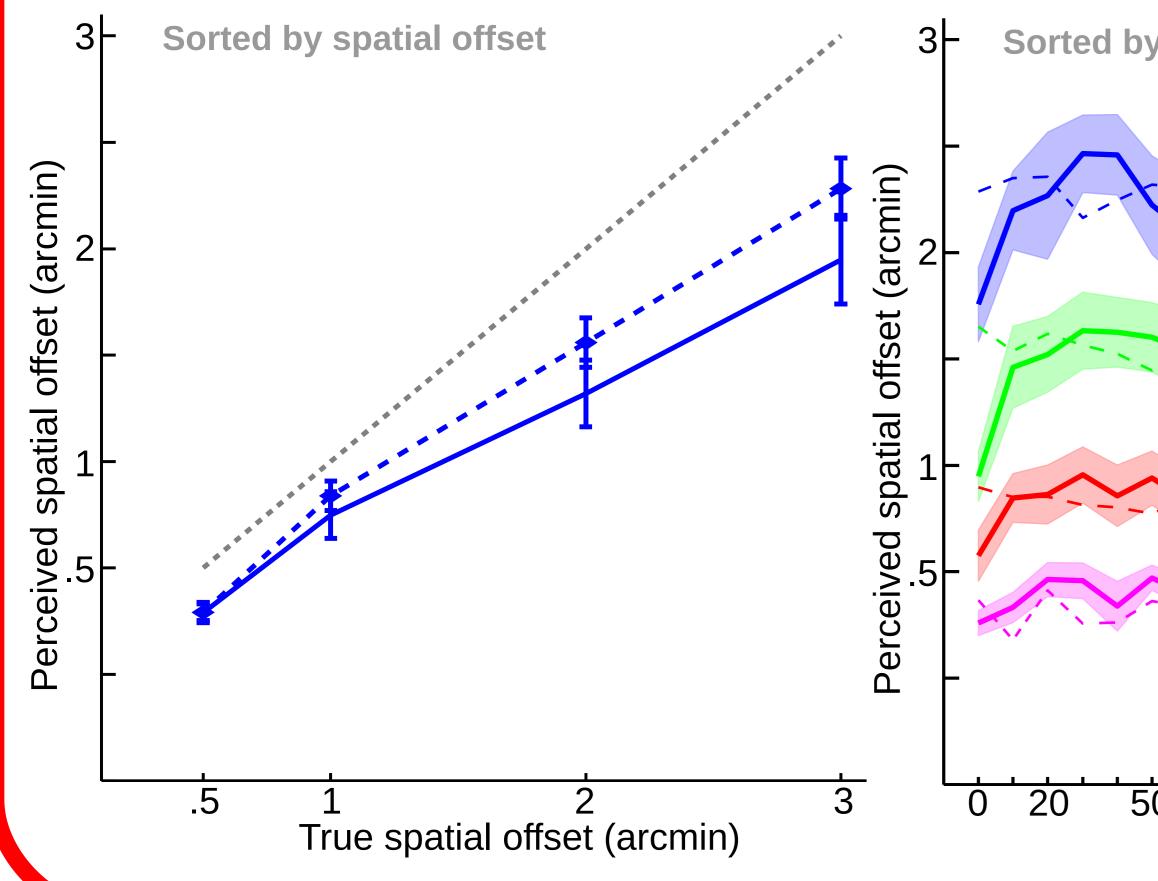






Introduction Across ISIs, the frequency of the perceived events depends on the spatial offset. For a given spatial offset, the frequency of the perceived events depends strongly on the ISI. At small ISIs and spatial offsets, the single percept dominates. At long ISIs and The visual system constructs a percept of the world across multiple spatial and temporal scales. We investigated this using Vernier Fusion, a phenomenon in which the features of two Vernier stimuli presented in close spatio-temporal proximity large offsets, the **double** percept dominates. At **intermediate** conditions, **motion** dominates. are fused into a single percept. With increasing spatial offset, perception changes dramatically from a single percept into 100_r Sorted by ISI apparent motion and later, at larger offsets, into two separately perceived stimuli (Scharnowski et al., 2007). Previous studies exclusively used binary choice to investigate this phenomenon. What is the time course and magnitude of the perceived (fused) Vernier offset? Is the perceived magnitude related to the perceived presentation type? Are spatial and temporal fusion governed by the same mechanism? 200 50 100(%) Methods cept Stimulation phase Response phase 1: indicate last offset by mouseclick Response phase 2: indicate type of percept ame Vernier Fixation Gap 200 50 70 100 20 of lOOr 1st Vernier Single/Fusion Motion Double / Segregation requency ISI 8(1 - 1.5s **Opposite Vernier** 200 ms 30ms 0-200ms 30ms 200 100 100 60 Results Subjects systematically underestimate the spatial offset, even in same-offset trials. However, in opposite-offset trials, underestimation is significantly stronger. When sorted by ISI, a time course emerges, with a peak around 30-40ms. 100 ISI (ms) 200 50 **Opposite-Offset Perceived Magnitude of the Spatial Offset** Sorted by spatial offset Sorted by ISI Perceived Magnitude of the Spatial Offset, Sorted by Type of Percept Single **Motion** (arcmin) in) Sorted by ISI 3.0 arcmin 2.0 arcmin offs 1.0 arcmin spatial 0.5 arcmin seived 200 0 20 50 70 100 50 200 100 50 70 100 20 70 0 20 True spatial offset (arcmin) ISI (ms) ISI (ms) cmin) 3 Sorted by spatial offset (ar Conclusions offset The time course of the perceived magnitude of the (fused) Vernier offset follows a non-monotonous curve and peaks at around 30-40ms ISI. spatial The perceived event type is strongly related to the perceived magnitude of the Vernier offset: when motion is perceived, offset estimation is enhanced, whereas offsets are strongly underestimated when stimuli are perceived as Perceived single or double. The mechanisms governing spatial and temporal integration during Vernier Fusion are not the same: spatial fusion occurs even when stimuli are temporally segregated. This research was supported by a European Research Council (ERC) grant (grant agreement no. 313658)



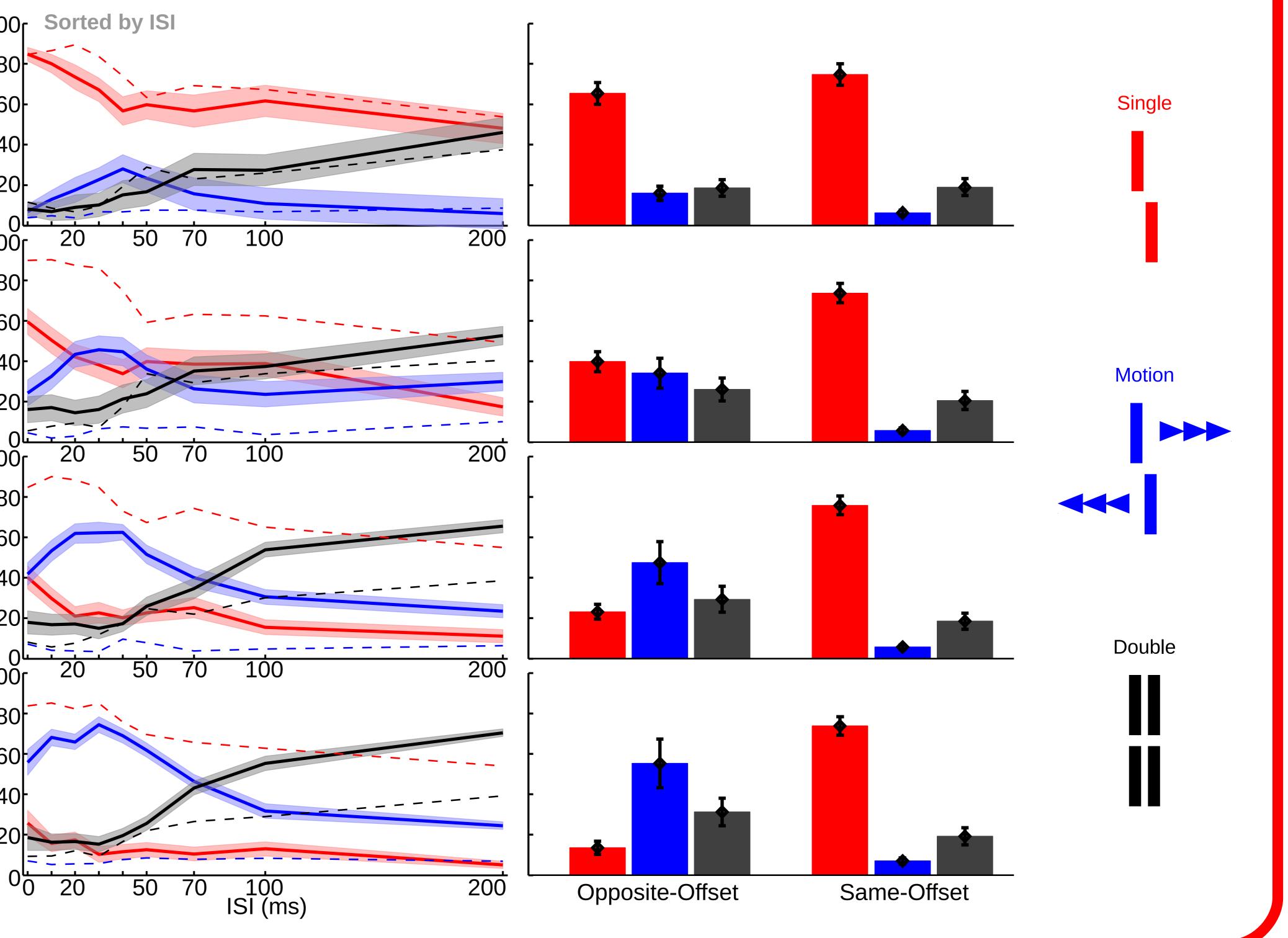


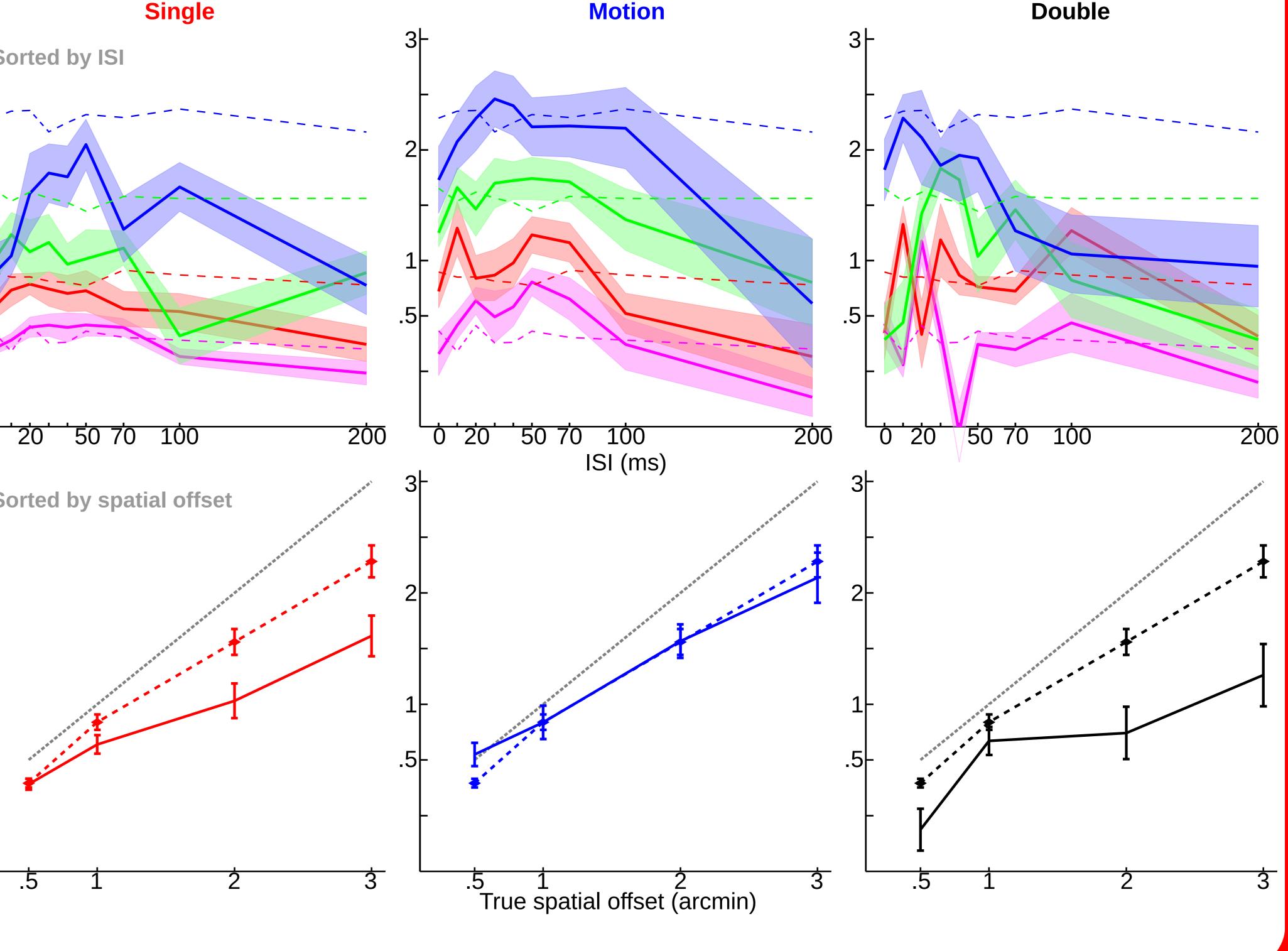
Scharnowski, F., Hermens, F., Kammer, T., Öğmen, H., & Herzog, M. H. (2007). Feature Fusion Reveals Slow and Fast Visual Memories. Journal of Cognitive Neuroscience, 19(4), 632–641. doi:10.1162/jocn.2007.19.4.632

Dissociating temporal and spatial integration windows: the case of Vernier Fusion Jan Drewes¹, Weina Zhu^{1,2,3,4} & David Melcher¹



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