

4166—5:00

SPATIO-TEMPORAL TUNING AND SUMMATION IN THE MECHANISMS DETECTING GLOBAL MOTION ((S.P.Tripathy, H.B.Barlow)) University of Bradford, University of Cambridge.

Purpose In random-dot kinematograms motion is perceived even when dot positions are correlated between non-adjacent frames (Mather & Tunley (1985) *Vision Res*, 25, 2117-2125). We have used this to estimate how well variable spatio-temporal information is summated for the detection of global motion. **Methods** We measured coherence thresholds in sequences consisting of 48 frames in which the dot positions could be separated by variable distances and times mixed together in the same sequence according to the following paradigms: *i) Fixed interval, fixed displacement* – dots in frame *n* were correlated with those in frame *n-4* (occurring 60 msec earlier) and the displacement was fixed at 8 pixels (5.5 arcmin). *ii) Fixed interval, variable displacement* – dots in frame *n* were correlated with those in frame *n-4* and the displacements varied from 2 to 14 pixels (average 8 pixels). *iii) Variable interval, fixed displacement* – dots were correlated in the following frame-pairs:- 1-8, 2-7, 3-6, 4-5, 5-12, 6-11, 7-10, 8-9, 9-16, etc; the displacement was fixed at 8 pixels. *iv) Variable interval, displacement varied in proportion to interval* – the frame sequence was as in (iii) but the displacement was 2 pixels/interleaved-frame; here all coherently moved dots had the same velocity. *v) Variable interval, displacement varied inversely to interval* – the displacements were reduced as the temporal interval increased, giving velocities varying more than any other paradigm. **Results** Over the above conditions thresholds for three observers ranged between 7 and 30 percent coherence. Upon ranking, the thresholds were lowest for condition (i), and increased in the following order: (iii), (ii), (v) and (iv). Surprisingly, the constant velocity condition (iv) yielded the worst thresholds. A similar set of results was obtained when the average frame interval used was 6 instead of 4 and the average displacement was 12 pixels. **Conclusions** These results suggest moderately broad tuning of ΔT and ΔS over the motion units feeding into the neurons of MT, as indicated by the moderate fall-offs between conditions (i) and (ii) and (i) and (iii). They do not support models that integrate constant velocity motion over variable ΔT .

None

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4167—5:15

EXACT CHROMATIC ADAPTING CONDITION WHERE THE L AND M CONE LUMINANCE SIGNALS HAVE IDENTICAL TEMPORAL RESPONSE ((C F Stromeyer III^{1,2}, J D Willen², PD Gowdy^{1,2}, R E Kronauer¹)) Division of Applied Sciences¹ and Dept of Psychology², Harvard University, Cambridge MA

Purpose. Studies on the human luminance (LUM) pathway indicate that the L and M signals may have different temporal responses. Hamer & Tyler (*JOSA* A9 1889) concluded that the M cones were considerably faster than L cones, assessed at high temporal frequency where little adaptation occurs. Is there a precise colored field condition which yields equivalent temporal responses for