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The source of variability in neural responses from MT

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We analysed the variability of response in records obtained from MT (V5) of awake, behaving monkeys and kindly provided to us by Newsome and Bair (see Newsome *et al.* 1990, for methods). Some sets of random dot kinematograms had been generated with a constant randomization seed (*no var* stimuli), while others had been generated with varying randomization seeds (*var*stimuli). The neural responses to *no var* stimuli exhibited a remarkable degree of consistent temporal modulation, while the responses to *var* stimuli were homogeneous over the presentation time. We suspected that correspondence noise might be a major source of variability and to test this we compared the variability of response to *novar* and *var* stimuli, making the assumption that the variability observed in responses to *novar* stimuli reflected the internal noise only, whereas variability in the case of *var* stimuli reflected internal noise and external noise. From this assumption, we could estimate the relative importance of external noise and internal noise in this system. The main conclusions are: (1) efficiency values (up to about 35 %) calculated from neural responses in MT are of the same order as those of human observers (Barlow & Tripathy, 1997); (2) external correspondence noise is a significant factor in limiting the detectability of coherent motion in these random dot stimuli.

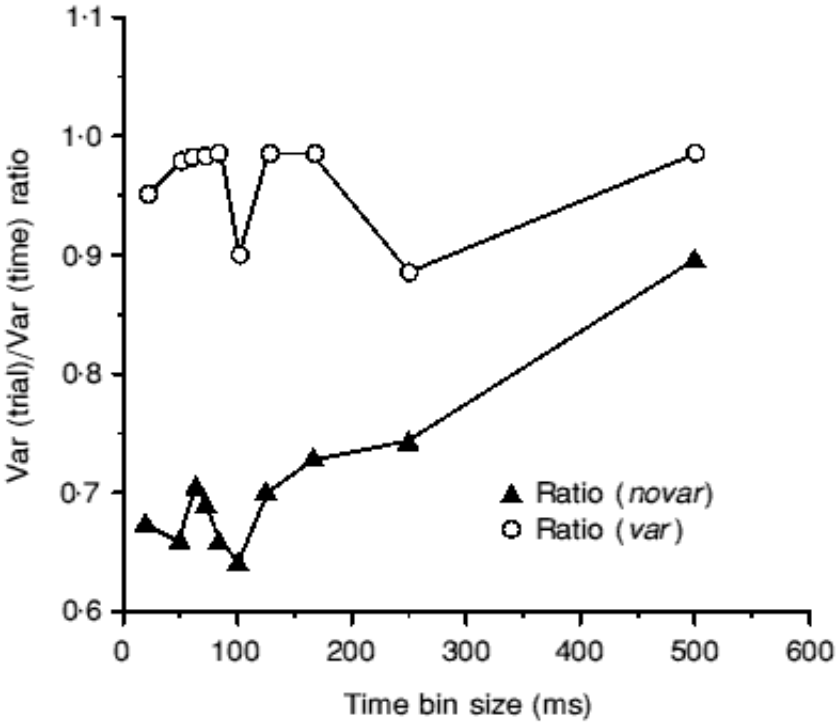

Fig. 1. The ratio of response variance over different trials to response variance at different times in the same trial (excluding the first 500 ms), plotted against duration of the time bin, for the reseeded *var* trials (○) and the *novar* trials with unchanged seed (▲). With unchanged seed the correspondence noise in each stimulus follows an

identical time course, and the response variance across trials is reduced.

Referencess

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