

Results confirmed the AB was modulated by emotion and not simply by dynamic targets. These findings suggest that emotional salience plays a critical role in the allocation of attentional resource during early stages of visual attention.

◆ **Decoding psychophysical performance from multi-electrode array recordings in the mouse visual cortex**
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Understanding how perception emerges from neural population activity is a central problem in neuroscience. The mouse has been of much recent interest as a model for vision research, owing to advances in genetic technology; if murine psychophysical performance can be related to neural activity, it will be possible to genetically manipulate the circuitry underlying perception. In this study we predict the contrast sensitivity curve for C57BL/6J mice as a function of spatial frequency, using recordings of neural activity in the primary visual cortex. We presented a set of full-field vertical sine-wave gratings of different spatial frequencies and contrasts monocularly; the same set of stimuli (approximating those used to characterise behavioural performance by Prusky and Douglas, 2004 *Vision Research* 44 3411–3418) was presented at all recording sites in all animals. Single-unit recordings were made with a 16-channel multi-electrode array. On each experimental trial, a spike count response vector r is observed (one dimension for each recorded cell). To estimate the psychophysical performance of an ideal observer of the neural spike trains, we used a maximum a posteriori decoder: on each trial the stimulus is selected according to the rule $s = \text{argmax}\{\mathbf{P} \times (r|s)\mathbf{P}(s)/\mathbf{P} \times (r)\}$, where the conditional response probability matrix $\mathbf{P} \times (r|s)$ is obtained by compiling the vector r over all neurons regardless of recording location or animal, and shuffling out noise correlations. Neurometric functions are formed by comparing decoded and actual stimuli. Preliminary results from 15 neurons indicate that population (rather than single-unit) decoding is required to predict behavioural contrast sensitivity.

◆ **Extra-foveal processing in visual short-term memory: Facilitatory or inhibitory?**

38 Raju P Sapkota, Shahina Pardhan, Ian Van der Linde¶ (Department of Optometry and Ophthalmic Dispensing, Anglia Ruskin University, East Road, Cambridge CB1 1PT, UK; ¶ Department of Computing and Technology, Anglia Ruskin University, Bishops Hall Lane, Chelmsford CM1 1SQ, UK; e-mail: i.v.d.linde@anglia.ac.uk)

The utility of extra-foveal processing in visual short-term memory (VSTM) has received relatively little investigation, despite its potential importance in understanding scene memory. We examined extra-foveal processing in VSTM for object-position binding in two forced-choice recognition experiments. Unfamiliar, nonverbal $1/f$ noise discs served as stimuli, minimising confounds arising from visual long-term memory recruitment and stimulus verbalisation. Four observers viewed five equally spaced 2 deg stimuli presented in a ring (13 deg), either serially (experiment 1) or simultaneously (experiment 2). Start position was randomised and pre-cued with a spatial probe. Subsequent stimuli were viewed consecutively in a clockwise direction. An auditory prompt sounded every 650 ms such that, in experiment 1, it coincided with the onset of the next stimulus and the offset of the previous stimulus, and, in experiment 2, reminded observers to saccade to the next stimulus. At test, in both experiments, a target stimulus was displayed at the screen centre. Observers were required to identify the spatial position the target stimulus had occupied in the preceding study display (5AFC). Position choices were annotated with numbered discs. Presenting stimuli simultaneously was found to increase overall hit rate by 21% above serial presentation ($t_3 = 6.27$, $p < 0.01$). Interestingly, this effect varied with stimulus recency: for the earliest three stimuli fixated, the simultaneous display was found to be facilitatory; for the fourth stimulus fixated, no difference was observed; for the fifth (final) stimulus fixated, the simultaneous display was inhibitory (verified by 95% confidence intervals). Start position had no significant effect.

◆ **A direct comparison of selective adaptation and multivariate pattern analyser methods in fMRI**
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A number of fMRI studies have attempted to measure the selectivity of cortical responses on a scale smaller than the spatial resolution of the acquired data (the voxel size) using either fMRI adaptation or multivariate pattern analysis (MVPA). The former utilises the fact that prolonged presentation of a particular stimulus results in relatively selective reductions in response to that stimulus.