

Selectivity for second-order spatial frequency involves multiple areas in human visual cortex

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I. INTRODUCTION

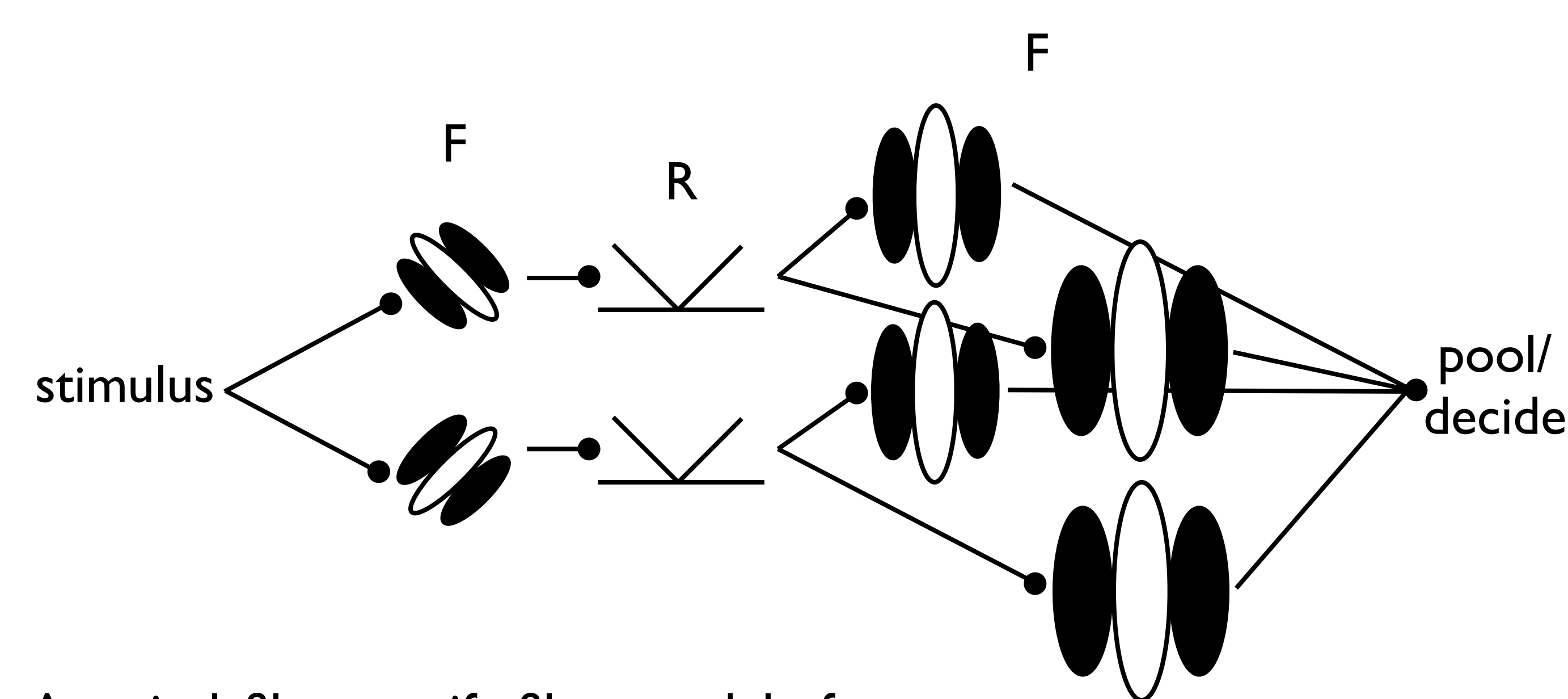
The human visual system is sensitive to the spatial variation of luminance (first-order cue), and also variation of texture (second-order cue; **STIMULI**). Via an fMRI adaptation protocol, we have found evidence of second-order, spatial-frequency (s.f.)-selective neuronal populations throughout visual cortex.

STIMULI:



Orientation-defined, second-order stimulus with high s.f. (1.25cpd). Low stimulus (0.18cpd) not shown. Carrier: 8cpd; +/- 45 deg.

MODEL:



A typical, filter-rectify-filter model of human, second-order perception.

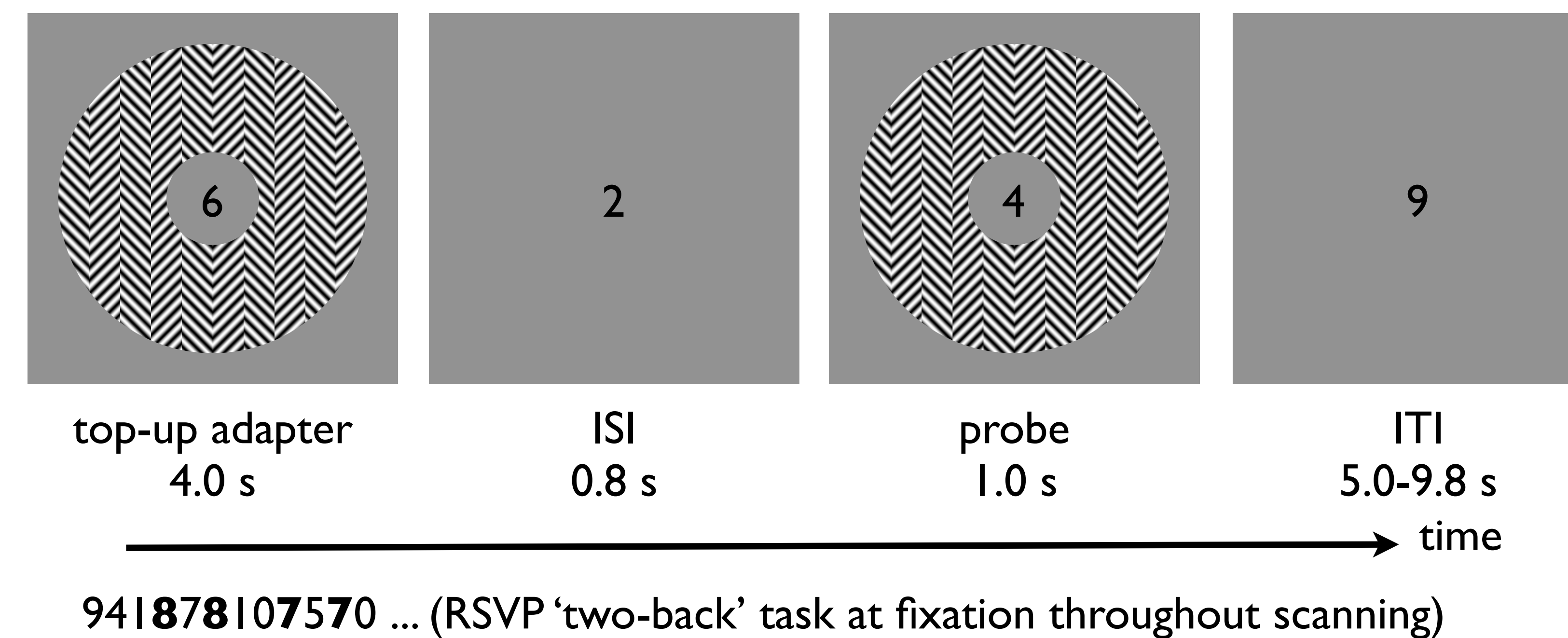
2. METHODS

PSYCHOPHYSICS: elevated, post-adaptation, contrast-detection thresholds measured outside scanner

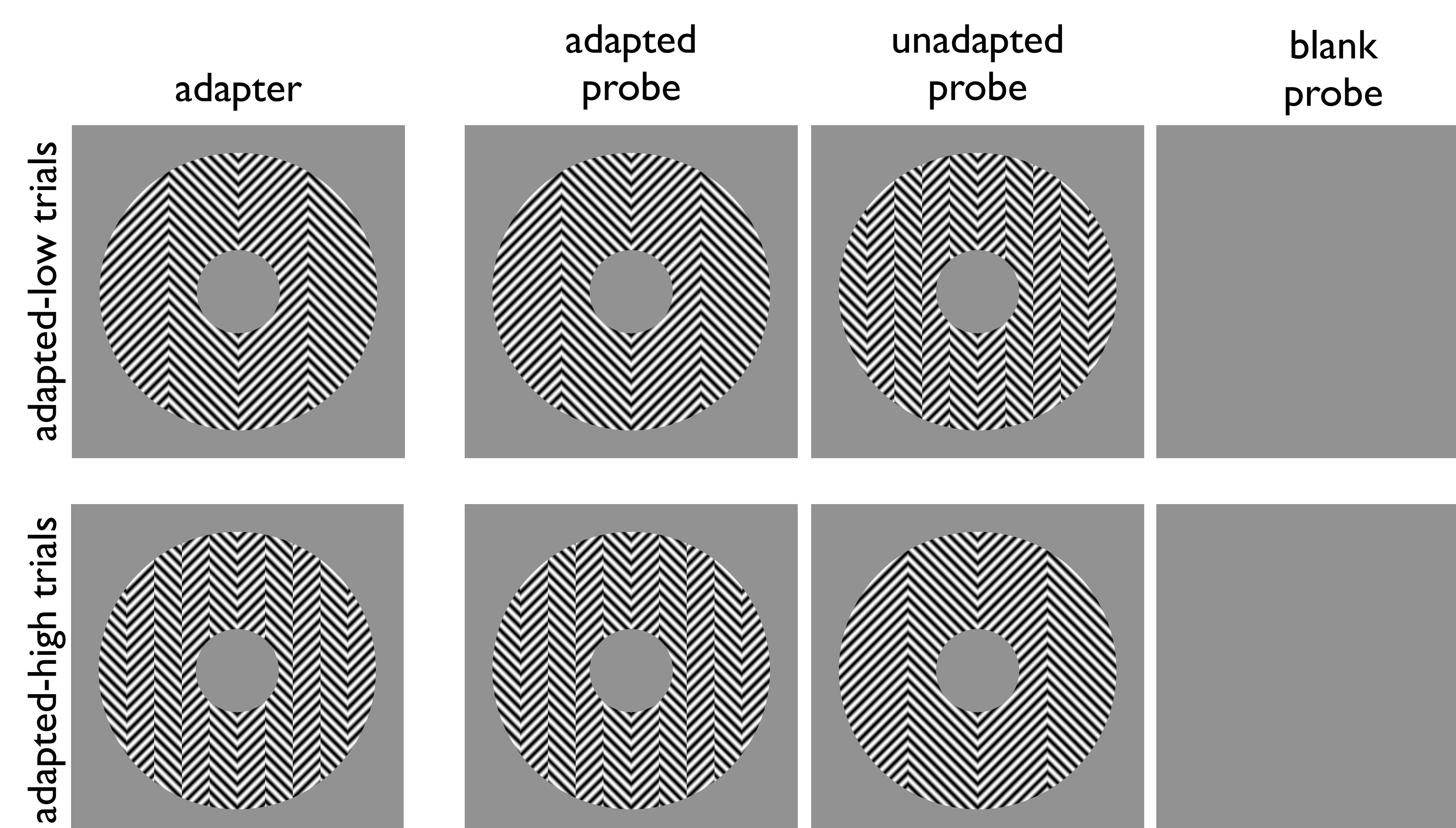
ANATOMICAL SCANS: T1-weighted, high-resolution (1mm)

RETINOTOPY: for defining visual cortical areas

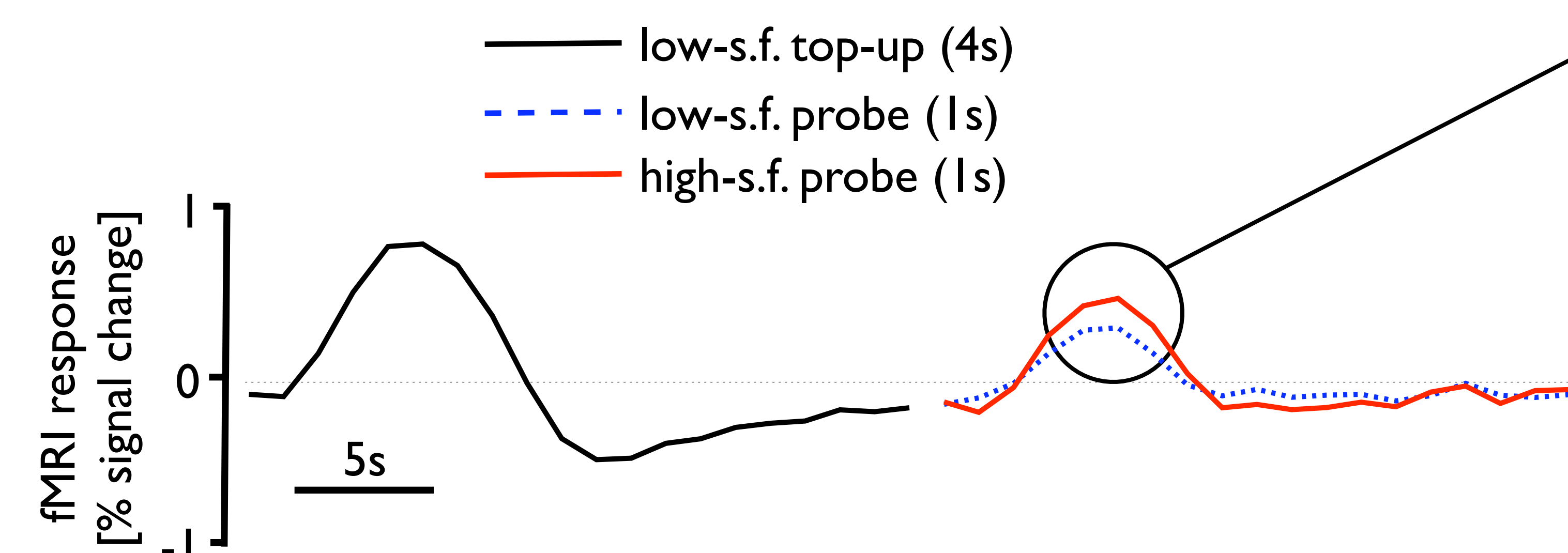
PROTOCOL:



Three subjects; 4 scans each with initial adapter (100s): 2 'adapted-low' and 2 'adapted-high'



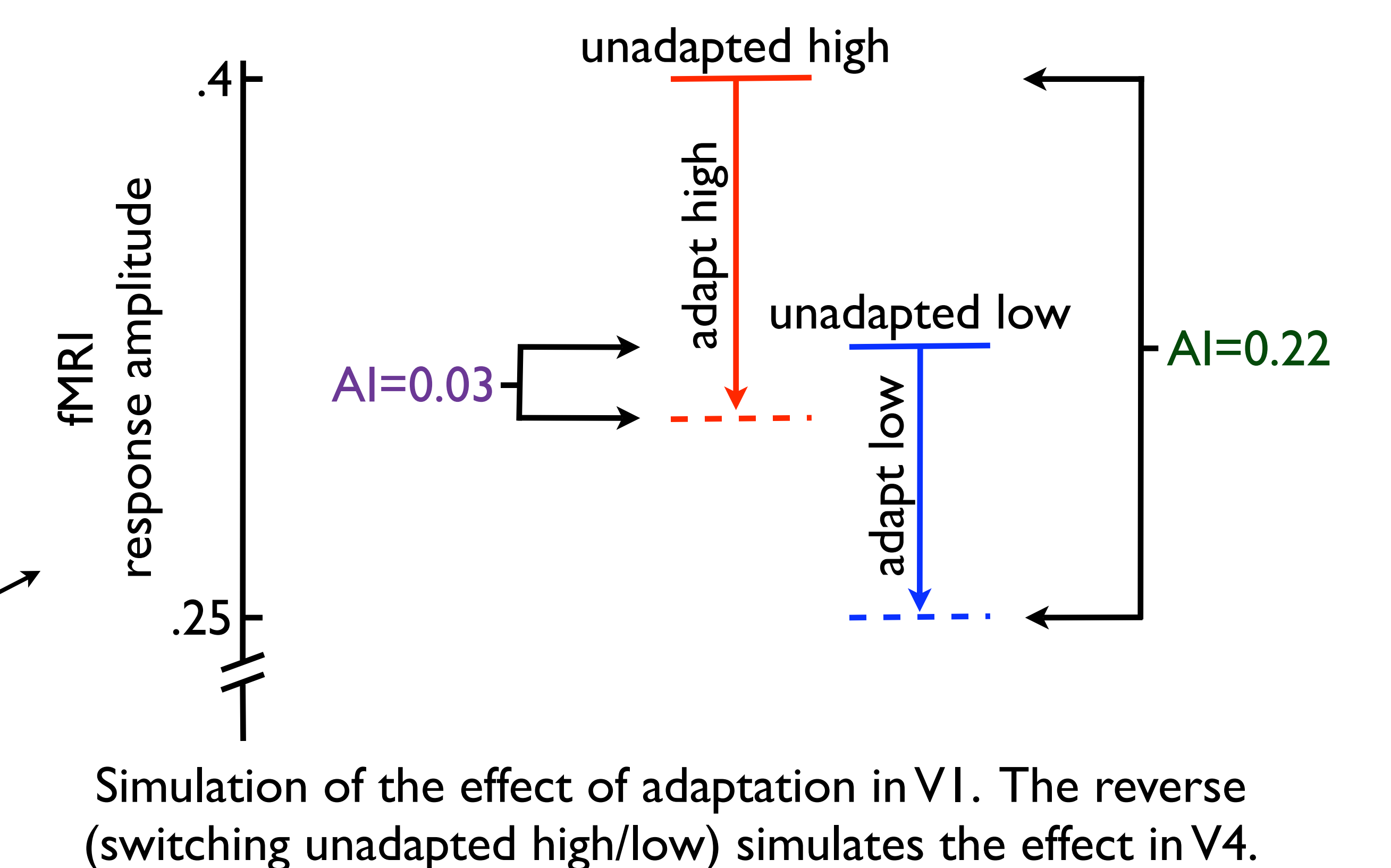
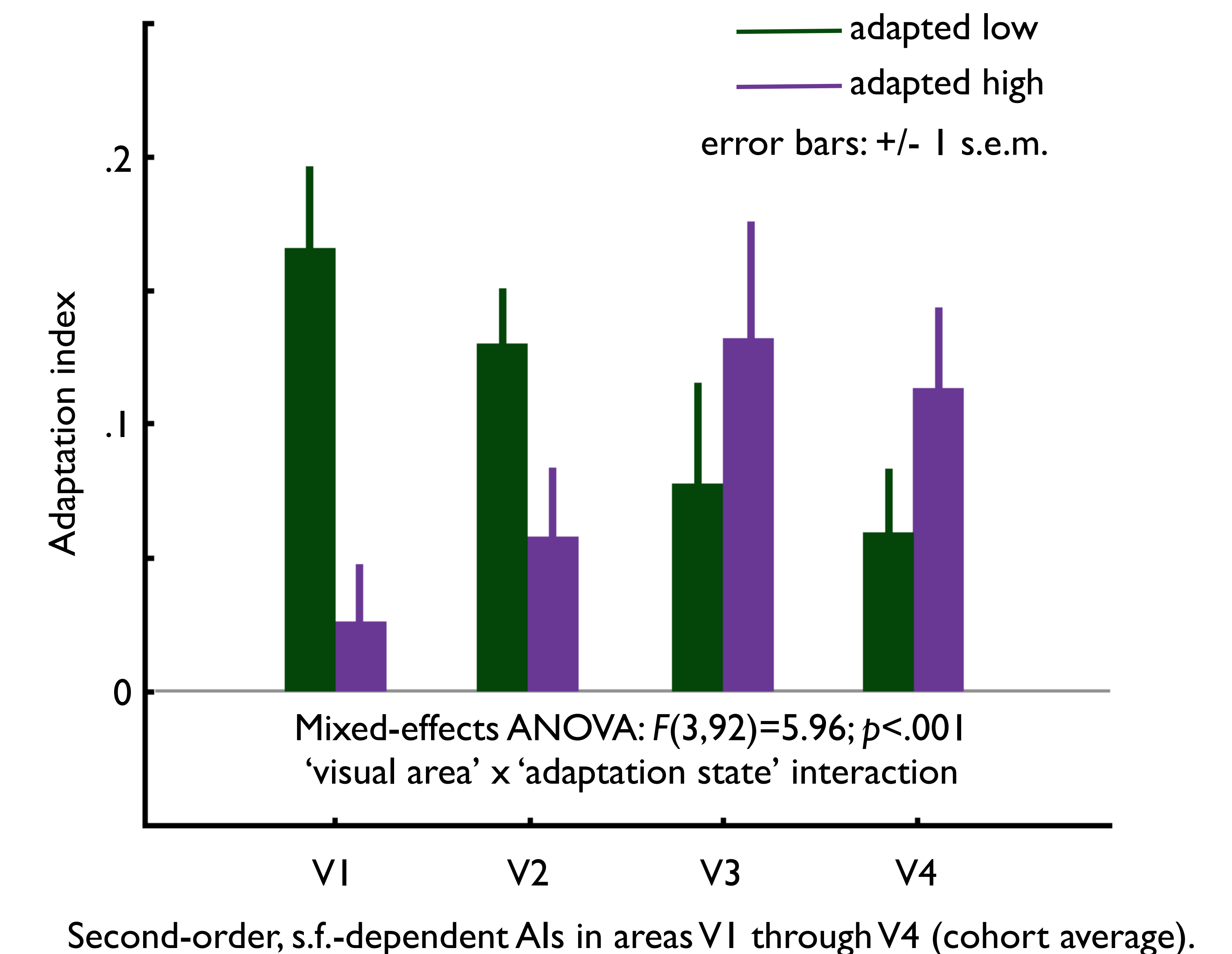
3. RESULTS



Second-order, s.f.-dependent hemodynamic response functions (HRFs) in left V1 of subject 2.

ADAPTATION INDEX:

$$AI = \frac{\text{unadapted} - \text{adapted}}{\text{unadapted} + \text{adapted}}$$



4. CONCLUSION

Our data are consistent with a high, second-order s.f.-selective population in early cortex (V1) and low, second-order s.f.-selective populations occupying higher-tier areas.

REFERENCE: Jonas Larsson et al. (2006), *J Neurophysiol.*
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