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  Automatic object-based selection in area V4

  Single unit studies of attention in monkey have identified competitive circuits in extrastriate cortex that could mediate selection of either spatial locations or coherent objects. When two or more stimuli appear at separate locations in a neuron's receptive field they compete with one another. This competition is resolved in favor of the attended stimulus. While these studies show that attention operates by resolving competition they employed stimuli at separate locations, confounding selection of objects with selection of spatial locations. To resolve this, we recorded responses of V4 neurons to superimposed transparent surfaces occupying the same retinotopic location. The surfaces were defined by patterns of dots that rotated rigidly around a common center. One set of dots was of the neuron's preferred color and the other was of an isoluminant non-preferred color. The response elicited by the preferred-color surface was consistently suppressed by the addition of the non-preferred surface. Human psychophysics using the same stimuli found that the delayed onset of one surface exogenously cues attention to it and suppresses processing of the other surface for several hundred milliseconds. When we delayed the onset of the non-

  preferred surface, the suppression caused by the new surface was magnified during a period similar to that observed psychophysically. Suppression was reduced in strength when the preferred stimulus was cued in this manner. These results show that competitive circuits in area V4 are not limited to mediating competition between spatial locations, and may play a role in object-based attention.

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