Reference: Reynolds, J.H., & Desimone, R. (2003). Interacting roles of attention and visual salience in V4. *Neuron, 37,* 853-863.
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Filename: Reynold_Desimone.pdf
Italic text taken from Jason Sherrill's handout

I. **Background – response competition theory (summarizes the paper)**
A. Neurons respond selectively to stimuli within their receptive field (RF)

B. "Good"" stimuli can elicit strong and frequent responding from a particular neuron, in contrast "Bad" stimuli elicit weak and infrequent firing from a neuron.

C. When two stimuli appear within a RF, a good and a bad one, the bad stimuli will supression neuron's response to the good one.

D. When attention is directed to the good stimuli, it reduces the suppression. When attention is directed to the bad stimuli, it increases the suppression.

II. **Experiment**
A. *Single unit recordings within V4 of two rhesus monkeys (80 neurons total, 50 neurons included in analysis)*

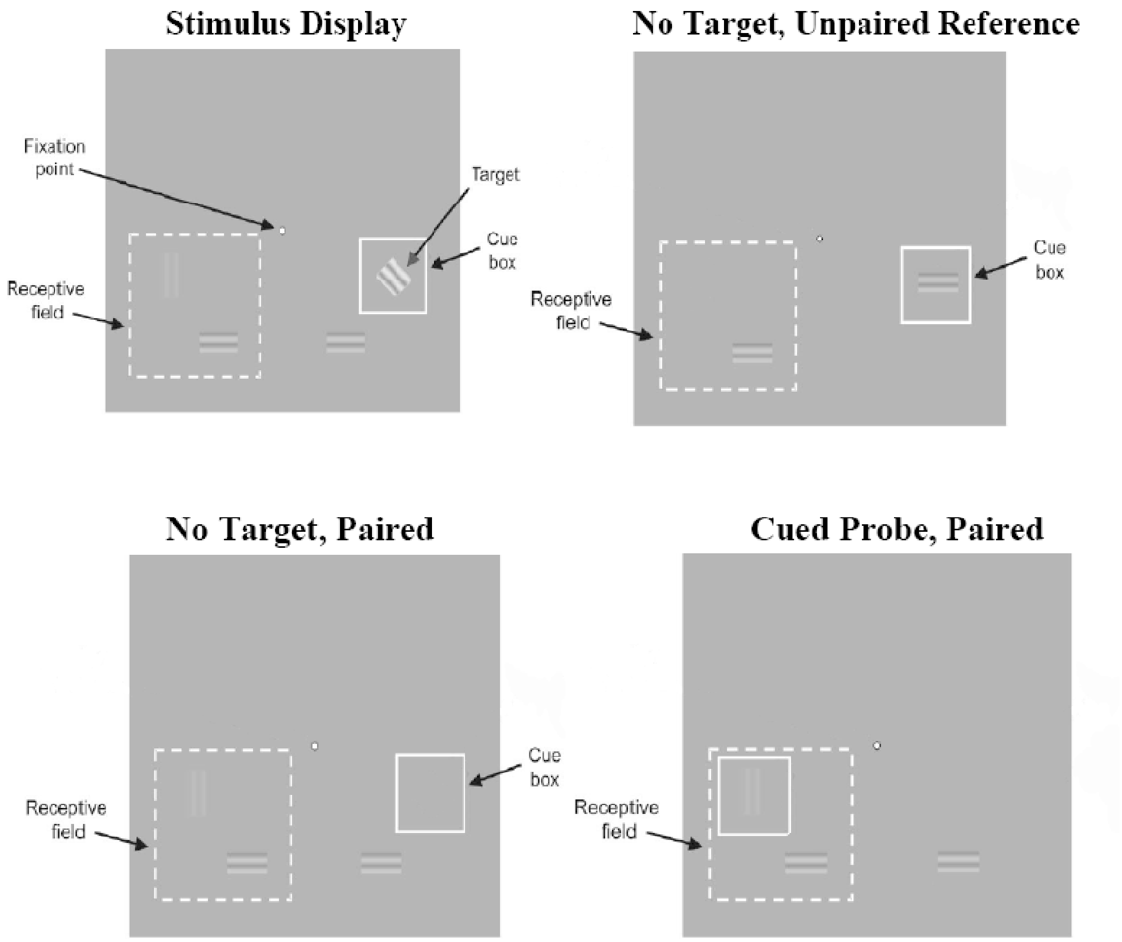
B. Task was to detect the appearance of a diamond-shaped target stimulus. The location where the target would appear was indicated by a white cue box at the beginning of athe block of trials.

C. *Block trials presented a variable sequence of displays with the final containing a target requiring a response*

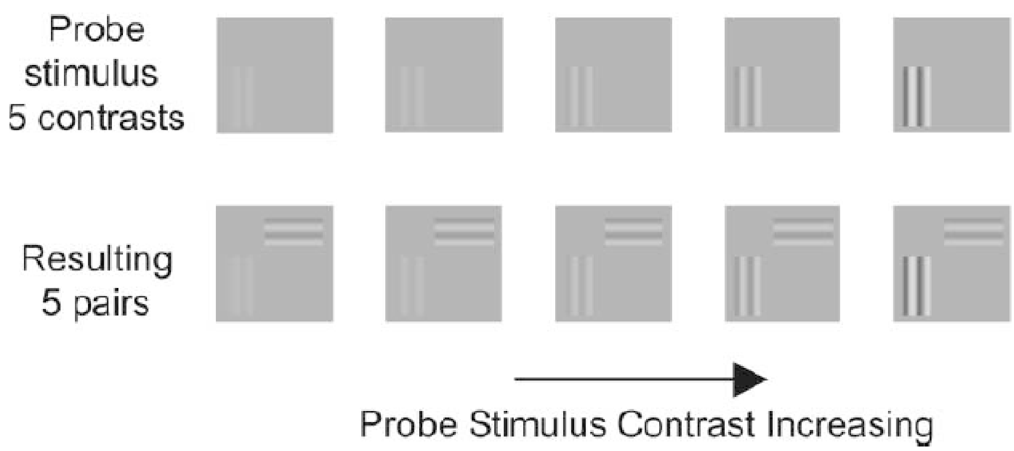
D. Stimuli appear in one of four locations, one of which is cued for attention. Distractors occasionally appeared at uncued locations, monkeys has to ignore them.

E. Stimuli classified as one of the following:
- *a. target*
- *b. probe (usually poor stimulus)*
- *c. reference (usually good stimulus)*
- *d. distractor (identical to target but in different location*

F. Probes and references appear either paired or separately within the RF

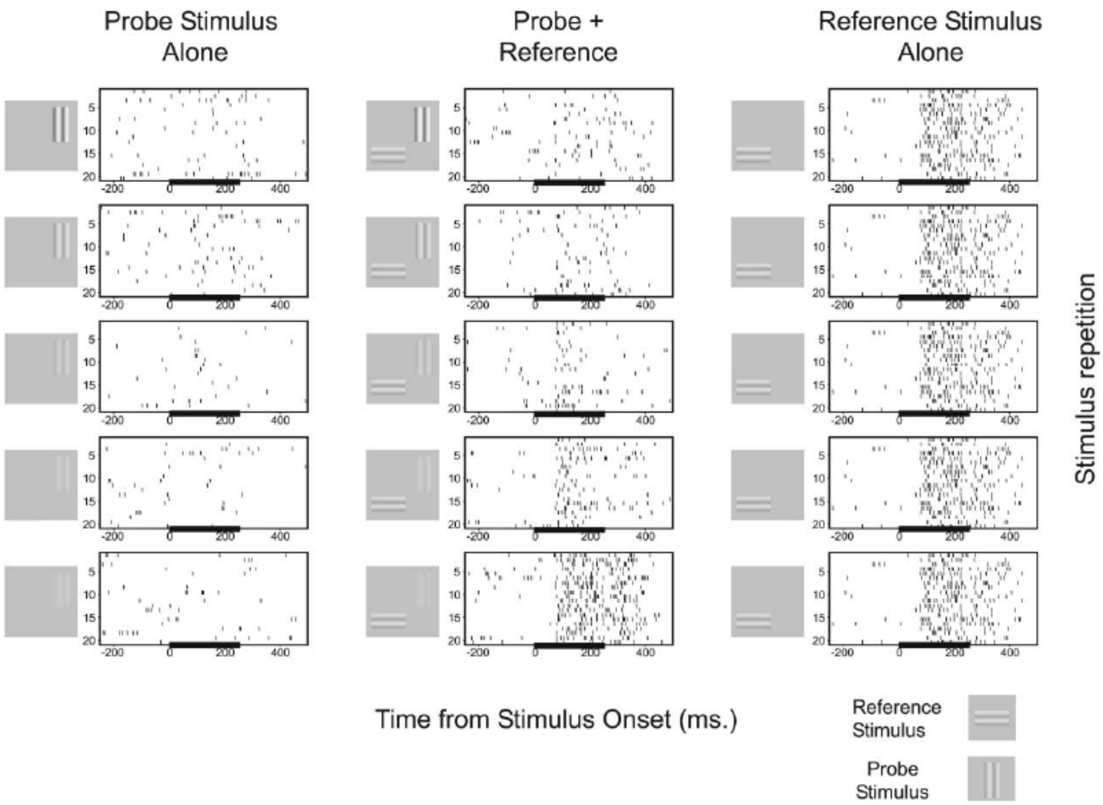


H. The luminous intensity of the probe varied (5 possible intensities) while the reference intensity remained constant

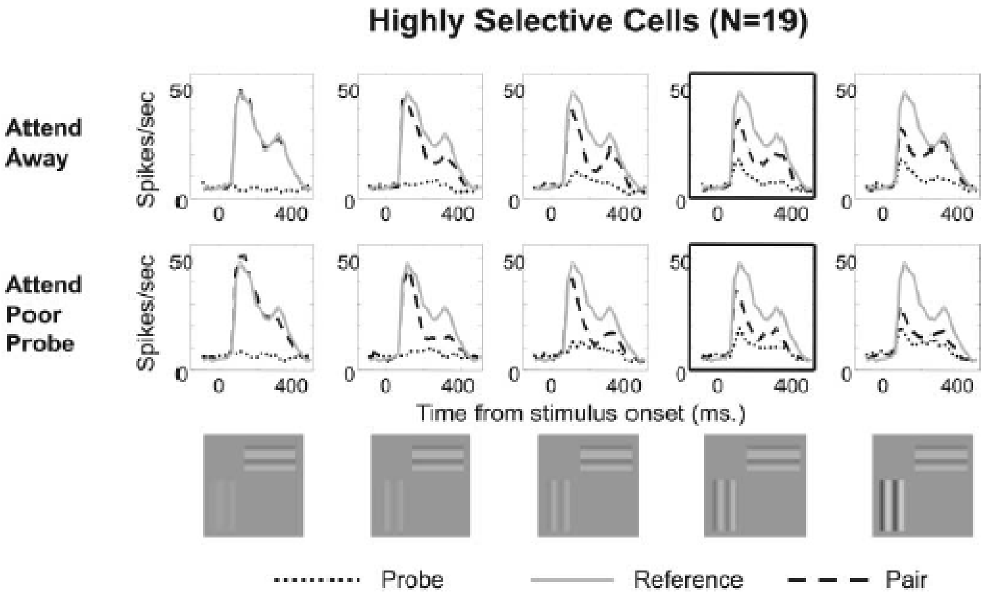


III. **Results**

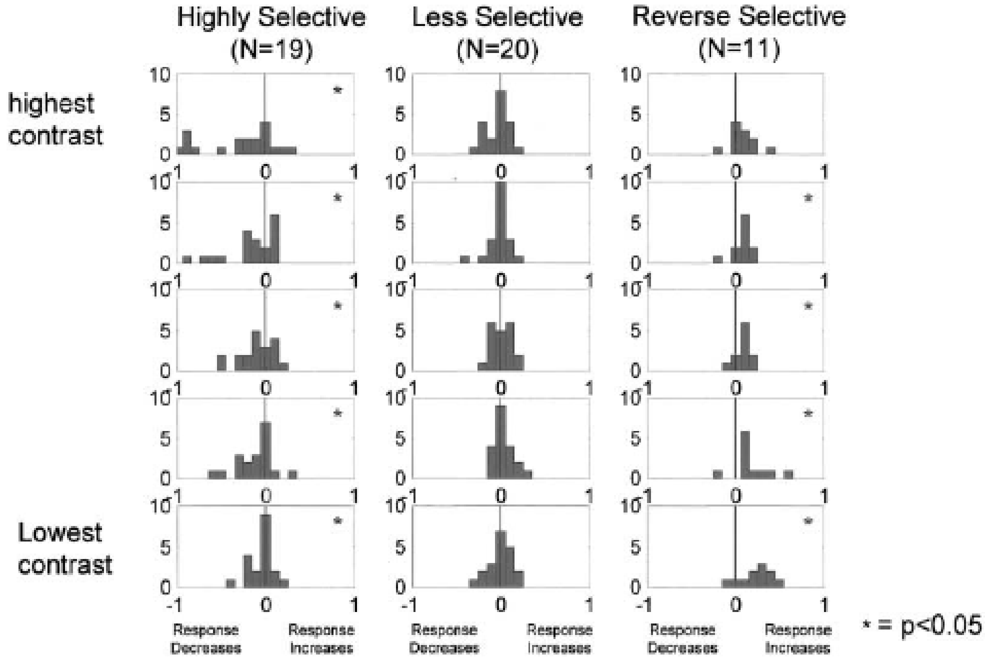
A. Bad stimuli suppressed good stimuli in the same RF



B. Attend to probe (poor) stimuli increased magnified its suppressive effect.



C. For highly selective cell (to the reference stimuli), attend to the probe stimuli shifts the neuron response to the probe response.



IV. **Conclusions**

A. Stimuli compete within RF, affecting the response of neurons. Poor stimuli suppress response when add to RF.

B. Attention can modulate response to stimuli within the RF. By increasing contrast gain of the attended stimuli, even if it's a weak one.