The background is remapped across saccades

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VCCLab

Vision, Cognition, and Consciousness Lab

Saccadic Eye Movements Disturb the Visual System

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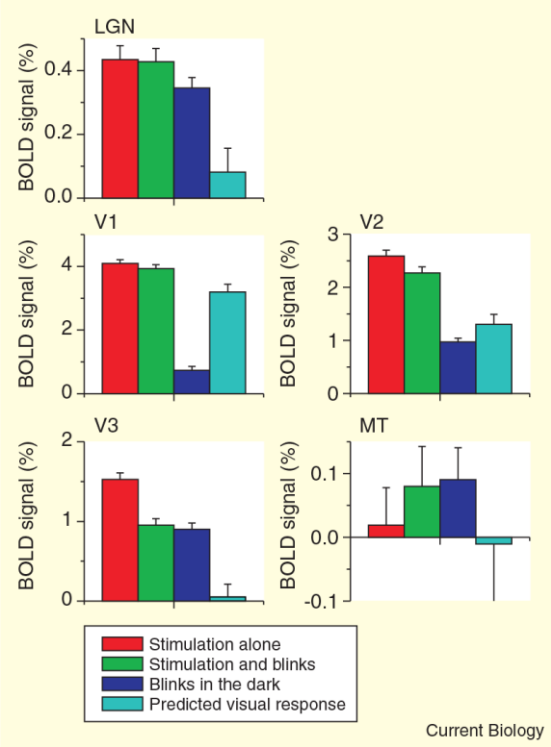
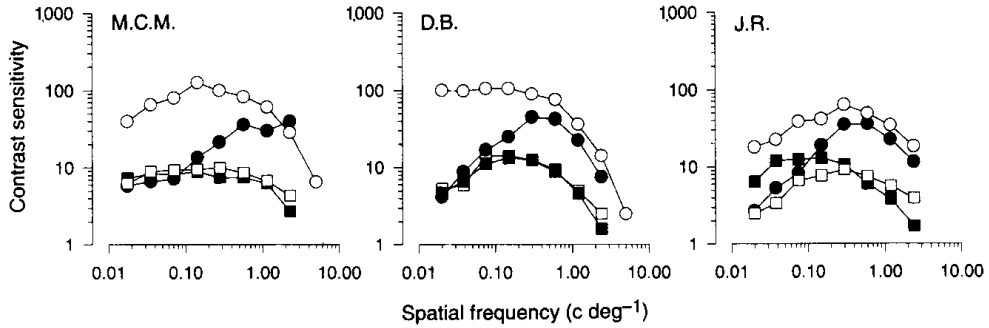
At the Time of Saccade: Blink/Saccadic Suppression

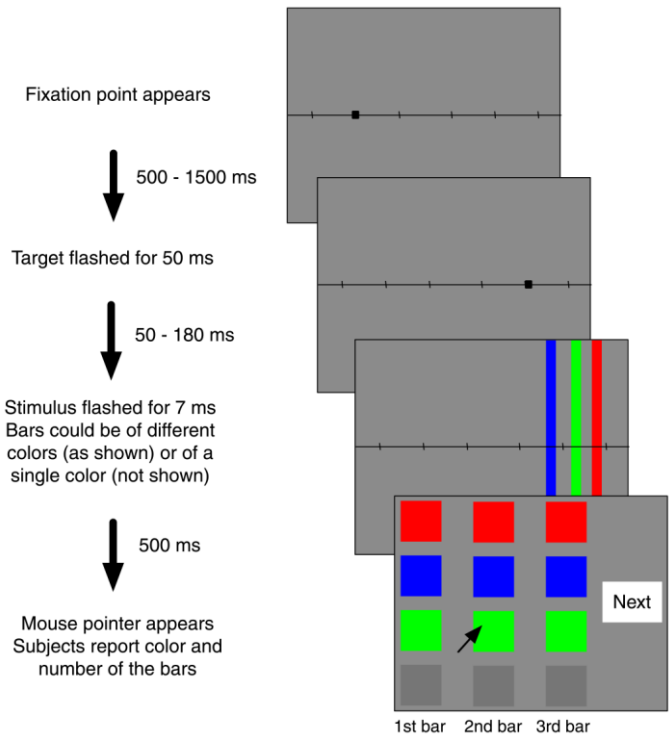
(Burr, 2005; Burr, Morrone, & Ross, 1994)

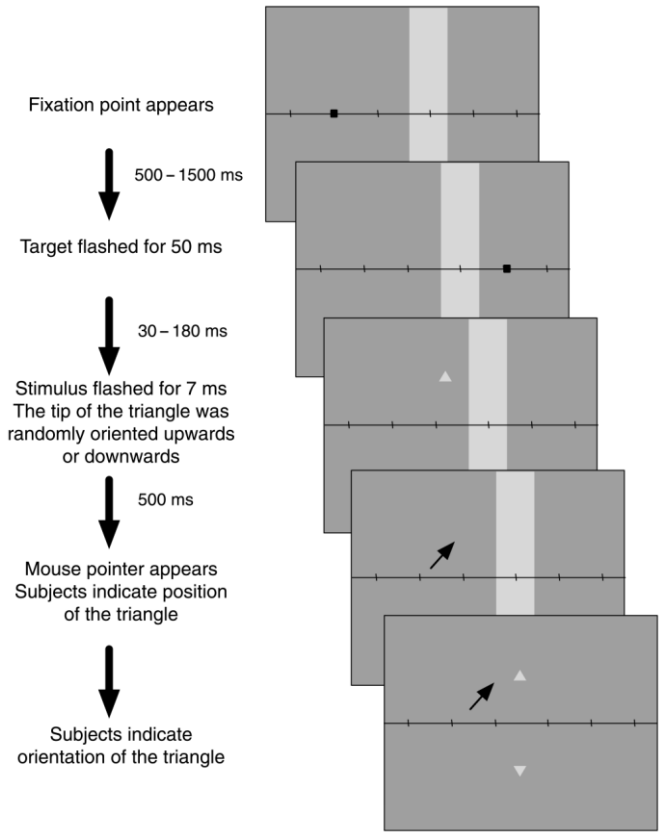




At the Time of Saccade: Saccadic Mislocalization

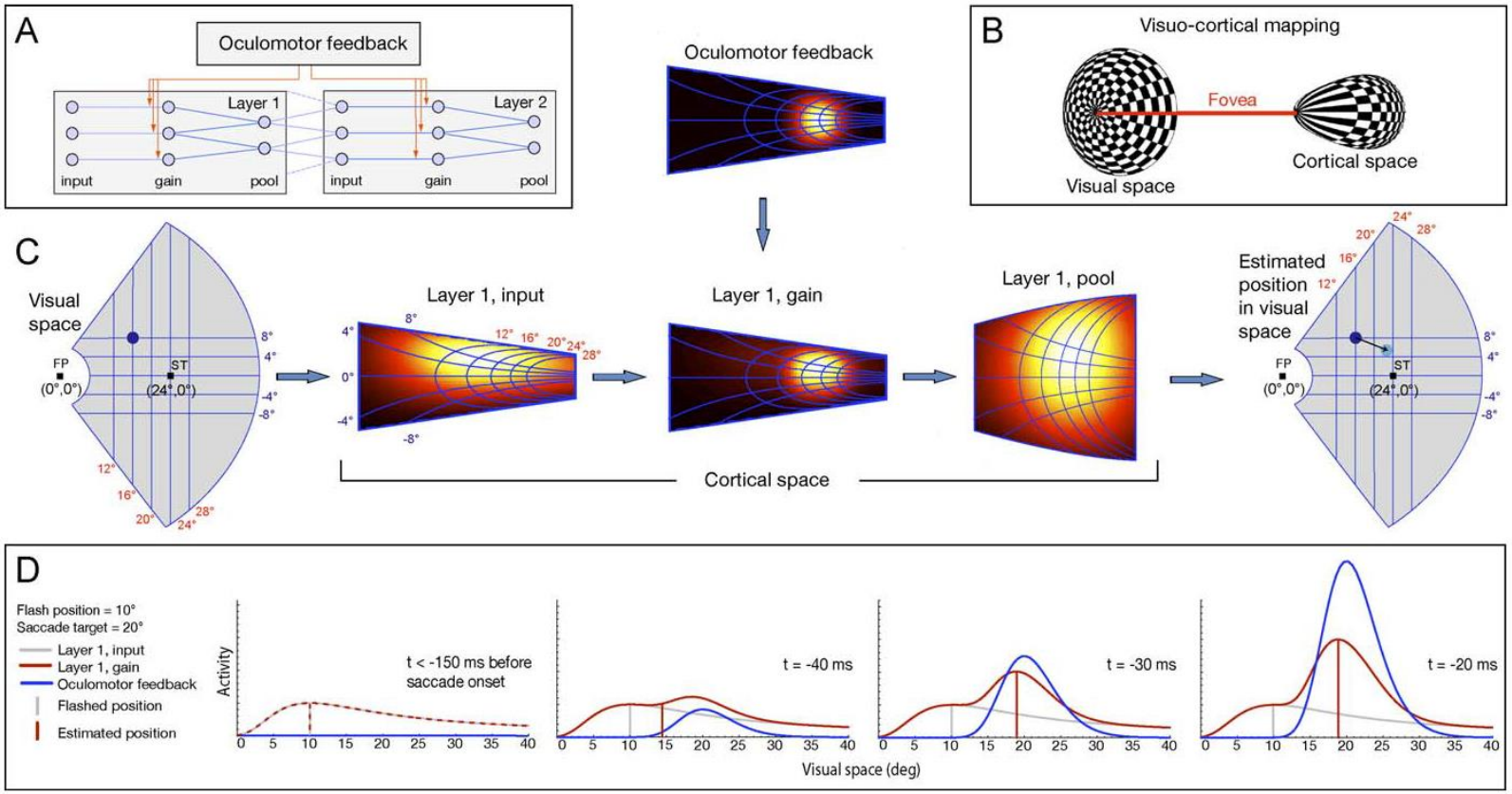
(Lappe, Kuhlmann, Oerke, & Kaiser, 2006)



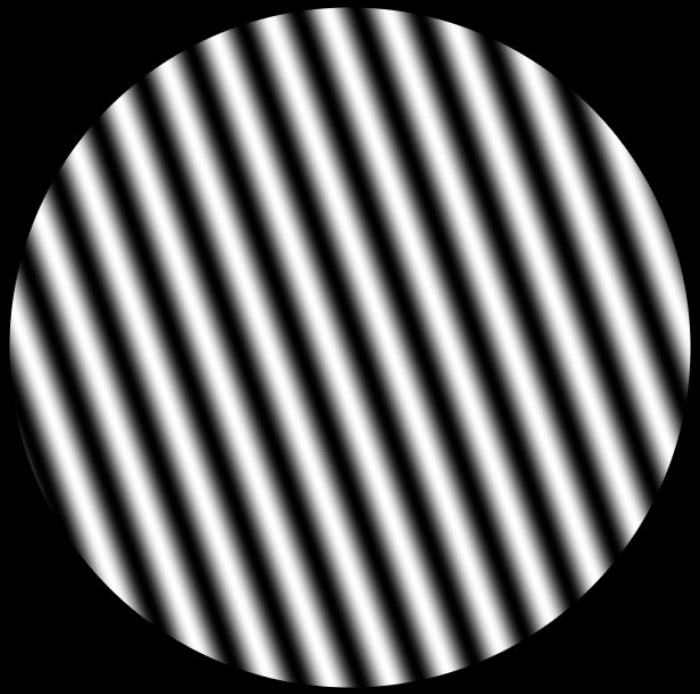


At the Time of Saccade: Saccadic Compression

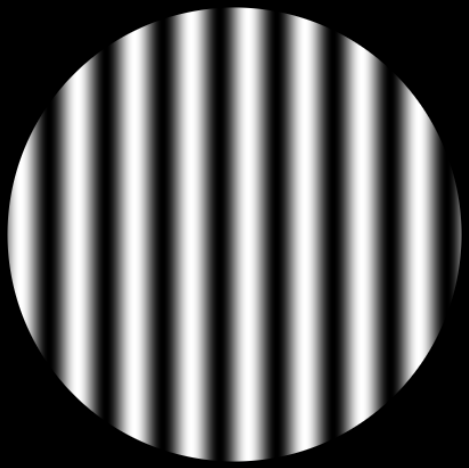
(Hamker, Zirnsak, Calow, & Lappe, 2008)



Tilt Aftereffect



Tilt Aftereffect



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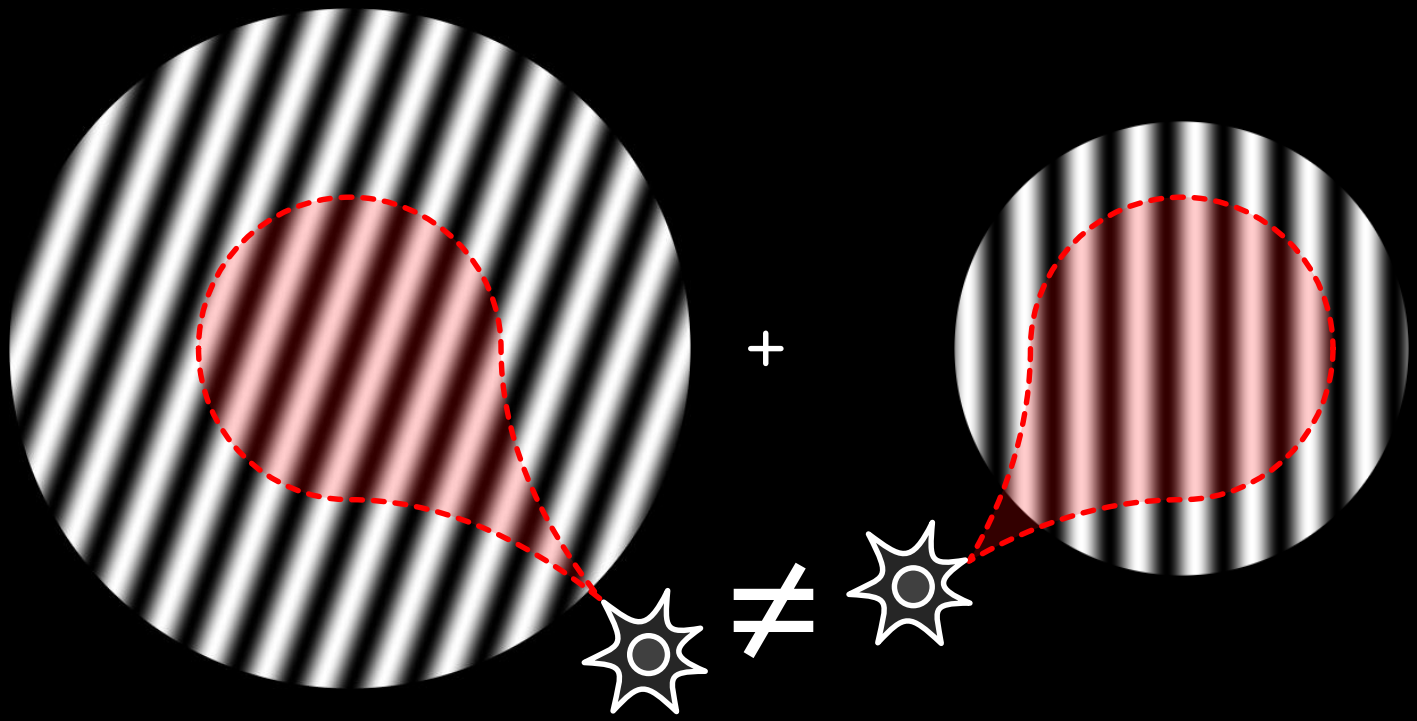
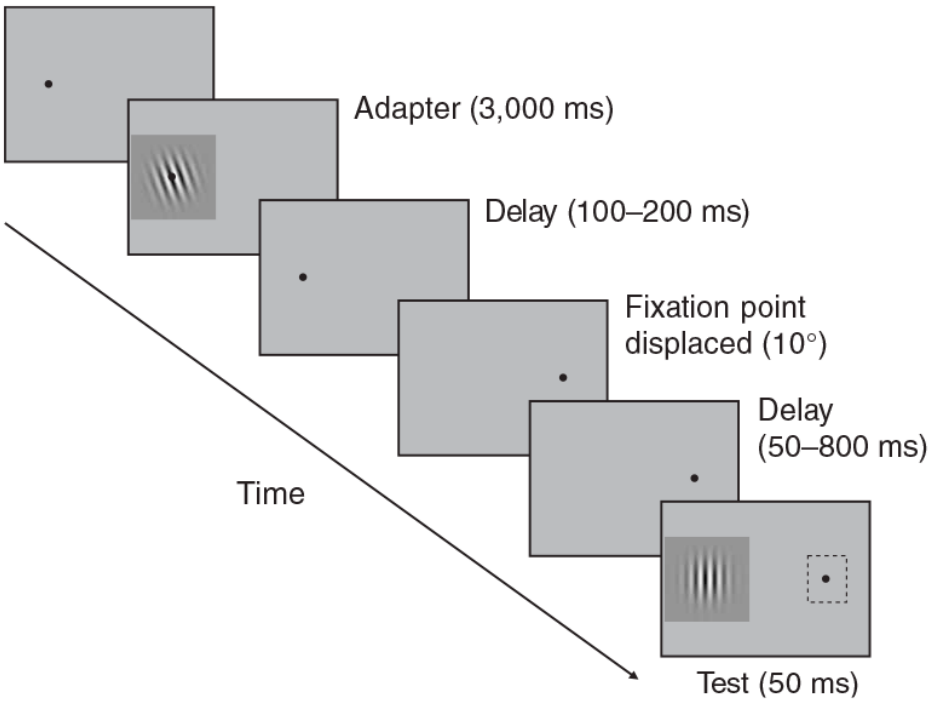
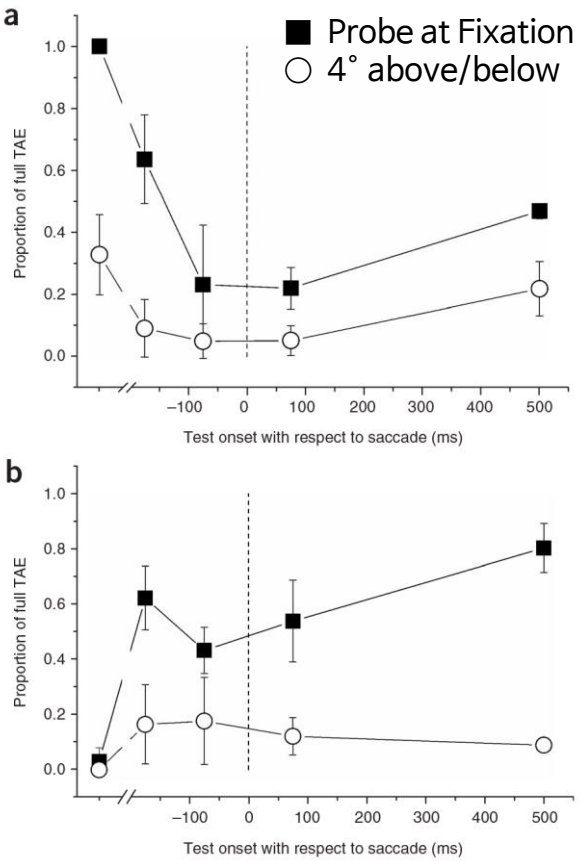
Probing Neurons with Tilt Aftereffect (cont.)



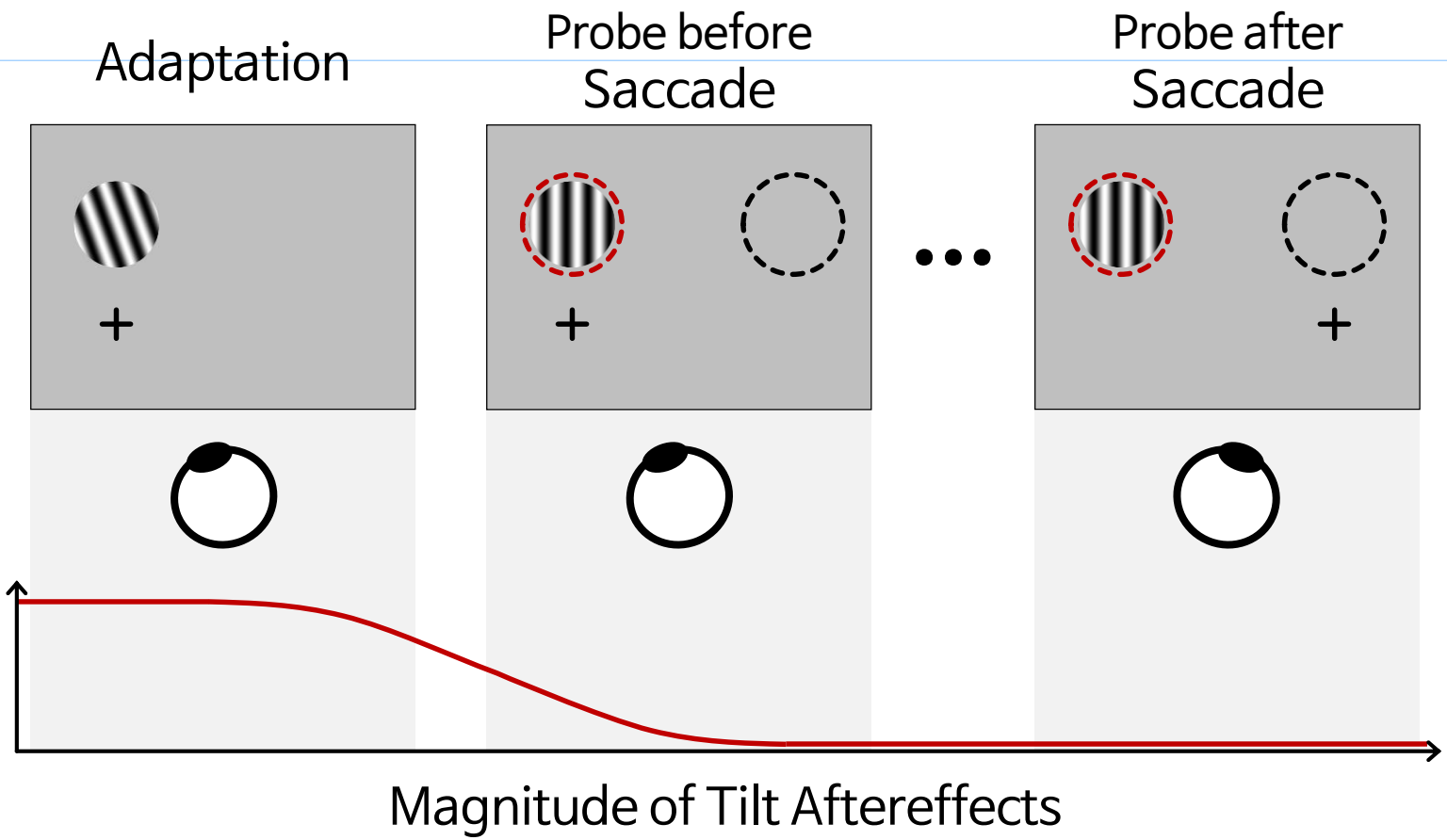
At the Time of Saccade: Saccadic Remapping

(Melcher, 2007)

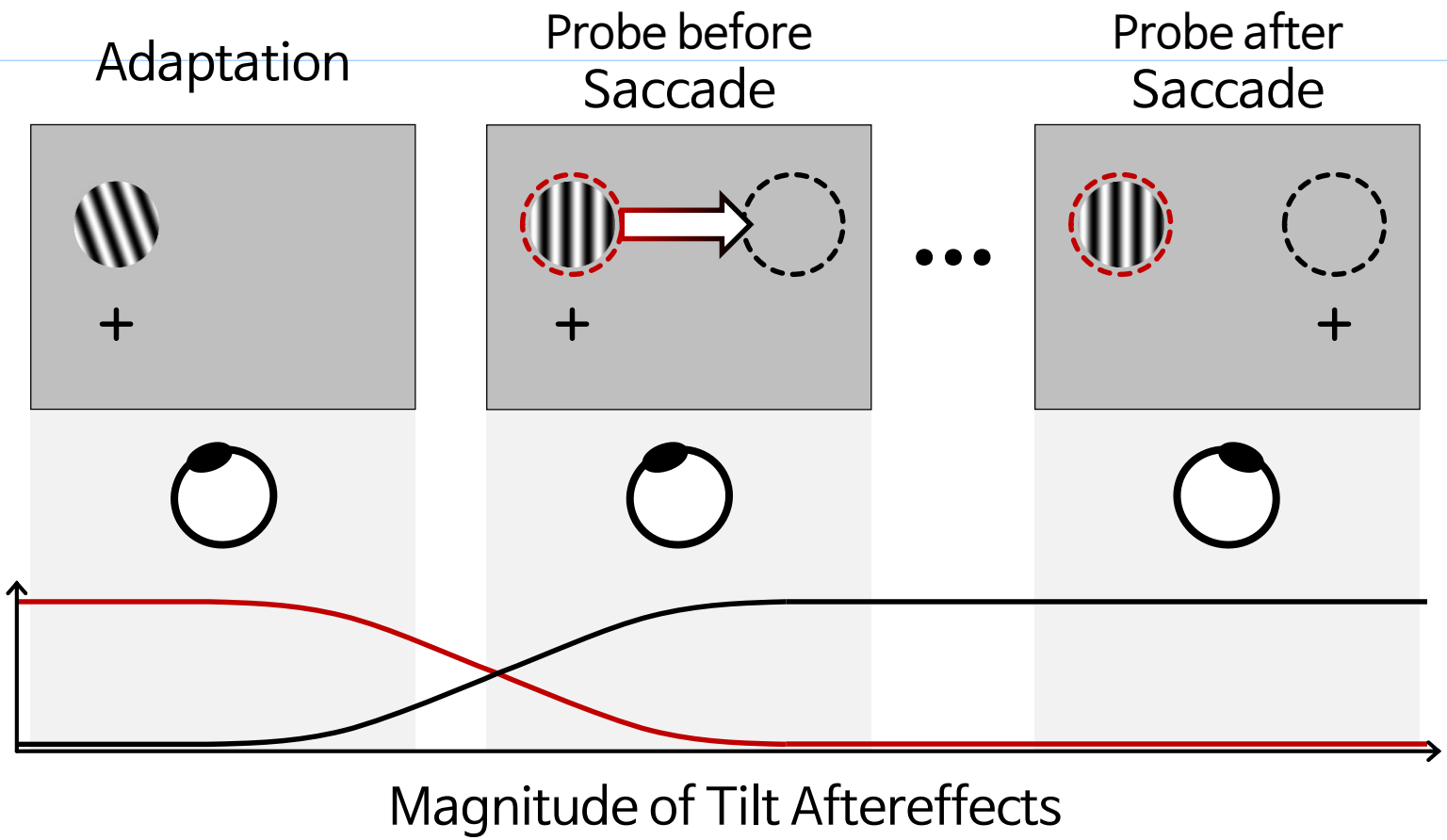




At the Time of Saccade: Saccadic Remapping (cont.)

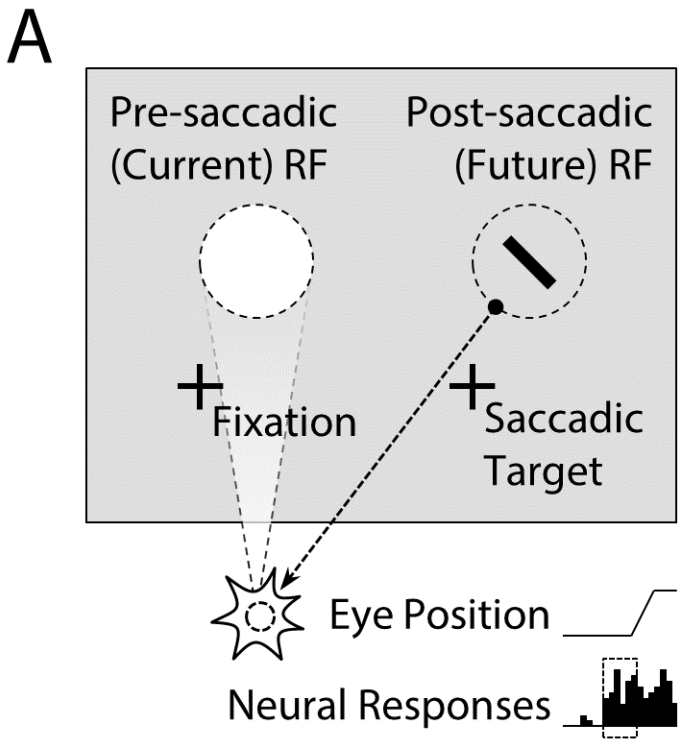


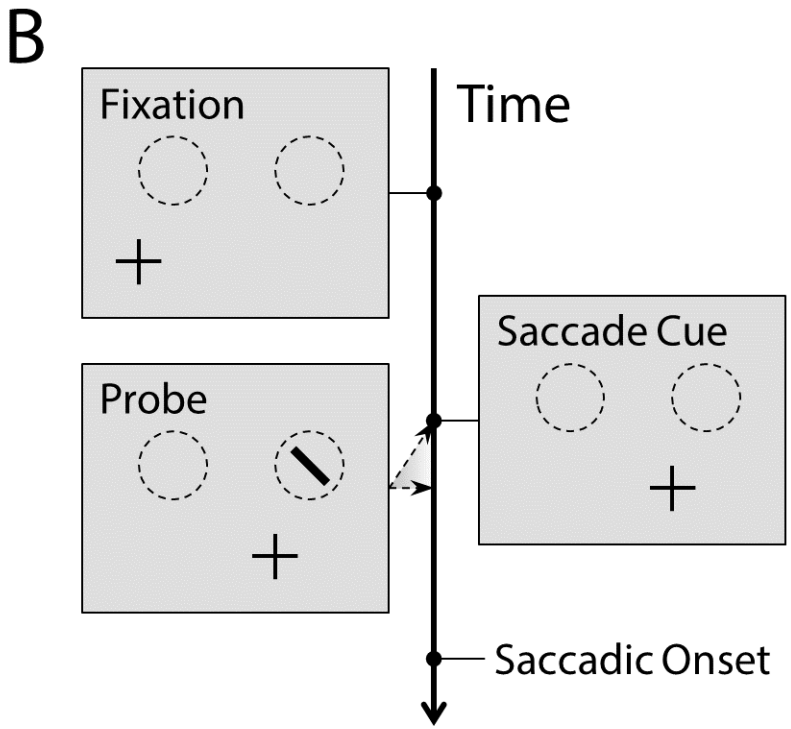
At the Time of Saccade: Saccadic Remapping (cont.)



RF Shifting vs. Activation Transfer: Physiological Studies: LIP, FEF, SC

(Duhamel, Colby, & Goldberg, 1992; …)

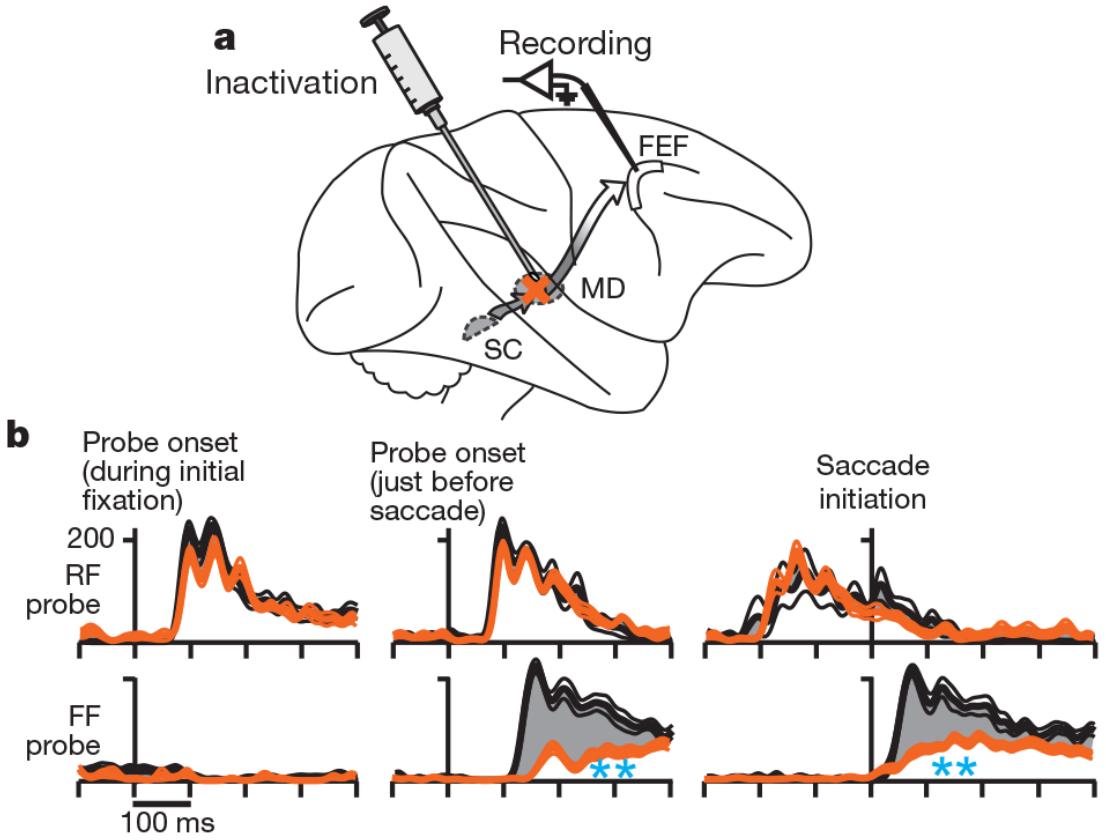




RF Shifting vs. Activation Transfer:

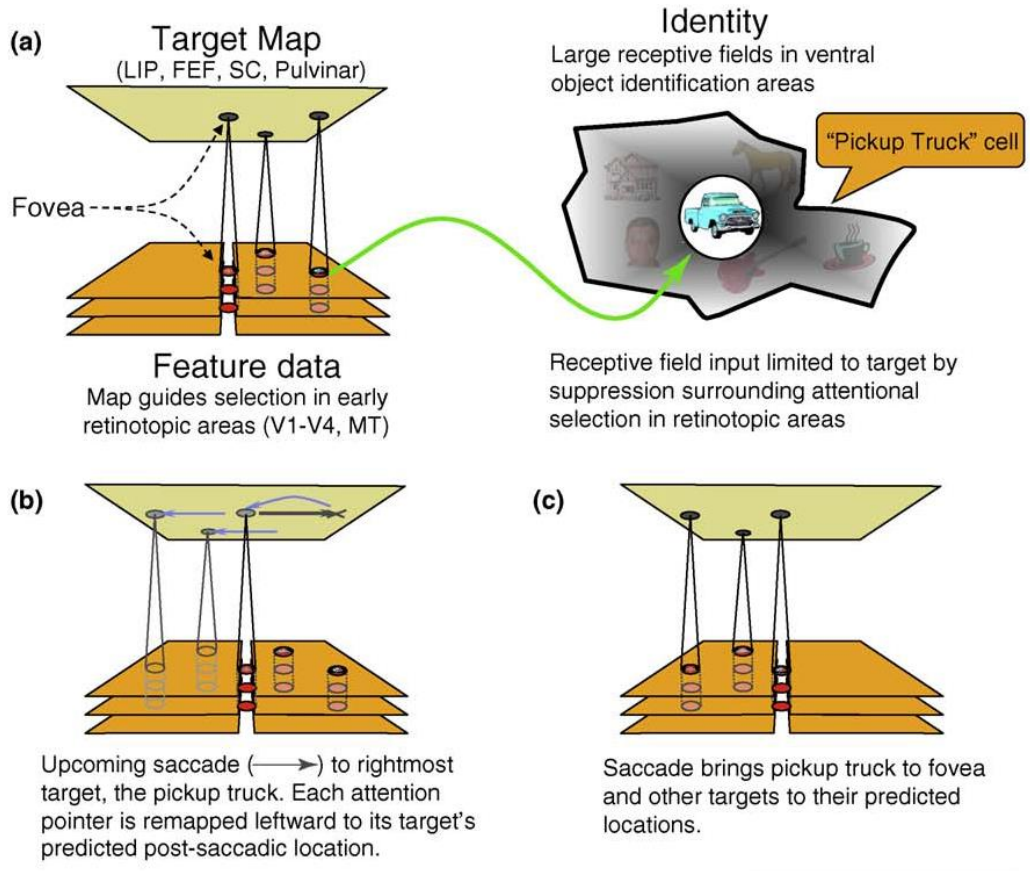
Superior Colliculus Frontal Eye Field

(Sommer & Wurtz, 2006)

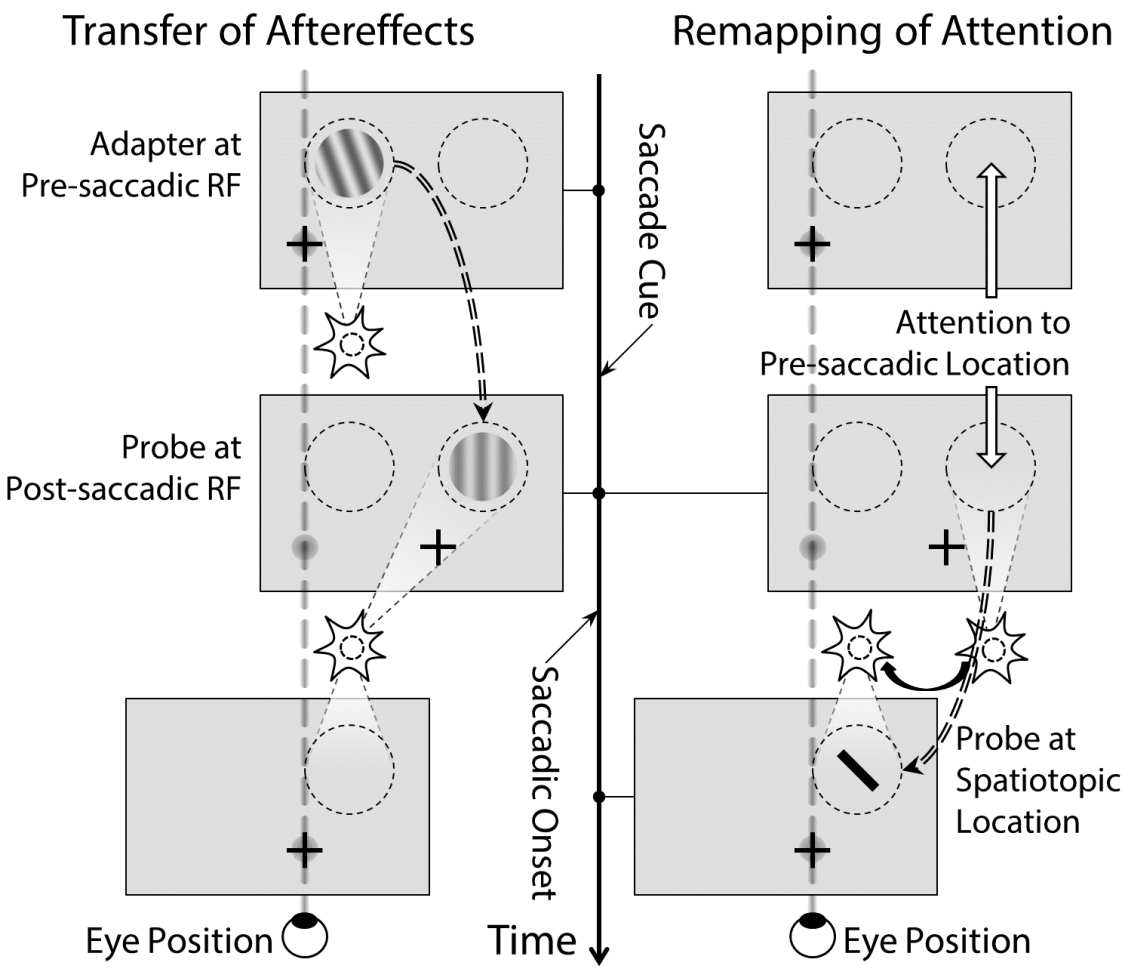


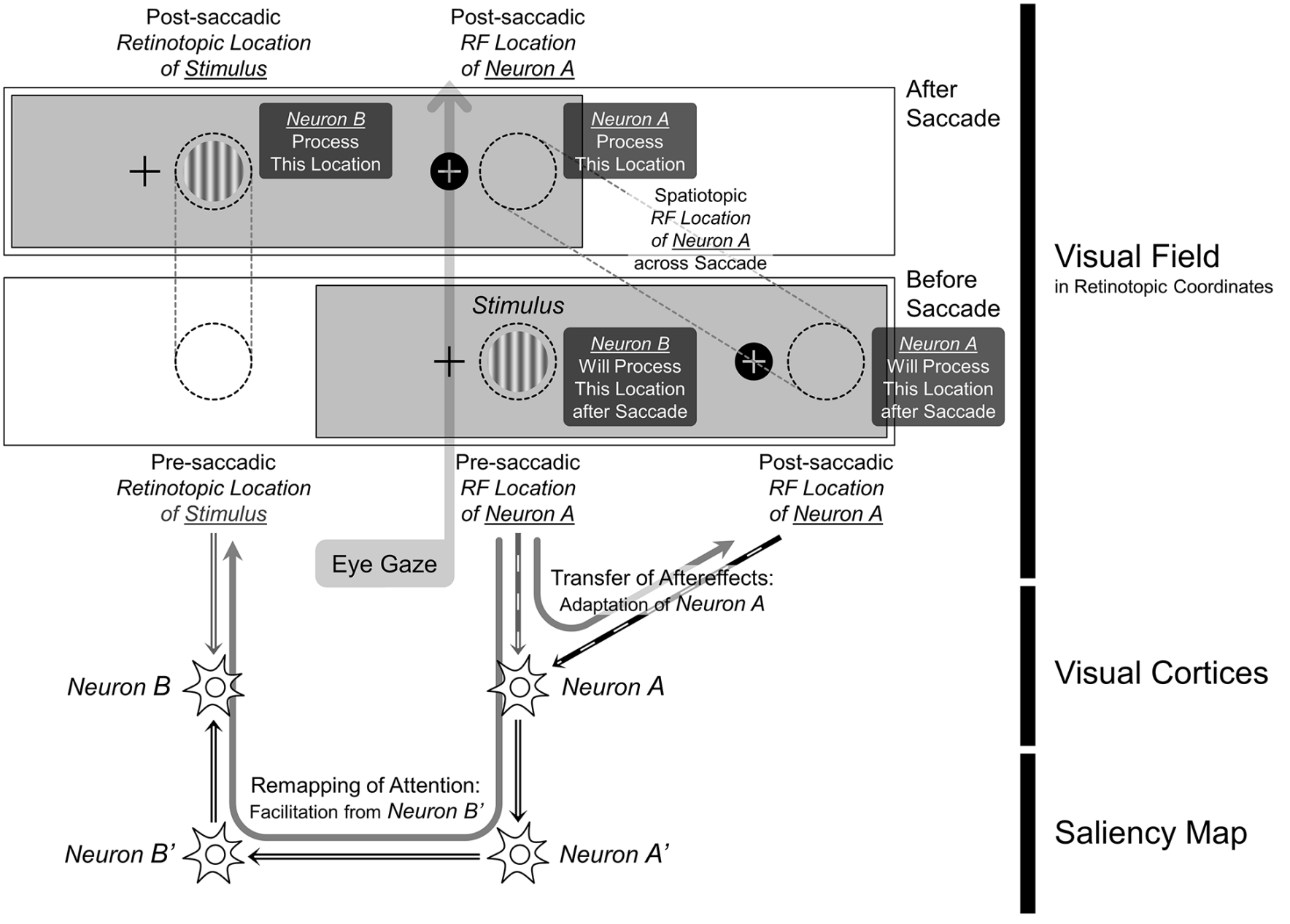
RF Shifting vs. Activation Transfer: Horizontal Connections in LIP

(Cavanagh, Hunt, Afraz, & Rolfs, 2010)

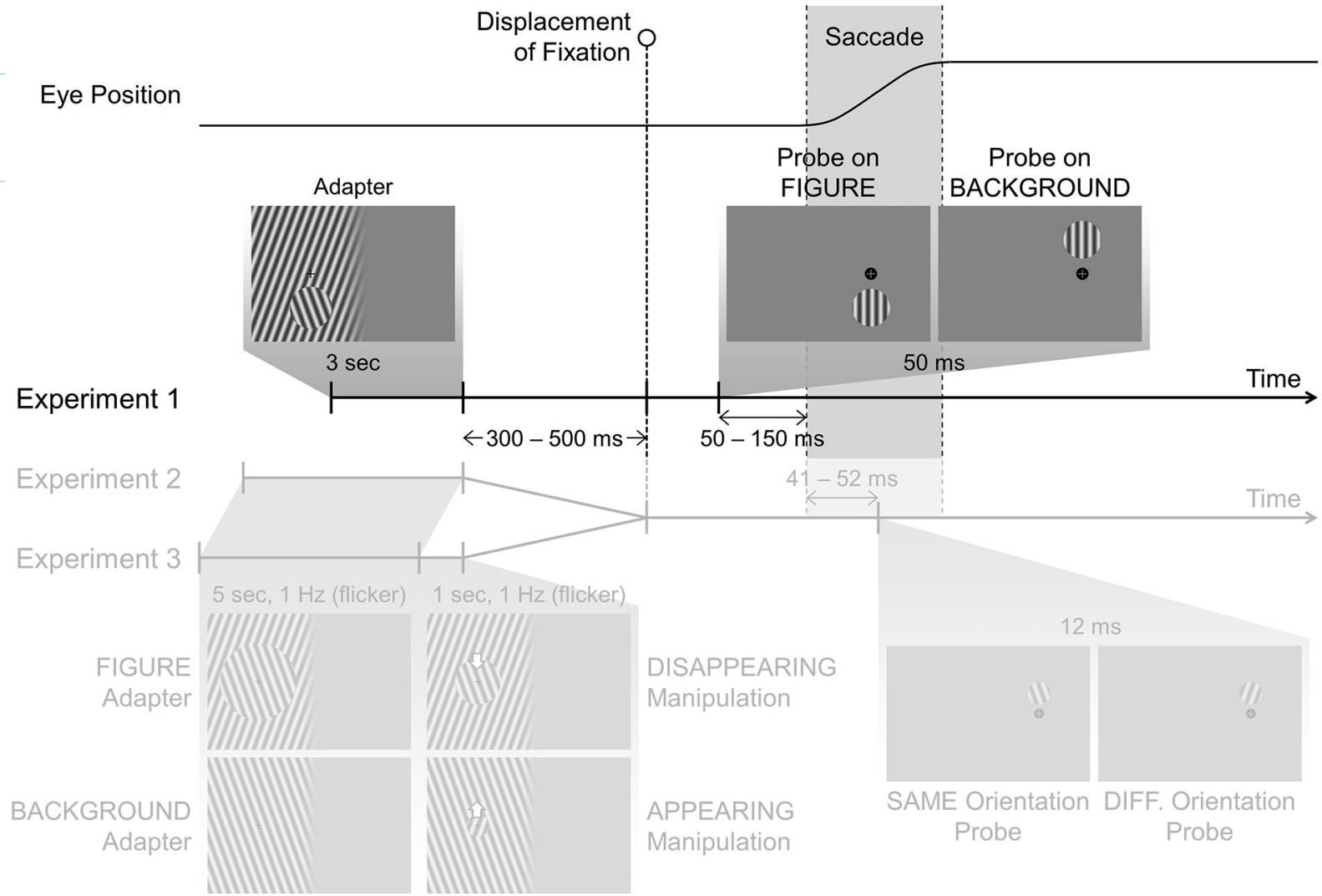


RF Shifting vs. Activation Transfer: Comparison of Behavioral Studies

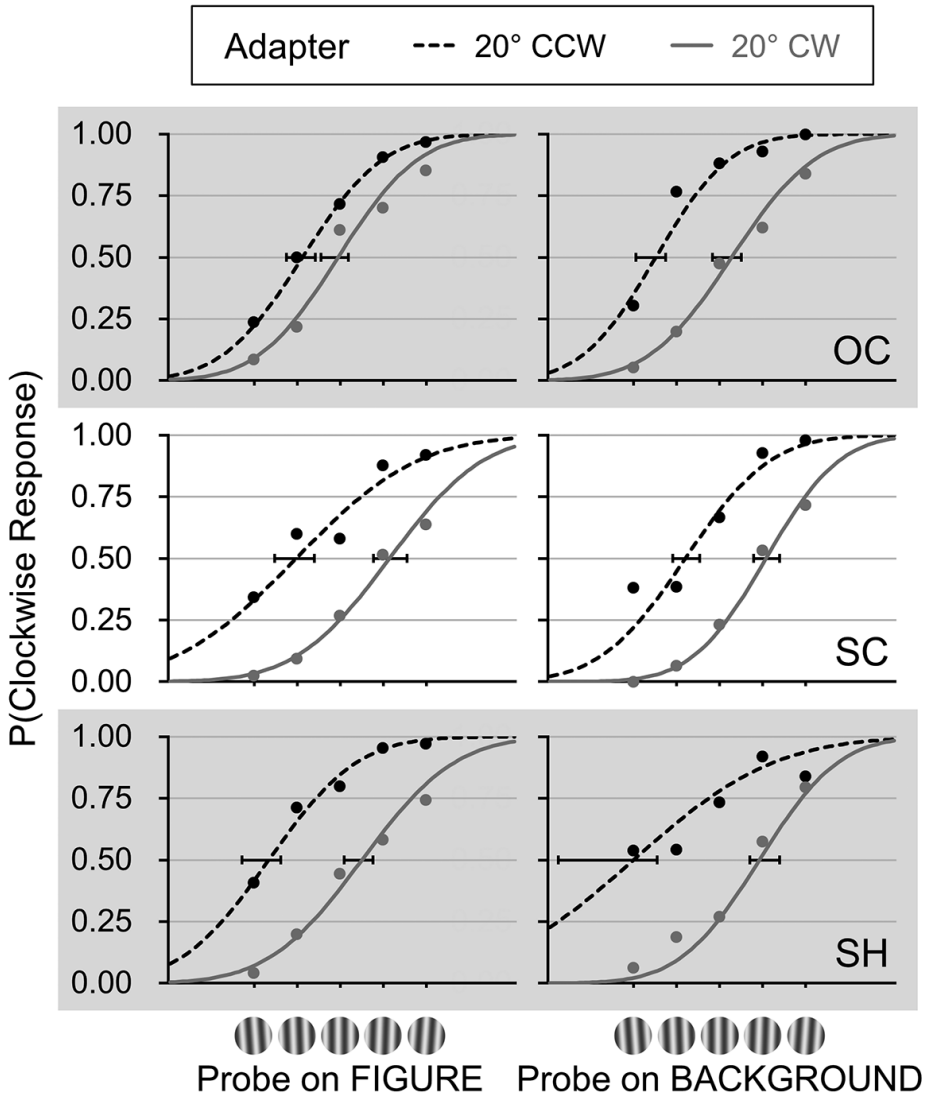


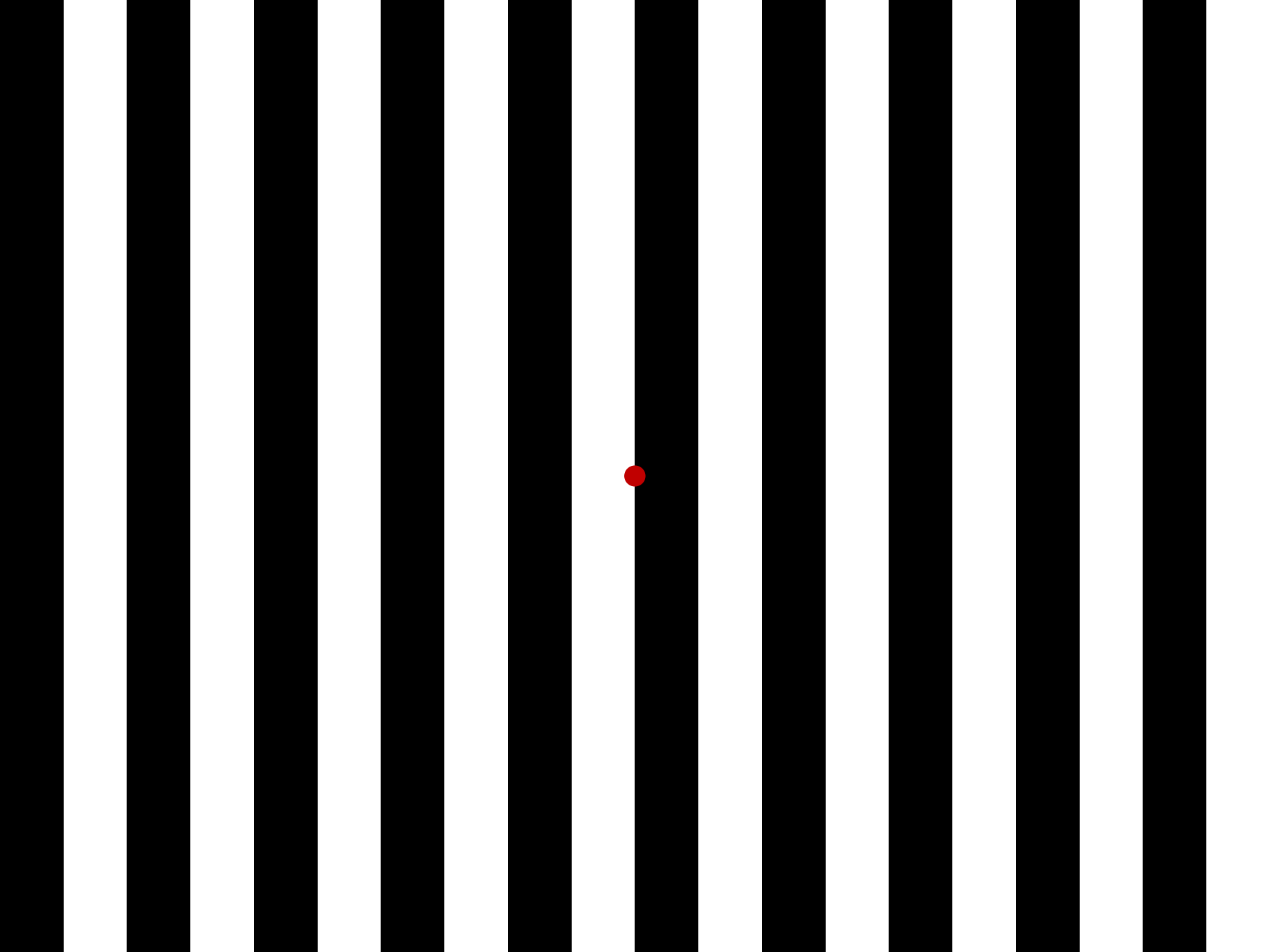

Post-saccadic
Retinotopic Location
of Stimulus
Post-saccadic
RF Location
of Neuron A
After
Saccade
Neuron B
Process
This Location
Neuron A
Process
This Location
Spatiotopic
RF Location
of Neuron A
across Saccade
Before
Saccade
Stimulus
Neuron B
Will Process
This Location
after Saccade
Neuron A
Will Process
This Location
after Saccade
Visual Field
in Retinotopic Coordinates
Pre-saccadic
Retinotopic Location
of Stimulus
Pre-saccadic
RF Location
of Neuron A
Post-saccadic
RF Location
of Neuron A
Eye Gaze
Transfer of Aftereffects:
Adaptation of Neuron A
Neuron B
Neuron A
Visual Cortices
Remapping of Attention:
Facilitation from Neuron B'
Neuron B'
Neuron A'
Saliency Map

Exp. 1: Remapping of Background

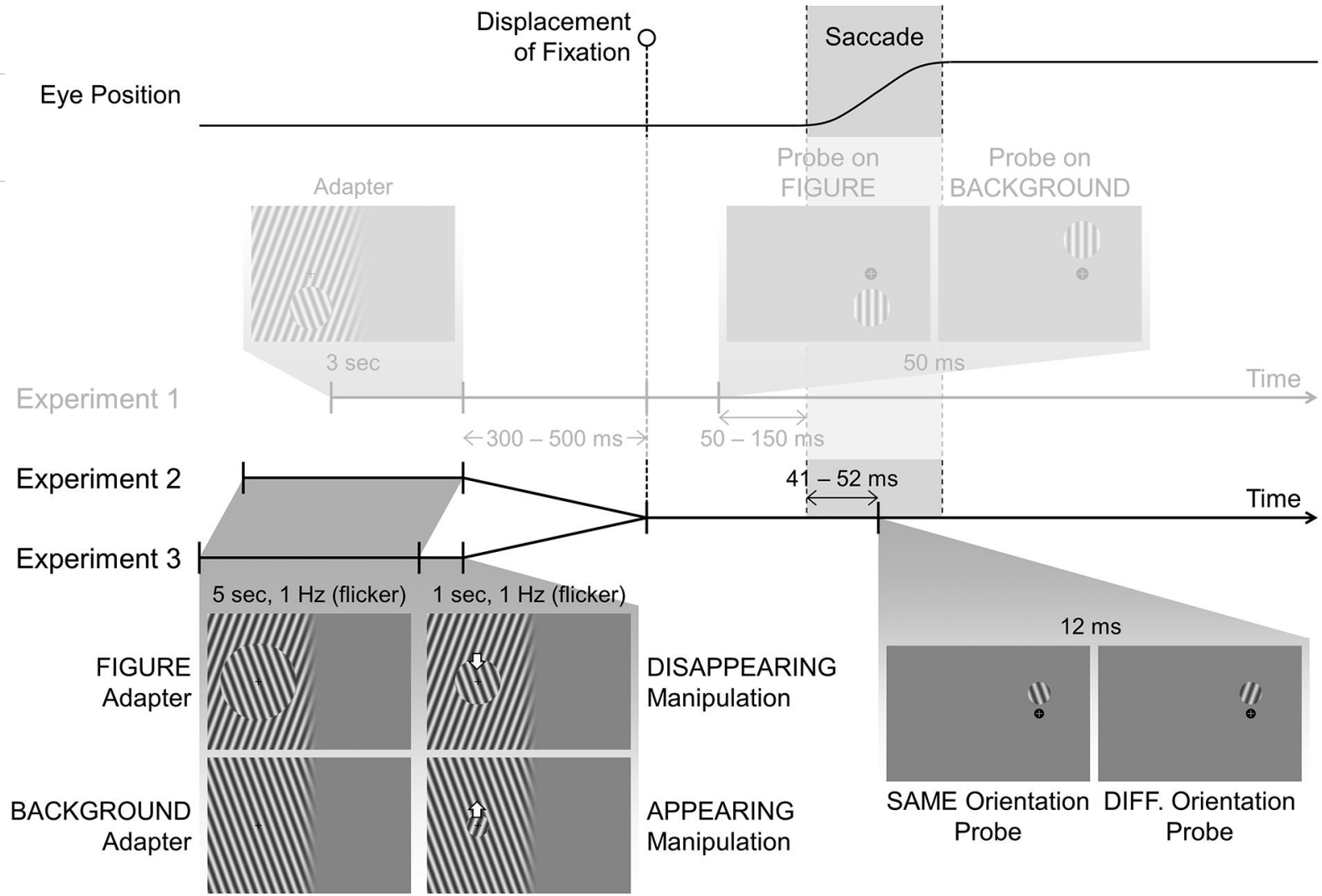


Exp. 1: “Background is Remapped”





Exp. 2 & 3: Modulation during Remapping



Exp. 2 & 3

Threshold Elevation Index

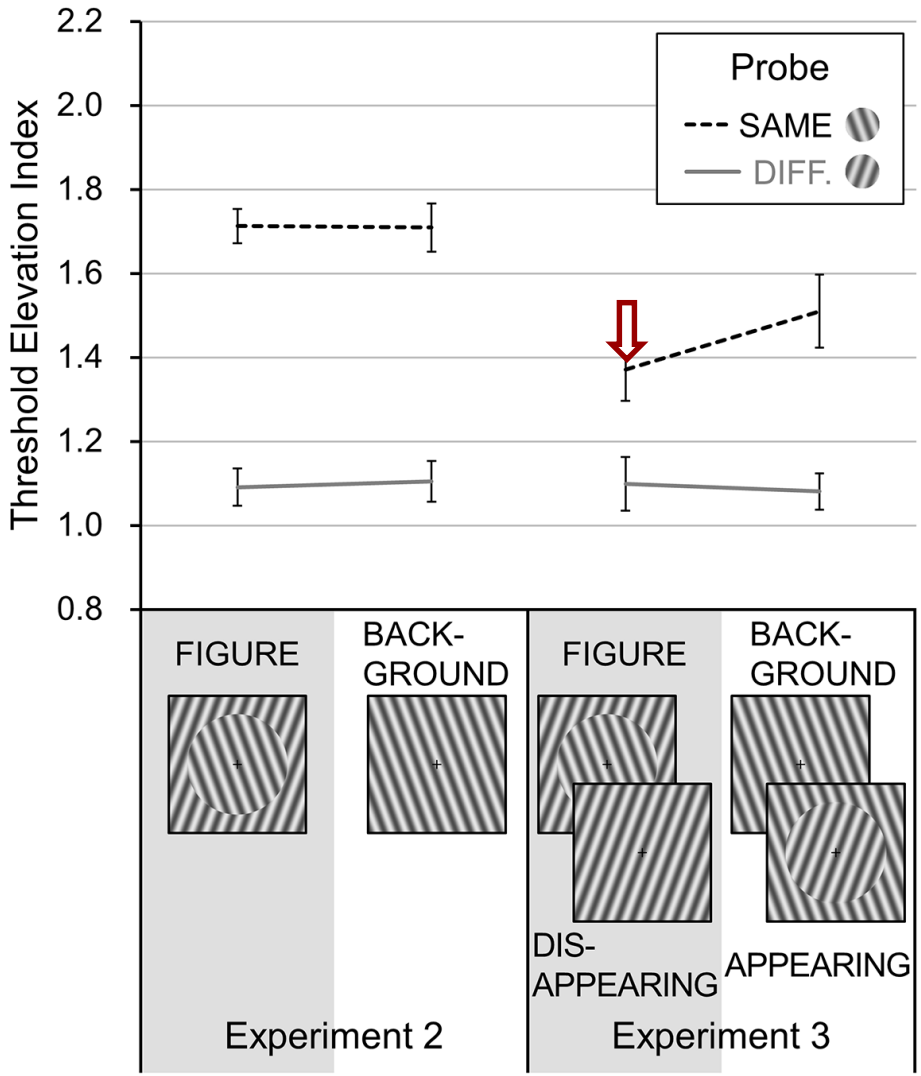
.12

/

.08

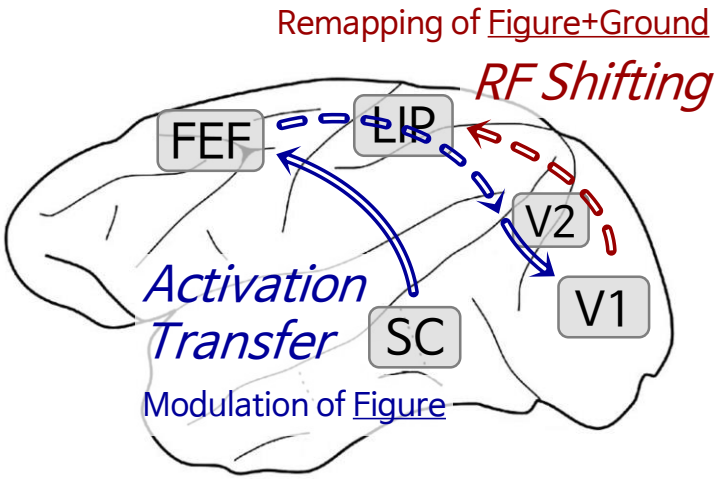
↳1.5

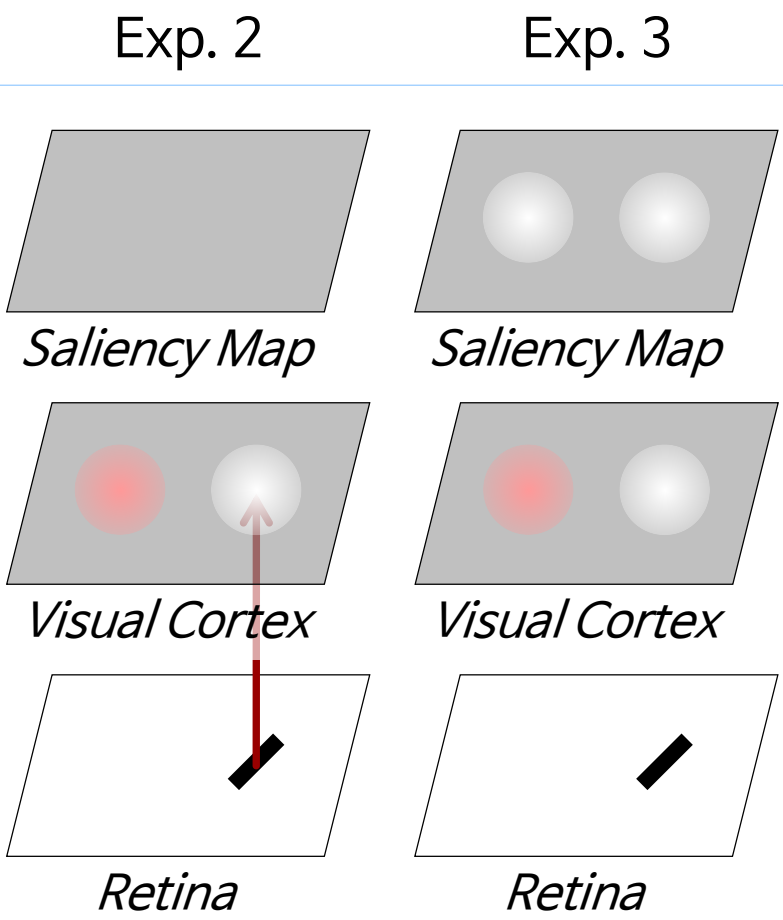
Exp. 2 & 3: “Figure Can Be Modulated”



Summary:

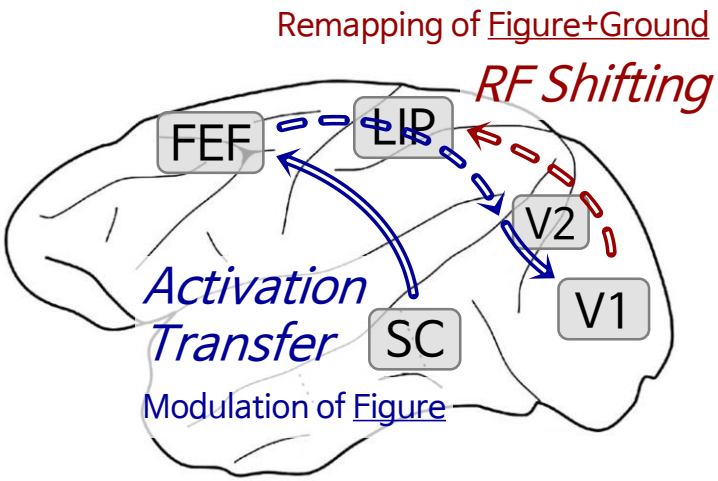
“RF Shifting & Activation Transfer Work Together”

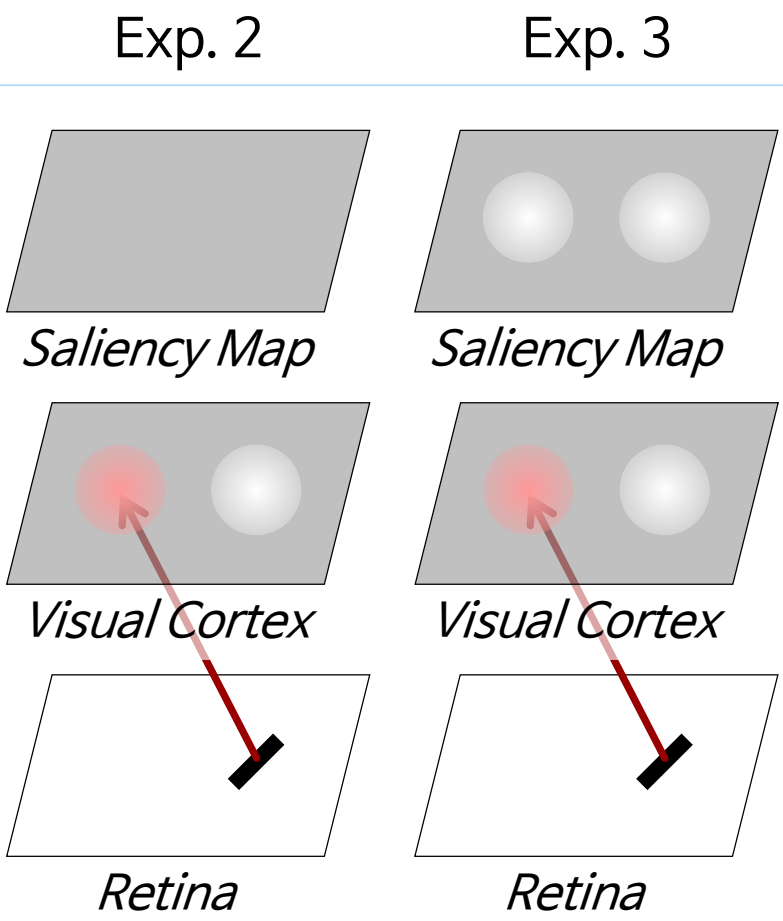




Summary:

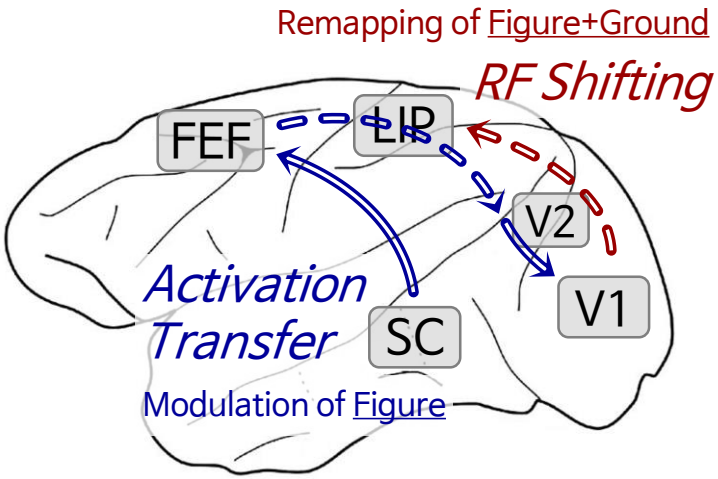
“RF Shifting & Activation Transfer Work Together”

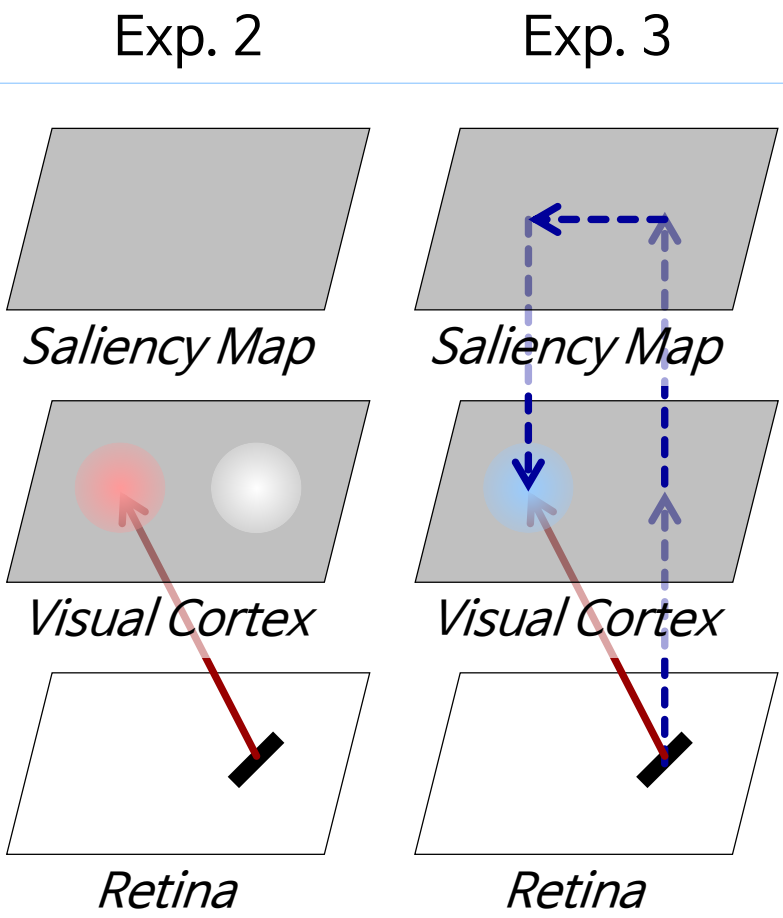


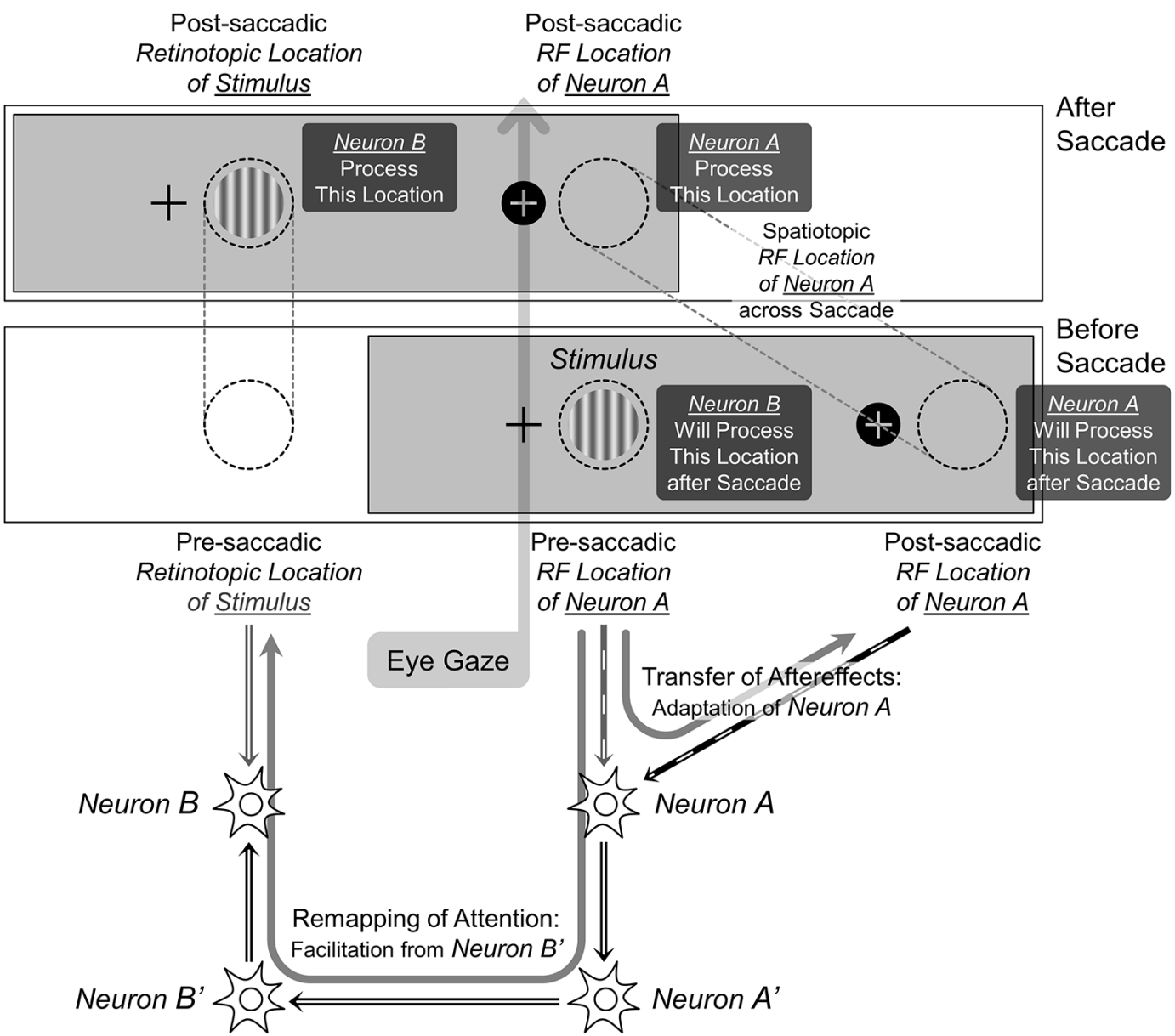


Summary:

“RF Shifting & Activation Transfer Work Together”







Visual Field
in Retinotopic Coordinates

Visual Cortices

Saliency Map

Thank you ☺