

Prior history shapes selection

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Classic models of attentional control assert a dichotomy between top-down and bottom-up control, with the former determined by current selection goals and the latter determined by physical salience. In the present presentation, I will argue that this theoretical dichotomy is inadequate to explain a number of cases in which neither current goals nor physical salience can account for strong selection biases. I will discuss feature-based attention (FBA), as the mechanism that enhances the representation of image characteristics throughout the visual field. FBA is explained in terms of the tuning of the responses of cortical neurons (increasing the gain of neurons) throughout the visual field. Even though it is suggested by previous studies, implicitly and explicitly, that this feature based tuning is under top-down (volitional) control, I will show that selection on the basis of feature characteristics (FBA) is not under top-down control but instead can be explained in terms of bottom-up (intertrial) priming. I will argue that the salience map that drives this selection is not only determined by raw physical salience of the objects in the environment but also by the way these objects are shaped by selection history. I will provide evidence that priming (both feature and reward priming) sharpens the cortical representation of these objects such that these objects appear to be more salient above and beyond their physical salience. I will demonstrate that this type of history effects are not under volitional control: it occurs even if observers try to volitionally prepare for something else. In other words, looking at red prepares our brain for things that are red even if we volitionally try to prepare for green.