Affective Attention Lab Tour – Texas A&M Psychology Department
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On an everyday basis, you encounter a dizzying amount of **visual information**—far more than you can consciously process. Instead, visual information is prioritized by **task relevance**, **salience**, and **history** (including **emotional associations**)[1]. The most heavily-prioritized information attracts your gaze and may be consciously noticed.

If you're searching for your red wallet, every other red object in your drawer may catch your eye. Attention is partially prioritized by the **relevance** of each stimulus to your immediate goals.

Salience is the degree to which features of an image like brightness or color attract attention, regardless of task relevance. For instance, a particularly bright yellow measuring tape might also catch your eye, even though you're only looking for your wallet.

Imagine sitting in a lab, looking at sets of colored shapes. Every time you spot the green shape, you press a button. After enough training, you may find your eyes drifting to the green shape even after the training session is over, hinting at the powerful effect of **selection history** on visual attention.

Reward (and Threat)

Our lab primarily studies the effects of emotional stimuli on **attentional capture**, or involuntary attentional biases toward an otherwise-irrelevant stimulus. If you spot a spider in your drawer, it may draw your attention immediately, allowing you to pull your hand safely away.

Many of our studies use **conditioning** to associate positive (usually money) or negative (usually a small electric shock) outcomes with a previously-neutral stimulus. In most circumstances, stimuli with an emotional association are more likely to catch your attention and your gaze than are neutral stimuli, an effect that remains even after the conditioning phase of the study is over.

Neurobiology of Visual Attention to Reward

When a reward is received, the **ventral striatum** releases **dopamine**[2], which strengthens the early **visual cortex's** representation of the stimulus associated with reward. These representations then influence activity in two separate visual pathways. In the **parietal cortex**, the stimulus is prioritized, making it more likely to outcompete other stimuli as described above. (That is, it becomes disproportionately important, regardless of its task relevance or visual salience.) Meanwhile, the **caudate tail** influences eye movements directly via the **superior colliculus**, bypassing the competition in the parietal cortex entirely. Thus sometimes a stimulus associated with reward will "grab" the eyes away from more salient and more task relevant stimuli.

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[1] For more information on the 3-part model in this handout, see the following article by our colleagues at the University of Chicago and VU Amsterdam:
Awh, E., Belopolsky, A.V., & Theeuwes, J. (2012). Top-down versus bottom-up attentional control: a failed theoretical dichotomy. Trends in Cognitive Science, 16(8), 437-43.

[2] A neurotransmitter involved in motivational signaling (reacting to a positive or negative stimulus), motor control, and decision-making, as well as a variety of functions outside the central nervous system.