

Attention II

PSYC 313 - Lecture 8
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Attentional Orienting

- **Overt spatial attention:** attention is aligned with where the eyes are looking
- **Covert spatial attention:** attention and eye gaze are misaligned such that the eyes are looking at one location but attention is allocated to a different location

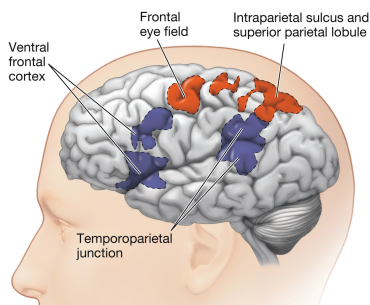
Attentional Orienting

- Most research investigating the effects of spatial attention on perception and neural responding has focused on covert spatial attention because the eye movements that accompany overt shifts of spatial attention cause a change in the image on the retina, which can cause a neural response
- To ensure that the observed changes in neural activity are due to attention, researchers use a covert attention procedure in which participants keep their eyes stationary on a central fixation point while attention is shifted to different peripheral locations

Shifting Spatial Attention

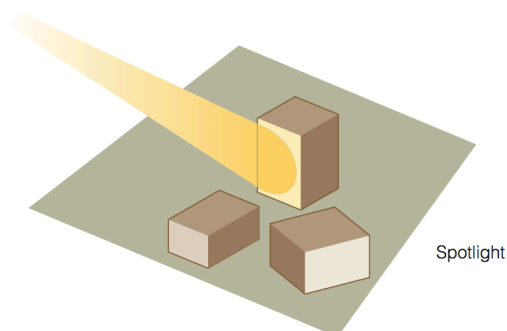
- Spatial attention can be shifted **voluntarily** (i.e., a goal-directed shift of attention to a peripheral location in response to information presented where attention is overtly oriented)
- It can also be shifted **reflexively** (i.e., an automatic shift of attention in response to the abrupt onset of a stimulus in the periphery)

Different neural regions are involved in voluntary and reflexive shifts of attention

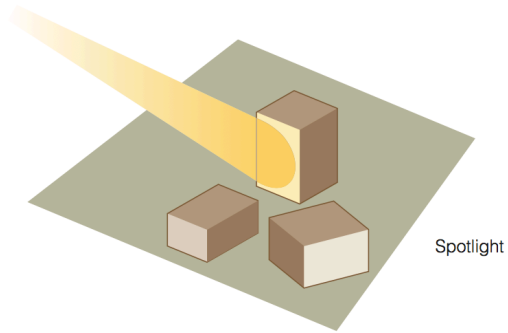


Areas along the dorsal pathway (red) are involved in voluntary spatial orienting and areas along the ventral pathway (blue) are involved in reflexive spatial orienting

Space-based theories of attentional selection propose that it is the spatial location of a stimulus that is selected for enhanced processing



Space-based attentional selection is the process of selecting visual information for conscious awareness in specific regions of space, has been likened to a spotlight that illuminates and raises the profile of whatever falls in its focus (Posner, 1980)

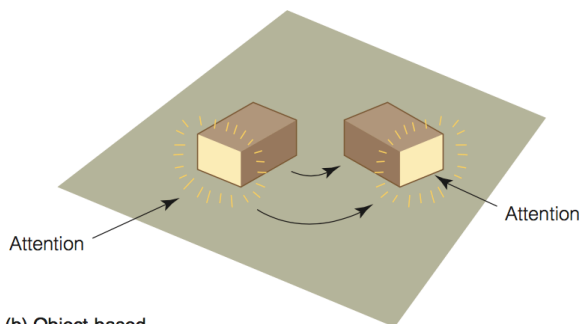


Complementing the spotlight metaphor of attentional selection is the idea that it can also function like a zoom lens



As you shift between one percept and the other you adjust the spotlight beam of attention

Object-based theories of attentional selection propose that entire objects or perceptually-organized groups of stimuli are selected for enhanced processing

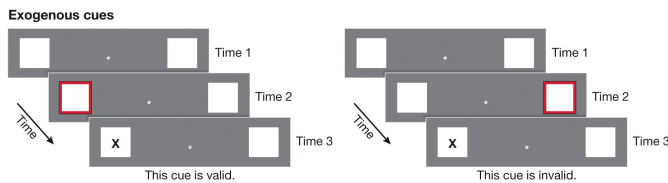


(b) Object-based

Space-Based Attentional Selection

- Space-based theory proposes that it is the *location of a stimulus* that is selected for enhanced processing
- The spatial cueing task comes in two forms:
 - The **endogenous** version uses a centrally presented, predictive cue to produce a **voluntary shift** of covert spatial attention to a peripheral location
 - The **exogenous** version uses an abrupt-onset peripheral cue to produce an automatic or reflexive shift of covert spatial attention to a peripheral location

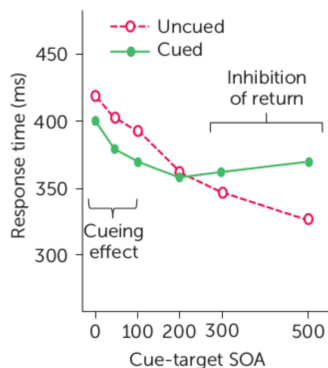
The Exogenous Spatial Cueing Task



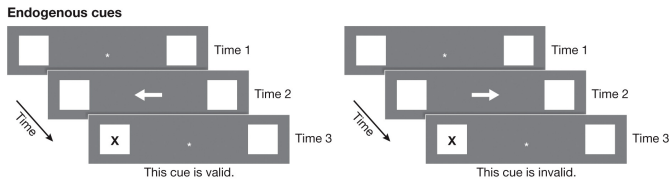
Cue validity: 50% valid (cued), 50% invalid (uncued)

Cue-to-target stimulus onset asynchrony (SOA): 100, 200, 300, 500ms

Exogenous spatial cueing effect—the abrupt-onset cue automatically draws attention to the location of the cue, making participants faster to respond to the target when it appears at the cued location than the uncued location



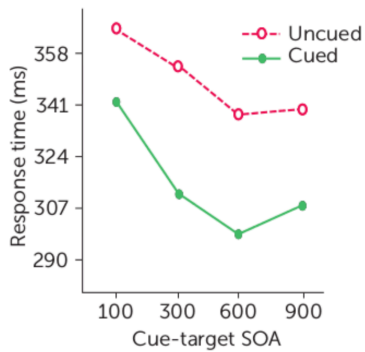
The Endogenous Spatial Cueing Task



Cue validity: 80% valid (cued), 20% invalid (uncued)

Cue-to-target stimulus onset asynchrony (SOA): 100, 300, 600, 900ms

Endogenous spatial cueing effect—valid cues allow participants to strategically shift their covert spatial attention to the cued location, making them faster to respond to the target when it appears at the cued location than the uncued location



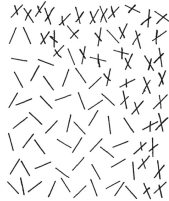
So both kinds of spatial cueing effects reflect the fact that participants were *faster* to detect the target when it appeared at the attended spatial location than when it appeared at the unattended spatial location

According to Posner:

“Information processing is more efficient at the location where covert spatial attention is directed”

It is more efficient because we have primed our detectors to expect a stimulus to appear at that spatial location

The symptoms of patients with spatial neglect syndrome support the space-based account of attentional selection because they cannot attend to the left side of their body and surroundings

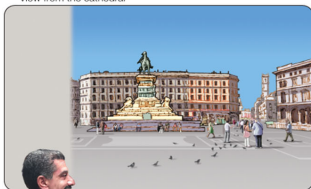




Bisiach & Luzzatti (1978)

The patient with spatial neglect syndrome only sees shops on one side of the square when facing toward the cathedral and only sees shops on the other side of the square when facing away from the cathedral

View from the cathedral



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View toward the cathedral



Bisiach & Luzzatti (1978)

