


Attention

PSY 200
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Lecture 11


How could you not see it?

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Attention


- The world contains more information than we can fully interpret or process all at once
- The ability to deal with some stimuli and not others is *attention*
 - ♦ not clear if there is an attentive *system*
 - ♦ or if attention *derives* from other systems


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Information processing

- Modern theories see cognition as *information processing*
 - ♦ much like a computer
- Different systems have different capabilities, capacities, and speeds
- Necessarily, some information is ignored because it is not processed




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Attention

- Part of attention seems to be due to mental effort on your part
 - ♦ attending a lecture
 - ♦ ignoring whispering around you
- Part of attention seems a natural side effect of mental effort
 - ♦ ignoring the “uhs” and “ums” from a speaker
 - ♦ ignoring the feel of clothes on your body
- Part of attention seems effortless
 - ♦ a loud noise

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Magic trick

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Magic trick

- Now the computer will shuffle the cards and present them again

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Magic trick

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Drawing attention

- Attention can be focused by meaningful stimuli
- Attention can be focused by environmental characteristics

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Automatic attention

- Simon effect (Simon & Wolf, 1963)
- An irrelevant cue can affect response time to a stimulus
- Task: respond as quickly as possible to identify the *color* of the square
- The square is sometimes on the left and sometimes on the right side of the screen (irrelevant)
- You respond with a keypress on the left (green) or on the right (red)

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Automatic attention

- Location of the square is irrelevant, but it sometimes is congruent with the response location (left-green; right-red) while sometimes it is incongruent (left-red; right-green)



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Automatic attention

- People are faster identifying color for congruent compared to incongruent conditions
 - 35 millisecond difference

CogLab class data (126 observers)



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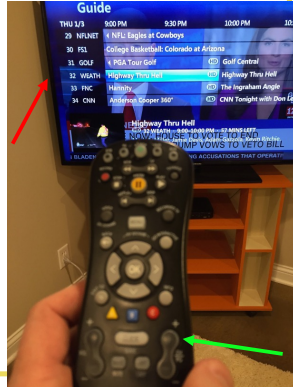
Automatic attention

- The Simon effect is, in some sense, a *failure* of attention
- You want to ignore the location of the target square and only attend the color
 - But you cannot ignore the target location
- CogLab has several labs that play on similar ideas
 - Stroop effect (more next time)
 - Spatial cueing
 - Several labs related to memory and decision making have similar properties

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Automatic attention

- These kinds of effects are small (~50 ms), but they matter a lot
- Consider the remote control and on-screen channel guide provided by my cable provider
- To move the "cursor" up on the screen, I press the "+" button the right side
- The effect on the screen is to go "up" one line, but that is to a channel with a *lower* number!



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Human Factors

- Applied cognitive psychology
- Among other things, design interfaces so that stimuli and responses are compatible
- Products "feel" better, are used as intended, and users make fewer errors
- Really important in high stress situations
 - Aircraft cockpits, nuclear power plant control stations
- Really important in everyday (low stress) situations that are used a lot
 - Your phone
 - Doors

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Drawing attention

- In some situations, attention can be focused by certain stimulus characteristics, especially changes
 - Flashes of light
 - Movement
 - Color
 - Think of advertising signs
- We depend on these characteristics a *lot*
 - Removing these cues can make simple tasks rather difficult

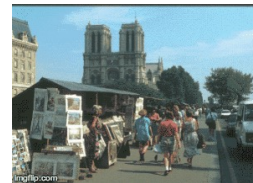
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Drawing attention

- Raise your hand when you spot what changes in the two images



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Drawing attention

- Raise your hand when you spot what changes in the two images



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Drawing attention

- Raise your hand when you spot what changes in the two images



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Drawing attention

- Suppose these cues were masked by other changing stimuli
- You might not notice the change at all

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Drawing attention

- Raise your hand when you spot what changes in the two images



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Drawing attention

- Raise your hand when you spot what changes in the two images



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Drawing attention

- Raise your hand when you spot what changes in the two images



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Drawing attention

- Raise your hand when you spot what changes in the two images



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Attention

- Masking the changes makes it difficult to identify the changed parts of the image
 - ♦ Suggests that you do not actually “see” the entire image with each presentation
- Attention seems to be *necessary* to detect stimulus changes
- Explains how people can “look” but not “see”
 - ♦ walking into doors
 - ♦ driving into trains
 - ♦ detecting changes on a radar screen
 - ♦ why magicians use flashes of light!

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What does attention do?

- It is not clear, and it is probably different things for different situations
- To many people, attended information feels “stronger”, so they think neural representations must be stronger in the brain.
- But if attention strengthens perceptual representations, we should lose perceptual veridicality
 - We might expect what is schematized below
 - But we normally do not experience this
- Attention generally seems to strengthen information about a stimulus that is not *perceptual*


Stimulus




Attend
red



Attend green

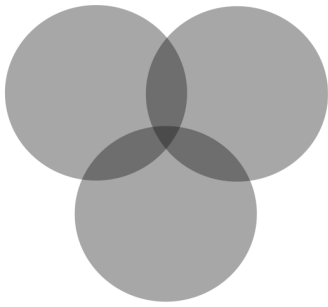


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Attention illusion

- Sometimes attention *can* change perceptual properties
- But then we have an incorrect perception of the properties of the visual scene
- So it is difficult to understand how attention is helping here




Tse, 2005

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More demos


- If time permits, here’s some more demos
 - http://viscog.beckman.uiuc.edu/djs_lab/demos.html
- Field
- Living room
- Phone call
- Lunch conversation (9 changes)
- Paris scene

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Conclusions


- Attention can have very powerful effects
 - help processing of focused on things
 - can cause unawareness of unattended things
- Not precisely defined
 - characteristic of processing?
 - An “extra” system?

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Next time

- Methods of studying attention
- What things influence attention
 - Timing, features
- CogLabs on Attentional blink and Visual search due!
- *Should you pay \$59.95 for Mega-speed reading?*

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