Attention

PSY 200
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Lecture 11

How could you not see it?

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

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

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 “uhhs” and “ums” from a speaker
  - ignoring the feel of clothes on your body
- Part of attention seems effortless
  - a loud noise

Magic trick

- Pick any card
  - Memorize it really study the card carefully to be certain you have it memorized

Magic trick

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

Hey, the card you selected is missing!

Try it on the web at http://members.tripod.com/~andybauch/magic.html

Drawing attention

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

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)

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)

Automatic attention

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

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

CogLab class data

126 observers

Graph showing the difference in identification times between congruent and incongruent conditions.
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.

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.
- Really important in everyday (low stress) situations that are used a lot.
  - Aircraft cockpits, nuclear power plant control stations.
  - Your phone.
  - Doors.

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.

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

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

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

Drawing attention

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

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

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

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

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.

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

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?

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?