

Attention

- What is attention?
- Why are there limits in processing
- Five functions of attention

What is attention?

- How is the word used?
- Examples
 - Something fluttering caught my attention
 - I didn't see you, I was paying attention to the game.
 - I struggled to pay attention to the lecture
 - I don't remember even cleaning the table. I must not have been paying attention

Talking about attention

- The way we talk about attention affects how we think about it
 - We use the same word for all of these examples
 - Are they really the same?
 - Perceptual attention
 - Seeing objects
 - Hearing one conversation but not another
 - High level attention
 - Switching between tasks
- Attention as a resource
 - We talk about "paying" attention

Attention is probably not one thing

- All of these definitions refer to limiting the amount of information that is processed
- There are probably many ways to do this
- Why are there limits?
 - There is no logical reason for limits
 - Our bodies place some constraints
 - Limited sensory systems
 - Limited effector systems
 - Movements must be planned sequentially
 - Words can only be spoken sequentially

Evaluating limits

- Perfect performance is often impossible
- Ideal observer analysis
 - The best possible performance
 - Because there is noise in the world, performance degrades as the world gets more complex.
 - That means that decreases in performance alone do not signal limitations in processing
 - It took a long time for Psychologists to realize this.
- Two examples...



Five functions of attention

- Three Perceptual Attention effects
 - Focusing
 - Perceptual Enhancement
 - Binding
- Two Executive Attention effects
 - Sustaining Behavior
 - Action Selection

Focusing

- Not everything that we perceive initially gets additional processing
 - Change blindness phenomena
- Is there a Span of apprehension
 - People are often unable to report much from a briefly presented stimulus
 - Are these limits immediate?

Partial report technique

- Sperling

F	J	K	M	<--High tone (Top Row)
B	R	L	S	<--Medium tone (Middle Row)
H	V	A	D	<--Low tone (Bottom Row)

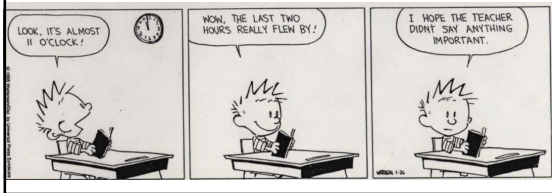
- Either 6 or 12 letters presented
- In full report (report all letters) people are limited to about 4-5 letters.
- In partial report, they get 3-4 letters from each row
 - That information had to be in there somewhere
- More information available early than late

Implications of partial report

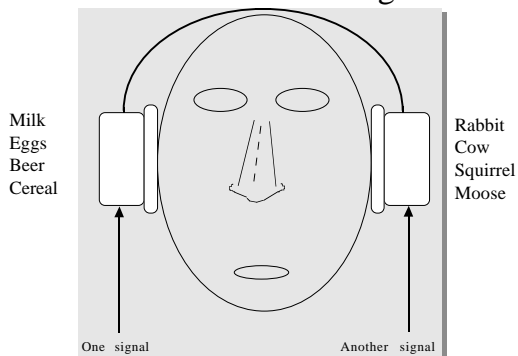
- Limits are not perceptual
 - Lots of information reaches our sensors and gets some initial processing
- Limits occur when information is stored
 - Reporting items requires holding them in memory for sequential output.

More Focusing

- Attending to some messages leaves other messages unprocessed
 - Sometimes we select among messages in the environment.
 - Sometimes the messages are internal...



Dichotic listening



What gets through?

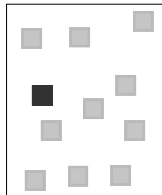
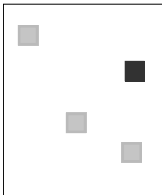
- People shadow text in one ear
 - What about the message in the other ear?
- Low level information gets through
 - Was it a voice? Sex of voice
 - Subjects name sometimes gets through (30% of time)
- Very little else
 - Language being spoken
 - The same word could be repeated without being noticed.

Some more complex information

- L: Give me liberty and shut the door
- R: Please leave quietly or give me death
- People shadowing the left ear will often switch to the right for a word or two.
 - Something about the message had to get through.

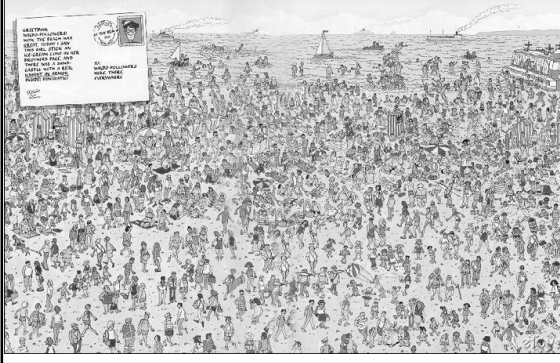
Focusing

- Lots of perceptual information is available initially
- As processing gets more complex, less information gets processed

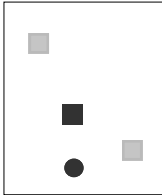


A simple search
Time to find the red item does not go up as the number of distractors (non-red items) goes up.

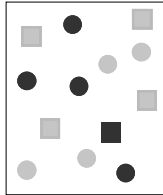
A more difficult search



Conjunctions



Time to find a target defined by a conjunction square AND red goes up with the number of distractors



- Searching for conjunctions of properties is harder.
- Something about conjunctions requires more mental effort.
 - Stay tuned for more details.