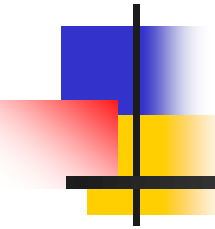
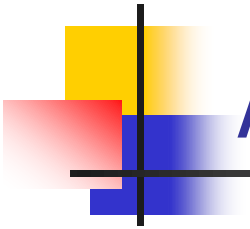


Attentional Processes and Cognition



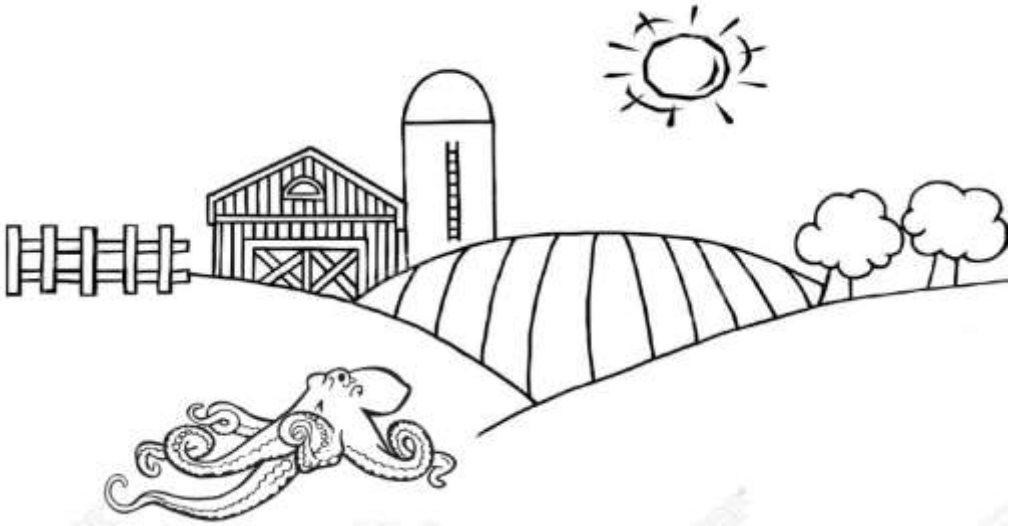
Attention

- How does attention work?
- What conditions predict attentional focus?
- What is the role of perception and attention?
- How long can we pay attention?

Attention

- Concentrating on specific features, thoughts, activities, or other stimuli

  - Conceptual dysfluency (Loftus, 1978)



Attention

- **Overactive top-down processing** and recognition errors

  - Cognition is remarkably efficient and accurate but NOT immune to errors and mistakes

  - Attentional and perceptual filters turn “off” when we need them, or turn “on” when we don’t!

Automatic (Unconscious) Processing

- Perception without attention is possible
  - **Automatic processing** is unintentional, unconscious, and effortless
  - Stimuli may not be consciously focused upon, but many features do register
    - Studies show familiarity and emotional preference help this process

Automatic (Unconscious) Processing

- **Advantages**

  - Allows us to do many things at once, especially when cognitive load is high

  - Helps build complex skill sets

- **Disadvantages**

  - Can lead to careless mistakes

  - Important details might be overlooked

Strategic (Controlled) Processing

- Perception requires attention, and performance suffers if attention declines
  - **Strategic processing** is intentional, conscious, and effortful
  - Skills that begin with strategic processing can become automatic
    - Playing a video game, driving a car, etc.

Strategic (Controlled) Processing

- **Advantages**
  - High cognitive elaboration
  - Detail-oriented
- **Disadvantages**
  - Perceptual bias and filtering
  - Information distortion

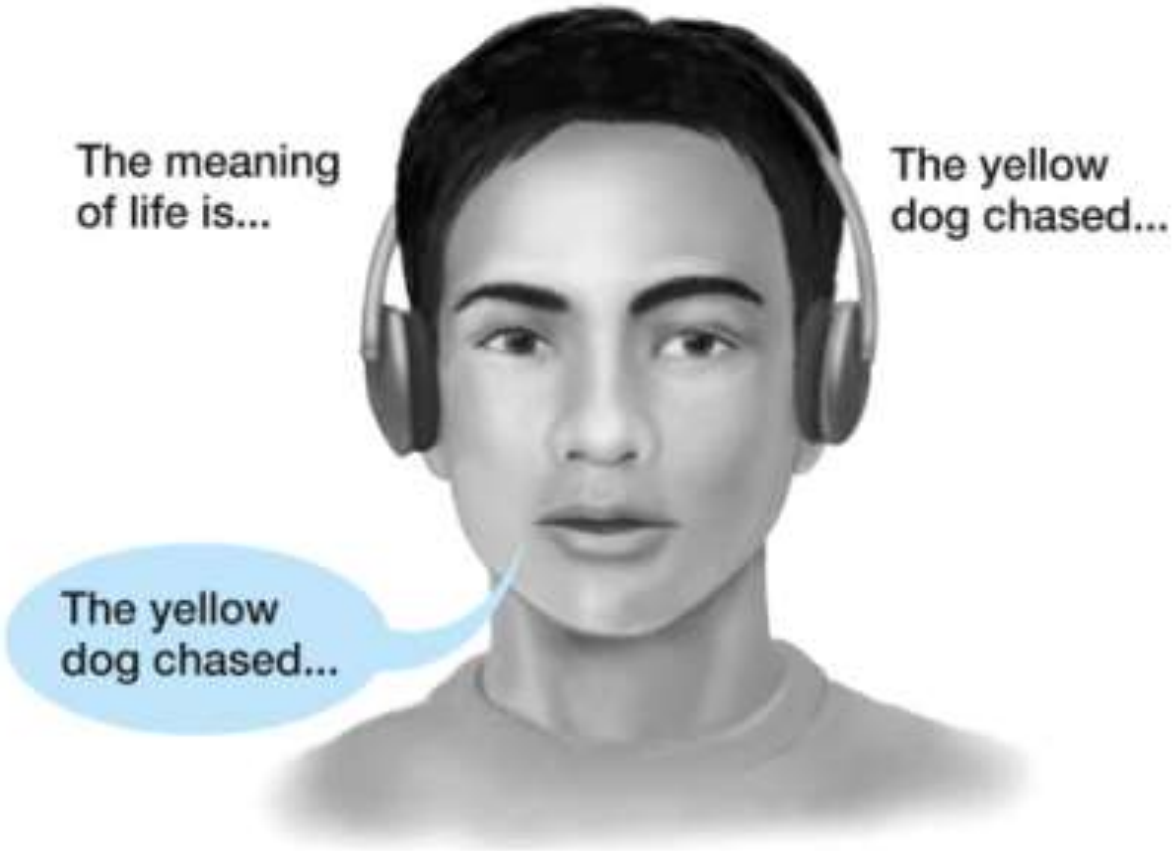
Attention

- **Consciousness**
  - (1) Rebound effects of thought suppression
  - (2) Mind wandering
    - Thoughts shift from external stimuli ("mindless reading")
    - May not be conscious of this for many paragraphs!

Attention

- **Selective attention**
  - Process one stimulus while ignoring all others
  - Ex: Dichotic listening tasks

Dichotic listening



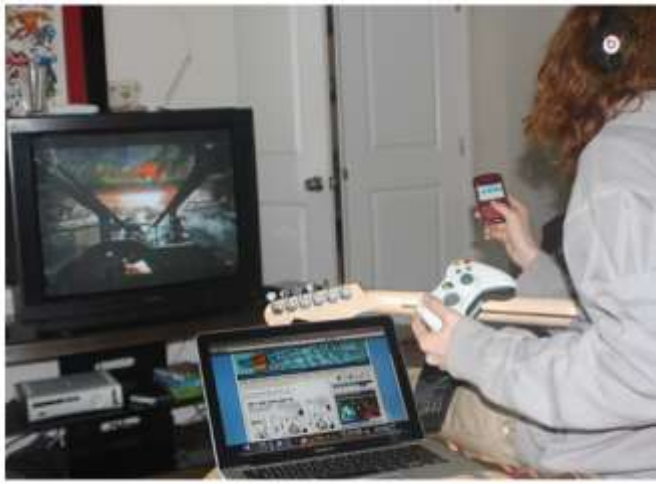
Attention

- **Divided attention**

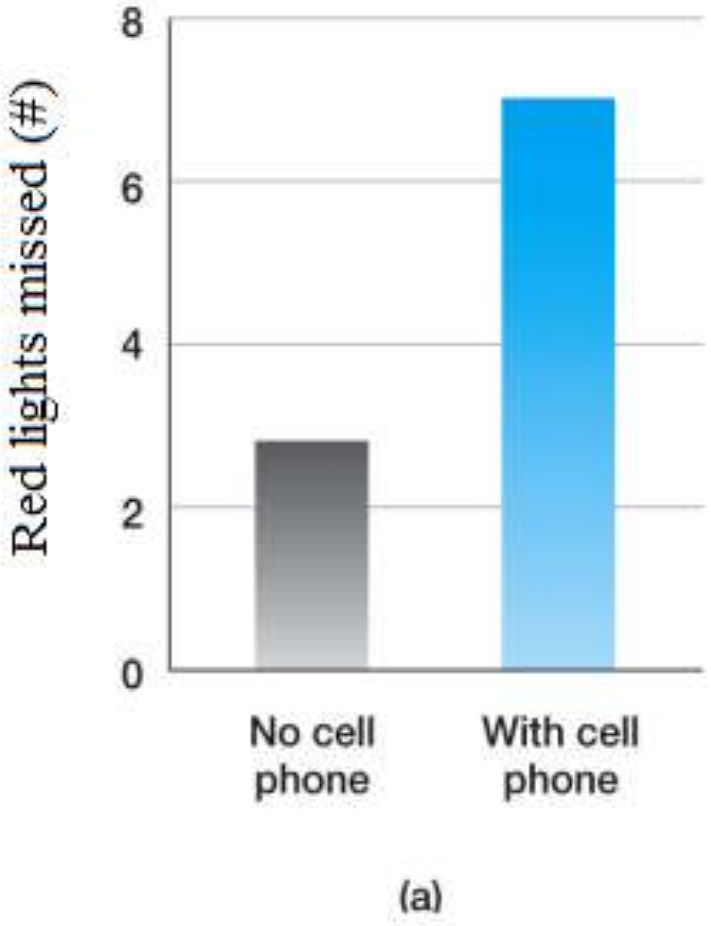
  - Many stimuli receiving at least some attention (i.e., “multi-tasking”)

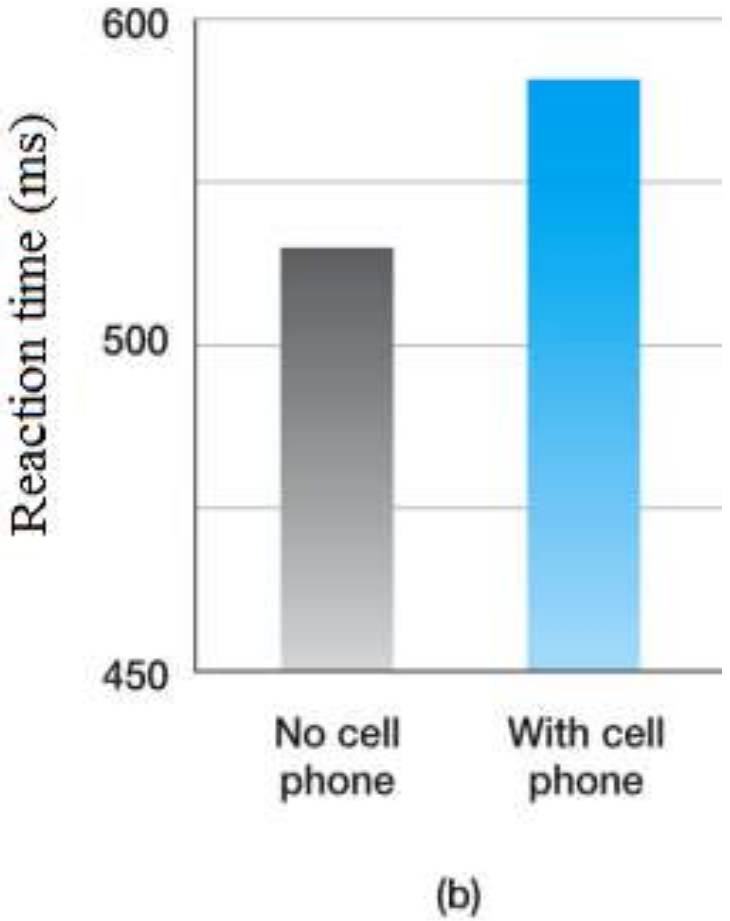
  - Processing STM to LTM

    can become automatic



Naturalistic Driving Study (N=100)





Attention

- Factors affecting dual-task attention and performance
  - Task similarity
  - Familiarity
  - Practice/effort
  - Task difficulty

Attention

- **Inattentional blindness**

  - Something **not** attended to is **not** perceived (even when looking directly at it)

  - Failure to detect an unexpected stimulus

Attention

- **Change blindness**

  - If shown two versions of a stimulus, the differences are not necessarily apparent

Attention

- **Goal-directed attention**

  - Influenced by expectation, knowledge, current motivation (i.e., top-down)

Attention

- **Stimulus-driven attention**

  - Unexpected stimuli or occurrences catch our attention (i.e., bottom-up)

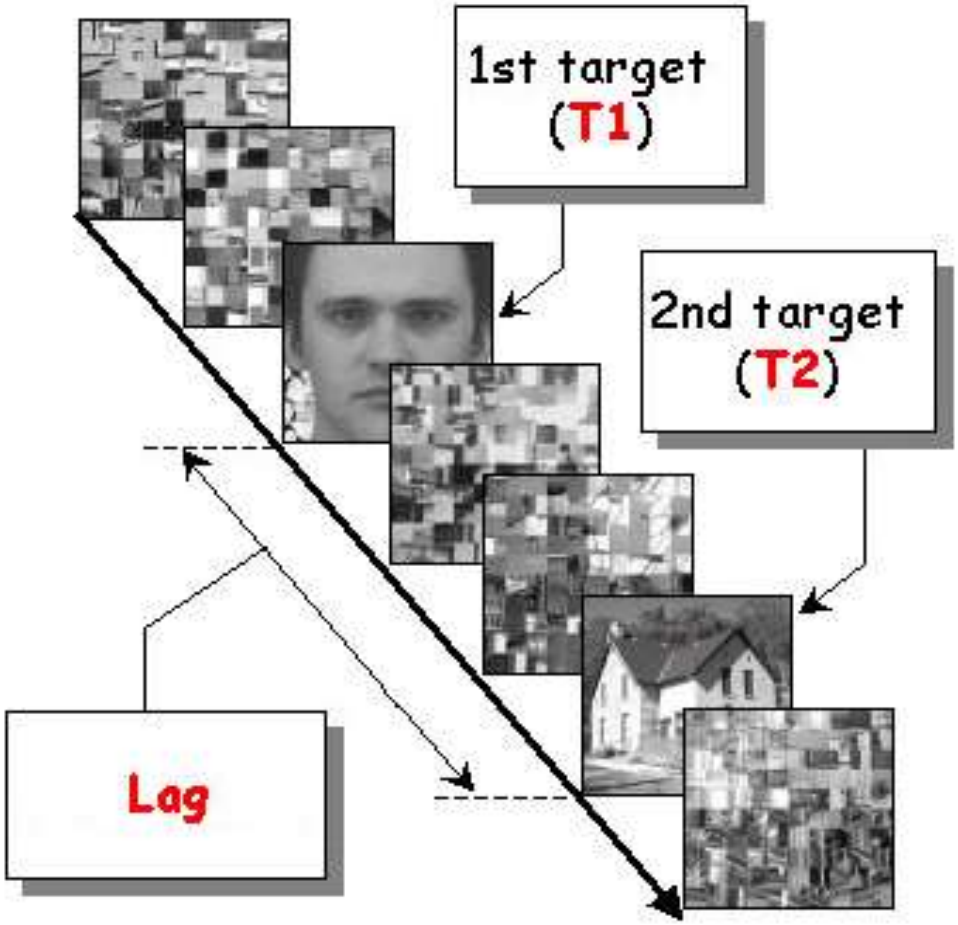
Attention

- **Attentional blink**

  - When presented with rapid sequence of stimuli in succession, some features will not register

  - Frequent video game use (primarily action games) greatly reduces subjects' attentional blink

Attentional Blink Paradigm



Attention

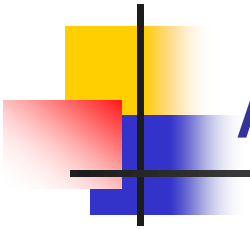
- **Cognitive load**

  - Subjective differences in perception capacity, motivation, and ability to process stimuli

  - Generated via:

    (1) novel (and number of) stimuli

    (2) interacting elements to process simultaneously

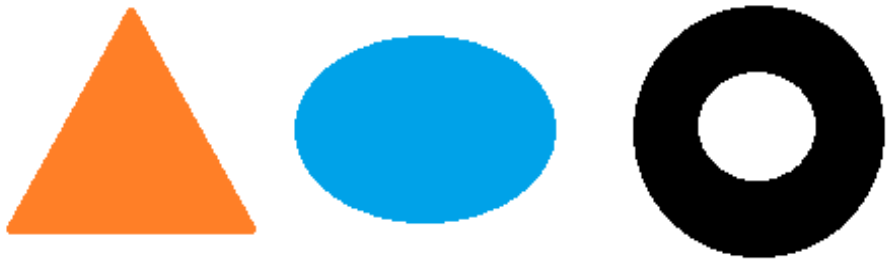


Attention

- **Treisman's Attenuation Model**
  - Messages differ in terms of their “subjective loudness”
  - Paying attention to message (or stimuli) means increasing its subjective loudness
  - Explains the “cocktail party phenomenon”
    - Unattended stimuli not completely blocked, and can get our attention

Attention

- **Treisman's Feature Integration Theory**
  - Perception involves analyzing stimulus properties (shape, color, size, movement) to combine features
  - This **feature search** generates a “pop out” effect
    - High levels of attention required or complex stimuli requires a **conjunctive search**



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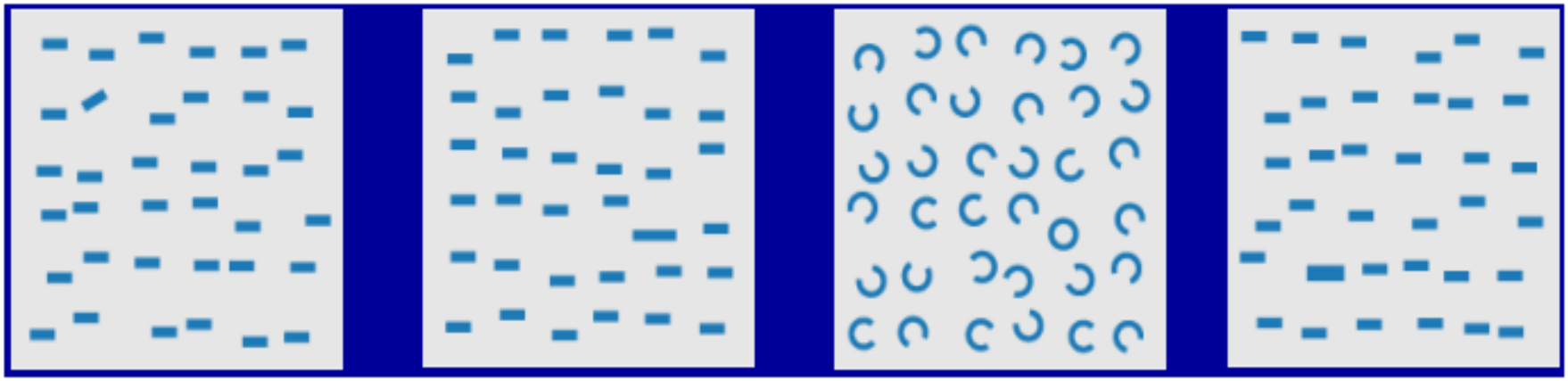
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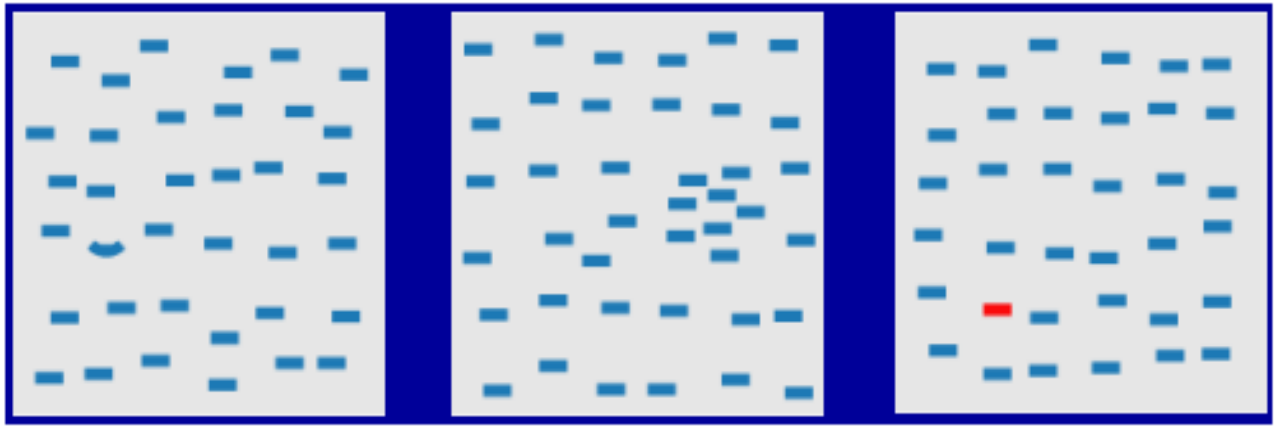
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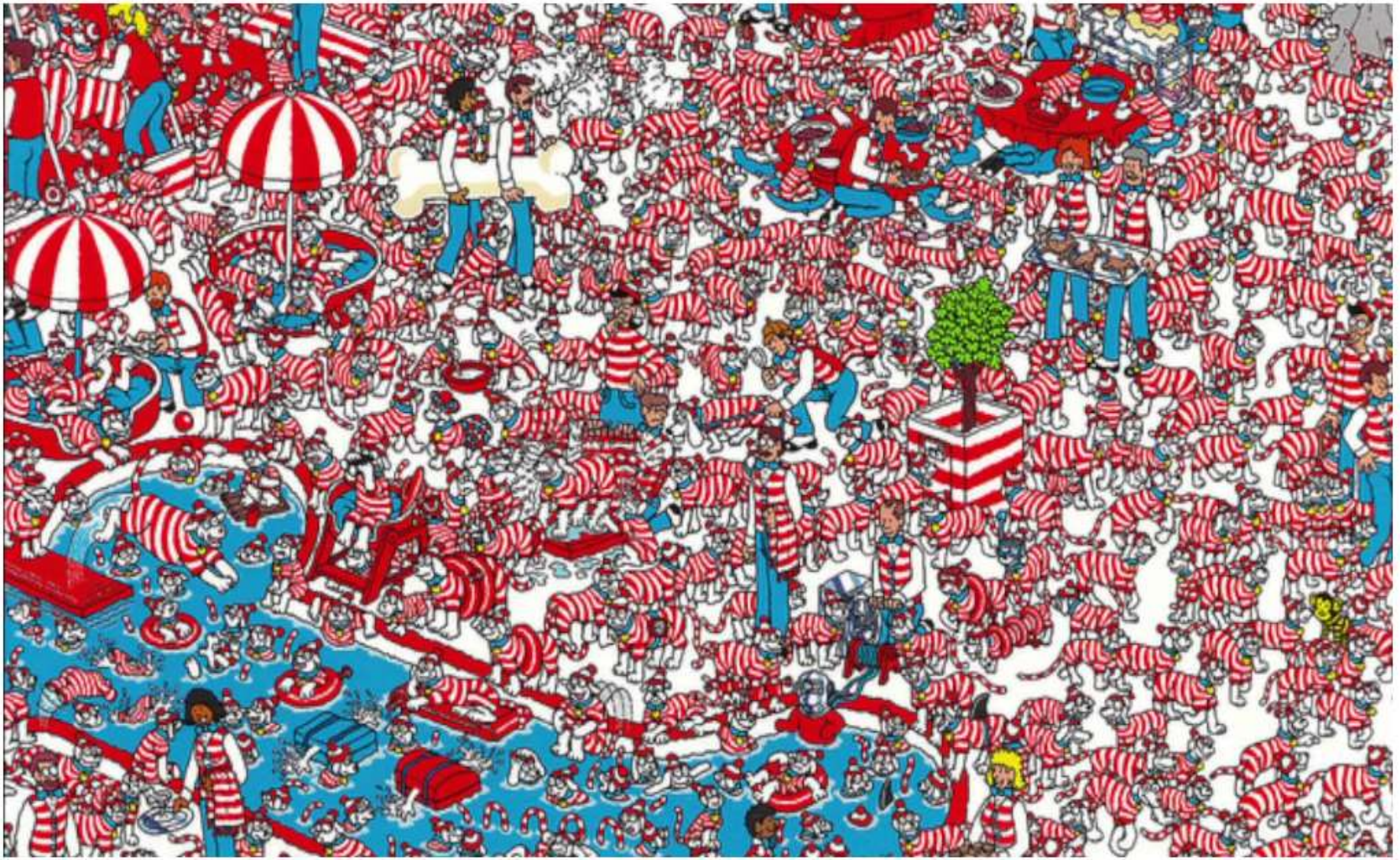

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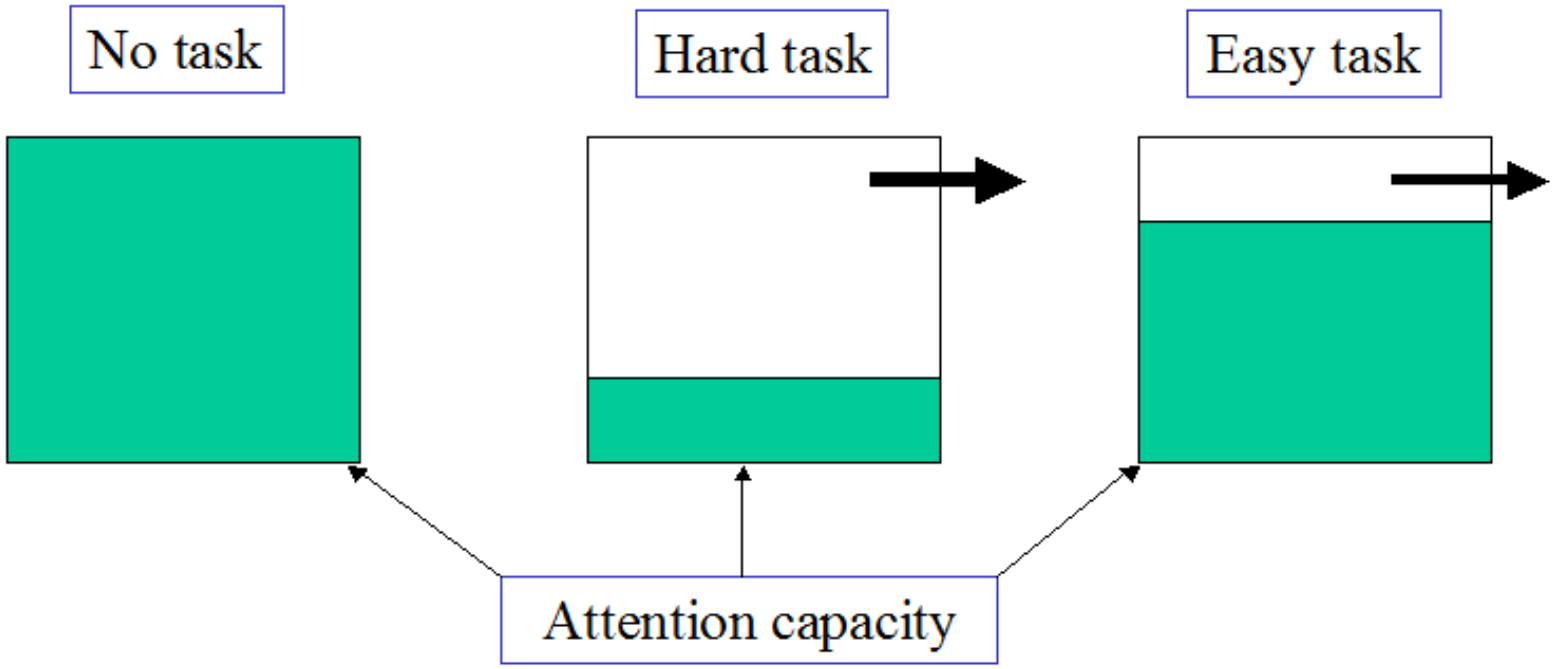
Attention

- **Kahneman's Capacity Theory**

  - When a task demands high cognitive processing, other tasks receive fewer resources

  - Cognitive load = attention, memory processing, etc.


No task
Hard task
Easy task
Attention capacity

Attention

- **Different theoretical perspectives**
  - STM is a “small plate” that can only fit a few things at a time
  - Attentional processing is what shifts them to LTM
  - STM has larger capacity but stimuli not retained very long at all, unless rapidly attended to (“filtered”)

Attention

- **Different theoretical perspectives**
  - In other words, when does meaning "stamp" the stimulus?
  - Bottleneck vs. filter? Both?

Attention Theories

- All theories propose that somewhere there is a bottleneck which allows some info through and slows down the rest.

- The main difference between these theories is the location of the bottleneck:
  - Bottleneck occurs early in the system
  - Triesman argues that bottleneck occurs mid-way in the system

Limitations of Research So Far

- *Research has so far mainly focused on the external determinants of attention. Internal factors can be play a crucial role in attention also.*

- *In experiments participants are often told what to attend to.*
  - *Is this anything like our real world experience?*

- *Stimuli are often 2-d, computerised and weird*

- *Attentional models tend to ignore the influence of emotional states*
  - *Widely known that anxiety influences attentional processes*