Learning about repeated events

Continuous occurrence of …..

- Clouds thundering
- Fire alarm at a distance (far)
- Exhaust fan
- New ring tone

- Can you feel your clothes?

- What behaviour do you exhibit?

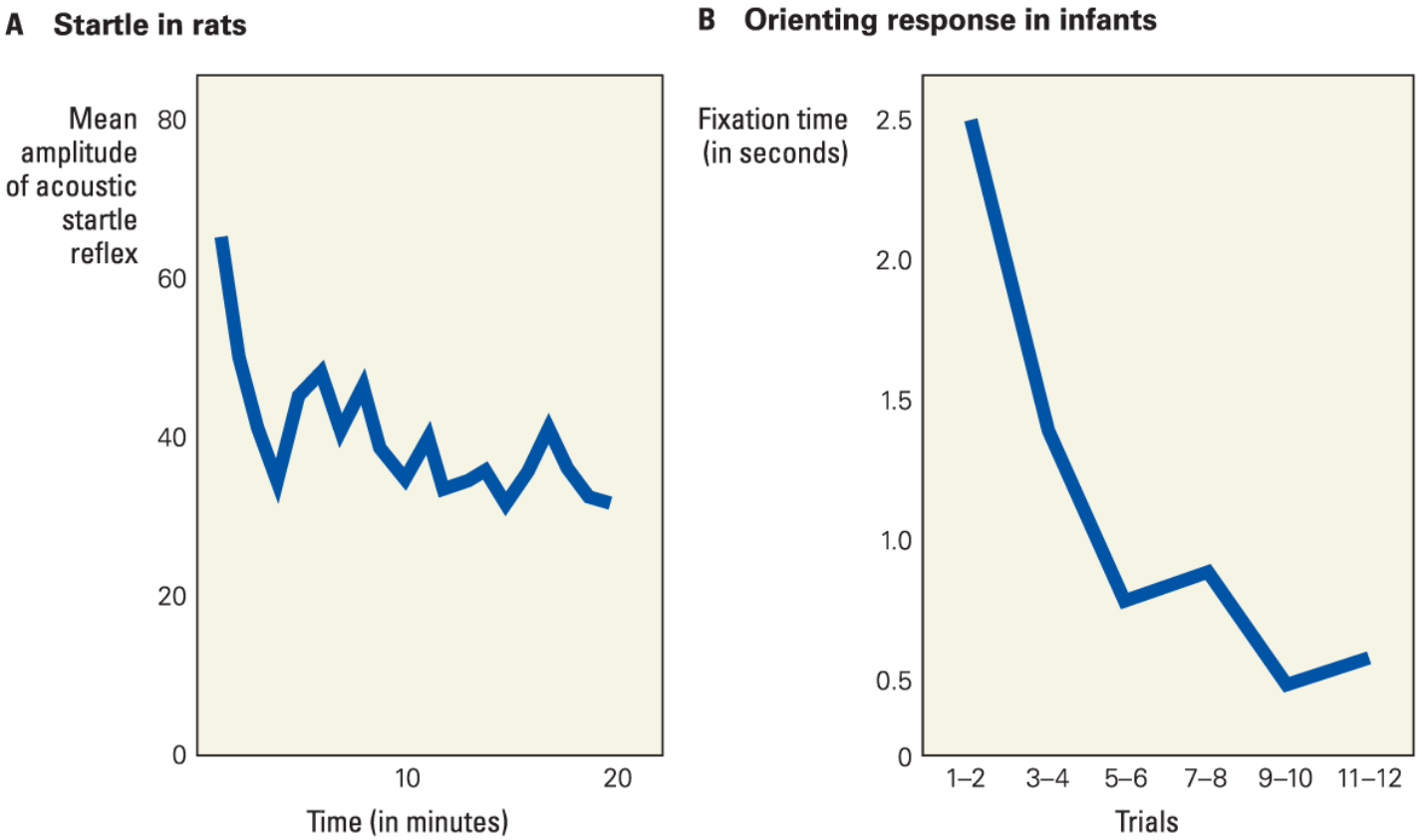
- How long can you smell a flower?
- How long does taste last in your mouth?
- How long can you feel a tight watch around your wrist?
- Do you become used to the darkness in a room?
- Can you feel the temperature of the room after 15-20mins of entering it? (or swimming pool)

- What kind of behaviour do you exhibit?

General Features of Habituation

In the laboratory, researchers examine simpler examples of habituation that they can describe in terms of a single, easily controlled stimulus and a single, easily measurable response

Acoustic startle reflex: a defensive response (such as jumping or freezing) to a startling stimulus (such as a loud noise)



Gluck et al., *Learning and Memory*, 4e, © 2020 Worth Publishers

Orienting response: an organism's innate reaction to a novel stimulus

- **Adaptation (Sensory)**
  - Environmental stimuli is filtered out over time – response stimuli dies out (smells, taste, tactile)
  - The receptors reduce or stop responding to the stimuli
  - A short sensory interval is necessary to perceive the stimulus again
  - You cannot perceive the signal, we don't have much control over it
  - No conscious control

vs

- **Habituation**
  - Novelty related startle in the beginning but gradually response to repeated (harmless) stimuli decreases
  - The receptors respond to the stimuli but the signal is not relayed to higher cortical regions for processing.
  - Stop noticing the signal but if you shift your attention to the stimulus you can perceive it (Conscious control)
  - It is a temporary lowering of response – decrease stimulus related arousal.

- Why do we habituate or adapt?
  - Helps to prevent being exhausted by repeatedly responding to unimportant stimuli
  - E.g. Living near railway station or airport or noisy market

If you

- Feel an earthquake
- Living in war zones
- See a stray dog (for those who fear one)

What behaviour do you exhibit?

Why?

Survival? Unpleasant response or consequence in the past?

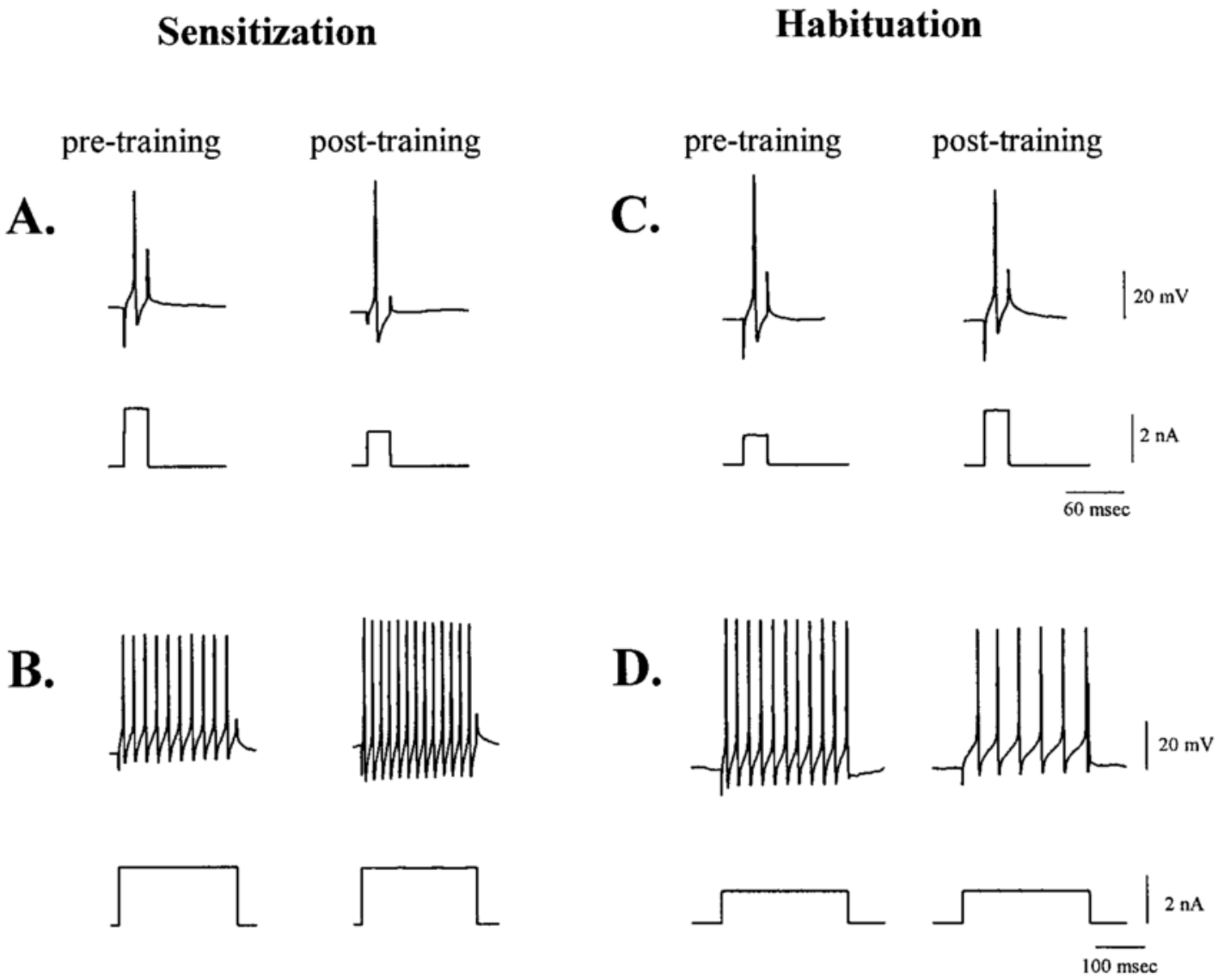
Sensitization

- Increased reaction/response to a stimulus after repeated exposure
- The receptors generate a greater response to the stimuli
- Increases stimulus-related arousal

Learning at a cellular level

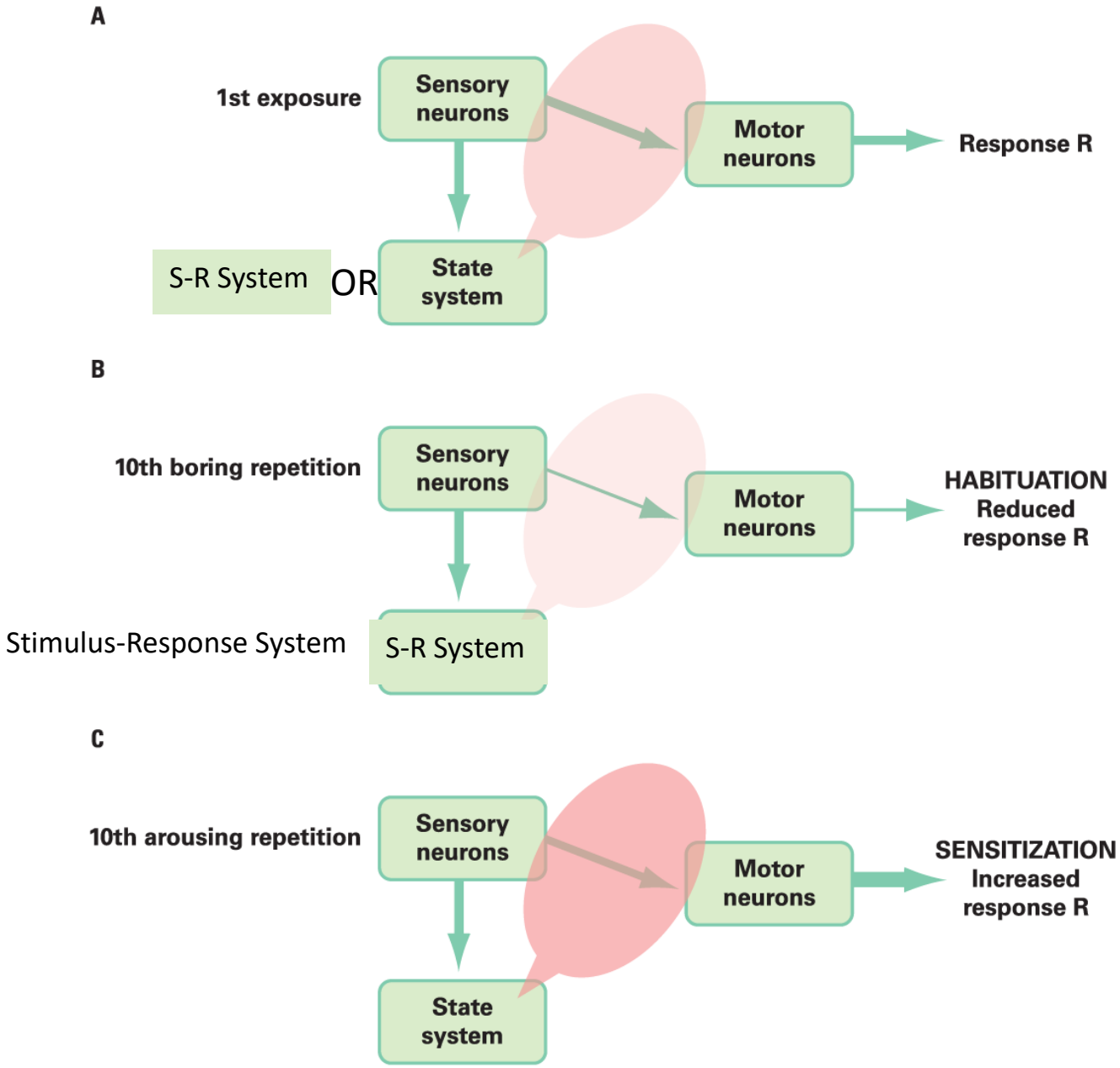
Sensitization (A) decreases the initiation threshold (measured as the amount of current necessary to produce a single action potential) and (B) increases the number of action potentials produced by a long current pulse.

Habituation (C) increases the initiation threshold and (D) decreases the number of action potentials elicited by the long stimulus pulse.



https://www.jneurosci.org/content/21/4/1401

Dual Process Theory



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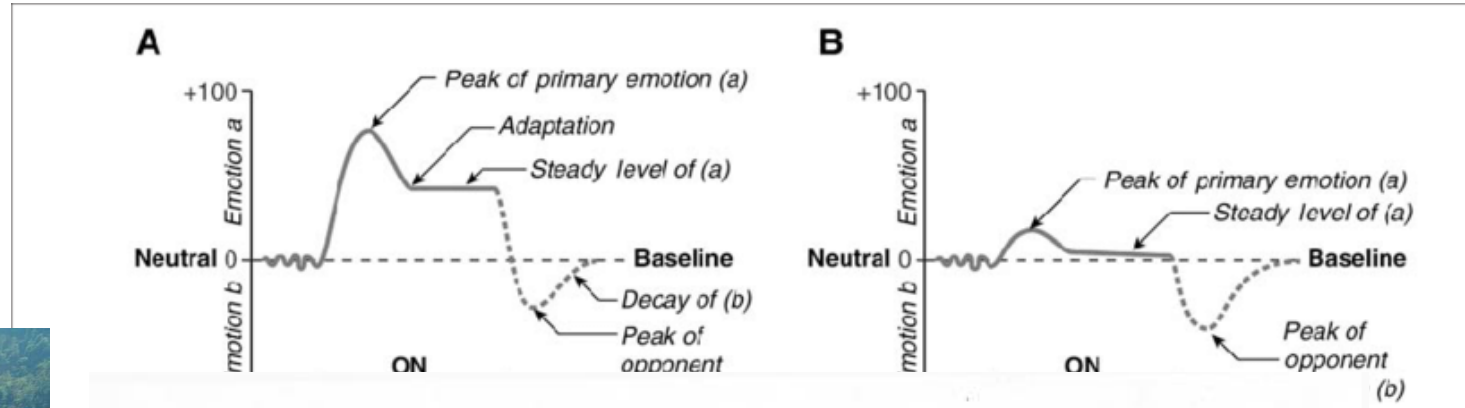
Habituation vs Sensitization

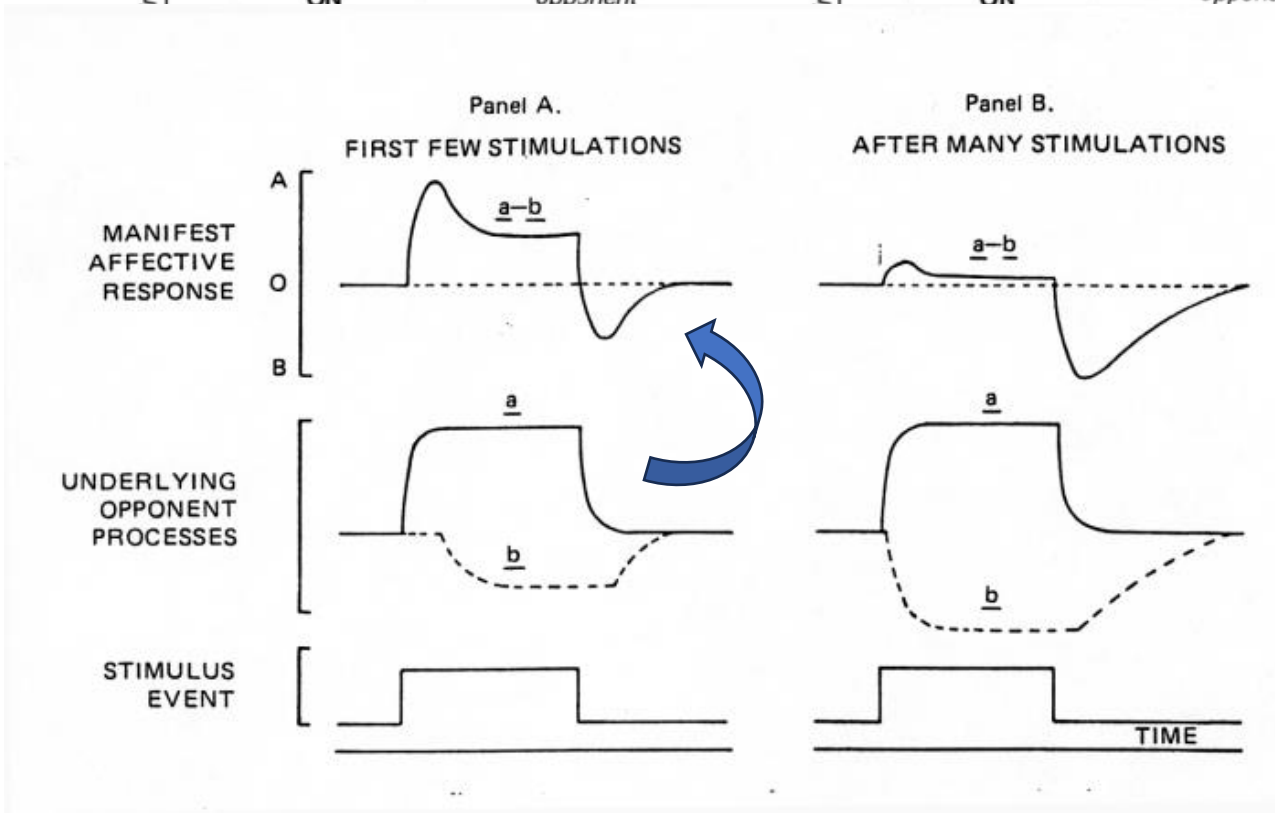
Which one?
Why?

- Past negative experience – sensitization
- Past neutral experience – habituation
- Illness/Health condition - sensitization

Opponent Process Theory

- Builds on Dual Process Theory
- Initial unpleasant experience can gradually turn to a pleasant experience or vice-versa





Complex Behavioural outcomes?

Habituation	Sensitization
Pros	Pros
Cons	Cons
Examples?	Examples?

Simple non-associative learning

- Habituation –
  - Specific to a stimulus
  - With repetition, response decreases
  - Can be localized in the brain

- Sensitization –
  - Similar stimuli may also trigger the same behavioural response -
  - With repetition, response is sustained or increases
  - Not localized, involves many regions in the brain.

At a behavioural level

- Habituation –
  - IIIT campus was exciting for the first few days…….
  - Ignoring inflation
  - Apathy/Indifference towards politics
  - Indifference of police towards criminals (inhuman treatment)

- Sensitization – become more sensitive to people or context
  - Bullying
  - Domestic violence / Abuse/ Sexual harassment
  - Financial setback – more cautious with transactions
  - PTSD
  - A timid child with angry parents that cries at school if the teacher uses a stern tone of voice

Sensitization to Stress

- *"individuals become sensitized to stress over time, such that the level of stress needed to trigger episode onsets becomes increasingly lower with successive episodes"* (Stroud, 2020, p. 349).

- If stressful experiences occur too often, too intense, more than what an individual can cope.

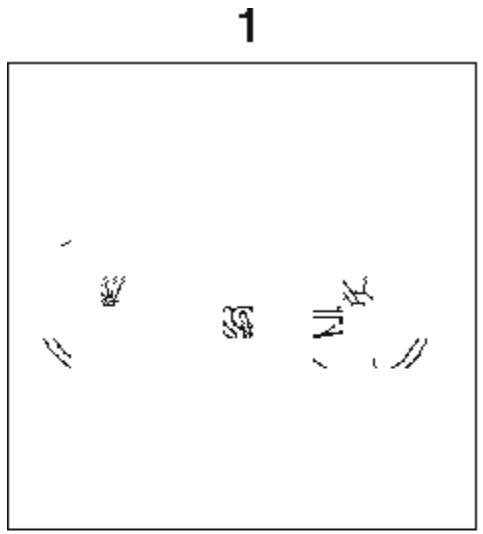
- Stress-related psychopathology can include major depression and bipolar disorder.

- Stress/adversity in early years/childhood can also result in psychiatric disorders

http://www.uclastresslab.org/pubs/Stroud_Stress%20Sensization_Oxford%20Handbook_2019-in%20press.pdf

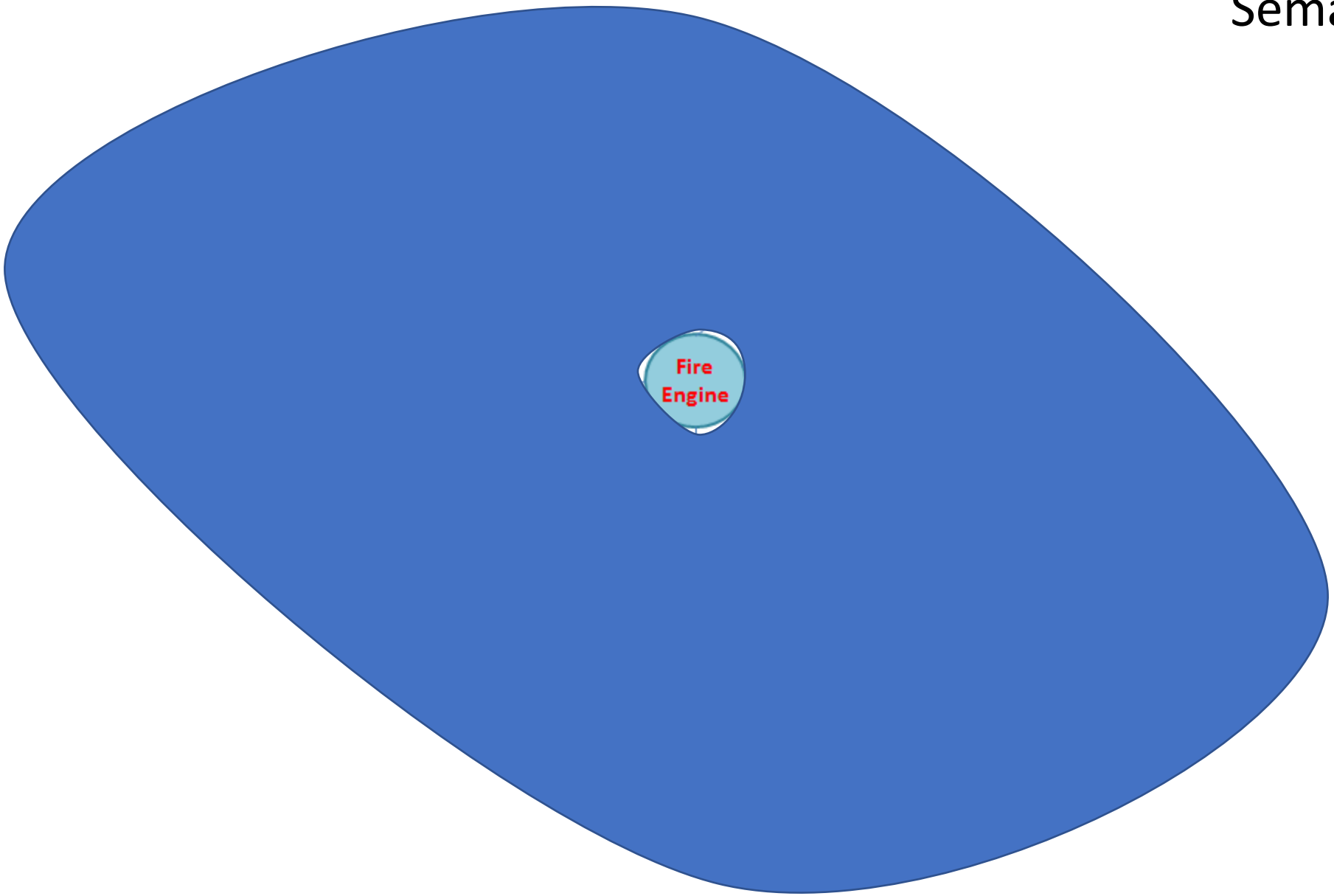
- Other repeated events?

Visual Priming



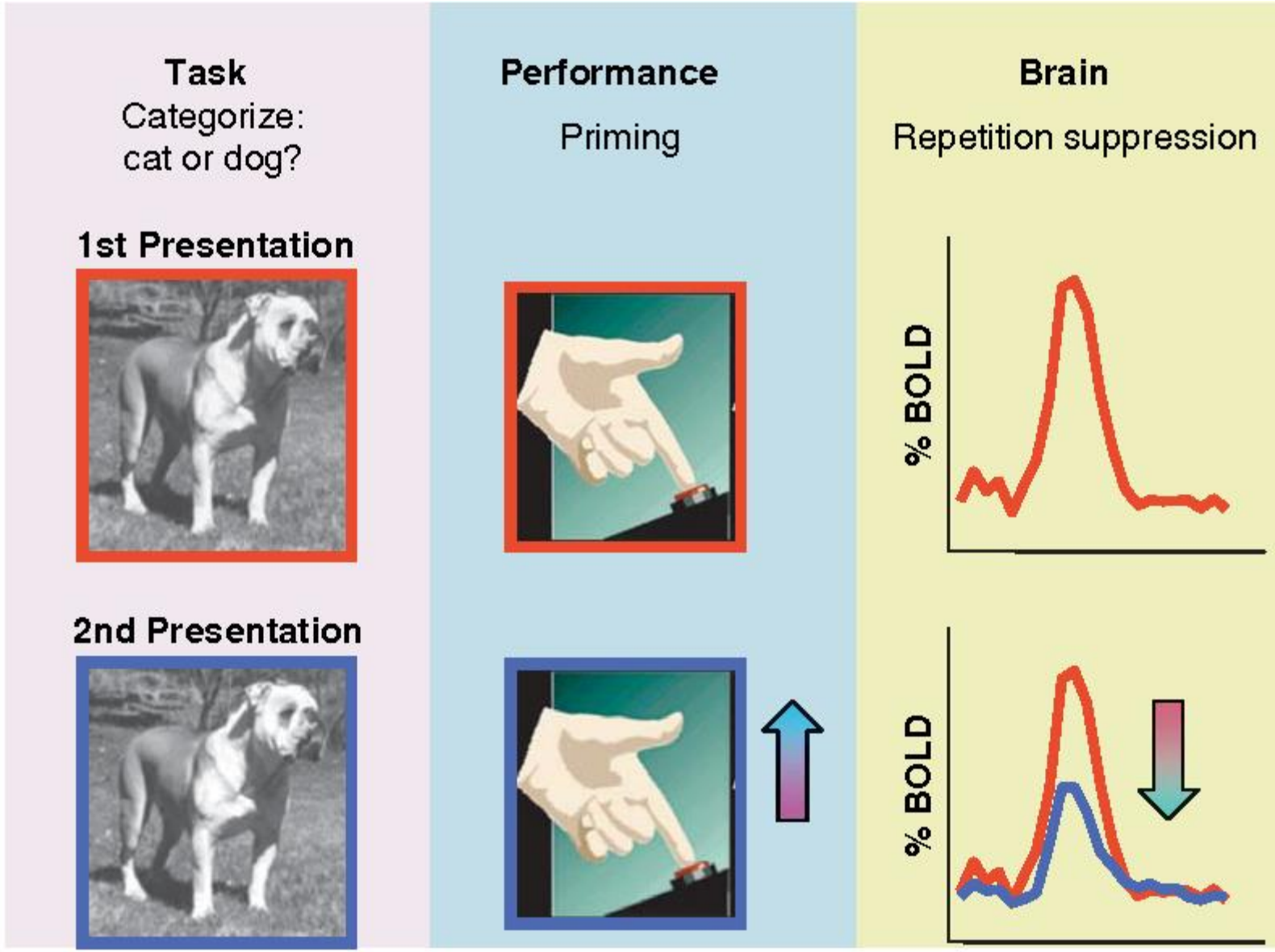
RED
BLUE
ORANGE
YELLOW
GR___

Semantic Priming



Priming

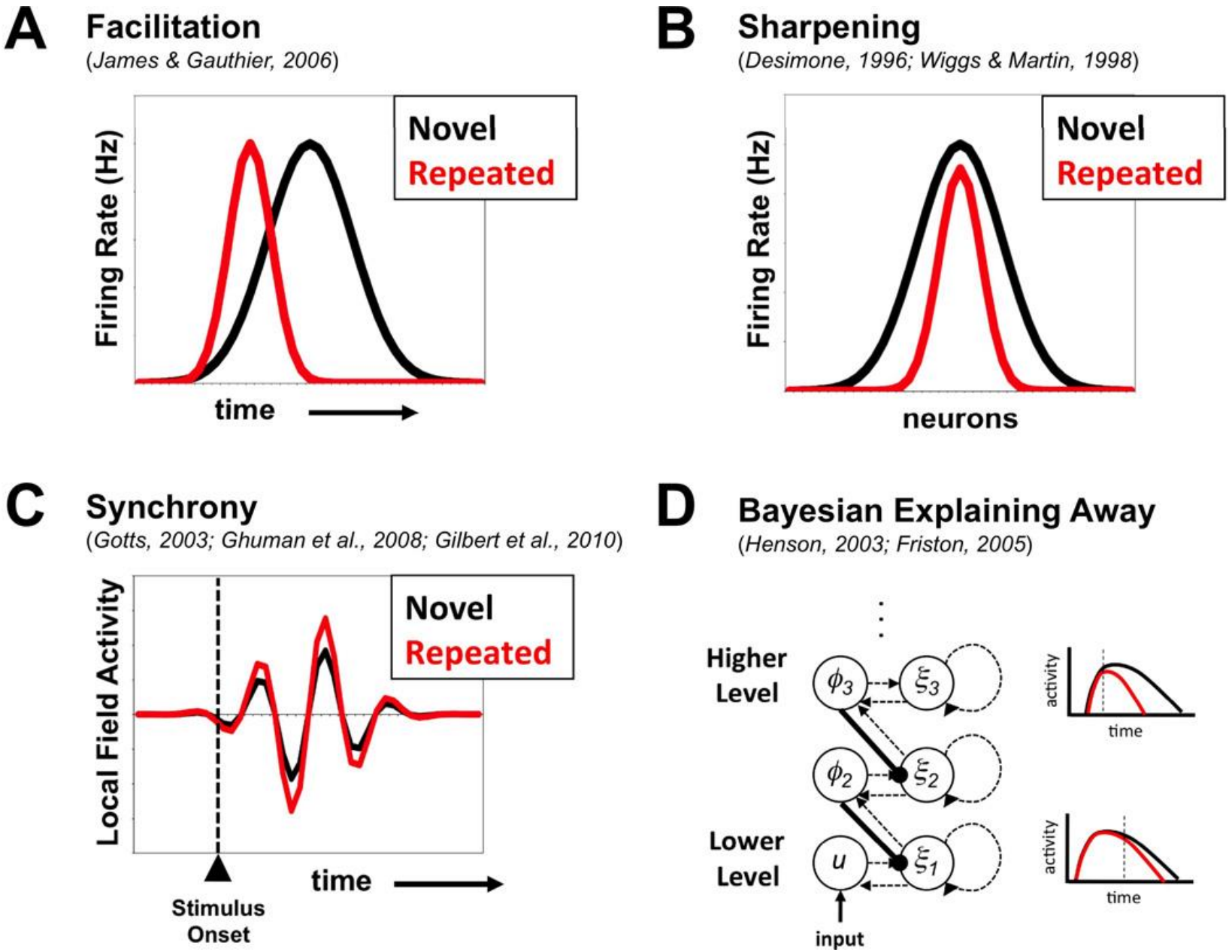
- **Priming:** a phenomenon in which prior exposure to a stimulus can improve the ability to recognize that stimulus later
- Priming can occur even in the absence of any feelings of familiarity or recognition that a stimulus was previously experienced
- Priming effects may persist much longer than recognition of past encounters



novelty

repetition

atic illustration of priming and repetition suppression/adaptation. Left: subjects are gol



[Repetition Priming and Repetition Suppression: A Case for Enhanced Efficiency Through Neural Synchronization]

Familiarity to the stimulus or content is important for priming

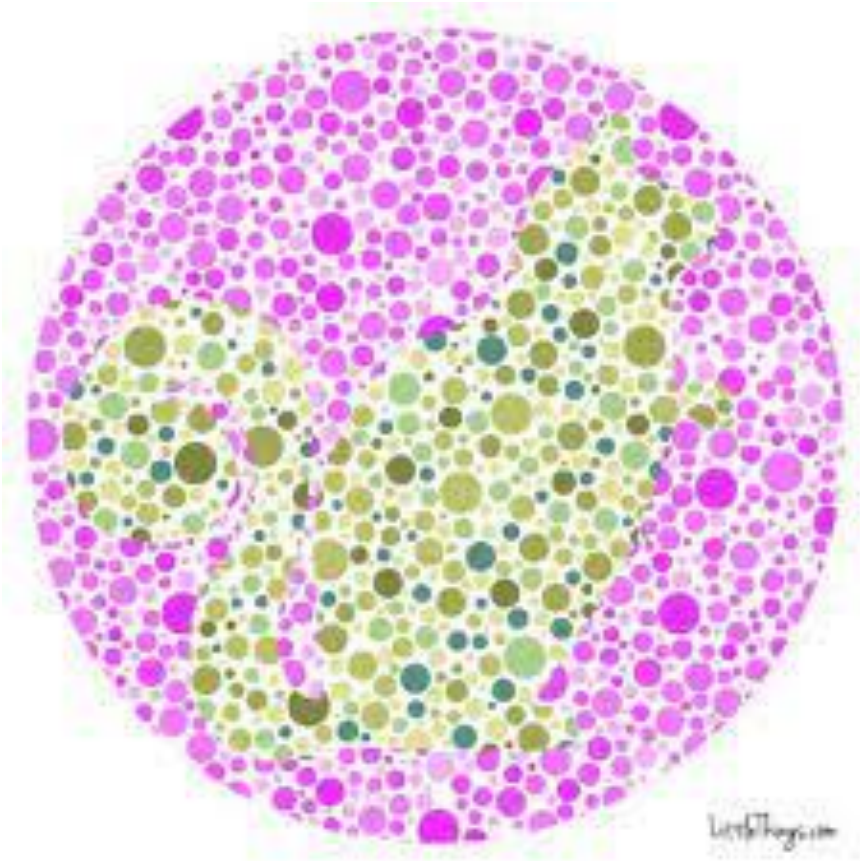
MARKET RESEARCH

Coca-Cola

VS.

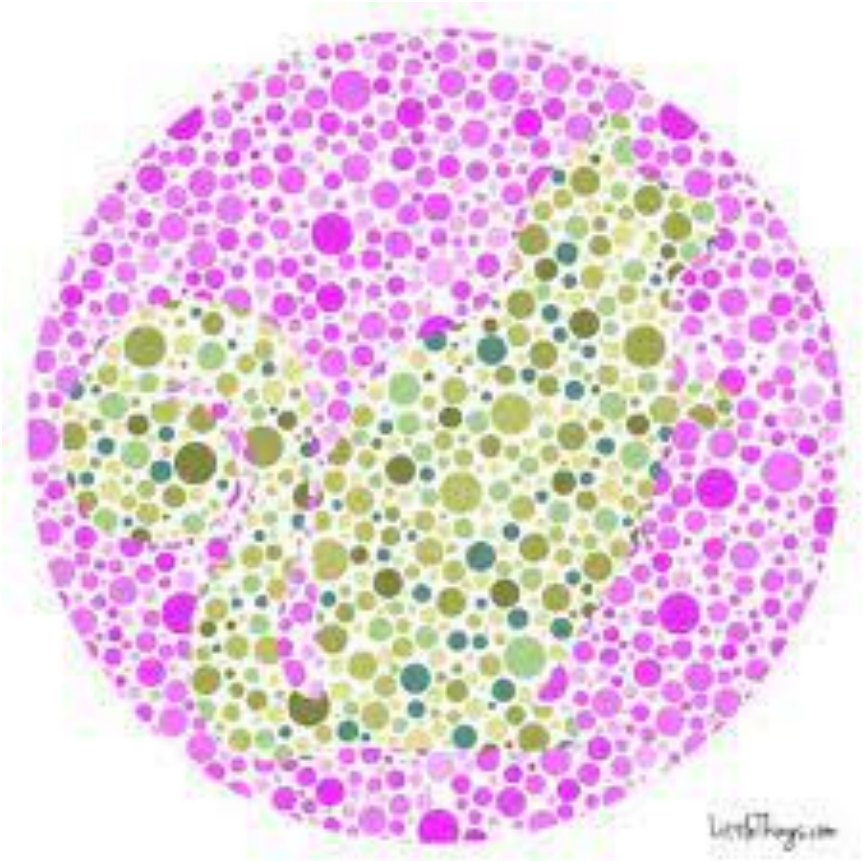
pepsi

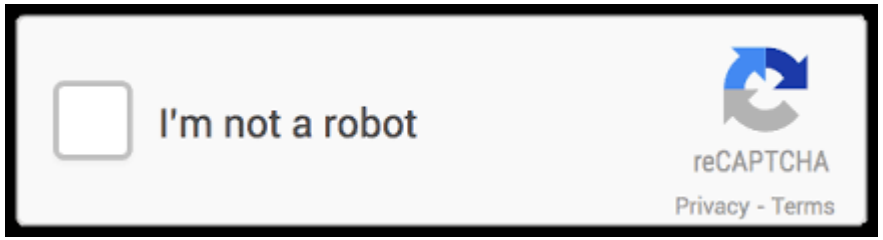
- Developing skills through repeated exposure?



Perceptual Learning

- Learning in which repeated experiences with a set of stimuli make those stimuli easier to distinguish is called **perceptual learning**

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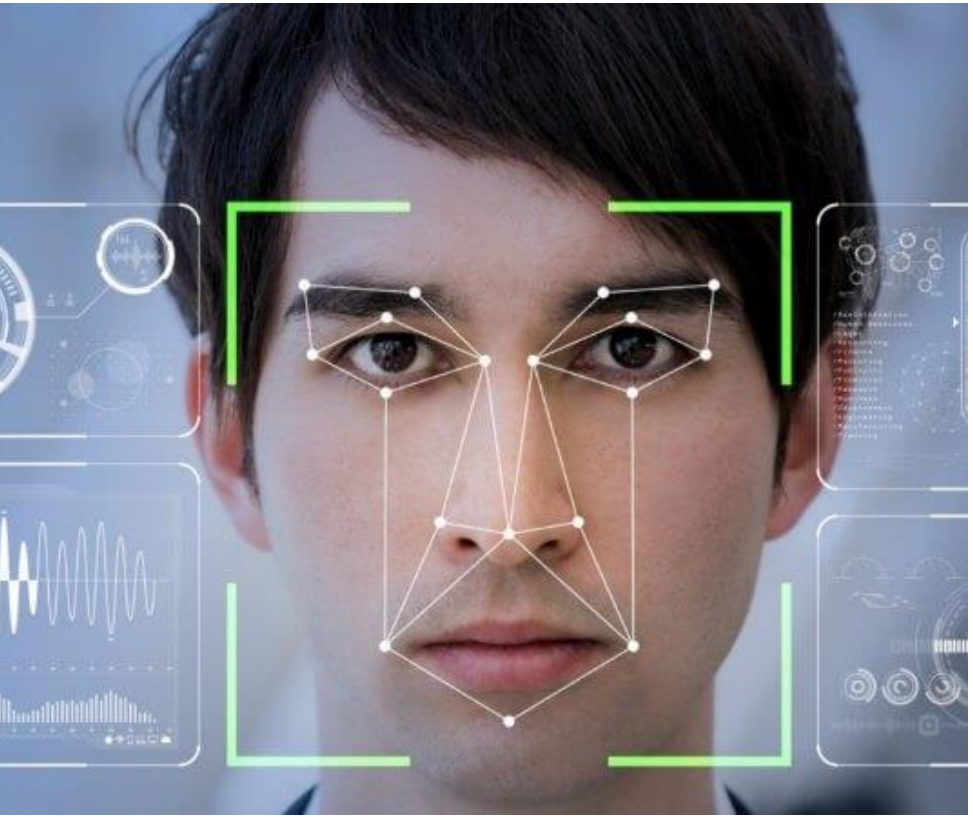
Click 3 pictures of kittens to submit

- Perceptual learning that happens without explicit training is sometimes called **statistical learning** because the percepts that individuals learn the most about are those that are experienced most frequently and consistently

Identifying sounds, smells, visual, and tactile information

Learning through repeated exposure



- Is there a common underlying phenomenon in the types of learning discussed so far?

Repetition learning works in our subconscious, and these processes are almost always unnoticeable to the subject.