

# Chapter 3

## Elicited Behaviors and Classical Conditioning

### Outline for this lecture

- Elicited Behaviors
  - Reflexes
  - Fixed Action Patterns
  - Opponent Process Theory of Emotion
- Classical Conditioning
- Characteristics of Classical Conditioning

## Elicited Behaviors

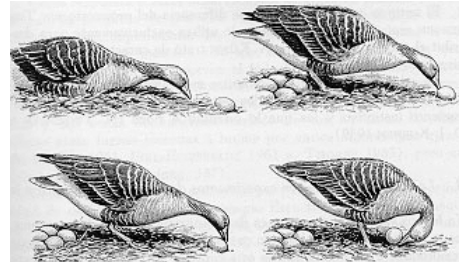
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- Sometimes called an involuntary behavior.
  - Examples:
    - Puff of air to face → eye blink
    - In infants, place an object in their palm → firmly grasp it

## Types of Elicited Behaviors

- Reflex:
  - Startle response, Orienting response, & Flexion Response (in book)
- Characteristics of Reflexes:
  - Latency-
  - Duration-
  - Magnitude -
    - A strong reflex has short latency, long duration, and large magnitude.
    - A weak reflex has long latency, short duration, and small magnitude.

## Types of Elicited Behaviors

- Fixed Action Patterns:



- Example: Greylag Goose

- Makes head movements until back at nest (even if egg is removed)
- Pattern is also triggered for other similar looking objects (balls, extra large eggs)



FIG. 69. Greylag goose retrieving egg. After Lorenz and Tinbergen, 1938.



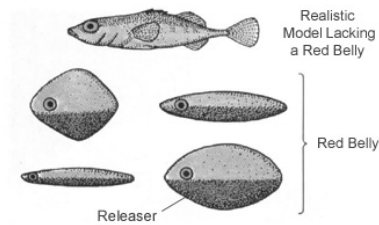
FIG. 70. Greylag goose attempting to retrieve giant egg. After Lorenz and Tinbergen, 1938.

## Greylag goose egg retrieval



## Fixed Action Patterns

- 
- 
- Trigger is a sign (sign stimulus or releaser)
  - Example: stickleback fish will attack another male nearby
  - the red belly of the male is the releaser



## Fixed Action Patterns in Humans?

- Still debated by researchers
- Eibl-Eibesfeldt recorded adults from different cultures interacting with babies
- Found universally people from all cultures performed the same sequence of facial movement.
  - Eyebrow raise
  - Eyes widening
  - smiling



## Simple Mechanisms of Learning

- Effects of Repeated Stimulation
  - Habituation:
    - Example: Attentional responses in infants
  - Sensitization:
    - Examples:
      - Attentional response to dog barking
      - Attentional response to sniffing in an exam

## Simple Mechanisms of Learning

- Opponent-Process Theory of Emotion
  - - Example: happy-sad
  - Activation of one member of the pair
  - The opposing emotion serves to
  - Thus, the normally brief duration of intense emotions. May help us balance our emotions

## Opponent-Process Theory

- The A process (e.g. fear) triggers the B process (e.g. tranquility), which reduced the feeling of the fear.
- No emotion is allowed to be intense for very long.
- Not allowed to exist simultaneously:
  - When one emotion is experienced, the other is suppressed.

## Factors Affecting Opponent Processes

- The a-process correlates closely with the b-process
- The b-process is
  - Ex. Mild depression after an exciting event like graduation, a wedding, etc.
- With repeated presentation of the emotional event,
  - Ex. Thrill seeking behaviors as fear wears off and excitement increases
  - In a long-term relationship--excitement wears off over time

## Problems with Opponent-Process Theory

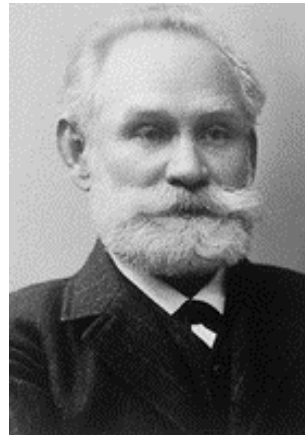
- What are the duration of the A and B process?
- What isn't there an opponent to the B process, etc.
- How does the strengthening of the B process take place (what are the mechanisms)?
- Does it apply to all emotions or peculiarly to strong emotions?

## Learned Stimulus-Response Behaviors

- **Classical Conditioning**
- A stimulus that results in a response is repeated alongside another stimulus which does not cause a response.
- Eventually the second stimulus will result in the same response.
  - (for example, a “whirring” sound doesn't naturally cause fear, but if it gets paired up with a dentist drilling into a tooth with the result of pain, it could!)
- A type of associative learning. (learning about associations between events)

## Classical Conditioning

- Also called “Pavlovian Conditioning”
- Developed by Ivan Pavlov (1849-1936) in late 1800s.
- Pavlov won Nobel Prize in Physiology/Medicine in 1904 for his work in digestion.
  - Digestion work led to his observations about the “conditioned reflex”.



## Classical Conditioning

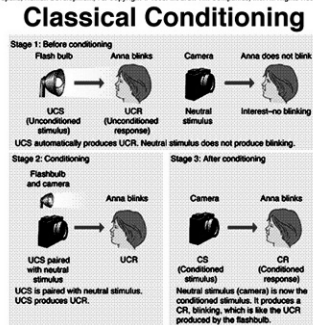
- How does Classical Conditioning happen?? Basic Processes:
- Five Elements of Classical Conditioning
  - NS -
    -
  - US (UCS)–
    -
  - UR (UCR)–
    -
  - CS –
    -
  - CR –
    -
  - Example: Pavlov’s dogs salivating to the sound of a bell or metronome



## Procedure-human example

- Before Conditioning:
  - Camera(NS)→ no response
  - Flashbulb(US) → eyeblink(UR)
- During Conditioning:
  - Camera: Flashbulb → eyeblink(UR)
- After Conditioning:
  - Camera (CS) → eyeblink (CR)

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## Practice Identifying Components

- A child develops a fear of heights after falling out of a jungle gym
- US:
- UR:
- CS:
- CR:
- Before Conditioning:
  - 
  -
- During Conditioning:
  -
- After Conditioning:
  -

## Practice Identifying Components

- I once got nauseous while playing the video game “Turok: the dinosaur hunter” due to the movement of the graphics. Now whenever I hear the music from the game, I begin to feel sick.
- US:
- UR:
- CS:
- CR:

## Practice Identifying Components

- Daniel always smoked a cigarette while waiting for the bus to work. Now he’s trying to quit and finds that he gets cravings whenever he stands at that bus stop.
- US:
- UR:
- CS:
- CR:

## Practice Identifying Components

- To treat alcoholism, a chemical is sometimes put in the alcoholic's food that makes them sick if they have alcohol. After a while, the taste of alcohol becomes aversive.
- US:
- UR:
- CS:
- CR:

## Appetitive and Aversive conditioning

- Appetitive Conditioning:
  - Example: food, praise, warmth
- Aversive Conditioning:
  - Example: pain, scolding, loud noise, cold
- Depends on state of organism

## Measuring Internal Variables

- How measure an internal variable like “fear”?
- Conditioned Suppression (Estes and Skinner, 1941)
- Paradigm:
  - 1) condition rat to press a lever for food
  - 2) 30 sec Tone: 1 sec Shock → Fear
  - 3) 30 sec Tone → Fear
  - The amount of reduction in lever pressing during 30 sec Tone indicates amount of fear.
  - Measured with Suppression Ratio

$$\text{Suppression Ratio} = \frac{\# \text{ of CS responses}}{\# \text{ of CS Responses} + \# \text{ of pre-CS responses}}$$

## Suppression Ratio

- Example:
- Normally press 40 times
- During tone, only press 10 times.
- $10 / 10+40 = 10 / 50 = .2$  (suppression ratio)
  
- Normally between 0 and .5 (for suppression)
  - 0 means  $(0 / 0+40) = 0$
  - .5 means  $(40 / 40 + 40) = .5$

## Conditioned Suppression cont.

- But is it really fear being measured?
- Can also occur for appetitive stimuli.
- Paradigm:
  - 1) condition rat to press a lever for food (rat is food and water deprived)
  - 2) 30 sec Tone: 10 sec access to water → reduction in lever presses
  - 3) 30 sec Tone → reduction in lever presses (even though hungry and can still get food)
  - Fear of water????

## Conditioned Facilitation

- What if we present a CR that is similar to lever pressing?
- Example - Paradigm:
  - 1) condition rat to press a lever for food (rat is food deprived)
  - 2) 30 sec Tone: 10 sec access to free food
  - 3) 30 sec Tone →
- Conditioned Facilitation.

## Conditioned Suppression Conclusions

- In Shock experiment:
  - The CR (tensing up) is incompatible with lever pressing, so it stops during tone. (Conditioned Suppression)
- In Water experiment:
  - The CR (drinking) has been evoked by tone (CS), and the drinking response is incompatible with lever pressing, so the lever pressing stops. (Conditioned Suppression)
- In Free Food experiment:
  - The CR (eating food) is compatible with lever pressing for food, so it increases the lever pressing during the tone. (Conditioned Facilitation)

## Excitatory and Inhibitory Conditioning

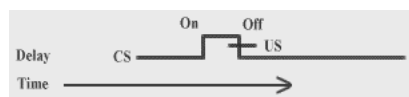
- Excitatory conditioning:
  - Most common type of conditioning
  - Example: Clicking noise → gas burner flame on
- Inhibitory conditioning:
  - Example: Squeaky door sound → dog barking stops

## Temporal Arrangement of Stimuli

- In other words, what effect does the timing of presentation of the NS, CS, and US have on the effectiveness of conditioning?
- Pavlov believed in contiguity:
  - Example: hear a crashing noise and then “ouch!” from the next room. Will associate them if occur close in time, but not if lots of time has passed.

## Temporal Conditioning-Delayed

- Delayed Conditioning(forward) –
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  - Example:
    - Bell begins to ring and continues to ring as until food has been presented.



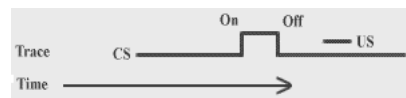
## Temporal Conditioning-Trace

- Trace Conditioning –

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– Example:

- Bell begins ringing and ends just before the food is presented



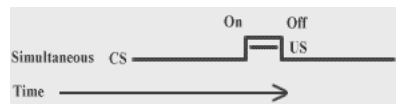
## Temporal Conditioning

- Simultaneous Conditioning –

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– Example:

- Bell begins to ring at the same time the food is presented. Both begin, continue, and end at the same time.



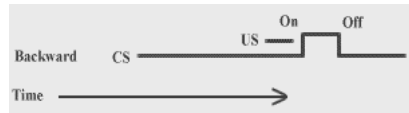


# Temporal Conditioning

- Backward Conditioning –

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- Example: The food is presented, and then the bell rings.

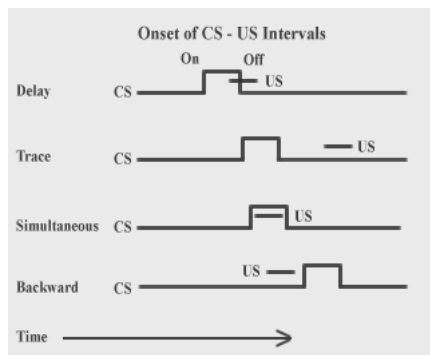


--Works somewhat for inhibitory conditioning (removal of a response).

- Example: unhappy baby due to some cause (US) → sight of mother (baby calms down)

## Why the difference in effectiveness for these 4 time relationships?

- The reason has to do with the fact that the NS must
- The less clear it is to the organism that the NS is a signal that something important is coming,



## Practical Applications of Classical Conditioning

- Pedophilia
- Interpersonal attraction
- Changes in relationships from dating to marriage
- Phobias
- Can you think of others?