Pavlovian and Instrumental Conditioning

Differences:

Contingencies:

Pavlovian: S—S contingency

Instrumental: R—S contingency

Ease of conditioning different types of behaviors:

Pavlovian: autonomic easy

Instrumental: skeletal easy

Similarities:

Principles: contiguity, frequency, intensity, stimulus control, etc.

General Process View

1. A Common E1 — E2 Associative system

   CS — US

   R — S*

2. Equipotentiality

   Any CS with any US

   Any Rf can increase any R

   Already know this is wrong: preparedness

3. Generality across species

Evolutionary Perspective

Variation

Selection/adaptation

Adaptive value of learning

Ethologists: Study learning in naturalistic conditions.

Attention to variation.

Conservation of a trait

e.g., associative learning; common causal relationships

Divergence; specialization

Niche: specific local habitat

Restricted Learning

Biological Constraints on Learning

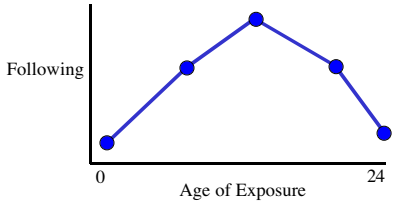
Learning restricted to age, species, stimuli, etc.

Imprinting (Lorenz)

Development of social attachment

Early Experience leading to long-lasting change.

"critical" or "sensitive" period: restricted age range for learning



Challenges to General Process

What is the Rf?

Restricted age for learning

Variability across species

Some stimuli better than others

Relatively difficult to reverse

Adaptive early learning

Common Terms:

Altricial vs. Precocial = Immature vs. relatively mature

e.g., rat = altricial, chicken = precocial

Why is it happening?

Ultimate cause: What is the adaptive value? Why did it evolve?

Proximate cause: What events in the environment cause the behavior?

Example: Imprinting

Example 2: When rat pup is born, it finds mom and begins to suckle

Why does it do it?

Ultimate cause? Nutrition

Proximate cause?

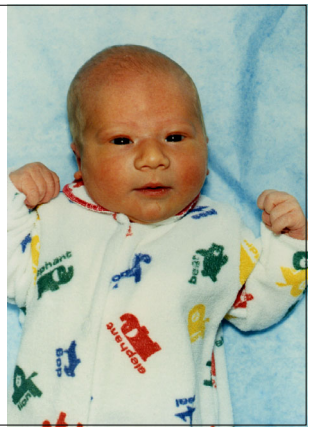
What guides the behavior?

Hints: Can find even if mom is anaesthetized
If wash mom, pups can't find nipple

Odor learning:
perhaps prenatal exposure to odor
that is then deposited on mom

Similar early learning in Human?

Baby prefers mom smell
(if breast fed)



CAUSATION OF BEHAVIOR

e.g., Why does a bird sing?

"Instinct" is a description, not an explanation

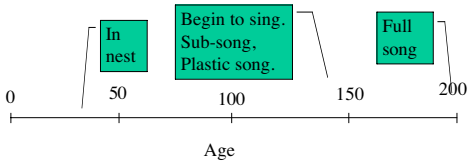
Ultimate cause? Adaptive value

Proximate cause? What guides the behavior?

Ontogenetic cause? How did it develop?

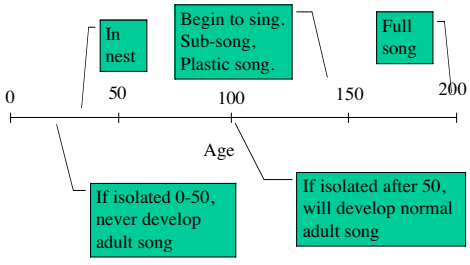
Song Learning

e.g., White Crowned Sparrow



Song Learning

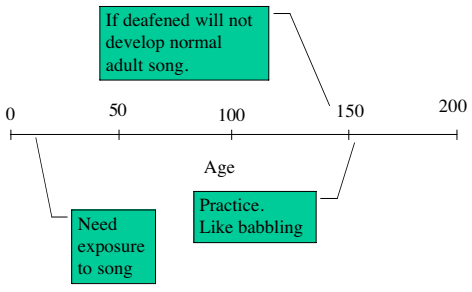
White Crowned Sparrow



Conclusion: Need exposure to song early in life

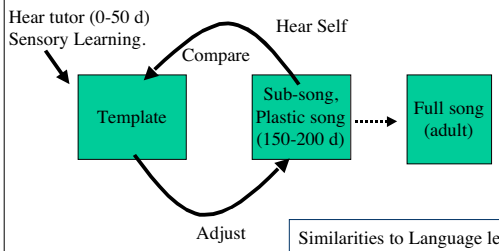
Song Learning

White Crowned Sparrow



Conclusion: Need to hear self sing.

Model



Similarities to Language learning

Best learned if young

Restriction of language ability with age

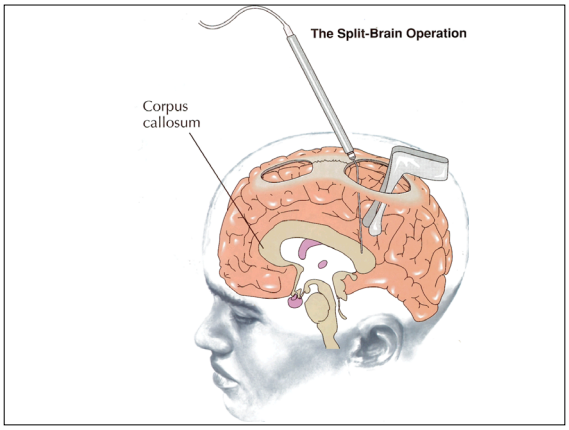
Development of communication between sides of the brain

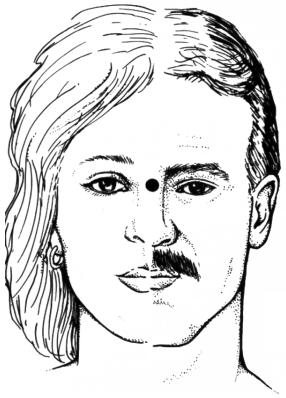
Common Features:

Most information goes to and comes from opposite side of brain
e.g., Left hand controlled by right brain

Language usually dominant on the Left side of brain

Normally two sides communicated extensively
major connection: corpus callosum





Development of communication between sides of the brain

Example 1: Odor learning

Odor — milk

Approach

Train	Test
Plug 1 nostril	Switch plug to other

If < 6 day old, no transfer

If > 6 day old, transfer

Train < 6, wait, test >6: show transfer

Conclusion: can be coded on one side, but must wait for crossed connection to develop in order to access the info from the other side.

Example 2: Intraocular transfer (vision)

Train spatial task	Test
1 eye covered	Other eye covered

Transfer only if trained and tested after 28 days old
(Different than olfactory)