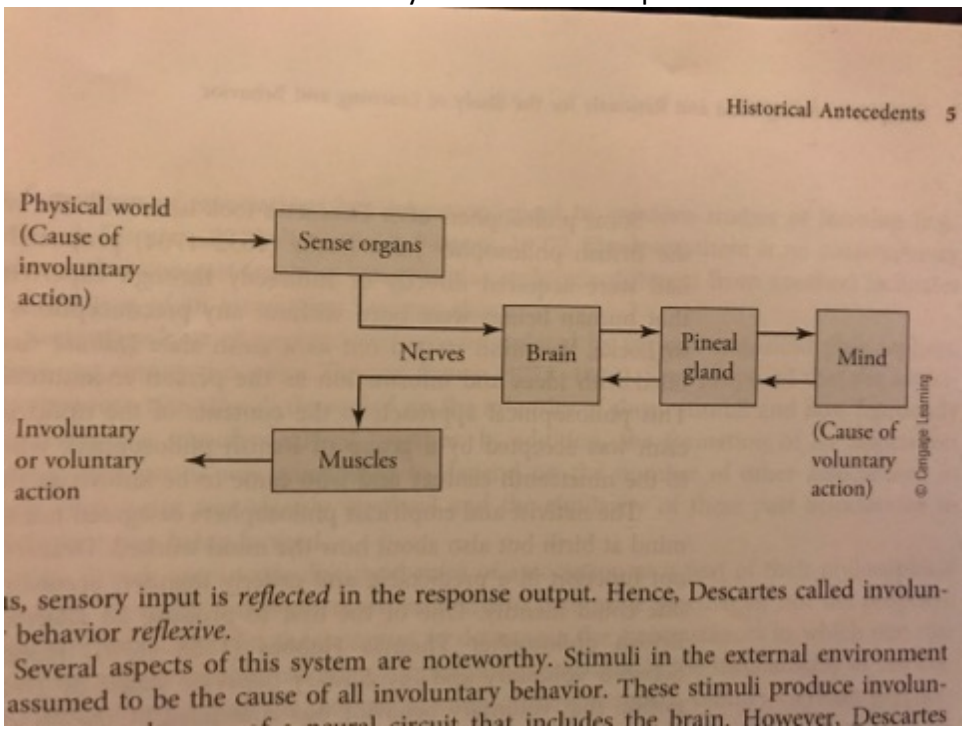
Week 1: Background

CHAPTER 1: DOMJAN

- Learning is one of the biological processes that facilitates our survival and promotes our well-being.
- Learning plays a critical role in improving how organisms adapt to their environment.
- Learning involves the acquisition of new behaviour
- The capacity of conscious thought is very limited.
- Study of learning
    - From philosophy
    - Descartes viewed all people to be free-willed
    - Dualism showed there were two types of human behaviour:
        - Involuntary: automatic reactions to external stimuli
        - Voluntary: intend to act in particular manner.



    - During this time, the mind was seen to be a non-physical entity.
    - Descartes believed the mind was connected via the pineal gland.
        - Some of the mind's contents came from senses.
        - Believed it was innate (instinctive) and existed in all humans
        - Believed the mind did not function in a predictable manner.
    - Mentalism: contents and working of the mind
    - Reflexology: mechanisms of reflexive behaviour.
        - Mentalism and reflexology formed the basis for modern learning.
    - Nativism: belief we are all born with innate ideas about things.
    - Locke believed that all of the ideas people had were acquired directly or indirectly after birth.
        - Believed the mind was a clear state (tabula rasa)
    - Empiricism: philosophical approach to the contents of the mind
    - Hobbs

        - Believed the mind was as predictable as a reflex
        - Hedonism: people do things in the pursuit of pleasure and avoid pain
    - Rules of association:
        - Continuity: if two events occur repeatedly together, they will become associated with each other.
        - Similarity: two things will become associated if they are similar in some way
        - Contrast: two things will become associated if they are different in some way
            - No contemporary evidence for contrast
        - Secondary associations:
            - Brown: association depended on the intensity of the stimuli and frequency. Depended on the number of associations to which each event was already involved in.
        - Ebbinghaus's experiment of nonsense syllables.
            - Studied lists of nonsense words and measured his ability to remember them.
- Study of reflexes:
    - Bell & Magendie showed that separate nerves are involved in the transmission of sensory information from sensory organs to the CNS.
    - Early philosophers' assumed that reflexes were responsible for simple reactions only.
        - Believed the more intense the stimuli, the more intense the reflex
        - Pavlov showed not all reflexes are innate
        - Sechenov showed that stimuli didn't elicit a response directly in all cases.
- Modern era:
    - Welcomed Darwin's work of evolution etc.
    - Descartes believed humans were unique and privileged in the animal kingdom and their reflexes were animal like.
    - Romanes defined intelligence as "to make new adjustments or to modify old ones in accordance with the results of its own individual experience.
    - Functional neurology:
        - Nervism: all key physiological functions are governed by the NS.
            - Done with Pavlov's work
        - Studies of learning provide clues about the machinery of the NS. Such studies tell us about the plasticity the NS is capable of, the conditions under which learning can take place, how long learned behaviours persist, etc.
    - Animal models of human behaviour
        - Animals are used as models
        - Used because most animals are smaller, easier to control and less expensive.
        - Model must have relevant features/functions
        - Key is similarity between the animal model and human behaviour in features that are relevant to the problem at hand.
- Definition of learning:

- Universal definition doesn't exist
- *Learning is an enduring change in the mechanisms of behaviour involving specific stimuli and/or responses that results from prior experience with those or similar stimuli and responses.*
- Performance refers to all of the actions of an organism at a particular time.
  - Change in performance is not always the same as learning.
  - Fatigue, hunger, thirst etc may produce changes in behaviour that are too short lasting to be considered learning
  - Persistent changes include maturation, but cannot be considered learning.

- Levels of analysis

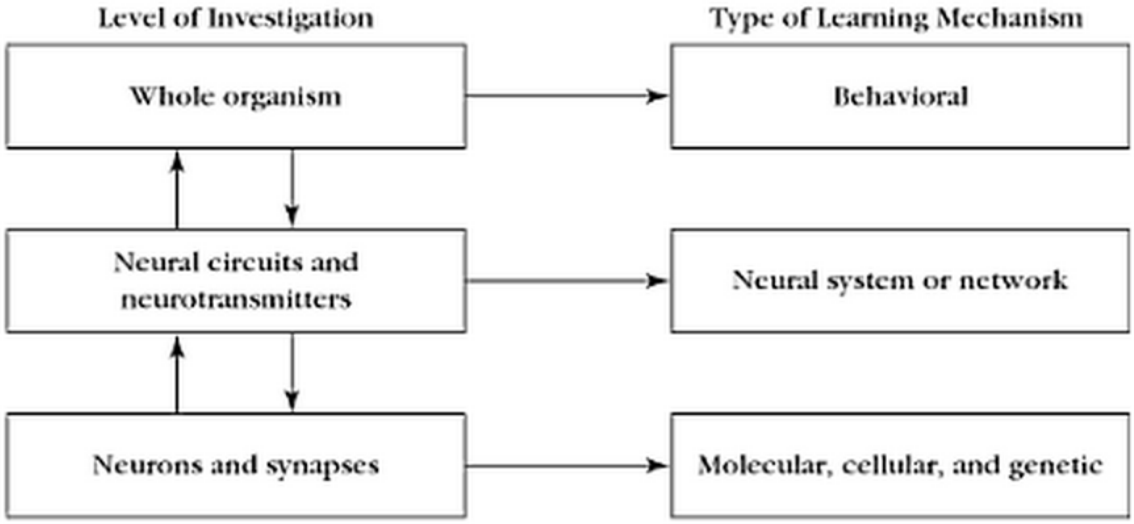


FIGURE **1.5**

Levels of analysis of learning. Learning mechanisms may be investigated at the organism level, at the level of neural circuits and transmitter systems, and at the level of nerve cells or neurons.

- Developmental changes: changes in learning that occur as a function of age.
- Methodological aspects of learning:
  - Learning as an experimental science:
    - Identifying the crucial components of training or conditioning protocols that are required to produce learning.
    - Can use observational techniques
    - Need to find a relationship between variables
    - Need to make sure learning is not due to changes in motivation, sensory development etc.
  - General-process approach:
    - Focus on commonalities
    - Whether or not general laws are discovered often depends on the level of analysis
    - Learning psychs have focused on commonalities of various instances of learning and have assumed that learning is a product of elemental

processes that operate in much the same way in different learning situations.
        - Generality is assumed to exist in the rules or process of learning- not in the contents or speed of learning.
        - General rules of learning may be discovered by studying any species.
- Using animals in research:
    - Experimental control of past experience cannot always be achieved with the same degree of precision in studies with human participants as in studies with lab animals
    - Cannot experimentally manipulate how emotions are learned in the first place on humans (ie frustration of not finding a partner)
    - Many of the investigations undertaken to unravel how the NS learns and remembers cannot be conducted on humans.
    - Process of learning may be more controlled on animals growing up in a lab setting
    - Some strains of lab animals may not be sufficient due to inbreeding etc.
        - Studies have proved rats bred in labs still act the same as rats bred naturally
        - Humans live in mainly artificial environments
    - Ethics:
        - Humane treatment of lab animals
            - Treating an animal as we would a human.
            - Be mindful of the animal's way of living.

Standards for the Humane Care and Treatment of Laboratory Animals

Slide 32

- Animals are properly cared for.
- Subjecting animals to painful or stressful procedures is used only when an alternative procedure is unavailable.
- Surgical procedures are performed under appropriate anesthesia, and techniques to avoid infection and minimize pain are followed.
- When an animal's life must be ended, it is done rapidly, with an effort to minimize pain.

- Information about normal learning cannot be obtained from sick animals → need to look after them
- Russel and Burch created the 3R's
    - Replacement of animals with other technology
    - Reducing the number of animals used
    - Refining the process to cause less suffering.
- Many alternatives cannot show learning effectively.