



Indian Institute of Technology  
Kanpur

In Collaboration  
with

...



# National Program on Technology Enhanced Learning (NPTEL)

# Presents

...

Course Title:

# Basic Cognitive Processes

By: Dr. Ark Verma,  
Assistant Professor of Psychology,  
Department of Humanities & Social Sciences,  
IIT Kanpur

# Lecture 04: Foundational Assumptions of Cognitive Psychology

# The Preliminaries

- The first questions...
  - What is '*behaviour*'?
  - What '*causes*' behaviour?

Remember the definition of  
'cognitive psychology'?



- In some sense, actually the whole notion of Cognitive Psychology seems counter - intuitive!
- the basic assumption in cognitive psychology concerns the existence of an inner world, the mind - space, where the mental processes take place.
- & where each element of the external 'real' world is somehow 'represented'.

- Without some understanding of the basic philosophical premises, it will be difficult to understand the root assumptions in Cognitive Psychology.

# The Problem

- the first concepts:
  - 'abstract' used to designate something that is defined without reference to the material (physical) world - that of objects!
  - thoughts, beliefs, emotions, etc. are all abstract because, while they may describe aspects of the physical world; they themselves are not physical entities.

- however, the fact that we can talk & theorize about these abstract entities, is slightly problematic.
- one of the reasons, is the distinction between the 'physical' & the 'mental'!!!

- Consider this statement, e.g. “William ‘decided’ to ‘make’ a sandwich because he ‘felt’ hungry”.

- How is it that two mental events, “feeling” & “deciding” can cause a physical event of “making a sandwich”?.
- there is very little indication of the means by which the mental & physical are supposed to interact (Fodor, 1981).

- however, as you will see, it is quite possible to discuss mental states & processes in the absence of any discussion of physical states & processes.
- in other words, it should be possible to posit that the mind is an abstract entity, with the only implication being that it can be discussed & defined without reference to the physical states and processes.

- from this perspective, cognitive psychologists are not so concerned with the physical states & processes that take place between the ears; they are more concerned with what mental states and processes might be like in their own right.



# An important question

- Can science, which is concerned with the physical nature of the world, help us understand the nature of the mind, which essentially is non - physical?
- What methods could be applied to study the mind?

- psychologists attempt to understand human behaviour & assume that a large component of this understanding requires the detailing of how the mind works (Read Steven Pinker's "*How the Mind Works*").

# Behaviorism: An alternate account

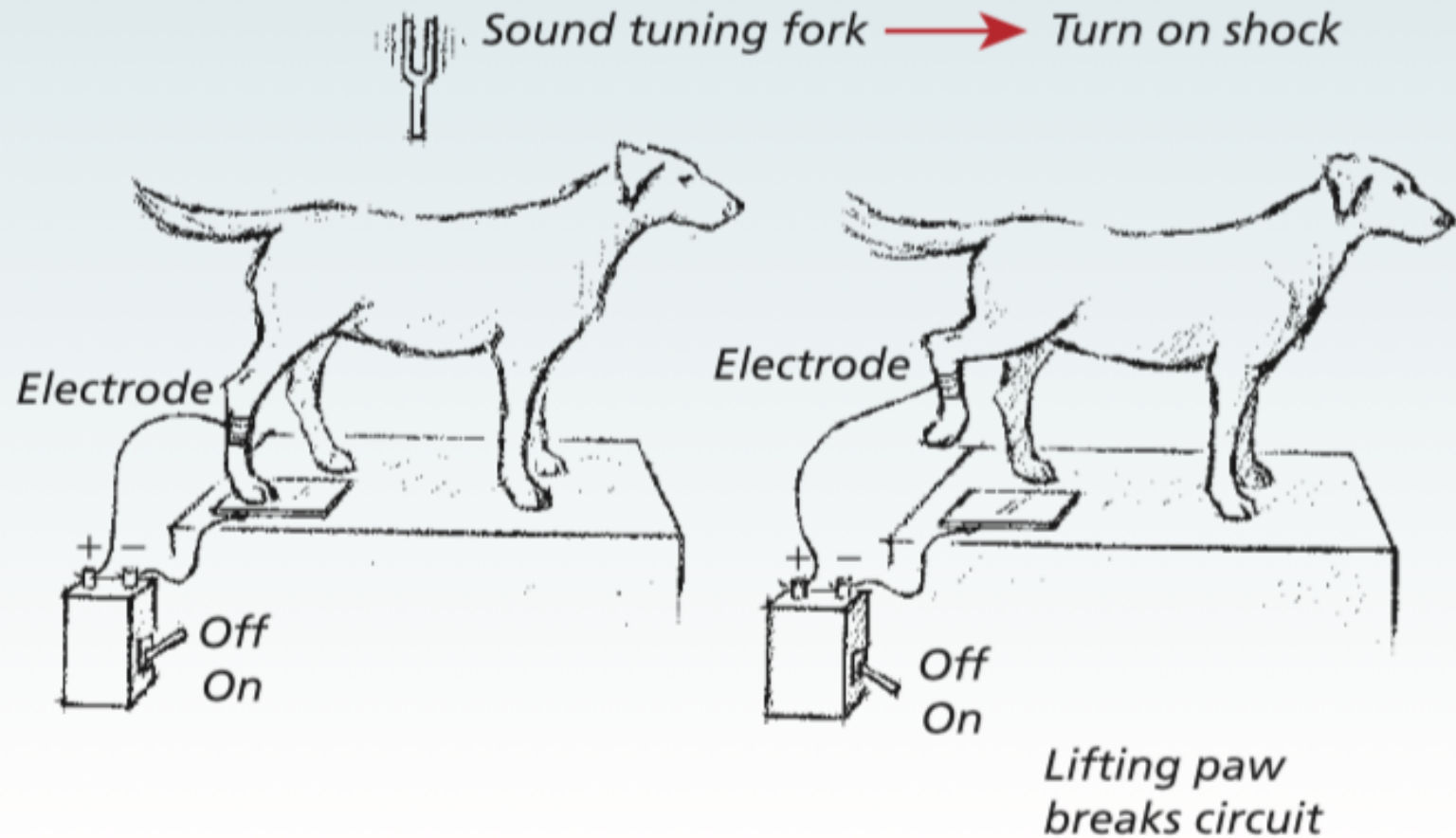
- Behaviorism, is the view that a true science of psychology strives to achieve a description of human nature in terms of **laws of behavior**.
  - we must strive to generate laws of behaviour in terms of physical events & physical processes.

- the laws will contain statements only about observable things that can be measured. Like Newton's Laws of Motion!
- the eventual theory of human behaviour therefore, should contain universally established principles (laws); that should correctly predict behaviour.

- For instance, “any given human will seek out pleasurable things over unpleasant things” and “given two outcomes, the human will choose the pleasurable option over the unpleasant one.
- the above is actually referred to as the **law of effect** which was proposed by Edward L. Thorndike.

- Thorndike put forward the idea that animals learn responses that result in rewarding consequences & they learn to drop responses that result in punishing consequences.
- because, “the effect” of making a particular response was thought to govern learning.

- Moving further with this assumption, one could posit associations between *stimuli* & their contingent *responses*.
- & discuss whether these associations could be strengthened or weakened.
  - strengthening a S - R bond implies that the tendency to make a particular R increases for a particular S.
  - weakening a S - R bond implies that the tendency to make a particular R decreases for a particular S.



**Figure 1.1 The law of effect in practice**

Image: Quinlan, P. & Dyson B. (2008). Cognitive Psychology. Prentice Hall.



# Other Laws

- under **principles of associationism** contingent reward or punishment does not play a necessary role.
  - for e.g. the strength of a particular S - R bond is found to be directly related to the **frequency** with which S & R co - occur.
  - further, the association between S and R will also reflect how closely S & R have co - occurred in the past, i.e **recency**.
- For example: how frequently a criminal is punished for a crime & also how quickly.

- So, useful learning can take place from being able to register the contiguity (i.e. closeness in time & space) and the frequency of co - occurrence of stimuli and responses.
- Learning depends on the ability to register the covariation of stimuli & their corresponding responses.

- in other words, **association formation** provides an apparently straightforward account of learning about causation.
  - for e.g. given that event B always follows event A, in close temporal proximity, it is reasonable to predict that the next time A occurs, B will follow closely.
  - one could be led to conclude that A **causes** B.

# Some reflections...

- applying the principles of associationism, the behaviourists had hoped to show that behaviour could be predicted & controlled.
- animal experiments were conducted in large numbers in controlled environments & their behaviours were predicted on knowing the previous history of reinforcement & by applying the laws of behaviour.

- the ultimate goal was to extrapolate the results of these experiments to the whole of human society and hence provide a theoretical framework for explaining & understanding human behaviour (Skinner, 1985).
- Note that, mind as an explanatory concept for behaviour was deliberately avoided.

- an implication (an unpleasant one!!!) of the behaviourist research programme was that animals & even humans are considered nothing more than machines!

- the point being conveyed is that, according to behaviourism, human behaviour is seen to be described in terms of a **deterministic system** whereby certain stimuli cause certain responses.
- So, as with any other machine, as long as we can identify the physical antecedents to some form of behaviour, we can then claim to understand the causes of that behaviour.
- In other words, behaviour, is fully determined by physical antecedents.

- Such an account is in line with all other scientific theories of the world; i.e. objects & events are linked by certain causal relations, & future actions can be predicted perfectly by the occurrence of their causal antecedents.



- much like a wall clock!!!
  - in winding up a wall clock, the rotational energy applied to the key is stored in the internal spring and the release of this energy results in the hands of the clock rotating.
  - this was referred to as an approach called **methodological behaviourism** by Searle (Searle, 1994, p. 33).

- in behaviourism, there is no room of FREE WILL as their aim is to provide an account of human behaviour that avoids any mention of decision making or choice.
- behaviourists limit themselves to describing behaviour solely in terms of deterministic principles.

# The Behaviorist Stance...

- the theory of behaviour is defined with respect to a set of laws of behaviour and the aim of behaviourism is to uncover these laws in order to predict & control behaviour.
- any theory that attempt to explain human behaviour should only contain statements about observable objects & events.

# Logical behaviourism

- **logical behaviourism is an extreme position that rules out discussion of anything but observable events and entities in our accounts of behaviour.**
- **it aims to rid our explanations of any mention of mental states or processes in a bid to focus only on observable entities.**

- Consider this statement:

1. William is thirsty

2. If there were water available then William would drink

- According to logical behaviourism, everything that you wish to predict from stating that “William is thirsty” can be accounted for by stating (2), these statements being referred to as **behavioural dispositions**.

- Logical behaviourists prefer statements like (2) because these make no mention of anything unobservable.

- Another example,
  1. Harry believes it will rain.
  2. Harry will be disposed to wear a raincoat and take an umbrella when he goes out.



- As Churchland (1984) notes, by such a behavioural perspective, mentioning mental entities is nothing more than a “shorthand way of talking about actual and potential patterns of behaviour”.
- Think!!! as this has been considered by many as a challenge to the cognitivist position.

# Criticisms to Logical behaviourism

- there are very good reasons to resist this line of argument.
  - for e.g. when one begins to analyse any particular behavioural disposition. Consider what “disposition” amounts to.

- Harman (1989) noted, “Whether you are disposed to take an umbrella with you depends on not just your belief that it will rain but also your desire not to get drenched, your perception of the umbrella in the corner, your further belief that umbrellas are good for keeping rain off, & so on (p. 833)”

- attempting to analyse any behavioural disposition inevitably leads to some form of reference to mental states, and/or processes such as beliefs, emotions, thoughts etc.

- Another objection was raised by Searle (1994, p. 35).
  - he reflected about what it means to be human & asks whether you can honestly say that logical behaviourist view corresponds with the 'ordinary experiences of what it is like to be a human being'.
  - for instance, can we really explain our behaviour without mentioning our thoughts & feelings?
  - is 'to be religious' really only a collection of dispositions such as attending a place of worship on holy days?

- Consider this example:
  - Logical behaviourists would have us believe that to have a pain is nothing more than to 'be inclined to wince, to take an aspirin etc. (Churchland, 1984, p. 24).

# To sum up...

- In summary, logical behaviourists substitute statements about mental states & processes with statements about dispositions to behave in certain ways.
- yet, in attempting to explain all of human behaviour in terms of behavioural dispositions, the approach fails to acknowledge that we as humans are sentient beings and that we typically act in ways that are determined by our thoughts and feelings and beliefs.

# References

- Quinlan, P. & Dyson B. (2008). Cognitive Psychology. *Prentice Hall*.