Chapter 11: Behaviorism (1892-1956)

Detailed Summary Notes

Leahey , T. H. (2012). *A history of psychology: From antiquity to modernity*. (7 ed., pp. 349-396). Pearson.

In Chapter 2 we learned psyche-logos = study of the soul (or mind).

- Since then psychology has been the study of the mind.
- A lot of debate about how the mind should be investigated and defined.

In the 20th century however, psychology started understanding its methods and subject matter in a new way.

- Resulted in a shift from what the mind was to what the mind did (cause behavior).
- By 1912, psychology was being considered more as the science of behavior instead of the mind.

Work in animal psychology contributed to this redefining of psychology.

- Led to a new field of research, as people believed that humans evolved from animal forms.
- This meant that people had to rethink Descartes' definition of the mind, because he believed that animals don't have minds.

New Directions in Animal Psychology

Animal psychology as Romanes begun, there are 2 methods:

- Anecdotal method to collect data
- Method of inference to interpret the data collected

Under special scrutiny in the late nineteenth and early twentieth century

- Anecdote was replaced by experiment techniques of Thorndike and Pavlov

<u>From Anecdote to Experiment</u>

- Experiment replaced anecdotes and informal, naturalistic experiments
- New aim of Animal Psychology was to produce natural science and this could not be achieved through the anecdote method

- Two research programs deserve special attention
    - Thorndike, and Pavlov

Initially, Thorndike was interested in children, however as he could not readily find enough available subjects, he turned to animals.
Thorndike studied animals in James' basement.

- Thorndike's importance - is his methodological and theoretical approach to animal learning and his formulation of an S-R psychology he called "connectionism"
- Deprecated the value of previous animal psychology for relying on the anecdotal method

Thorndike argued that the anecdotal method overestimated animal intelligence by reporting atypical animal performances.

He urged replacing anecdotes with experiments to impose order on a welter of conflicting observations of so-called animal intelligence.

Thorndike developed puzzle boxes
- trap cats inside boxes
- opened by cat in different way (some form of behaviour)
- cat rewarded with salmon for escaping
- example of instrumental conditioning - cat acts certain way, rewarded will learn
    - Animal makes some response and if its rewarded - in Thorndike's case with escape and food, the response is learned.
    - If response not reinforced, gradually disappears.

Says animals learn solely by trial and error, reward and punishment
Animals have no ideas to associate
There is association, but not of ideas

Issues:
Wesley Mills (1847-1915)

- Mills defended anecdotal psychology by asserting that animals could be properly investigated only in their natural settings
- Not in artificial confines in the laboratory - unnatural situation
- Said animals were forced into blind trial and error by instruction of Thorndike's puzzle boxes
- Could not see how the escape mechanism worked it simply could not reason its way out
- Lacking all pertinent information

Thorndike argued that the purpose of psychology should be the control of behaviour - can be no moral warrant for studying mans nature unless the study will enable us to control his acts.

Concluded by prophesying that psychology would become study of behaviour

Thorndike proposed two laws of human and animal behaviour:

- First was the law of effect
    - Those which are accompanied or closely followed by satisfaction to the animal will, other things being equal be more firmly connected with the situation so that when it recurs they will be more likely to recur
    - Punishment reduces strength of association connection
    - Greater reward or punishment, greater change in connection
    - Abandoned punishment

Law of effect became basic law of instrumental conditioning

- Second law was the law of exercise
    - Any response to a situation will all other things equal be more strongly connected with the situation in proportion to the number of times it has been connected with that situation, and to average vigour and duration of the connections

Thorndike claimed that these two laws could account for all behaviour no matter how complex it would be possible to reduce the processes of abstract association by similarity and selective thinking to secondary consequences of the two laws (exercise and effect).

- He analyzed language as a set of vocal responses learned because parents reward some of a child's vocalization but not others
- Rewarded ones are acquired and the non rewarded ones are unlearned following law of effect
- Learning is increasing s-r probabilities, forgetting is lowering them

Just as animal learning is automatic, response and reward so is human learning also unconscious, according to Thorndike.

- One may learn an operant response without being aware that one is doing so
- Thorndike reduced human resigning to automatism and habit as he did for animals

Thorndike recognized a problem that haunted later behaviourism and remains troublesome for any naturalistic psychology

- The problem is accounting for human behaviour without referring to meaning
- Animals respond to stimuli only in respect one way to the stimulus house and another way to horse

- But it seems implausible to suggest that an animal will ever grasp meanings

Not quite grasping the problem, Thorndike posed it as a matter of stimulus complexity more than as a problem of meaning.

- Objective psychologist faces difficulties defining the stimuli that control human behaviour

Thorndike realized the complexity of languages when he said that the number of connections necessary to understand a simple sentence may be well over 100,000 and he conceded that organized language is far beyond any description given by associationist psychology.

Thorndike formulated the basic law of instrumental learning, the law of effect and the doctrine that consciousness is unnecessary for learning.

Unlike Pavlov, he proposed a principle of belongingness that violated a basic principle of conditioning that those elements most closely associated in space and time will be connected in learning.

Thorndike did not found behaviourism though he practiced it in animal researches his devotion to educational psychology quickly took him outside academic experimental psychology in which behaviourism developed. May be concluded that Thorndike was a practicing behaviourist but not a whole hearted one.

Neuroscience of I.V. Pavlov (1849-1936)

Important new experimental approach to animal psychology grew from Russian objective psychology. The founder of modern Russian psychology was Ivan Meikhailovich Sechenov. Sechenov believed that psychology could be scientific only if it were completely taken over by physiology and adopted physiology's objective methods he dismissed introspective psychology as being comparable to primitive superstition.

Sechenov - Reflexes of the brain

- Thought is generally believed to be the cause of behaviour, the initial cause of all behaviour always lies, not in thought, but in external sensory stimulation
- Sechenov's objectivism was popularized by Vladimir Michailovitch Bechterev
- Called his system "reflexology"
    - Greatest follower - Ivan Pavlov

Pavlov's general attitude was uncompromisingly objective and materialistic

- He had the positivists' faith in objective method as the touchstone of natural science and consequently rejected reference to mind

- Pavlov rejected any appeal to an active inner-agency or mind in favour of an analysis of environment
- Possible to explain behaviour without reference to fantastic internal world
- Analysis of thinking was atomistic and reflexive

Pavlov contributions to psychology of learning was considerable

- Discovered classical conditioning and originated a systematic research program to discover it mechanisms
- Observed salivation could later be elicited by stimuli present at time food was presented to an animal
- Called these learned reactions psychical secretions and later called them conditional responses

<u>The Problem of Animal Mind</u>

Finding a Criterion for Consciousness:

- If comparative psychologists were going to attribute mental processes to animals, they had to come up with some criterion of the mental
- Descartes and Christian theology: The soul, not the body, thinks; so language, the expression of thought, is the mark of the mental. Comparative psychologists thought this was no longer plausible (they disposed of the soul)
- Yerkes (1876-1956): The criteria of the mind can be divided into two categories
    - 1. Structural Criteria: e.g sophisticated nervous system
    - 2. Functional Criteria: behaviors that indicate the presence of the mind.

- Most investigators took learning to be the mark of the mind & arranged experiments to see if a given species can learn. (Consistent with James Darwin). They looked for signs of adjustment in their subjects. An animal that could not learn is regarded as a mere automaton
- Yerkes: Three grades of consciousness:
    - 1. Discriminative consciousness: ability to discriminate one stimulus from another
    - 2. Intelligent consciousness: learning
    - 3. Rational consciousness: initiates behaviors rather than just responding

A Radical Solution

- John B. Watson (1878-1958) : Disliked introspection and took up animal psychology.
- His book “Animal Education” mostly attempted to find a physiological basis for learning. The study of animal behavior can be carried out objectively with no reference to the mind.

-Abandoning introspection. Criteria of the mind were useless in both animal and

human psych.

Discarding Consciousness

- The mind is problematic: shifting concern from the structural study of mental content to the functional study of mental processes & shifting from experimental technique from the introspective
- Psychology was viewed very poorly- lack of agreement, failure to teach and train more than a set of bizarre facts.
- Bawden: we need a general shift in methods and attitudes away from philosophy and towards biology
- APA convention 1911: Discussion of the place of consciousness in psychology
    - Angell: consciousness is in danger for extinction- psychology is on the road to become a general science of behavior
    - Dunlap: the term introspection should be restricted to reporting internal stimuli. It is not the central method of psychology.
    - Frost: psychological concepts are superstitions- no room for animal consciousness in the explanation of animal behavior
- Mental concepts can be replaced with behavioral ones
- APA convention 1912: marked the final transition of psychology- mentalism to behaviorism
    - Angell: not willing to abandon introspection altogether- it retains an important role in providing data not otherwise attainable.

-Psychology was now the study of behavior, its methods were now objective, introspection serving pragmatically when needed but no longer at the center of the field.

The Rise of Behaviorism

The Behaviorist Manifesto

By 1908 John Watson had defined an approach to animal psychology based solely on behavior.

- 1913: he did a lecture at Columbia University: "Psychology as the Behaviorist Views It".
- After encouraged by the editor of the *Psychological Review*, he eventually published it.
- 1943: it was rated the most important paper ever published by the *Psychological Review*.

J. B. Watson, Modernism in Person

Watson went to Furman University to complete his undergraduate degree.

- At first this university was religious and based around the Baptist denomination.
- It later lost its theology school and with a modernizing president it weeded out religion and added more science to its curriculum.

1900: he went to the University of Chicago to do graduate study under the supervision of Angell.

- Angell was the leader of psychological functionalism and later became president of Yale, where, during the Depression, he used social science to solve social problems at the Institute for Human Relations (IHR).

During the time of the new urbanizing America, Watson had a nervous breakdown, lost his faith, and then found faith in behavioristic psychology and its ability to control people.

Watson came up with a utopia in which government officials would be replaced by behaviorists who would practice preventive psychology to detect and treat "understandardized sex reactions" and "unsocial ways of behaving".

- However, it was said that a society run by psychologists would wither away.

Skinner was a bit younger than Watson and made a similar transition from the pre-modern past to scientific modernity.

- He was inspired by Watson's ideas, carried Watson's faith, and created his own state-less Utopia and deterministic view of the human condition.
- Like other manifestos at the time, Watson tried to abandon ideas of the past and come up with new ones for the future, which made it clear that he was declaring a manifesto.

Critique of Mentalistic Psychology

Watson rejected psychology as it was.

- Because both structuralism and functionalism incorporated the traditional definition of psychology being the scientific phenomena of consciousness and used introspection, Watson saw no differences between them.

He really felt restricted by the fact that, traditionally, psychologists were required to discuss their subjects' minds.

- Animals are not capable of introspection, which leaves psychologists with the task of constructing conscious contents of animals using their own minds as a guide.

Traditional psychology was considered to be ***anthropocentric***, as animals were hardly a priority unless they could answer questions about human psychology.

- Watson wanted to reverse these traditional ideas.
- He wanted to use humans as subjects with methods similar to those used for animals and said that the study of animal behavior was the independence of animal psychology.

Watson ridiculed introspection on empirical, philosophical, and practical grounds.

- On **empirical** grounds he said it did not state the questions it could answer convincingly.

    - This is because their most basic psychological questions about the consciousness were still not answered.
- On **philosophical** grounds he criticized mentalistic psychology for using introspection, which he said was non-scientific.
    - When results don't make sense, psychologists are more likely to attack the introspective abilities of the observer instead of the conditions of their experiment.
- On **practical** grounds, introspection requires animal psychologists in the lab to look for a behavioral criterion of consciousness.
    - But according to Watson, consciousness was irrelevant to animal work, as psychologists have to attempt to reconstruct what they think the animal's mind is like.
        - He felt as though introspective psychology had nothing to recommend it and a whole lot against it.
        - So he suggested discarding the idea of consciousness and turning to the science of behavior.

The Behaviorist Program

Watson's new psychology was the study of adjustive behavior and had nothing to do with conscious content.

- He said that both humans and animals just adapt to their environments, which means that behavior can be predicted in terms of stimulus and response.
    - A stimulus can be used to predict a response and a response can be used to predict a stimulus.
- Watson was interested in finding techniques that could be used to control behavior so that the leaders of society could use the behavior data practically.
- His program for behavior was comparable to Comte's positivist traditions as it involved describing, predicting, and controlling observable behavior.

Other than the fact that behaviorists could compare humans to their work on animals, the behaviorist manifesto was not clear about the methods that would be used to achieve psychology's new goals.

- Watson's methods were so vague that they were later replaced by Pavlov's conditioned reflex method.

In addition, Watson believed that thinking had nothing to do with the brain, but it instead involved "motor habits in the larynx".

- His ideas were the outcome of the motor theory of consciousness in which consciousness does not affect what we say or do. It just records it.

In 1913 Watson published another one of his Columbia lectures titled "Image and Affection in Behavior" in which he continued to attack the idea of mental content with extremely radical views.

- First, he considered thinking to be an "implicit behavior" that could happen between a stimulus and the resulting "explicit behavior".
- From this he hypothesized that the larynx is where this implicit behavior occurs, which makes it open to observation using a technique that had not been developed.
- One of his important points was that behavior occurs only in chains and does not involve

functional mental processes.
- Watson said that both the soul and the cortex were unexplained mysteries that we knew nothing about, so people who believed in centrally initiated processes actually believed in the soul.

The Initial Response, 1913-1918

In 1913 there were not many responses to Watson's behaviorist manifesto.
- Angell, who had taught Watson, recognized behaviorism as a logical development of his own work on behavior.
    - However, he disagreed that introspection could be completely removed from psychology.
    - It could still be used to determine the processes connecting stimulus and response. Haggerty agreed with Watson that behavior could be reduced to "physical terms" and that consciousness was therefore no longer needed to explain thinking.
- Yerkes did not agree with the idea of discarding the method of self-observation, as psychology would no longer be set apart from biology and would be left as a "fragment of physiology".
- Marshall feared that psychology might fade away because although the behavioral *Zeitgeist* had value, consciousness is still necessary in psychology.
- Calkins, who used to consider her self-psychology as a mix between structural and functional psychology, decided that instead it was a mediator between behaviorism and mentalism.

Other pre-WWI responses to Watson's manifesto were similar to most of those before them.
- Most acknowledged the issues of structuralism and benefits of studying behavior, but still supported introspection as the *sine qua non* of psychology.
    - The study of behavior alone is just biology without introspection.
- Titchener was one of those who considered the study of behavior as a form of biology rather than psychology, because consciousness can be studied, which is the purpose of psychology.
- McComas had a different type of response to the manifesto compared to the others, as he viewed it as just a natural extension of the motor theory of consciousness because Watson's idea that thinking occurred in the larynx was wrong.
    - People who have lost their larynxes still have the ability to think.

In 1916 Watson became the president of the American Psychological Association (APA) and in his presidential address he discussed the method and theory that would be used to study and explain behavior.
- Although he tried for years to demonstrate that thinking was just implicit speech, he failed to actually prove this.
    - During this time he presented work on the conditioned reflex as the substance of behaviorism and said that Pavlov's method of studying this reflex could be applied to humans too.

Watson acted as a bold voice for this area of research and finally named it *behaviorism*.

However, his manifesto never did receive much attention, good or bad, so it didn't result in any kind of revolution.

- Most people were fairly neutral, as older psychologists had already acknowledged that psychology needed to pay attention to behavior.
- In addition, younger psychologists had already accepted behaviorism, so they didn't care much either.

Although "Psychology as the Behaviorist Views It" didn't turn many heads, it did mark the point in history when behaviorism became influential and self-conscious and it gave the history of psychology a secure anchoring point.

- However, Leahey said that even if Watson never became a psychologist, these things would have still happened.

<u>Behaviorism Defined, 1919-1930</u>

Behaviourism discussion interrupted by WWI

- Changed the grounds of discussion
- Value of objective psychology proved by soldiers and success had brought psychology before a wider audience

After war it was no longer a question of Behaviorism's legitimacy, now the question was "What form behaviourism should take?"

Varieties of behaviourism:

- Watson's views:
    - Definition of psychology as the study of stimulus and response relations
    - Hunter tried to delude the issue by defining a new science "Anthroponymy" the science of human behaviour
    - This never caught on

Set out by Karl Lashley (1890-1958)

- Lashley wrote behaviourism had become an accredited system of psychology
- Its emphasis on experimental method had failed to give any departure from tradition in psychology
- Needed clearer formulation of behaviourism
- Claimed three forms of behaviourism had been advanced
    - First two acknowledged existence of consciousness
    - Strict behaviourism (later named radical behaviourism)

Facts and consciousness do not exist

Lashley said ultimately:

- Choice between behaviourism and traditional psychology comes down to a choice between two

incompatible world views
- Scientific vs. Humanistic
- Psychology must leave room for human ideals and aspirins but other sciences have escaped
- Psychology must turn to physiology

Opposing views to Lashley
- Neorealist philosopher R B Perry (1921)
- Saw behaviourism as nothing new, a return to the Aristotelian view that mind and body are related as activity and organ
- Adopting behaviourism did not mean denying that mind has a role of behaviour
- Behaviourist regard mind as something that intervenes in determining behaviour

Jastrow (1927)
- Who had been around since the beginning of psychology in America
- Saw nothing new in behaviourism
- Argued it was a mistake to conduce Watson radical behaviourism with the more general and moderate behaviourism held by most American psychologists
- Mind as something that intervenes in determining behaviour

Human or robot?

- James' automatic sweetheart
- Contrasting behaviourism with humanism
- Lashley noted - final objection to behaviourism is that it just fails to express the vital personal quality of experience
- Objection of James' argument of automatic sweetheart
- James - ones beloved is an automaton, and can only true love a machine?
- Lashley - description of experience belong to art not science
- Hunter dismissed worries about whether one could love or be loved by a machine
- Concerned only with aesthetic satisfaction of the belief and not scientific truth

BH Bode (1918)
- Defending behaviourist point
- Argued upon reflection no meaningful difference between a human sweetheart and a mechanical one because no behavioural difference between them could be proven

William McDougall
- Critic of behaviourism
- Put issue in up to date terms

- Saw critical question, men or robots?
- Behaviourism rested on claim that humans are just machines — robots — but that claim was unproved
- Woodworth claimed robots could do anything humans could

Following of WWII - development of computers

- One of the creators (of computers) posed James a question
    - "Can machine be said to think if you can talk to it and be fooled into believing you are talking to another person?

B. H. Bode - If you cannot tell it's a machine, then we are just machines too"

James refused this

- Said battle between mechanistic explanation and finalistic valuation between a view of human beings as robots or as actors with purpose — values, hopes, fears and loves

Later Watsonian Behaviourism

Following WWII

- Watson pursued human psychology based on conditioned reflex (infants)
- Believed complex behaviours of adults might be explained as simply acquisition of conditioned reflexes over years of Pavlovian conditioning
- Turned to nursery to show humans are no more plastic material waiting to be molded by society
- Believed nature endowed humans with dry few unconditioned reflexes
    - Fear, rage, sexual response
- All other emotions conditioned versions of unconditioned ones
- Watson asserted there is no such thing as inheritance of capacity talent temperament, mental constitution and characteristics
- Said that humans were blank slates
    - e.x. Denied human hand preference innate, no structural differences between left handed or right handed infants

Little Albert

- Conditioned emotional response
    - Conditioned fear response
- People only born with few instincts

- US produce fear — loud noise (metal bar struck by hammer) to scare Little Albert
- Paired noise with CS (rat) now when Albert touched rat hit hammer

    - Conditioned emotional response
    - Dubious claims and questionable ethics

- Watson claimed this demonstrated rich emotional life of adult no more than large number conditioned responses

- Mentalism remained mythical

Behaviourism substituted positivistic, scientific psychology of description, prediction and control of behaviour in place of fantastic secretly religious traditional mentalistic psychology.

Watson said behaviour psychology began with observation of behaviour of our peers. He rejected religion and moral control of behaviour and aimed to replace these with science and technological control of behaviour through behavioural psychology.

The Golden Age of Theory

- By 1930- behaviorism well established as dominant viewpoint in experimental psych. Set the stage to create specific theories for predicting and explaining behavior
- Functionalism had taken the ability to learn to be the criterion of animal mind
- Learning: the process by which animals and humans adjusted to the environment, by which they were educated, and by which they might be changed in the interest of social control or therapy.
- Increasing self-consciousness about proper scientific method
- Watson's objective method was too vague and confused to provide anything more than attitude
- **Beginnings of logical positivism**

Psychology and the Science of Science

- Behavioralism reflected the image of Comtean positivism: description, prediction, and control of behavior
- By early twentieth century, emphasis on what can be directly observed, excluding science concepts such as "atom" and "electron" could not be sustained
- Logical positivism began with a small circle of philosophers in Vienna just after WWI
- Two main aspects: formal axiomatization of theories and the operational definition of theoretical terms

- Scientific language contained two kinds of terms
    - 1. Observation terms: referred to directly observable properties of nature
    - 2. Theoretical terms: providing explanations in addition to descriptions of natural phenomena. Should be understood to consist in procedures linking it to observation terms (not religion)

    -such definitions = operational definitions
- Scientific theories consisted of theoretical axioms relating theoretical terms to one another
- The laws of science were no more than summary statements of experience- what counted was whether or not concepts could be systematically related to observation
    - Logical positivists relating to romantic idealists
- Provided specific recipe for doing science in any field:
    - 1. Operationally define one's theoretical terms
    - 2. State one's theory as a set of theoretical axioms from which predictions can be drawn
    - 3. Carry out experiments to test predictions, using operational definitions to link theory and observations
    - 4. Revise one's theory as observations warrant

- S. S. Stevens (1939) brought operational definition to psychology and called it "the Science of Science" in aim to make psych an undisputable science and to unify it with other sciences. What cannot be defined operationally is scientifically meaningless
- Operationism's revolution ratified behaviorism's claim to be the only scientific psychology because it was compatible with the demand of terminology. Mentalistic psych is unscientific and had to be replaced by behaviorism

Edward Chace Tolman's Purposive Behaviorism

- Behaviorism's central problem: to account for mental phenomena without invoking the mind- more liberal behaviorists leave the mind as unseen but a causal agent that determines behavior
- Watson & Lashley claimed that consciousness, purpose, and cognition were myths, so that the task of psychology was to describe experience and behavior as products of the nervous system
- Tolman (1886-1959) studied leading philosophers and psychologists (Perry and Holt, Munsterberg and Yerkes). Noticed in his courses with Munsterberg that he made little opening speeches that the method of psych was introspection and the work in his lab was primarily objective in nature- little could be made of introspective results in experimental papers

    -Read Watson's book *Behavior* and agreed

- Neorealism was foundation of Tolman's approach to the mind. Evidence supported the

existence of mind was of two sorts: introspective awareness of consciousness and the apparent intelligence and purposefulness of behavior

- Neorealism implied that there was no such thing as introspection, as there were no mental objects to observe- introspection was only an artificially close scrutiny of an objects in one's environment and attributes great detail
- Motor theory of consciousness: introspection of internal states such as emotions was just the "back action" of behavior on awareness.

  -In any case(neorealism and motor theory) introspection was of no special importance
- Tolman's "A New Formula for Behaviorism" was a methodological behaviorism, conceding that awareness existed, but ruling its study out of the domain of science

- Tolman criticized McDougall. McDougall being a mentalist, merely infers purpose from behavior, while behaviorists, identify purpose with persistence toward a goad
- Purpose is an objective behavior
- Tolman proposed a behaviorism that excised mind and consciousness from psychology but retained purpose and cognition, not as powers of a mysterious mind, but as objective, observable aspects of behavior itself.

- Tolman's behavior was molar rather than molecular (studied whole, integrated, molar acts)
- Tolman was also treating purpose and cognition from a neorealist perspective and wrote of consciousness as providing "representations" that guide behavior. Speaking of cognitions and thought as internal representations of the world playing a causal role as determining behavior

- Rudolph Carnap: the traditional terms of mentalistic folk psychology should be understood as referring not to mental objects, but to physicochemical processes in the body. (A version of the motor theory of consciousness). But we don't know the physiochemical referent of certain behavior … the behaviors are "detectors" of the unknown, underlying physiology.
- He also stated that language may serve as an expressive function. The expressive function of language lies outside scientific explanation and Is the subject of poetry, fiction, art etc..
- Carnap's psych was not incompatible with Tolman's but it gave Tolman a new way to articulate his behaviorism.

- Tolman reformulated his purposive behaviorism in logical positivists language "scientific psychology seeks the objectivity statable laws and processes governing behavior. Descriptions of immediate experience may be left to the arts and metaphysics".
- Behavior was to be regarded as a dependent variable, caused by environmental and internal (but not mental) independent variables and intervening variables that connect independent and dependent variables provide equations that allow one to predict behavior.

- Tolman redefined his behaviorism as operational behaviorism. Two main principles :
    - 1. It assert that the ultimate interest of psychology is solely the prediction and control of behavior.
    - 2. The interest is to be achieved by a functional analysis of behavior in which psychological concepts may be conceived as objectively defined intervening variables defined wholly operationally

Clark Leonard Hull's Mechanistic Behaviorism

Like many others from the 19th century, Hull lost his faith and tried to find a substitute. Eventually he found faith in math and science.

- In fact, his first career was a mining engineer.
- However, he wanted to find a field that involved theory that was new enough that he could be recognized quickly and would allow him to make machinery.
    - Psychology filled these special requirements.
    - Hull believed that cognition was mechanical and could therefore be described and understood using the precision of mathematics.

Eventually, the work he did on learning helped him leave his mark on psychology.

- Before this he used math in his undergraduate degree and doctoral dissertation to formulate various concepts.
- Then, due to certain circumstances, he spent the next few years doing unrelated research, such as aptitude testing in which he designed a machine that could calculate correlations between aptitude scores.
- So Hull, like Pascal, made machines that could think, but unlike Pascal, he was not horrified by them. These years doing unrelated research started Hull's psychological reputation.

Hull actually agreed with Watson's attacks on introspection, but he did think that Watson's ***dogmatism*** could lead young people to embrace the behaviorist manifesto more like a religion than science.

- Later, Koffka convinced Hull that Watson's behaviorism needed improvement.

In 1929 Hull moved to Yale University where he started a very influential career as the prominent experimental psychologist of his day.

Hull's plan had 2 components.

- He tried to build machines that could think and learn that could contribute to research on mental phenomena and behavior.
- Also, he extended the geometric spirit of Hobbes and the association of Hume.
    - He really liked math, so it's not surprising that he ended up with a bad case of physics envy and thought of himself as the Newton of behavior.
    - Around 1930 he concluded that "psychology is a true natural science".

During the mid-1930s Hull became influenced by logical positivism, as we will see that many did.

- And in 1936 he began focusing on formal theories alone, without the additional pursuit of "psychic machines" that were capable of thinking.
- This happened while he was president of the American Psychological Association and, in his presidential address, described his ambitions for theoretical psychology.
- During this address he discussed that accounting for the mind was the biggest problem of behaviorism.
    - He proposed to take a scientific, yet mechanistic approach to solving this problem.

To do this he tried to demonstrate that purposive behavior could be accounted for mechanistically, using his proposed *postulates*.

- From trying to figure out how consciousness fit into all of this, he formed his own version of methodological behaviorism.
- He decided that psychology could discard consciousness because before that point, there had been no theorems that could be facilitated by assumptions about consciousness.

Mechanical simulation was very important to Hull's thesis, but did not receive much attention because he rarely mentioned his "psychic machines" after his presidential address.

After 1937, Hull identified his system with "logical empiricism" and focused on the creation of a formal, deductive, quantitative theory of learning.

- In the process, his "psychic machines" were hardly heard of.
- However, like Tolman, his realism was overshadowed by his adoption of positivist language.

Finally, Hull wrote a series of books about his postulate systems, but the *Psychological Bulletin* said that *Principles of Behavior* was "one of the most important books published in the twentieth century".

Tolman Versus Hull

Battling Theories

Tolman's purposive behaviorism came into conflict with Hull's mechanistic behaviorism.

- During the 1930s and 1940s there was what Leahey referred to as an intellectual "tennis match" between their theories.
- While Tolman was trying to show that purpose and cognition were real, Hull and his followers were either trying to fix the theory or trying to show flaws in Tolman's demonstrations.
- Leahey presented a simple experiment from 1930, before this Hull-Tolman debate, that was meant to support Tolman's theory.
- Leahey used this example to contrast Tolman's cognitive views with Hull's Stimulus-Response views. This can be seen in Figure 11-1.

Figure 11-1 represents the maze that rats were familiarized with by being forced to go through each path during training.

- After the maze was learned, a rat would go to the choice point from the start box and have to pick a path.

We can look at this in terms of a Hullian analysis.

- If we look at the choice point as the stimulus, the three conditioned paths represent three responses.
- Each path is a different length, so Path 1 is preferred to Path 2 and Path 2 is preferred to Path 3. The next diagram represents the choice point and path choices in terms of stimulus and response.
    - In current example, the top connection (S-R1) would be stronger than the middle (S-R2), which would be stronger than the bottom one (S-R3).

In terms of a *divergent habit family hierarchy*:

- If we block Point 1, the rat will notice and choose Path 2, which will weaken the S-R1 path. In turn, S-R2 becomes stronger and gains priority.
- Path 2 would also be chosen if Point 2 was blocked instead, which would result in the same effects on those two S-R connections.
    - However, you can see that Path 2 will bring the rat back to that block again, so S-R2 will be weakened and S-R3 will become the strongest.
    - Therefore, the rat would choose Path 3, which is the Hullian Prediction.

Tolman did not agree that the rats learned that the different responses were triggered by the differing S-R strengths.

- He believed that rats' behavior was guided by a mental map of the maze.
- With Block Point 1, rats will still choose Path 2, but not because they know the S-R strengths of each path, but because Path 2 is shorter than Path 3.
    - However, unlike with the Hullian Analysis, if it encounters Block Point 2, it will know that both Path 1 and Path 2 are interrupted, because it learned the paths, so it knows to completely ignore Path 2 and go straight to Path 3.
- A mental map provides much more information than a set of S-R connections.

The results of this experiment provide more support for Tolman's cognitive theory of learning than Hull's S-R theory.

Despite the differences in their theories, Tolman and Hull shared important goals and assumptions.

- They both wanted to write scientific theories of learning and behavior for all mammals.
- They generalized their work on rats to the behavior of humans.
    - Assumed that their lab results represented naturalistic behavior.
- Both of them were methodological behaviorists who rejected consciousness and took description, prediction, and control of behavior as psychology's tasks.
- They were both influenced by logical positivism, but, for the most part, reached their conception of science, psychology, and behavior independently of it.

Relative Influence

Although both were honored and influential, Hull was more influential than Tolman.

- Tolman took a "fun" approach to science and was never a systematic theorist.

    - So although he could inspire his students, he couldn't teach them a systematic viewpoint and therefore had no disciples.
- Hull had disciples at Yale's Institute of Human Relations (IHR), because he valued the long, difficult labor of constructing postulates and deriving theorems from them.
    - He also had an explicit set of ideas to teach, unlike Tolman.
    - Finally, Hull got Spence to continue his program at the IHR.
    - Hull had a greater impact on psychology than Tolman.
        - In the 1960s a list of the most cited psychologists was created. Spence, who was Hull's student, was the most cited, Hull was in 8th, and Tolman didn't even make it into the top 60.

<u>We're All Behaviorists Now</u>

1948: Spence observed that although Tolman considered himself as a behaviorist, most psychologists didn't consider themselves as behaviorists at all.

Behaviorism is a fairly vague term because it can take so many forms.

- However, behaviorism made some progress and Spence tried to create common beliefs that all behaviorists could agree on.

1931: Skinner began working out a behaviorism in a similar radical spirit as Watson, but with new technical concepts.

- His first major theoretical statement, *Behavior of Organisms*, had a major influence on psychology.

After the Golden Age

After WWII, the study of learning was the most consciously troubled area.

Koch wrote that after WWII psychology "entered an era of total disorientation" and "never before had it seemed so evident that the development of a science is not an automatic forward movement".

- He claimed that there were two causes of this "crisis" in experimental psychology.
    - Internally, there was a decade worth of inactivity in the development of theoretical systems before the war.
    - Externally, clinical and applied psychology abandoned theory for useful practices to take on "social responsibilities" and gain "social recognition".

Lashley, one of Watson's students, argued that the standard S-R theory of complex behaviors that Watson proposed was actually impossible because transmission of nervous impulses from the receptor to the brain to the effector is slow.

- He suggested that organisms have central planning functions that coordinate sets of large units and not as chains.

- He argued that this is how language is organized, which raised a problem that would increasingly cause issues for behaviorism.

Beach questioned whether psychologists were actually interested in a general science of behavior of if they only cared about one topic in one species, like learning in rats.

- He noted that there were species-specific behaviors that could not be generalized to other species.

During the 1950s and 1960s the psychology of learning would increasingly plague the problems of comparative psychology.

Formal Behaviorism in Peril

After WWII there was a new generation of experimental psychologists coming into maturity raised on logical positivism and operationism.

- Many of them agreed with Koch that the problems of the psychology of learning were not being solved.

At the Dartmouth Conference on Learning Theory, this new generation evaluated learning theories in terms of logical positivism.

- Hull's theory, which they thought was most comparable to their positivist standards of theory construction, received the worst criticism.
    - Koch used positivistic criteria to show that it failed.
    - He said that Hull's theory didn't progress from the formulation of 1943 to those of the early 1950s.
- Several other theories received criticism for the same reasons.
    - Some of these included theories by Tolman, Skinner, Lewin, and Guthrie.
    - In particular, Skinner's brand of behaviorism didn't even try to live up to the criteria.
        - However, he had his own standards under which his theory did well.
- Psychologists' goals needed to be changed, instead of their continued pursuit of goals set by abstract psychology.

Radical Behaviorism

Most known and influential major behaviourist:

- Burrhus Frederick Skinner (1904-1990)
    - Proposed replacing this tradition with a scientific psychology modelled on Darwinian evolutionary theory, which looked outside humans for the causes of behaviour
    - Went from internal processes to external
    - Skinner, like Watson, placed responsibility for behaviour only environment
    - However, Skinner says that people deserve neither praise nor blame for anything they do

Radical Behaviourism as a Philosophy

Heart of radical behaviourism can be approached by looking at Skinner's analysis of Freud's theory in his paper

- For Skinner, Freud's discovery was that much human behaviour has unconscious causes
- Skinner says Freud's mistake was in inventing a mental apparatus
    - Id, ego and superego
    - And its attendant mental processes to explain human behaviour
    - Skinner believed the inference to an unconscious explains nothing that cannot be explained by simply referring current behaviour to the consequences of past behaviour
    - Skinner believed lesson taught by Freud's concept of the unconscious is that consciousness is irrelevant to behaviour

Skinner claimed ental link adds nothing to an account of behaviour.

- Said it complicates matters by requiring that the mental link itself be explained

Skinner had extended criticism of mental entities to encompass all traditional psychologies.

- Believed truth to be found in observations rather than interpretations of them

Radical behaviourism represented a sharp break with psychology.

- Concluded that reflex was not an entity inside an animal but rather a convenient term for correlation between stimulus and response
- Skinner says organism produces variant forms of behaviour
- Some reinforced some not
- Those not reinforced disappear

- Skinner - radical behaviourism is a straightforward extension on neorealism in psychology
- Neorealist's rejected inner mental world posited by way of ideas
- Therefore no ideas no such thing as private consciousness or introspection
- Like Tolman, behaviour is a function of environment to which organism responds
- Inner mental capacity unnecessary

Experimental Analysis of Behaviour

Goal of psychology is to locate specific determinants of specific behaviours and to establish the exact nature of the relationship between antecedents influenced and subsequent behaviour.

- Best way to analyze behaviour
- Find determinants
- Describe relationship between influence and behaviour itself
- This was done through experiment
- All factors affecting behaviour are systematically controlled

- Skinner called this experimental analysis of behaviour

Contingencies of Reinforcement

Behaviour is explained when investigator has identified and controlled all influences of which the behaviour is a function.

- Antecedents influence acting on behaviours
    - These are independent variables
- Behaviour that is a function of antecedents
    - Dependent variables
- Organism can be thought of as a locus of variables
    - Place here independent variables act together to produce behaviour
    - No mental processes intervene

Scientific explanation is nothing more than precise description of relationship between observable variables.

- Skinner emphasized the descriptive nature of his work as "descriptive behaviourism"
- Importance of controlling behaviour for Skinner, not just describing it
- Control is the ultimate test of scientific adequacy
- Prediction alone is insufficient
- Something may result from third variable
    - e.g. child age and shoe size may correlate, but shoe size does not determine the age of child

According to Skinner, investigator has explained a behaviour only when (in addition to being able to predict) he/she can influence its occurrence through manipulation of I'V's.

Skinner distinguished two kind of learned behaviour

- Respondent behaviour (Pavlov)
  - reflex behaviour
  - respondent behaviour elicited by definite stimulus unconditioned or conditioned
  - involuntary
  - e.g. salivary response

- Operant behaviour/learning
  - voluntary

- not elicited but emitted from time to time
- increased occurrence by reinforcement
- e.g.cat puzzle box

Setting box
Reinforced response - lever
Reinforcer - escape - contingencies of reinforcement

- Operant responses never elicited
- Light doesn't elicit response
- Reinforced bar press only when light is on
- Just sets the occasion for reinforcement
- Light is a discriminative stimulus
- Not S-R
- Reflexive link
- Skinner not S-R, but another way

Organisms may be affected by controlling variables not be considered stimuli.

- Motivation
- Drive-stimulus - food deprivation
- Skinner sees no need for drive stimulus reduction
- Mental thinking may be eliminated directly linking food deprivation to change in behaviour
- Deprive food, affect behaviour

Behaviour for Skinner was merely movement in space. However, Skinner was careful not to define operants as movements.

- Operant not a response
- Operant is a class of responses
    - Puzzle box - cat may press in many different ways
    - Each different response in that its form is different at each occurrence
    - All are members of the same operant
    - All are controlled by the reinforcer

Two movements same but different operants

- Different for setting and reinforcement

e.g. Raise hand in the air, could be for waving or could be for asking a question

Operant Methodology (Skinner)

1. Choose experimental situation that preserved fluidity of behaviour refusing to chop it up into trials

Continuous, changes over time

2. Experiment exert maximum control over organism's environment
Place organism in small space and reinforce for some behaviour
Manipulate or hold constant IV's and directly observe change in behaviour

3. Choose a simple, artificial response to study
Easily counted to machines
e.g. Rat lever pressing
Easily counted by machines to produce cumulative record of responding

4. Rate of responding as basic data of analyses
Measure of response probability minimal ambiguity what to manipulate or measure

Interpreting Human Behaviour

- Skinner extended his radical behaviourism to human behaviour
- Viewed human behaviour as not significantly different from animal behaviour from the animals he studied in his lab
- Same methods can be used without serious modification

Verbal Behaviour (1957)

- Skinner on language
    - Defined language as behaviour who's reinforcement is mediated by other persons
    - Skinner introduced a number of technical concepts in discussion on verbal behaviour
    - 3 set contingencies of reinforcement
        - Stimulus, response, reinforcement

Introduced concept of "tact" - verbal operant response under stimulus control of some part of physical environment.

- Correct use of tacts is reinforced by verbal community
- e.g. child reinforced by parents for saying "doll" when in presence of doll
- Operant - makes contact with - physical environment is called a "tact"
- Reduced naming to functional relationship among a response its discriminative stimulus and reinforcer

- Tacting raises points about human consciousness and private stimuli
- Skinner believed earlier methodological behaviourist like Tolman and Hull were wrong to

exclude private events like mental images or toothaches from behaviourism bc they were private

- Part of each person's world is private and mental, unknown to observer
- Many verbal statements, such as tacts under control of just the person
- Toothaches tacting response - painful inner stimulation
- Say "I have a toothache" get reinforced — go to dentist or take pain medication to cease pain
- Skinner says verbal community trained us to observe our private stimuli by reinforcing such utterance that refer to them
- This gives verbal statements survival value
- Can be useful for parents to know when their child is distressed
- So reinforce child when self-report of verbal behaviour

Also self-tacting allowed Skinner to explain purposive verbal behaviours without reference to intention or purpose.

- "I'm looking for my glasses"

Really means…

- "When I behaved this way in the past, I have found my glasses and stopped behaving in this way"

Last topic discussed in verbal behaviour was thinking

Most mental of all human activities

- Skinner argued thought is simply behaviour
    - "I think I shall be going" translates to "I find myself going"

- Thought is simply a tact that we have learned to apply to a certain form of behaviour
- Skinner denied the existence of mind
- Saying when we deny the mind, all that is left is behaviour
- Skinner did not wish to merely describe behaviour, he wanted to control it
- As control being a fundamental part of experimental analysis of behaviour

Scientific Construction of Culture

WWII Skinner worked on project called OrgCon (Organic Control)

- Behaviour guidance system for air missiles

Skinner trained pigeons to peck at projected image of a target that the missile they were imprisoned in was to seek out.

- Pecking operated controls on missile to reach its target until it stuck
- The result destroying both the target and the pigeons

- Skinner was impressed with the complete control over the birds' behaviour
- Said if pigeons' behaviour could be controlled to that extent then so could humans'
- Military deemed implausible, and no new pigeon-guided air missiles ever flew again

After WWII, Skinner wrote Walden II

- This was a utopian novel based on principles of experimental behavioural analysis
- It was a proving ground for experimental analysis of behaviour
- Skinner wanted to be able to control human behaviour in interest of society
- Described a utopia based on principles of experimental analysis of behaviour
- Could have total control over humans to cause them to be happy and productive and to feel free and dignified

Behaviorism and the Human Mind: Informal Behaviorism

Aside from those who followed Skinner's radical behaviorism, other behaviorists did not continue the Watsonian tradition of rejecting all inner causes of behavior.

- Very few people agreed with Skinner's idea that organisms were "empty".
- Behaviorists knew the hazards of "junkshop psychology", in which mental faculties and entities were multiplying as fast as the behaviors to be explained.
- So the problem was trying to avoid "junkshop psychology", which was solved by building on Hull's concepts of the *r-g-r-s mechanism* and the "*pure stimulus act*".

Hull proposed the *r-g-s-g mechanism* to deal with the error that the maze rats made of making the correct response too soon.

- He observed that rats tend to turn into blind alleys before finding the last choice point before the goal.
- As the goal was approached, the error was more likely to be made.

"*Pure stimulus act*": Hull noted that some behaviors didn't act on the environment, but instead occurred to a stimulus support for another behavior.

- Such processes *mediate* between the stimuli and the responses to them.

First, an external stimulus elicits internal mediating response.

- This response then has internal stimuli properties.
- These internal (but not external) stimuli elicit overt behavior.

Behavior could still be explained by S-R behavior chains, but some chains occurred invisibly inside the organism.

This language of behaviorism could be used to discuss behaviors, but seemed out of reach of radical

behaviorism.

- Osgood applied this approach of behaviorism to language with special reference to the problem of meaning, which he tried to measure behaviorally.
- Maltzman and Goss separately applied it to problem solving and concept formation.

Social Learning Theory was the broadest program of psychology with loosening restrictions.

- Miller and others at Hull's Institute for Human Relations (IHR) attempted to develop a psychology that would stay within objective realm of S-R psychology while doing justice to Freud's insights into the human condition.
    - However, they made their discussion of mental life more precise than Freud's by adding mediation.
- Social learning theorists loosened its restrictions, but didn't abandon S-R theory.
- Neo-Hullian behaviorists challenged the explanation of human thought by using the concept of mediation.

Mediationists didn't leave S-R psychology intact.

- They thought mediation occurred centrally in the brain and completely gave up Watsonian & Hullian muscle-twitchism.
- Changes resulting from these neo-Hullians were evolutionary, not revolutionary.
- Mediational behaviorism was possibly THE most theoretical position in the 1950s.
    - Proved to link inferential behavioralism of 1930s & 1940s to that of 1980s, which was cognitive psychology.
- The dedication of mediationalists to internalising S-R language was mostly due to their desire to preserve theoretical exactness & avoid "junkshop psychology".
    - But the new language made it easier for mediational psychologists to adopt information processing.

<u>Philosophical Behaviorism</u>

Logical Behaviorism

- A semantic theory about what mental terms mean. Attributing a mental state to an organism is the same as saying that the organism is disposed to behave in a certain way.
- When we attribute a mental statement to humans, we're really just describing his or her actual or likely behavior in a given circumstance, not some inner mental state.
- But how one is disposed to behave depends on their beliefs … making any direct equation of mental state and behavioral disposition impossible

The "Ghost in the Machine"

- Gilbert Ryle (1900-1976) attacked the dogma of the Ghost in the Machine by Descartes
- Descartes defined two worlds: one material and including the body; the other mental, a ghostly inner stage on which private mental events took place

- Ryle accused him of a huge "category mistake" treating mind as if it were a distinct thing opposed to the body and somehow lying behind behavior
- Cartesian dualism is a category mistake. Describe behaviors with mental predictors such as "intelligent", "hopeful" and then assume that there must be a mental thing behind the behaviors that make them "intelligent" and "hopeful". Ryle says the behaviors themselves are "intelligent" and "hopeful"- inventing the Ghost in the Machine accomplishes nothing because if there were an inner ghost, we would still have to explain why its operations are intelligent and hopeful…
- Ryle held that there is indeed more to mental predicates than simple descriptions of behavior (ex. A bird migrating means they are flying south.. but there are so many other meanings to migration)

Mind as Social Construct

- Ludwig Wittgenstein (1889-1951) led people to believe that there are mental objects (ex sensations) and mental processes (ex memory), whereas in fact there are neither… example: pain. We do not say "I am in pain" because we observe ourselves moaning and holding the painful area. So pain does not describe behavior or some inner object. They are expressions that must be interpreted by those who hear it.
- Mental processes do not consist in any *thing*. There is behavior, there are mental events, and there are physiological processes, but no one of them is the same, so there is no uniform process.
- "Family resemblance" – terms referring to mental processes are all family – resemblance terms, having no defining essence that can be captured. "Remembering", "thinking" and "intending" are not processes, but human abilities! It's just something people *do*
- In psychology there are experimental methods and conceptual confusion. Psych's conceptual confusion is to think there are mental objects and mental processes when there are not, and then to seek descriptions of the fictitious objects and processes
- There is nothing behind our acts, no Ghosts in the Machine.. Explanations stop somewhere. Psychologists have all along supposed that thinking, memory, wishing and so on required explanations, but Ryle and especially Wittgenstein claim they do not. They are human abilities, and thinking, remembering and wishing are things we just *do* without there being some "inside story" mental or physiological
- We cannot scientifically explain behavior, but we can understand it. To understand people's behavior, and the expressions of their thoughts, we must take into consideration what Wittgenstein called human "forms of life"- human action is meaningful only within the setting of a form of life.
- Psychology should give up the "craving for generality" and the "contemptuous attitude to the particular case" it has picked up from the natural science, and accept that the modest goal of explicating forms of life and explaining particular human actions within their historically given forms of life.