

Behaviourism

1892-1956

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Behaviourism: An Introduction

- At the beginning of the 20th century, psychology began to reevaluate its *methods* and *subject matter*
 - Attention began to shift away from what the mind *was*, and towards what the mind *did*
- By 1912, psychologists were beginning to define psychology as *the study of behaviour*, not the study of the mind
- This transition was a result of work in *animal psychology*

New Directions in Animal Psychology

- The animal psychology created by Romanes utilized two methods
 1. An *anecdotal method* to gather data
 2. An *inference method* to interpret data
- These methods were heavily criticized by American psychologists, which resulted in...
 - Experimentation replacing anecdote, by techniques of E.L. Thorndike and I.P. Pavlov

From Anecdote to Experiment

- In the laboratory of the new animal psychology, informal naturalistic experiments were replaced by investigations of behaviour in a range of species, from protozoa to monkeys
- The goal of the new animal psychology was to create a *natural science*

The Connectionism of Edward Lee Thorndike (1874-1949)

Edward Lee Thorndike



The Connectionism of Edward Lee Thorndike (1874-1949)

- Thorndike was initially attracted to psychology by William James' *Principles*
- Thorndike attended Harvard for graduate study
 - Here, he started studying with James
 - Initially wanted to pursue research of children and pedagogy, but no child subjects were available
 - Then began studying learning in animals

The Connectionism of Edward Lee Thorndike (1874-1949)

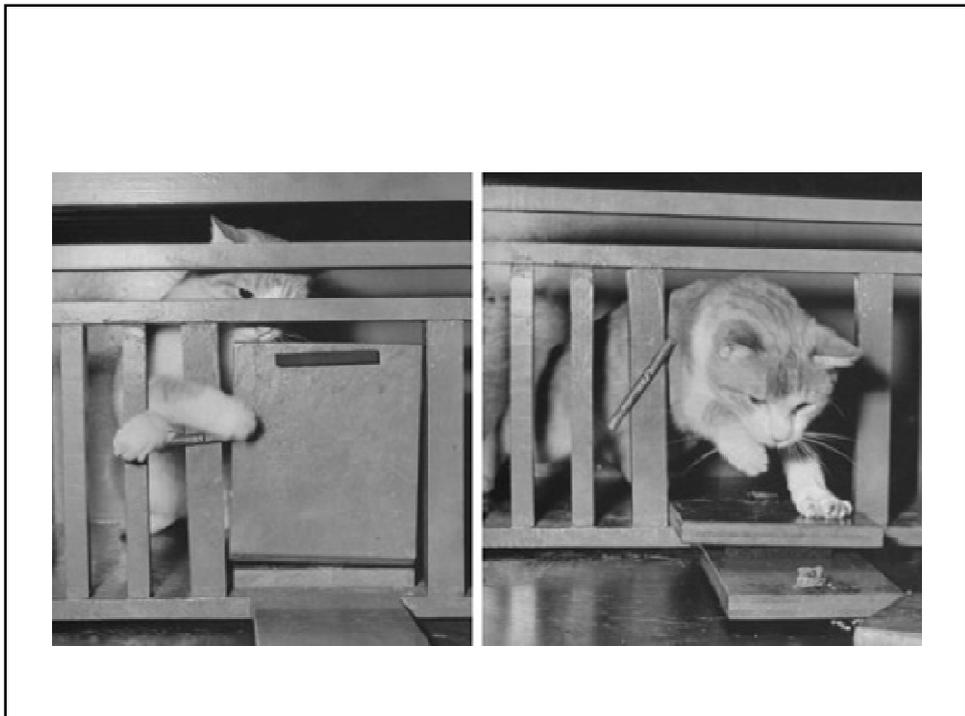
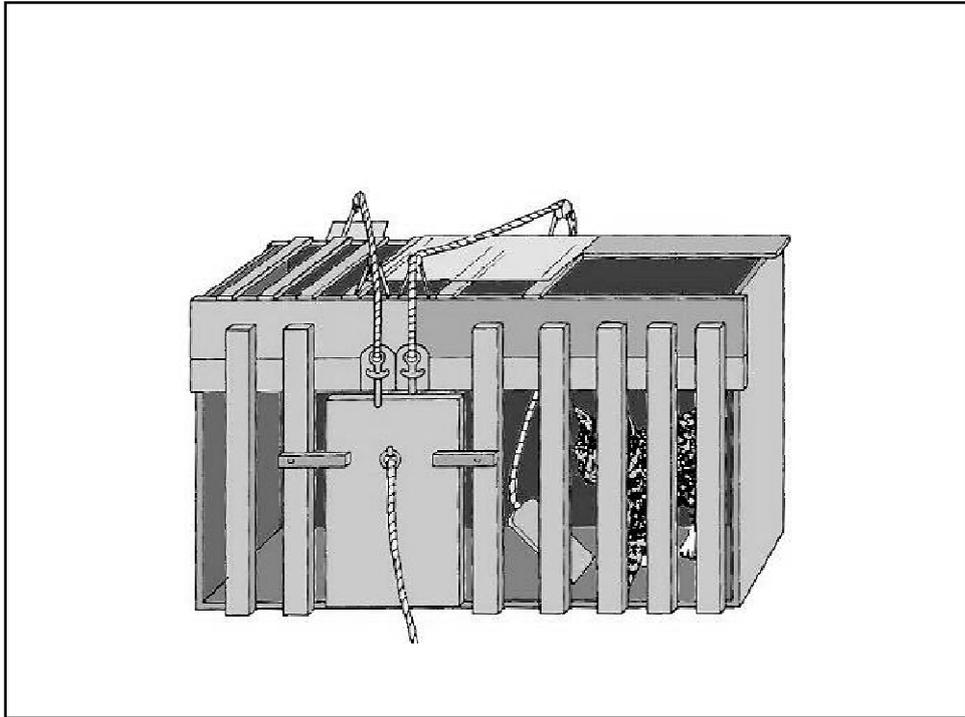
- Thorndike is influential due to his *methodological and theoretical* approach to research on animal learning, and his formation of a stimulus-response (S-R) psychology which he called *connectionism*
- Stated that the problem of animal psychology was “to learn the development of mental life down through the phylum, to trace in particular the origin of the human faculty”

The Connectionism of Edward Lee Thorndike (1874-1949)

- Argued that the previous anecdotal method had overestimated the intelligence of animals by reporting atypical animal performances
- Goal was to use experimentation to see animals “using their minds” under controlled and repeatable conditions

The Connectionism of Edward Lee Thorndike (1874-1949)

- Placed cats in “puzzle boxes” and rewarded them with salmon for escaping
 - An example of *instrumental conditioning*
 - Animal makes a response, and according to Thorndike, if that response is rewarded it will be learned
 - If not rewarded, response will gradually disappear



The Connectionism of Edward Lee Thorndike (1874-1949)

- Results lead to rejection of the anecdotal psychologist's older view that animals reason
 - Thorndike said that animals learn only by *trial and error* and *reward and punishment*
 - Thorndike said that there *are* associations made, but not of *ideas*
 - “The effective part of the association [is] a direct bond between the situation and the impulse”

The Connectionism of Edward Lee Thorndike (1874-1949)

- America's senior animal psychologist, Wesley Mills, stated that Thorndike swept away “almost the entire fabric of comparative psychology”
- Mills defended anecdotal animal psychologists by saying that animals could only be properly investigated in their natural habitat – not in a laboratory

The Connectionism of Edward Lee Thorndike (1874-1949)

- Wolfgang Köhler also countered Thorndike, stating that because the cat could not see *how* the puzzle box's escape mechanism worked, all that was available to it was trial and error
 - Because Thorndike's experiment could *only* permit trial and error, that is all he found
 - Stated that Thorndike's claim that an animal is only capable of association, is unjustified

The Connectionism of Edward Lee Thorndike (1874-1949)

- Thorndike included humans in his theory of learning
 - “This objective method could be extended to human beings, for we can study mental states as forms of behaviour”
- Criticized that human consciousness was a fabricated, artificial imaginary picture created by structuralists
 - Not necessary for learning

The Connectionism of Edward Lee Thorndike (1874-1949)

- Argued that the *control of behaviour* should be the purpose of psychology
 - “There can be no moral warrant for studying man’s nature unless the study will enable us to control his acts”

The Connectionism of Edward Lee Thorndike (1874-1949)

- Proposed two laws of human and animal behaviour
 1. The Law of Effect
 - Reward will strengthen connection
 - Punishment will reduce strength of connection
 - Later omitted the punishment part of his law
 2. The Law of Exercise
 - The more a situation and response occur together, the stronger their connection

The Connectionism of Edward Lee Thorndike (1874-1949)

- Stated that these two laws could explain all behaviour, regardless of the complexity
- Applied connectionism to human behaviour in *Human Learning*
 - Presented a complex S-R psychology
 - Many stimuli are connected to many responses
 - Hierarchies of S-R probabilities
 - Learning increases S-R probabilities, forgetting lowers S-R probabilities
 - Simplified human reasoning to habit

The Connectionism of Edward Lee Thorndike (1874-1949)

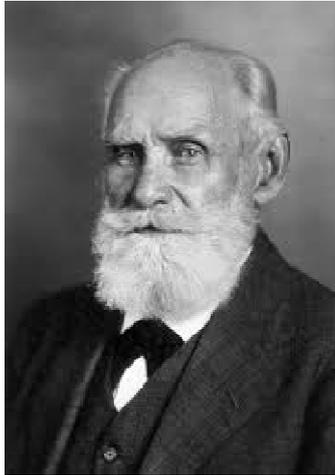
- Discovered a problem
 - Accounting for human behaviour without considering *meaning*
 - Animals respond to things in accordance of their physical properties
 - Meanings are embedded in the minds and lives of humans
 - Creates a barrier to applying theory of animals onto humans
 - Suggested a problem of stimulus complexity, not meaning

Thorndike Conclusions

- Thorndike proposed...
 - Law of Instrumental Learning
 - Law of Effect
 - Law of Exercise
 - Doctrine that consciousness is not necessary for learning
 - Principle of “belongingness”
 - Resembled Gestalt psychology
 - Counters the idea that elements most closely associated in space will be connected
 - Ideas must *belong* together
 - John is a butcher. Harry is a carpenter.

The Neuroscience of I. P. Pavlov (1849-1936)

Ivan Petrovich Pavlov



The Neuroscience of I. P. Pavlov (1849-1936)

- Ivan Petrovich Pavlov was a great follower of Russian physiologist Ivan Mikhailovich Sechenov
 - Sechenov dismissed introspective psychology and said that psychology could only be scientific if it were completely taken over by physiology

The Neuroscience of I. P. Pavlov (1849-1936)

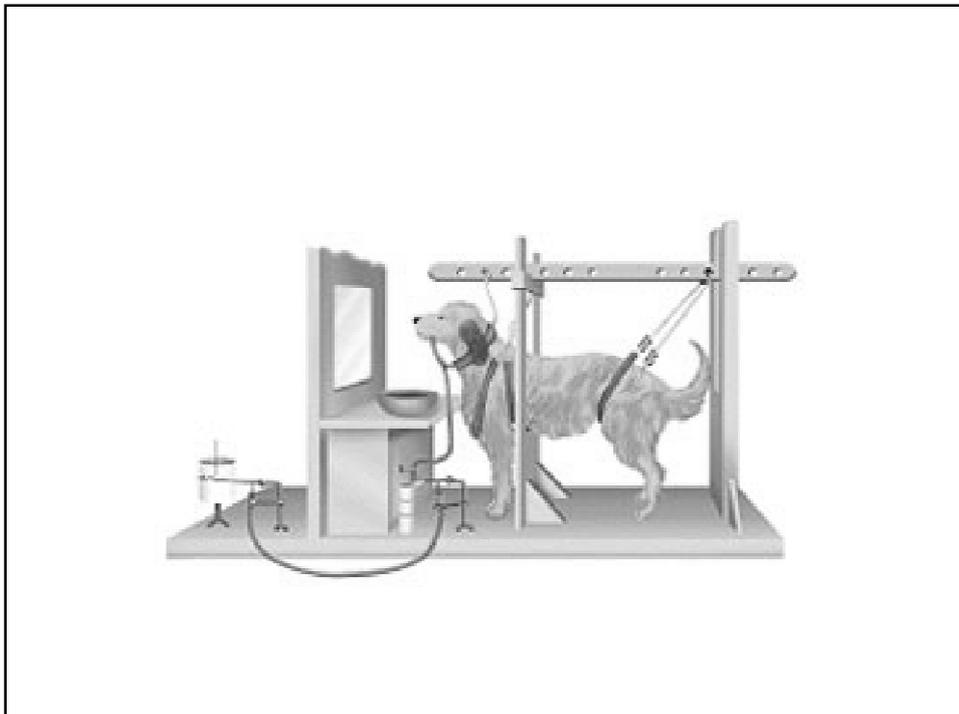
- Sechenov wrote that when physiology replaces psychology...
 - Physiology will begin by separating psychological reality from psychological fiction
 - Physiology will study the simple aspects of psychical life and progress slowly
 - Progress will lose rapidity, but gain reliability
 - Psychology will lose its brilliant universal theories
 - “The essence of the psychical phenomena manifested in consciousness... will remain an inexplicable enigma”
 - *Psychology will gain enormously, for it will be based on scientifically verifiable facts*

The Neuroscience of I. P. Pavlov (1849-1936)

- Pavlov won the Nobel Prize in 1904 for his research in digestion
 - Discovered that salivation can be elicited by stimuli other than food
 - Studied canine salivation
 - This led him to study psychology
 - Particularly to the study of the conditioned reflex

The Neuroscience of I. P. Pavlov (1849-1936)

- Pavlov discovered *classical conditioning*
 - Observed that stimuli other than food could eventually elicit salivation, as long as that stimuli was present when the dog was given food
 - Originally called the learned reactions *physical secretions*
 - Eventually replaced physical secretion with *conditional response*



The Neuroscience of I. P. Pavlov (1849-1936)

- Pavlov was objective and materialistic
 - Rejected reference to the mind
 - “For the naturalist everything lies in the method, in the chance of obtaining an unshakeable, lasting truth; and solely from this point of view... the [concept of the] soul... is not only unnecessary but even harmful to his work”
 - Favoured analysis of the environment and the influence of external stimuli

The Neuroscience of I. P. Pavlov (1849-1936)

- Pavlov replicated Köhler’s ape experiment in an attempt to emphasize that “association is knowledge...thinking...[and] insight”
- Pavlov held weekly discussion groups
 - Many meetings were devoted to negatively discussing Gestalt concepts
 - Stated that Gestaltists were dualists and that they did not understand their own experiments

The Neuroscience of I. P. Pavlov (1849-1936)

- Pavlov contributed immensely to the psychology of learning, especially by...
 - Discovering classical conditioning
 - Initiating a systematic research program to discover all mechanisms of classical conditioning

Thorndike & Pavlov

- Between the two, many important methods were contributed to psychology
 - These methods would be the “experimental mainstays of behaviourism”
- Both questioned the need for psychologists and biologists to focus on the animal mind
 - Thorndike found blind associations: denied that animals reason
 - Did not mention physiology at all
 - Pavlov proposed substituting psychology with physiology
 - Focused on the brain, not the mind

The Problem of the Animal Mind

- Comparative psychology began the 20th century with detractors
- E.C. Sanford (1859-1924)
 - 11th president of APA (1902)
 - Criticized comparative psychology
 - Felt that we cannot equate human and animal behaviour
 - Negating conscious experience
 - Favoured introspection

- Main obstacle for comparative psychology → Descartes's problem
 - What is “mental”?
 - Comparative psychologists believed higher animals had minds, but didn't know what an animal had to demonstrate to gain this distinction
- Problem: formulating the criteria for “mind”

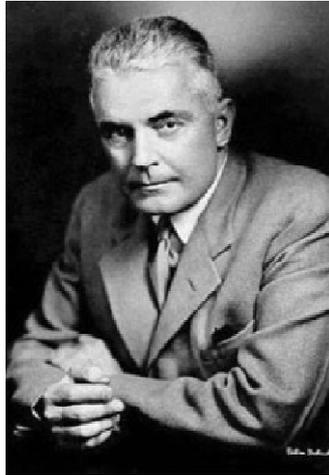
Robert Yerkes (1876-1956)



Robert Yerkes (1876-1956)

- Yerkes led this debate
- Saw comparative psychology as integral to human psychology and vice versa
- Consciousness → 2 criteria
 - Structure → possession of a sophisticated nervous system
 - Function → ability to learn (consistent with William James)
- Consciousness → 3 levels
 - Discriminative consciousness → ability to discriminate stimuli
 - Intelligent consciousness → learning
 - Rational consciousness → behaviours more complex than simple response to environment

John B. Watson (1878-1958)



John B. Watson (1878-1958)

- Graduate student of J.R. Angell (1869-1949) at University of Chicago
 - Dissertation: *Animal Education*
- Early opponent of introspection
- Became frustrated as a reviewer of *Psychological Bulletin* with futile debates over the criterion of the “mental”

Watson comes into his own

- Took a posting at John Hopkins University (1908)
- Petitioned for a purely objective study of animal behaviour akin to natural sciences

Watson comes into his own

- (Arguably) Watson's boldest move
 - Presented "A Point of View in Comparative Psychology" (1909) for Southern Society for Philosophy and Psychology
 - Criteria of the psychic:
 - We should rely on behaviour and observation when studying psychology
- Watson helped spur a major trend in psychology
 - The abandonment of "consciousness"

Discarding Consciousness

- Consciousness was revised to become more behavioural, and less abstract
- Consciousness became synonymous with:
 - Motor response
 - Relation
 - Function
- This trend was mirrored in changes to methodology
 - introspection → direct observation of behaviour

Discarding Consciousness

- Both of these trends are consistent with psychology's widespread attempt to become more useful and applicable
 - Studying behaviour was more widely relevant than studying consciousness or underlying mental processes

Fighting for Respect

- The early 1900's was a turbulent, frustrating time for psychologists due to a lack of respect from other disciplines
- Some European physiologists such as Jacques Loeb(1859-1924) equated psychological concepts to superstition
- Yerkes surveyed biologists regarding their perceptions of psychology
 - Most knew little about psychology
 - Widespread belief that psychology was merely a sub-field of biology that would soon be enveloped by the larger discipline

Fighting for Respect

- Yerkes concluded that:
 - There was a lack of assuredness within the field concerning the discipline
 - Insufficient overlap with physical sciences, resulting in psychologists with little knowledge of this area
 - Widespread disagreement over core principles
 - Poor teaching

Behaviourism Emerging

- The study of behaviour became popular partly as a result of this frustration
 - Seen most clearly at the 1911 APA convention
 - Substantial amount of acceptance of the shift towards behaviourism and away from “study of self-consciousness”
 - Angell: while the soul has long been abandoned, even the concept of the mind is being questioned
 - Still, the study of consciousness is warranted, as it is consciousness that leads to behaviour
 - Psychology would evolve into a “general science of behaviour”, a definition appearing in many psychology textbooks at the time

Behaviourism Emerging

- However, psychologists such as Knight Dunlap and J.R. Angell (1869-1949) guarded their view that introspection should not be entirely discarded
 - Needed to study events one cannot observe
 - Felt that by only focusing on behaviour, excessive overlap with psychology would result in psychology being enveloped

Behaviourism Emerging

- Two possible ways the concept of the mind could be eliminated (as proposed by European physiologists)
 - 1. Identify physiological structures underlying mental processes
 - Neuroscience
 - 2. Replace mental concepts with behavioural concepts that cannot be reduced to basic physiology
 - Did not appear until later, with B.F. Skinner

Behaviourism Emerging

- 1912 APA meeting
 - Near unanimous acceptance of focus on behaviour
 - Angell: Consciousness is “a victim marked for slaughter”
 - This trend was only encouraged by the development of new fields of study (ex: sociology, economics) for which consciousness had no purpose
 - However, Angell guarded his view that introspection should not be entirely discarded

John B. Watson (1878-1958)

- Commonly known as the “founder” of behaviourism
- Famous for the “Little Albert” experiment and
- Famous quote:
- “Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select – doctor, lawyer, artist, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors.”

The Rise of Behaviourism

The Behaviourist Manifesto – John Watson

- Outlined purely behavioural approach to animal psychology
- Wanted to apply an objective approach to human psychology
- 1913 lecture, was later published “Psychology as the Behaviourist Views it”

Critique Of Mentalistic Psychology

- Watson rejected previous approaches to Psychology
- Saw no difference between structuralism and functionalism. Both:
 - Defined psychology as the science of consciousness
 - Used the traditional “esoteric” method of introspection
 - Therefore hindered psychology from becoming a natural science

Critique Of Mentalistic Psychology

- Rejected previous approach – discussion of animals’ minds
 - Animals can’t introspect
 - Psychologists “construct” the conscious contents of animals minds analogous to their own minds
- Humans should be studied using the same methods as animal psychology
- Earlier comparative psychologists warned do not anthropomorphize animals - Watson urged not to anthropomorphize humans

Critique Of Mentalistic Psychology

- Faulted introspection on three grounds:
Empirical, Philosophical, and Practical

1) Empirical

- Did not define questions it could convincingly answer
 - e.g. the number of sensations

Critique Of Mentalistic Psychology

2) Philosophical

- Introspection non-scientific method
- Does not provide reproducible results
 - Natural science: unclear results blamed on experimental conditions
 - Introspection: observer is attacked for poor or untrained introspections
 - Introspection has a personal element - wanted to remove this

Critique Of Mentalistic Psychology

3) Practical

- Consciousness irrelevant to animal work
- Experiments test what an animal will *do* in a novel circumstance
- Attempts to reconstruct the animal's consciousness adds nothing

Critique Of Mentalistic Psychology

Praised applied psychology

- psychopathology, psychopharmacology, mental testing, educational, legal, and advertising psychology
- Flourished because less dependent on introspection
- Truly scientific:
 - Sought broad generalizations
 - Would lead to control of human behaviour

Critique Of Mentalistic Psychology

- Psychology must:
 - Discard all reference to consciousness
 - Be a science of behaviour
 - Never use terms such as consciousness, mental states, mind, content, introspectively verifiable, imagery etc.
 - Focus on stimulus and response and habit formation

The Behaviourist Program

- Animals/humans adjust themselves to their environment
- Psychology is the study of this adjustive behaviour
- Description of behaviour leads to prediction of behaviour in terms of stimulus and response
- Aim: to learn methods by which to control behaviour
 - Society's leaders could then "utilize our data in a practical way"
- Proposed methods were vague other than that work on humans is directly comparable to work on animals

The Behaviourist Program

- Startling ideas:
 - Thinking does not involve the brain
 - No centrally initiated processes
 - Thinking is just implicit behaviour that sometimes occurs between a stimulus and the resulting explicit behaviour
 - Most implicit behaviour happens in the larynx
 - Could be observed, but no method yet developed

The Behaviourist Program

- Applied to both mental images and experienced emotions
 - imagery a mental luxury (even if it exists) without any functional significance
- “I care not what goes on in a person’s so called mind, as long as his or her behaviour is predictable”

The Behaviourist Program

- Mentalist psychology still clinging to religion
 - Science had made religion obsolete
 - Belief in centrally initiated processes = belief in the soul
 - We know nothing about the cortex; it is easy to attribute the functions of the soul to the cortex – but both are unexplained mysteries
 - Soul does not exist
 - Cortex does not exist other than as a relay station between stimulus and response
 - Soul and brain could both be ignored in the description, prediction, and control of behaviour

The Initial Response (1913 – 1918)

- Responses were few and restrained
- Leahey details several, but in general they:
 - Acknowledged the deficiencies of structuralism
 - Saw the benefit of studying behaviour
 - but considered it to be part of biology
 - Defended introspection
- Psychology was, by definition, the study of consciousness
 - Should remain introspective to retain its identity

The Initial Response (1913 – 1918)

- One substantive criticism was by H.C. McComas (1916):
 - Pointed out that some people who had lost their larynxes to illness could still think
 - Falsified Watson's idea that thinking is due to laryngeal movements

The Initial Response (1913 – 1918)

- For years Watson tried to show that thinking is just implicit speech, but failed.
- Turned to the conditioned reflex as the substance of behaviourism
 - Applied Pavlov's method as tool to study humans
 - Conditioned reflex theory the basis for the prediction and control of behaviour
 - Provided an objective substitute to introspection

The Initial Response (1913 – 1918)

- Argued that neuroses were just habit disturbances/conditioned reflexes/poor behaviour adjustments
 - usually of speech
 - could be corrected by application of behavioural principles

The Initial Response (1913 – 1918)

- According to Leahey:
 - Watson did not create a revolution or propose anything new
 - Behavioural approach had slowly been taking over since 1892
 - Older psychologists had already admitted psychology had to pay attention to behaviour
 - Younger ones accepted this, even if they rejected Watson's extreme points

The Initial Response (1913 – 1918)

- Watson came up with a name that stuck:
Behaviourism
- Gave it in an aggressive voice
- Clarified that psychology no longer the science of consciousness
- Gave later psychologists
 - an anchoring point in the history of psychology
 - a justification to abandon the introspective method
- This would have happened without Watson