
UNIT 9 NEO-BEHAVIOURISM*

Structure

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Learning Objectives

After reading this Unit, you will be able to;

- Explain the evolution and extension of behaviourism;
- Discuss the development of logical positivism and operationism;
- Describe the role of logical positivism and operationism in the emergence of neobehaviourism; and
- Describe the contributions of the four major behaviourists – Guthrie, Hull, Tolman, and Skinner.

9.0 INTRODUCTION

The revolution brought about by Watson was not an overnight transformation in psychology. It took some time for Watsonian behaviourism to be firmly established. By 1924, a little over a decade later after Watson launched his behaviourism, it was said to have been spread all over. By 1930, Watson could justifiably proclaim that his victory was complete. Thus, behavioural psychology by 1930, had routed all prior approaches to the field.

Watsonian behaviourism was only the first phase of behaviourism. Behaviourism, as a school of psychology, went through different phases, continuously evolving. The evolution of behaviourism can be traced in three different stages:

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- **First Stage:** The stage of behaviourism – *Watsonian behaviourism* – lasted from 1913 to about 1930.
- **Second Stage:** The second stage of behaviourism – *Neo-behaviourism* – is said to have dated from 1930 to about 1960. This stage strengthened the ideas of Watson in a more rigorous manner.
- **Third Stage:** The third stage of behaviourism – *Neo-neobehaviourism* or *Sociobehaviourism* – can be said to have dated from about 1960 to about 1990. This stage saw the return to the consideration of cognitive processes, while maintaining focus on the observation of overt behaviour.

During the later phase of Watsonian behaviourism, one major development in philosophy in form of *logical positivism*, and one major development in science, in the form of *operationism* was taking place. These two developments directly had an impact on behaviourism, leading to the emergence of neobehaviourism.

9.1 LOGICAL POSITIVISM

The goal of Comte's and Mach's positivism was to have sciences deal with only what is directly observable. By the early 20th century, this was considered as unrealistic, as physicists and chemists had discovered theoretical concepts such as gravity, magnetism, atom, force, electron, and mass indispensable. None of these entities were directly observable. The difficulty was, then, to find a way for science to use theory without encountering the dangers put forth in metaphysical speculation. The solution to this problem was given by logical positivism.

Logical positivism is the name given to the view of science developed by a small group of philosophers in Vienna known as the Vienna Circle, around 1924. The older positivism of Comte and Mach was taken up by the Vienna Circle and was combined with the rigors of formal logic. According to them, abstract theoretical terms were allowed only if such terms could be logically tied to empirical observations. The empirical and the theoretical were two major parts into which logical positivism divided science. The observational terms of science refer to empirical events, and the theoretical terms try to explain that which is observed.

The logical positivists in no way reduced the importance of empirical importance by accepting theory as part of science. As a matter of fact, empirical observation was the ultimate authority for the logical positivists. If the theories helped explain what was observed only then they were considered useful. Logical positivism had a powerful influence on psychology. By allowing theory without sacrificing objectivity, it allowed much more complex forms of behaviourism to emerge. As a result of this psychology entered into what Koch called the *age of theory*, which can be said to have occurred from about 1930 to about 1950. A member of the Vienna Circle, **Herbert Feigl**, along with **Rudolph Carnap** named logical positivism and did the most to bring it to the attention of psychologists.

It was believed that if psychology followed the dictates of logical positivism, it could be on par with physics. For that to happen, however, psychology would need to adhere to the principles of operationism.

9.2 OPERATIONISM

In 1927, the Harvard physicist **Percy Bridgman** published the book, *The Logic of Modern Physics*. In the book he elaborated Mach's proposal that every abstract concept in physics be defined in terms of the procedures used to measure the concept, which he called *operational definition*. Thus, concepts like *force* and *energy* would be defined in terms of the operations or procedures used to measure the quantity of force or energy that is present. In other words, operational definitions tie theoretical terms to observable phenomena. There would be no ambiguity about the definition of the theoretical term due to this. The insistence that all abstract scientific terms be operationally defined was called *operationism* or *operationalism*.

The purpose of operationalism was to render the language and terminology of science as being more objective and precise and to get rid of science of "pseudo-problems," that is, those problems that are not actually observable or physically demonstrable. Operationism took hold in psychology almost immediately along with logical positivism. To convert theoretical terms like *drive*, *learning*, *anxiety*, and *intelligence* into empirical events operational definitions could be used. It would, thus, strip them of their metaphysical connotations.

This kind of an approach was clearly in accordance with psychology's new emphasis on behaviour. For example, learning could be operationally defined as making x number of successive correct turns in a T-maze, and anxiety and intelligence could be operationally defined as scores on appropriate tests. These definitions had no excess "mentalist" meaning and were completely in terms of publicly observable behaviour. Most psychologists soon agreed with the logical positivists that a concept is scientifically meaningless unless it can be operationally defined. Logical positivism had no aversion to theory, unlike the earlier positivism. To show how science could be theoretical without sacrificing objectivity was in fact one primary goal of logical positivism. Logical positivism dominated experimental psychology by the late 1930s.

All sciences being viewed as essentially the same, was one outcome of logical positivism. It was suggested that all the sciences should use the same terminology, as they all followed the same principles, made the same assumptions, and attempted to explain empirical observations. It was, further, suggested that a language database be created in which all terms would be defined in reference to publicly observable, physical objects and events. There was a push for the unification of and a common vocabulary among the sciences, including psychology, which came to be known as *physicalism*. In psychology, this proposal that all scientific propositions refer to physical things had profound implications. A physical concept is the same as the set of operations or procedures by which it is determined. A number of psychologists believed that this principle would work well for them and were eager to apply it.

Behavioural psychologists were particularly appealed by Bridgman's insistence on discarding pseudo-problems, that is, those questions that defy answer by any known objective test. Propositions such as the existence and nature of the soul that cannot be put to experimental test, something that

cannot be observed in a laboratory, and cannot be measured and manipulated, do not have any meaning for science.

Due to the same reasons, as mentioned above, the concept of individual or private conscious experience is also a pseudo-problem for the science of psychology. Objective methods cannot be used to determine or even investigate the existence or characteristics of consciousness. Thus, consciousness has no place in a scientific psychology, according to operationism. When physicists openly accepted the idea of operationism, many psychologists also felt like doing the same. Since the times of Wilhelm Wundt, psychology had longed for the respectability of physics. Eventually, psychologists used operationism more extensively than did physicists. In the late 1920s and 1930s, all this resulted the neo-behaviourists to incorporate operationism in their approach to psychology.

Check Your Progress 1

- 1) How did logical positivism prove to be helpful in using theoretical concepts, without encountering the dangers of metaphysical?

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- 2) How did operationism play a role developing a unified language for science, including psychology?

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9.3 CONTRIBUTIONS OF NEO-BEHAVIOURISTS

When behaviourism was combined with logical positivism, it resulted in neo-behaviourism. This also reflected the triumph of behaviourism over the mentalistic psychology of consciousness. Additionally, the identification of psychology as a positive science proceeded in a similar manner as the physical sciences.

Each of the neo-behaviourists had their own distinct approach, they however, agreed on several points about the systems they designed to explain their data:

- 1) The core of psychology is the study of learning. This is because learning is the primary mechanism by which organisms adjust to changing environment, making it to be of high importance.
- 2) Most of the behaviours, no matter how complex they may be, can be accounted for by the laws of conditioning.
- 3) If theory is used, it must be used in ways demanded by logical positivism.
- 4) Psychology must adopt the principle of operationism.
- 5) Nonhuman animals should be used as research subjects. The reasons for this are firstly, relevant variable is easier to control in nonhuman animals as compared to human subjects. Secondly, perceptual and learning processes that occur in nonhuman animals differ only in

degree from those processes in humans. The information gathered from nonhuman animals can, therefore, be generalized to humans.

Neo-behaviourism mainly constitutes the work of the psychologists Edwin Guthrie, Clark Hull, Edward Tolman, and B. F. Skinner.

9.3.1 Edwin Guthrie

Edwin Guthrie's approach is called *contiguity theory*. Guthrie advocated a psychology of observable behaviour consisting of muscular movements and glandular responses elicited by environmental stimuli, just like Watson. His theory of associations asserted a single principle to account for learning, which was in the tradition of Pavlov and Thorndike. Thorndike's reinforcement principle based on the law of effect was not accepted by Guthrie but he rather viewed Thorndike's secondary notion of associative shifting as the basis of learning.



**Figure 9.1: Edwin Ray Guthrie
(1886-1959)**

Source: www.

behaviouranalysishistory.pbworks.com

Box 9.1: Edwin Guthrie

The most influential theoretical work of Edwin Guthrie is *The Psychology of Learning*, initially published in 1935, and later revised in 1952. His writing style was non-technical, humorous, and full of anecdotes. He felt that scientific theory should be written in such a way that students at the undergraduate level can easily understand it. He also emphasized a lot on the practical application of ideas. Guthrie's most influential experimental work was written along with George Horton. In that he studied the problem-solving behaviour of cats. It was published as *Cats in a Puzzle Box*, in 1952.

Even though Guthrie himself was a behaviourist, he had disagreements with other influential behaviourists such as Watson, Hull, Tolman, and Skinner. He felt that their theories were not as parsimonious as it should be, and that their approach is too subjective.

The single principle that contiguity is the foundation of learning is the key to Guthrie's associationistic theory. Behaviour was viewed in terms of movement rather than responses by Guthrie. By this distinction, he meant that movements are the components of larger response units, or behavioural acts. Accordingly, skilled behaviours may be viewed in terms of a gross response composed of smaller units of movements that are largely muscular. Likewise, stimuli were viewed as a complex situation consisting of smaller elements. Given the presence of similar stimulus elements, Guthrie's principle of contiguity stated that when a combination of stimulus elements is accompanied by movement, the movement sequence will recur. Guthrie suggested that learning is a pattern or chain of discrete movements elicited by both environmental and internal stimulus cues.

The role of reinforcement received a unique interpretation in this because Guthrie's view of associations relied on stimulus and response contiguity. Guthrie believed that learning takes place in one-trial. This means that the contiguous relationship between stimulus and response elements immediately produces the associative bond at full strength. The effects of a reinforcing reward or punishment serve to feed back on the stimulus situation, which alters the situation and requires a new bond between the altered stimulus situation and movement. Therefore, reinforcement brings

about a change in the stimulus context, requiring movement. With this the learning proceeds within the behaviour act.

Extinction or forgetting takes place due to interference from new associations rather than the decay of stimulus-response bonds caused by the absence of reinforcement. In the same manner, practice effects were seen as improving the coordination of established bonds within the gross behavioural act instead of affecting stimulus movement association. Accordingly, Guthrie viewed drives as energizers of behaviour act and not as causal motivational agents.

The later behaviouristic psychologists were influenced by Guthrie's arguments and interpretations. **F. D. Sheffield** defended Guthrie's views and extended them to include the use of positive reinforcement as a means of refining behaviour. Similarly, many of the implications of Guthrie's writings were demonstrated by **Virginia Voeks** with the use of carefully designed experiments. A major criticism against Guthrie's approach was that it is incomplete and that it does not deal with complex learning and memory problems, in a comprehensive manner. Despite this criticism, Guthrie has been appreciated in explaining complicated systems parsimoniously.

9.3.2 Clark Hull

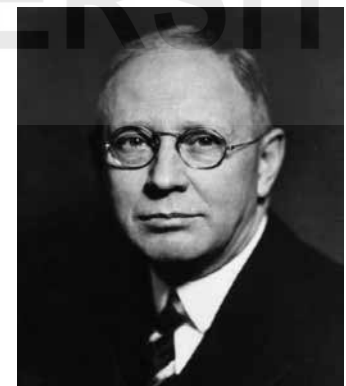
Clark Hull's systematic approach is called *hypothetico-deductive* theory. This theory came closest to a comprehensive treatment of behavioural issues governed by common principles. The central idea of Hull's approach is habit formation, which is the accumulations of experiences for effective adaptation. Hull's scientific approach was truly systematic. He advocated a hypothetico-deductive structure to guide research as he recognized the importance of observation and experimentation. Following the approach of Euclidian geometry, in this strategy a behaviour principle or formulation is first deduced from postulates and then rigorously tested. A belief is supported by a successful test to form the postulates, and a failure results in revision of the postulates. Following a logical progression, Hull's approach was positivist and verified through empirical demonstration.

Box 9.2: Clark Hull

Clark Hull was devoted to the problems of the scientific method, like no other psychologist, at that time. He was very well versed in mathematics and formal logic, and applied them to psychology, like no one else before him. His form of behaviourism is said to be more sophisticated and complicated than that of Watson. He and his followers dominated American psychology from the 1940s to the 1960s.

In 1936, Hull was elected as the 44th president of American Psychological Association (APA). In his presidential address, he talked about his goal to use mechanistic and lawful principles in explaining purposive behaviour. Hull had a huge influence on the discipline of psychology. He inspired a whole lot of research and influenced a large number of psychologists, indicating his stature in psychology. He propagated and extended the idea of an objective behaviourist approach, like no one else.

Today, based on his interest in machine learning, Hull is viewed as the forerunner of artificial intelligence. Hull viewed humans as machines that can learn and think, and therefore, comparing and contrasting machines with learning was compatible with his approach.



**Figure 9.2: Clark L. Hull
(1884-1952)**

Source: www.verywellmind.com

Hull's system relied heavily on mathematical predictions and was intricate. As his experimental tests progressed over time, he made detailed modifications. Hull's theory of learning is defined in terms of the reduction of drives arising from motivational states as essentially it is focused on the necessity of reinforcement. A homeostatic model seeking equilibrium from drive forces is the context used to view the behaving organism.

The core of Hull's analysis is the idea of intervening variables. Intervening variables are unobservable entities that psychologists employ to account for observable behaviour. Thus, from a purely behaviouristic perspective, Hull extended Watson's conceptualization of behaviour in terms of the peripheral (S–R) events to a consideration of central, organismic factors, stimulus–organism–response (S–O–R), intervening variables. It was Woodworth who had suggested this expansion of the behavioural model, in 1918, but it was Hull who systematically articulated organismic variables.

In Hull's theory, Habit strength, (${}_sH_R$), is the chief intervening variable for learning. It depends on two factors for associations. Contiguity is the first principle, which means that a close temporal relationship must exist between stimulus and reinforcement. Reinforcement is the second principle, which is defined in its primary form as drive reduction. There are also secondary reinforcements, which are cues that are reliably associated with the primary reinforcement and take on the reinforcement properties. For instance, if in the presence of light, a hungry rat is repeatedly given food for correct responses, the light takes on some of the rewarding characteristics of the food.

In order to get the basic procedure in which learning occurs as contiguity of stimulus and response under conditions of reinforcement, Hull attempted to integrate Thorndike's law of effect with Pavlovian conditioning. Habit strength (${}_sH_R$) and drive (D) interact to produce what Hull referred to as *reaction potential* (${}_sE_R$). Reaction potential is defined as the "tendency to produce some reaction under the effect of the stimulus." ${}_sE_R$ is a theoretical concept, which is not synonymous with observable responses. It is the product of ${}_sH_R$ and D:

$${}_sE_R = {}_sH_R \times D$$

Hull's intervening variables, therefore, represents a qualitative conceptualization along with an attempt to define quantitative relationships. For example, on the basis of the aforementioned expression, little performance would be observed from a hungry but naive rat. In such cases, drive will be high, and habit strength is not, which shows a low tendency to respond. Similarly, a rat with a well-established response to bar-press for food reward would not perform if it is not hungry, accounting for the distinction between learning and performance. In such a case, habit strength is high, but drive is low, which will produce little expectation of reaction potential.

In order to complete his framework for intervening variables that mediate performance, Hull included negative, inhibiting factors (I) that result from fatigue and boredom, as a by-product of performance. Hull also included the contributions of stimulus magnitude (V), such as, a faint versus a loud CS; the magnitude of reinforcement (K), such as, one versus four food pellets

per correct response; and the oscillating, momentary threshold of reaction for an individual subject ($S-O_R$). All of these intervening variables are related in the following manner:

$$S-E_R = S-H_R \times D + V + K - I - S-O_R$$

As Hull's theory developed this summary equation was itself articulated into more refined components. Hull's entire detailed structure was applied to the quantification of all possible influences on the acquisition of adaptive behaviour. His conceptualization has been supported by laboratory tests that have been largely conducted on rats. This analytic approach assumed that more complex forms of behaviour could be derived from these intervening variables.

Despite being supported by experimental tests, Hull's theory as a whole was not found to be very successful. Empirical discrepancies were found in Hull's system, in that it was unable to deal with insightful and rapid acquisition of behaviour. Hull had stressed upon on the importance of practice during training, which produced continuous but gradual improvement during acquisition. More importantly, the theory failed in its attempt to quantify the conceptual relationships among intervening variables. Hull's views have also been found to be premature. His system is often suggested to be a fixed, rigid structure that is perhaps not suitable for the variability of human and animal behaviour. Nevertheless, Hull's system has been found to be superb as a model for research. Much of the contemporary jargon to describe learning is because of Hull.

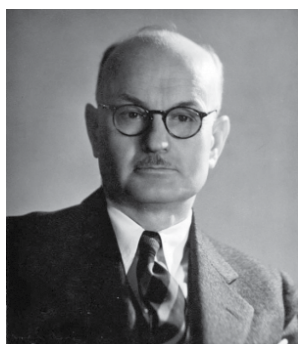
Check Your Progress 2

- 1) How did Guthrie distinguish between movements and responses?
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- 2) How did Hull extend Watson's conceptualization of behaviour?
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9.3.3 Edward Tolman

Edward Tolman's approach is called cognitive behaviourism. His theory further expanded the idea of Watson's behaviourism, more than Guthrie and Hull. Tolman proposed a consideration of behaviour that was *molar*, as opposed to molecular in his major work, *Purposive Behaviour in Animals and Men* (1932). According to him, molar behaviour is a unified and complete act, which provides the proper unit for psychology. He suggested that underlying molecular elements like neural, muscular, or glandular processes are not good enough to be considered as a molar act.

In doing so, Tolman can be viewed as departing from Watsonian behaviourism by incorporating the study of higher cognitive processes in psychology. His approach to molar behaviour was not reductionistic. Tolman argued that explanations based on molecular components is following a reductionist approach, which becomes inadequate, because it results in the loss of the purely psychological level. It said that explanations based upon molecular



**Figure 9.3 Edward
C. Tolman (1886-1959)**

Source: www.consciousnessandculture.com

components are not adequate. Therefore, according to Tolman, molar behaviour is more than the sum of the molecular elements.

Box 9.3: Edward Tolman

Edward Tolman is considered to be the forerunner of modern cognitive psychology. His work on the problems of learning and his concept of the intervening variable had a great impact on the discipline of psychology. Tolman used intervening variables as a way of defining unobservable internal states. This made such internal states to get respect in scientific study.

Tolman believed that organisms are active processors of information, which is in accordance with contemporary cognitive psychology. Tolman's theory in way is a precursor to the information processing theory and the social-cognitive theory of Bandura. Tolman was also a pioneer of behaviour genetics, which is very popular in the present-day scenario. In 1937, Tolman was elected as the 45th president of the American Psychological Association (APA). Additionally, he received APA's Distinguished Scientific Contribution Award.

Tolman relies heavily on many of the premises of Gestalt psychology. He used the term Gestalt to describe holistic, insightful learning experiences. Further, his notion of molar behaviour and adoption of mental isomorphism were directly taken from Gestalt psychology. He used the term *mental isomorphism* to describe the central product of learning in terms of the acquisition of field maps, which exist in the brain as cognitive representations of the learned environment.

Tolman's *laws of acquisition* mainly focused on practice that builds up sign Gestalts, or expectancies. For instance, in his maze learning experiments with rats, Tolman described the acquisition of *place learning*, which he inferred as the acquisition of relationships or *cognitive maps* in the subject. In the same way, he demonstrated expectancy of reinforcement, when he found that rats that were trained to one kind of reward switched to a more appealing food. Finally, he demonstrated the idea of *latent learning* in rats, which suggests different effects on performance levels can be exerted, depending on the quality of reinforcement. In all these experiments, Tolman clearly showed that organisms are guided by central, mediating processes that are beyond the environment. In doing so, he used cognitive explanations as intervening variables.

The theoretical orientation of Tolman has not been to be very systematic, when compared to the approach of Hull. Further, Tolman explanations of the central mediation of cognitive learning have been found to be vague. Despite these criticisms, Tolman is credited with bringing about a new perspective of behaviourism. He enabled behaviourism to move away from the reductionist, molecular view of Watson. Additionally, his discovery of performance being different from learning, which he even repeatedly demonstrated, showed that learning is not something that can simply be reduced to elements of stimulus-response-reinforcement. He was able to firmly establish the notion of molar behaviour, and stimulated a great deal of research in it. Tolman, unlike Hull, may not have behind a large number of followers or a systematic school of thought, but he certainly did

anticipate the research theme of cognitive learning, which is predominant in contemporary psychology.

9.3.4 Burrhus Fredrick Skinner

B. F. Skinner, in 1950, published his paper, *Are Theories of Learning Necessary?* This paper brought about what is called the end of the *theory-building phase* of the behaviourism. Skinner felt that theory building had a number of limitations. He felt that theories are based on a-priori assumptions that are questionable and misrepresent behavioural sciences. Instead of theories, Skinner suggested a system of behaviourism that is guided by data. For Skinner, theory should only be used in making descriptive generalizations that are made on the basis of facts, using a positivistic approach.

Skinner's approach had more of a methodological emphasis. He propagated a return to the study of behaviour with respect to peripheral events. He, thus, was completely against the usage of central mediating agencies of behaviour, whether they were cognitive or physiological. Instead of central mediating agencies, Skinner strongly believed that behaviour is only determined by the environment. Many-a-times, because of this, Skinner's approach has been referred to as radical environmentalism. Due to his strong emphasis on environmental determinacy, Skinner believed that if the environment is controlled, then behaviour can also be controlled. For this reason, he gave preference to exhaustive single subject studies, comparing the subject in different environmental conditions. He believed that organisms differ due to differences in the environment and not individual differences inherent in them.

Box 9.4: Burrhus Fredrick Skinner

B. F. Skinner was considered to be the most influential psychologist, for many decades. From the 1950s to the 1980s, Skinner remained the major figure associated with behaviourism. During this time, he shaped American psychology more than any other psychologist. Unlike other neobehaviourists, Skinner's approach was more in line of positivism rather than logical positivism. After the second World War, Skinner's behaviourism not only rivalled other versions, but even surpassed them all.

Skinner had a number of achievements throughout his life. He attracted a large number of loyal and enthusiastic followers. He developed a program for the behavioural control of society, promoted behaviour modification techniques, and invented an automated crib for tending infants. His novel, *Walden Two*, remained popular decades after its publication. In 1958, Skinner was awarded the Distinguished Scientific Contribution Award by the American Psychological Association (APA). His book *Beyond Freedom and Dignity* (1971) was a national best-seller, which also gave him the opportunity to appear on television talk shows, to discuss his views. He was even featured on the cover of *Times Magazine*, in 1971. He had become more of a celebrity. His name became very familiar to the general public. The magazine *Psychology Today*, in 1972 noted that Skinner being a professor in psychology had also acquired the celebrity status of a movie star.

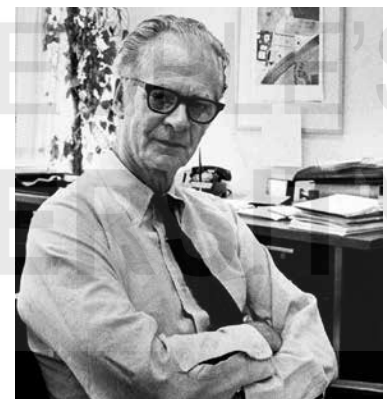


Figure 9.4: B. F. Skinner (1904-1990)

Source: www.britannica.com

Despite following the mechanistic principle stringently, Skinner was a humanitarian, and his overall goal was the betterment of society. This was vividly reflected in his efforts to modify behaviour in real-life settings such as homes, schools, and other organizations. He strongly believed that his methods could relieve humans from many of the sufferings, and wanted his approach to be applied in a more widespread manner.

For his efforts in developing the behaviour modification technique, which was used to enhance the quality of life of the mentally retarded, Skinner was presented with the Kennedy International Award, in 1971. He was named the Humanist of the Year by American Humanist Association, in 1972. In 1990, Skinner was presented the Lifetime Contribution to Psychology Award. Just eight days after that, at the age of 86, Skinner passed away. As a tribute to Skinner, the November 1992 issue of the journal *American Psychologist* was entirely dedicated his ideas.

The study of *operant behaviour* was the basis for Skinner's research. This made his approach different from Pavlov, who studied respondent behaviour. When responses are caused by specific stimuli, then it is referred to respondent behaviour. In contrast to that, operant behaviour is something that is ongoing, without any apparent stimulus. Operant behaviour is also about the organism operating on the environment. To study operant behaviour, Skinner developed an environmental chamber in which birds could engage in pecking, or rats in bar pressing. Skinner felt that using such an apparatus makes it easier to control the environment enabling to record ongoing, operant rates of responses.

According to Skinner, learning takes place when the operant behaviour is controlled by reinforcement from the environment. Initially, the operant responses are shaped by reinforcement of approximations of the desired operant behaviour. In order to increase the probability of the operant, a reinforcing event is introduced after the initially refined operant. For example, bar pressing in a rat being defined as an operant can be increased if food is presented after the act of bar pressing. Therefore, for Skinner reinforcement is the probability of changes in the operant rate. This makes his idea of reinforcement to be different from that of Thorndike and Hull. Thorndike saw reinforcement in terms of satisfiers or annoyers, and Hull saw reinforcement in terms of drive reduction. Skinner avoided these two ways of defining reinforcement.

Skinner showed that specific response rates can be obtained for particular schedules of reinforcement, demonstrating the power of reinforcement. In the same way, he translated conditioning processes such as *generalization* and *discrimination* to a reinforcement contingency framework. He also extended the principles of operant control to a consideration of verbal behaviour. Skinner used his experimental data for his argument that behaviour is controlled. Accordingly, he suggested that psychologists should define the parameters of effective control that may be suitable for social implications.

Skinner has been heavily criticised for his approach. His idea of behavioural control and his mechanical conception of human nature have not gone down well with a lot of people. Skinner, however, felt that human activity

does not involve personal freedom or self-determinacy. He argued that the humanistic characteristics that are assigned to human beings, making them different from other species is more of an illusion that has been created throughout history. According to Skinner, to be truly human means to be in control, understanding and using the environment for benefitting the self.

Check Your Progress 3

- 1) How is Tolman's approach different from Watsonian behaviourism?
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- 2) What is the role of environment in behaviour, according to Skinner?
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9.4 BEHAVIOURISM IN TODAY'S TIME

All the neo-behaviourists have been highly influential in one way or the other. Tolman's cognitive behaviourism, emphasising on purposive behaviour and mental constructs has been the forerunner of contemporary cognitive psychology. Hull's emphasis on deriving mathematical equations has led a number of psychologists to develop mathematical models of different types of behaviours.

Among all the neo-behaviourists, the influence of Skinner has been really strong. The popularity of Skinner's behaviourism is reflected in the followers of Skinner establishing a separate division in the American Psychological Association (APA), which directly associated with Skinner. Division 25, in the APA, known as the division of the Experimental Analysis of Behaviour is all about Skinner's approach. The division has its own journal to publish all related research in the area.

Advances in psychological research, however, over the years, have led the influence of behaviourism to diminish. Contemporary psychology emphasizes a lot on cognitive aspects, which, except for Tolman, can be viewed as completely against the whole idea of behaviourism. Research in evolutionary psychology has given a lot of evidences that much of animal behaviour, which includes human social behaviour, is genetically determined. This is also completely against the idea of behaviourism.

Additionally, the insistence of neo-behaviourists to operationally define theoretic terms has been found to be problematic. Many of the logical positivists have themselves abandoned the idea of strict operationism as it seems to be too restrictive. Due to the emphasis on operationism, scientific concepts that were too complex, yet useful in giving new pathways of research, had to be excluded, hampering scientific progress.

Nevertheless, there is one legacy of behaviourism and neo-behaviourism that still dominates the discipline of psychology. Psychologists, mostly agree that the subject of psychology should be overt behaviour. Even cognitive and neuropsychological processes are largely examined in terms of overt behaviour, under different specific situations. In that sense, most of the experimental psychologists in today's time are behaviourists.

9.5 SUMMARY

Now that we have come to the end of this Unit, let us list all the major points that we have learnt.

- Behaviourism, as a school of psychology, went through different phases, continuously evolving. The evolution of behaviourism can be traced in three different stages – Watsonian behaviourism (1913 – 1930), Neo-behaviourism (1930 to about 1960), and Neoneobehaviourism (from about 1960 to about 1990).
- During the later phase of Watsonian behaviourism, one major development in philosophy in form of logical positivism, and one major development in science, in the form of operationism was taking place. These two developments directly had an impact on behaviourism, leading to the emergence of neo-behaviourism.
- When behaviourism was combined with logical positivism, it resulted in neo-behaviourism. Neo-behaviourism mainly constitutes the work of the psychologists Edwin Guthrie, Clark Hull, Edward Tolman, and B. F. Skinner.
- Guthrie advocated a psychology of observable behaviour consisting of muscular movements and glandular responses elicited by environmental stimuli, just like Watson. The single principle that contiguity is the foundation of learning is the key to Guthrie's associationistic theory.
- Hull's theory came closest to a comprehensive treatment of behavioural issues governed by common principles. The central idea of Hull's approach is habit formation, which is the accumulations of experiences for effective adaptation. He advocated a hypothetico deductive structure to guide research as he recognized the importance of observation and experimentation.
- In Hull's theory, Habit strength, (${}_sH_R$), is the chief intervening variable for learning. In order to get the basic procedure in which learning occurs as contiguity of stimulus and response under conditions of reinforcement, Hull attempted to integrate Thorndike's law of effect with Pavlovian conditioning.
- Tolman's theory further expanded the idea of Watson's behaviourism, more than Guthrie and Hull. Tolman proposed a consideration of behaviour that was *molar*, as opposed to molecular. He used the term Gestalt to describe holistic, insightful learning experiences. Tolman's *laws of acquisition* mainly focused on practice that builds up sign Gestalts, or expectancies.
- Tolman anticipated the research theme of cognitive learning, which is predominant in contemporary psychology.
- B. F. Skinner, in 1950, published his paper, *Are Theories of Learning Necessary?* This paper brought about what is called the end of the *theory-building phase* of the behaviourism. Due to his strong emphasis on environmental determinacy, Skinner believed that if the environment is controlled, then behaviour can also be controlled.

- Skinner believed that organisms differ due to differences in the environment and not individual differences inherent in them. The study of *operant behaviour* was the basis for Skinner's research. This made his approach differ from Pavlov, who studied respondent behaviour. When responses are caused by specific stimuli, then it is referred to as respondent behaviour. In contrast to that, operant behaviour is something that is ongoing, without any apparent stimulus.
- Contemporary psychology emphasizes a lot on cognitive aspects, which, except for Tolman, can be viewed as completely against the whole idea of behaviourism. Research in evolutionary psychology has given a lot of evidence that much of animal behaviour, which includes human social behaviour, is genetically determined. This is also completely against the idea of behaviourism.

9.6 KEY WORDS

Logical Positivism: The name given to the view of science developed by a small group of philosophers in Vienna (the Vienna Circle) around 1924. The older positivism of Comte and Mach was taken up by these philosophers and combined with the rigors of formal logic. According to them, abstract theoretical terms were allowed only if such terms could be logically tied to empirical observations.

Operational Definition: Defining abstract concepts in terms of the procedures used to measure that concept.

Operationalism: Insistence that all abstract scientific terms be operationally defined.

Physicalism: The push for unification of and a common vocabulary among the sciences, including psychology.

Principle of Contiguity: When a combination of stimulus elements is accompanied by movement, the movement sequence will recur. Learning is a pattern or chain of discrete movements elicited by both environmental and internal stimulus cues.

Hypothetico-deductive: Following the approach of Euclidian geometry, in this strategy a behaviour principle or formulation is first deduced from postulates and then rigorously tested. Belief is supported by a successful test to form the postulates; failure results in revision of the postulates.

Habit Formation: The accumulations of experiences for effective adaptation.

Intervening Variables: Unobservable entities employed by psychologists to account for observable behaviour

Habit Strength: The chief intervening variable for learning in Hull's theory. It depends on two factors for associations. Contiguity principle is the first one, meaning that a close temporal relationship must exist between stimulus and reinforcement. Reinforcement itself is the second principle, defined in its primary form as drive reduction. There are also secondary reinforcements, cues that are reliably associated with primary reinforcement and take on reinforcement properties.

Reaction Potential: The tendency to produce some reaction under the effect of the stimulus.

Molar Behaviour: A unified and complete act, which provides the proper unit for psychology. Tolman argued that reductionism results in the loss of the purely psychological level in adhering to the molar level. It said that explanations based upon molecular components are not adequate. Thus, molar behaviour is more than the sum of the molecular elements for Tolman.

Place Learning: The acquisition of relationships in a maze or cognitive maps.

Latent Learning: Different effects on performance levels can be exerted, depending on the quality of reinforcement.

Environmental Determinacy: Behaviour being determined by the environment.

Operant Behaviour: Behaviour that is ongoing without any apparent stimulus in contrast to respondent behaviour, where responses are elicited by specific stimuli.

Skinner's reinforcement: Probability of changes in the operant rate.

9.7 REVIEW QUESTIONS

- 1) What are the three stages of evolution of behaviourism?
- 2) How did logical positivism have an influence on psychology?
- 3) In what ways did operationism influence psychology?
- 4) Describe the different points on which the neo-behaviourists agreed upon.
- 5) Describe the role of contiguity in learning, according to Guthrie.
- 6) Describe the different intervening variables used by Hull, in his framework of reaction potential.
- 7) Explain the cognitive components that Tolman incorporated in his approach.
- 8) How did Skinner use the idea of operant behaviour in describing learning?
- 9) How is Skinner's idea of reinforcement different from Thorndike and Hull?
- 10) Why did the influence of behaviourism diminish, over the years?

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