
UNIT 3 ASSOCIATIONISM*

Structure

- 3.0 Introduction
- 3.1 British Empiricism
- 3.2 Contributions of British Empiricists
 - 3.2.1 Thomas Hobbes
 - 3.2.2 John Locke
 - 3.2.3 George Berkeley
 - 3.2.4 David Hume
 - 3.2.5 David Hartley
 - 3.2.6 James Mill
 - 3.2.7 John Stuart Mill
 - 3.2.8 Alexander Bain
- 3.3 Empiricism in Contemporary Psychology
- 3.4 Associationism and Learning Theorists
 - 3.4.1 Hermann Ebbinghaus
 - 3.4.2 Ivan Pavlov
 - 3.4.3 Edward Lee Thorndike
- 3.5 Contemporary Role of Associationism
- 3.6 Summary
- 3.7 Key Words
- 3.8 Review Questions
- 3.9 References and Further Reading
- 3.10 References for Figures
- 3.11 Web Resources

Learning Objectives

After reading this Unit, you will be able to:

- Elucidate the principle of associationism;
- Explain the philosophy of British empiricism;
- Discuss the contributions of all the British empiricists;
- Discuss the contributions of learning theorists with respect to associationism; and
- Describe association of stimulus and response.

* Dr. Saif R. Farooqi, Department of Applied Psychology, Vivekananda College, University of Delhi

3.0 INTRODUCTION

Associationism is considered to be one of the oldest perspectives in psychology. It is regarded to be more of a principle rather than being a proper school of psychology. Associationistic ideas have been said to have taken over all the major schools of psychology. Even the first school of psychology—*structuralism*—was majorly influenced by associationistic ideas.

The principle of associationism suggests that mental processes operate by the association of one mental state with the other that succeeds it. A major idea of associationism is that “complex ideas come from the association of simpler ideas”. The British empiricists majorly used associationistic principles in explaining mental activity. This led to the widespread usage of forming associations in explaining several psychological factors. In their attempts to apply something more than pure philosophy in explaining the activity of the mind, the British empiricists are said to have anticipated later psychological developments. After the British empiricists using associationism to explain mental activity, the associationistic concepts played a central role in many of the learning theories. Among them Hermann Ebbinghaus, Ivan Pavlov, and Edward Lee Thorndike stand out.

3.1 BRITISH EMPIRICISM

Empiricism is the philosophy that emphasizes on experience in knowledge attainment. By experience, the empiricists refer exclusively to sensory experience, and not inner experiences such as dreams and fantasies or mental experiences involved in problem solving and mathematical deduction. Further, empiricists assert that sensory experience constitutes the primary data of knowledge, that knowledge is unable to exist until sensory evidence has been gathered first, and that all subsequent intellectual processes must focus only on sensory experience.

3.2 CONTRIBUTION OF BRITISH EMPIRICISTS

Let us discuss important British empiricists.

3.2.1 Thomas Hobbes

Thomas Hobbes is often referred to as the founder of British empiricism; he believed that all knowledge was derived from sensory experience. Hobbes used the principle of associationism to explain complex thought processes. He made an attempt to explain the tendency of one thought following another in a coherent manner, which is referred to as “trains of thought”. For this, Hobbes used the law of contiguity, which was first proposed by Aristotle. The law of contiguity states that when events are experienced together, they are remembered together and therefore are subsequently thought of together.

All the British empiricists who followed Hobbes accepted this conception of association in explaining the reason for mental events being experienced or remembered in a specific order.

Box 3.1: Thomas Hobbes

The founder of British empiricism, Thomas Hobbes, was influenced by William of Occam, Francis Bacon, and Galileo. On the basis of his overall work, it can be said that Hobbes was a *materialist* because he believed that everything that existed is physical; he was *mechanist*, because according to him, the universe and everything that it consisted, including human beings, function like a machine; he was a *determinist*, because he believed that all activity, including human behaviour, is caused by forces acting upon them; and he was an *empiricist*, because he felt that knowledge is derived from sensory experiences. Even though all the empiricists who followed Hobbes were not necessarily as materialistic or mechanistic like him, they all agreed with him in the complete denial of innate ideas.

Thomas Hobbes lived a long, productive, and influential life.



Figure 3.1: Thomas Hobbes (1598-1679)

Source: www.theguardian.com

3.2.2 John Locke

John Locke's major work with respect to the discipline of psychology is *An Essay Concerning Human Understanding* (1690). This book is considered to have marked the formal beginning of British empiricism. The primary concern of Locke was to understand how the mind acquires knowledge. He rejected Rene Descartes notion of innate ideas and suggested that all humans are born without any knowledge. In doing so, Locke used Aristotle's notion of *tabula rasa*, which means blank slate – indicating that the mind at birth is like a blank slate on which experience is written. Locke, further, stated that certain concepts are learnt at a very early age and individuals are unaware about it, which is why they may seem to be as innate during adulthood. Thus, according to Locke, the mind acquired knowledge through experience.

Locke, further, argued on how people form ideas and in doing so, he differentiated between simple and complex ideas. Simple ideas arise from sensation and reflection that the mind receives passively. Simple ideas are elemental in nature, that is, they cannot be reduced to simpler forms. These simple ideas are then actively combined by the mind to create new ideas, which are complex ideas. Complex ideas are, thus, compounds of simple ideas; they can be reduced to simpler forms.

The notion of ideas being compounded is regarded as the beginning of the mental-chemistry approach of association. According to this view, simple ideas are associated with each other forming complex ideas. This notion of the reduction of mind to simple ideas and their association to form complex ideas became central to the new science of psychology. Locke argued that ideas are like machines. Just like machines can be dismantled into smaller components and reassembled to form complex machines, so can be human ideas. By likening the mind to a machine model or a mechanistic model, Locke suggested that the mind behaved in accordance with the laws of the natural universe. The simple ideas are like basic particles that cannot be further reduced to smaller particles but can be combined or associated to form more complex structures. Therefore, the theory of association was significant in considering the mind, like the body, to be a machine.



Figure 3.2: John Locke
(1632-1704)

Source: www.history.com

Box 3.2: John Locke

Thomas Hobbes was the founder of British empiricism, but it was John Locke who shaped most of the British empiricism. This is evident in that all the later empiricists accepted Locke's idea of mind-body dualism, and rejected physical monism, which was proposed by Hobbes.

The most famous work of Locke, which is also the most important for psychology is *An Essay Concerning Human Understanding* (1690). It took 17 years for Locke to complete this work; it got published when he was nearly 60 years old. Locke also wrote extensively on topics like education, the government, and economics.

More than an empiricist, Locke considered himself to be a political philosopher. Locke was strongly against the notion of innate moral principles. He believed that idea of one innate moral truth led to the development of dogma. Locke also challenged the notion of the divine right of kings and proposed a government by and for the people. His political ideas make him the founder of modern liberalism.

3.2.3 George Berkeley

Berkeley applied the principle of association in explaining about knowing objects in the real world. For this, Berkeley suggested that an association of different sensations takes place in order to understand the surroundings. This understanding is basically a construction or composition of simple ideas (mental elements) bound by the mortar of association. In his work, *An Essay Towards a New Theory of Vision* (Berkeley, 1709), Berkeley explained that complex ideas are formed by joining the simple ideas that are received through the senses. For instance, Berkeley explained the knowledge of a coach, a complex idea, is gained by the sound of its wheels, the sturdiness of its frame, the smell of its leather seats, and the visual image of its boxy shape. According to Berkeley, the mind constructs complex ideas by fitting together these basic mental building blocks, which are simple ideas.



Figure 3.3: George Berkeley
(1685-1753)

Source: www.britannica.com

Box 3.3: George Berkeley

George Berkeley became a famous author before the age of 30. At the age of 24, he published *An Essay Towards a New Theory of Vision* (1709). A year after that he published *A Treatise Concerning the Principles of Human Knowledge* (1710), which is considered to be his most important work. Three years later, in 1713, he published his third major work, *Three Dialogues between Hylas and Philonous*. Berkeley's empirical account of perception and meaning turned out to be a milestone in the history of psychology. It showed that complex perceptions can be understood as compounds of elementary sensations.

Berkeley died in the year 1753. Over a hundred years later, the first University of California (1868) was named after him.

Berkeley used association to explain *visual depth perception*. He examined the problem of how we perceive the third dimension of depth, given that the human eye has a retina of only two dimensions. Berkeley suggested that depth is experienced as a result of the individual's experience. As

the eyes of an individual adjust to seeing objects at different distances, visual impressions are associated with sensations and the movements that are made in approaching and retreating the objects. This means that the sensory experiences of reaching out or walking towards objects as well as the sensations from the eye muscles get associated, resulting in depth perception. Therefore, depth perception rather than being a simple sensory experience is an association of ideas that must be learned.

Berkeley carried forward the associationistic trend by explaining cognitive process in terms of the association of sensations. His explanation anticipated the modern view of depth perception.

3.2.4 David Hume

David Hume differentiated between two contents of mind, namely, impressions and ideas. Impressions are the basic elements of mental life. In the present-day, the equivalent of impressions are sensations and perceptions. Ideas are the mental experiences that take place in the absence of any immediately present stimulating object. The equivalent of ideas in the present-day is image. Impressions differ from ideas in terms of their relative strength and not their source. Impressions are strong and vivid. In contrast, ideas are weak versions of impressions. Both of these mental contents may be simple or complex. A simple idea will resemble its simple impression. Complex ideas do not necessarily resemble simple impressions. Instead, complex ideas are evolved from simple ideas being combined into new patterns; they are compounded from simple ideas by the process of association.

In order to explain how ideas get combined, Hume gave three laws of association – *resemblance or similarity*, *contiguity in time and space*, and *cause and effect*. The law of similarity suggests that the more similar the ideas are, more readily they will be associated. The law of contiguity suggests that the more contiguous two ideas are or the more closely two ideas are experienced in time, more readily the ideas will be associated. The law of cause and effect suggests that the more frequently two ideas, events, or objects are experienced in the same sequence, more likely they are inferred that one will cause the other, and more strongly they will be associated.

In giving his laws of association, Hume's work fits in the mechanistic framework, like the previous empiricists, and continued the development of associationism. He believed that his laws of association are universal principles of how the mind operates, and that these laws are the mental counterpart of the laws of physical universe that explain the functioning of planets. In this way, Hume provides additional support to the existing associationistic notion of simple ideas being associated to form complex ideas in a mechanical manner.

Box 3.4: David Hume

According to David Hume, all the sciences have some relation to human nature. He felt that all important matters reflect nature, and therefore, studying human nature is essential. He followed the empirical tradition of Occam, Bacon, Hobbes, Locke, and Berkeley. He was also highly



Figure 3.4: David Hume
(1711-1776)

Source: www.britannica.com

impressed by Newtonian science and wanted to do something for moral philosophy, just as Newton had done for natural philosophy.

Hume increased the importance of psychology to a great extent. He brought politics, philosophy, science, and psychology all together. According to Hume, all knowledge is learned from experience. He also suggested that beliefs cannot be rationally determined nor rationally defended. They are derived from experience, and it is not possible to determine that what has been learned in the past will be applicable in the future. Due to this, Hume suggested that nothing is certain, and for he is often referred to as the supreme skeptic.

Check Your Progress 1

- 1) How does the mind acquire knowledge, according to John Locke?

.....
.....
.....

- 2) How did David Hume explain the combination of ideas?

.....
.....
.....

- 3) Explain Berkeley's view on visual depth perception.

.....
.....
.....

3.2.5 David Hartley

David Hartley suggested contiguity and repetition as two fundamental laws of association. By these laws, Hartley explained the processes of memory, reasoning, emotion, and voluntary and involuntary action, thereby expanding the scope of British empiricism.



Figure 3.5: David Hartley
(1705-1757)

Source: www.wikiquote.org

Box 3.5: David Hartley

David Hartley's most important work is *Man, His Frame, His Duty, and His Explanations* (1749), which took a number of years to be completed. The book has two parts, the first one being completely about psychology.

Hartley used neurophysiological speculations that there at his time in the analysis of his association. In doing so, he became the first person since René Descartes to give neurophysiological explanations for thought and behaviour. Hartley had only made neurophysiological postulates, which eventually proved wrong as more accurate information became available. But he did start the search for biological correlates of psychological phenomena.

Contiguity means that for ideas or sensations to be associated, according to Hartley, they should occur simultaneously or successively, thus, one

occurrence being connected with the other. Hartley also proposed that repetition of sensations and ideas is necessary for associations to be developed. Like John Locke, Hartley also suggested that knowledge is not present at birth and that there are no innate associations. Knowledge is derived from experiences through the senses. As varied sensory experiences are accumulated, which the child is growing, complex mental connections are established. By the time individual reaches adulthood, higher systems of thought are developed. These higher systems, which include skills like judging and reasoning are compounds of mental elements or simple sensations. This means that like earlier empiricists, Hartley also suggested that simple ideas combine to form complex ideas. In this case, complex ideas are higher mental processes. Hartley was the first person to apply the theory of association in explaining all types of mental activity.

3.2.6 James Mill

Like the other empiricists, James Mill also had a mechanistic approach to the human mind, but with more directness and comprehension. His goal was to strongly establish the idea that the mind is nothing but a machine and was adamant in refuting the idea of subjectivity and psychic activities, which he referred to nothing but an illusion. By being more emphatic in suggesting the mind to be like a machine, Mill was emphasizing that the mind is passive and is acted on by external stimuli. Accordingly, humans respond to these stimuli in an automatic manner, further suggesting incapability of spontaneity.

In his major work *Analysis of the Phenomena of the Human Mind* (1829), Mill proposed the method of analysis to study the mind. According to this method, to understand the mind, it should be reduced to its elementary components. This method was proposed because of the idea that a complex phenomenon like the mind needs to be broken down to its smallest components, in order to understand it in a better way. These elements of the mind, according to Mill, are sensations and ideas. Like other empiricist, Mill also suggested that knowledge begins with sensations, and then, through the process of association, higher complex ideas are derived. Further, Mill suggested that association took place due to contiguity or concurrence, and that it is either simultaneous or successive.

Box 3.6: James Mill

The most significant contribution of James Mill with respect to psychology is his work *Analysis of the Phenomena of the Human Mind*, originally published in 1829. This is considered to be the most complete summary of associationism.

Mill's conception of the mind was based on Newtonian physics. According to Newton, the universe comprises of elements that are held together, which act in a predictable manner. Similarly, Mill suggested that elements of mind are held together by the laws of associationism. In this way, experiences related to the mind are as predictable as the physical events.

Mill believed that the notions of mechanism and passive mind should be strengthened and be more rigid within associationism. He believed that the mind is completely passive; it has no creativity and that ideas are



Figure 3.6: James Mill
(1773-1836)

Source: www.britannica.com

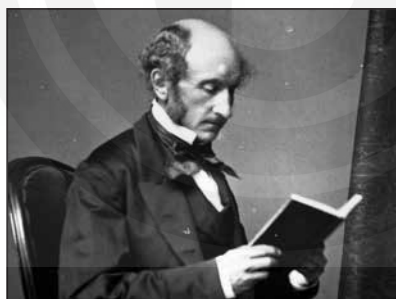
organized only by the process of association, in an automatic manner. This conception of mind, however, did carry forward among the British empiricists after James Mill. The conception of the mechanistic and passive mind was about to be revised.

Mill, further, added that the association that takes place is passive and automatic, and that the mind has no creative function. This means, as per Mill, association is a mechanical process, and the resulting ideas are a sum of the smaller elements.

3.2.7 John Stuart Mill

John Stuart Mill, the son of James Mill, differed in his view of association of ideas, from the previous empiricists. He disagreed with the empiricists, including his father, in their mechanistic position. He suggested that the mind plays an active role in the association of ideas, opining that the mind is not passive. He further suggested that complex ideas are not simply a summation of simple ideas, as the earlier empiricists had suggested.

According to John Stuart Mill, when simple ideas are associated, they do not just add up to become complex ideas, because they take the form of new qualities that were not found originally in the simple ideas. Just like colors merge develop into an entirely new color, in the same manner, when simple ideas are associated, they combine together forming something that is completely new, which are complex ideas. The simple ideas getting associated to form new qualities is known as *creative synthesis*. In other words, creative synthesis means that mental elements always combine to produce some unique quality that was not originally present in the elements initially.



**Figure 3.7: John Stuart Mill
(1806-1873)**

Source: www.theguardian.com

Box 3.7: John Stuart Mill

The most famous work of John Stuart Mill is *A System of Logic, Ratiocinative and Inductive: Being a Connected View of the Principles of Evidence, and the Methods of Scientific Investigation* (1843). This book got popular in quick time and multiple editions. It was considered to be a must-read for any scientist in the late nineteenth century.

J. S. Mill played a highly significant role in facilitating the development of psychology as a scientific discipline. He continuously stressed that the scientific method can be used to study human nature. He believed that human thought, feeling, and behaviour can be studied in terms of lawfulness, and thus suited for scientific enquiry. J. S. Mill was also a social reformer. He worked extensively for issues like freedom of speech, representative government, and emancipation of women.

By suggesting the idea of creative synthesis, John Stuart Mill was being influenced by research in chemistry. This provided him a model that was different from the other empiricists as they were influenced by research in physics and mechanics. During that time, chemists were demonstrating the idea of chemical synthesis in which chemical compounds were found to have qualities that were not present in their smaller components. John Stuart Mill used this notion of chemical synthesis to explain association, by suggesting that simple ideas do not merely add up to form complex ideas.

Instead, they develop into completely new forms. John Stuart Mill referred to this new approach of association as *mental chemistry*. In this way, John Stuart Mill brought about a major change in British Empiricism, changing the course of the system of associationism.

3.2.8 Alexander Bain

Alexander Bain took forward the idea of John Stuart Mill of the mind being active and carried forward with the approach of mental chemistry. According to Bain, the mind has three components, which are *feeling*, *volition*, and *intellect*.

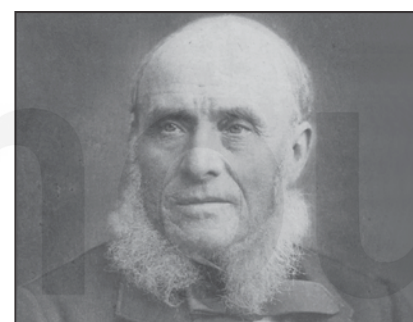
Bain proposed some laws of association. Like the earlier British empiricists, Bain suggested the law of contiguity to be a basic principle of association. Bain suggested that when actions, sensations, and states of feeling get associated when they occur together. Along with the law of contiguity, Bain suggested another law that was common with the earlier British empiricists, which is the law of frequency.

Box 3.8: Alexander Bain

Alexander Bain is often said to be the first true psychologist. His two books *The Senses and the Intellect* (1855) and *Emotions and the Will* (1859) are considered to be first systematic textbooks in psychology, and were also the standard texts in psychology for about fifty years.

Apart from these two books, Bain also wrote *Mind and Body* (1873), which is the first book dedicated completely to the mind-body relationship. He also founded the journal *Mind*, in 1876, which is said to be the first journal to solely address psychological questions. The journal is well known in philosophical psychology, even today.

Bain, just like David Hartley, was interested in finding correlates between physiological processes and behaviour. Hartley had used only imaginary physiological constructs, whereas Bain was exploring actual processes. Thus, Bain was the first person to relate real physiological processes with psychological phenomena. This turned out to be highly significant in the development of psychology. It was after Bain that examining the relationship between physiology and psychology became an integral aspect of the discipline of psychology.



**Figure 3.8: Alexander Bain
(1818-1903)**

Source: www.historyradio.org

One thing that made Bain different from the other empiricists was that according to him, the laws of contiguity and frequency took place because of neurological changes, which is now referred to as changes in the synapses. Bain also suggested the law of similarity as a principle of association. According to the law of similarity, the experience of an event elicits memories of similar events even if those similar events were experienced under widely different times and circumstances.

To these already existing laws of association, Bain added two of his own laws, which are the *law of compound association* and the *law of constructive association*. The law of compound association states that associations are usually links between many ideas at the same time, through contiguity or similarity, instead of just the linking of one idea with another. When this takes place, then there is compound association.

Bain inserted a creative element into associationism by introducing his law of constructive association. The law of constructive association states that

the mind has the power and ability to form new combinations different from the ones that were present during the course of experience. According to Bain, the mind reforms and rearranges memories of various experiences into infinite number of combinations.

Check Your Progress 2

- 1) In what ways did John Stuart Mill got influenced by research in chemistry?
.....
.....
.....
- 2) How did Alexander Bain differ in his approach from the earlier empiricists?
.....
.....
.....

3.3 EMPIRICISM IN CONTEMPORARY PSYCHOLOGY

With the rise of empiricism, many philosophers turned away from earlier approaches to knowledge. British associationism/empiricism left a legacy of the utmost significance to the newly developing experimental science of psychology. A major part of this significance lay in the methodological point of view which associationism developed and refined. The stimulus-response type of thinking and experimenting grow more or less out of it.

The major role empiricism was playing in shaping the new scientific psychology was about to become evident; the concerns of the empiricists formed psychology's basic subject matter. By the middle of the nineteenth century, philosophers had established the theoretical rationale for a natural science of human nature.

3.4 ASSOCIATIONISM AND LEARNING THEORISTS

Historically, associationistic concepts have served as substitutes for learning theories. Three learning theorists stand out as contributors to this aspect of associationism – Hermann Ebbinghaus, Ivan Pavlov, and Edwin Thorndike.

3.4.1 Hermann Ebbinghaus

Hermann Ebbinghaus caused a profound shift in associationism. Before his studies on the learning of nonsense syllables, the tendency had been to begin with the associations already formed and attempt to infer backwards to the process of formation of the associations. Before Ebbinghaus began his work, the usual way of studying learning was to examine associations that were already formed. The British empiricists had followed this approach. In doing so, investigators were working backwards, attempting to determine how the connections had been established.

Ebbinghaus began at the other end, with the study of the formation of the associations; it was thus possible for him to control the conditions under which the associations were formed and to make the study of learning scientific. Thus, the focus of Ebbinghaus was different. He began his study with the initial formation of the associations. In this way he could control the conditions under which the chains of ideas were formed and thereby make the study of learning more objective.

Box 3.9: Hermann Ebbinghaus

Hermann Ebbinghaus is known to be the psychologist who proved Wundt to be wrong. A few years after Wundt had claimed that it was impossible to conduct experiments on the higher mental processes, Ebbinghaus working alone, isolated from any academic center of psychology, began to experiment successfully on the higher mental processes. Ebbinghaus became the first psychologist to investigate learning and memory experimentally. In doing so, he not only showed that Wundt was wrong, but also changed the way in which associations can be studied. Ebbinghaus did not make theoretical contributions to psychology, created no formal system, or school of thought. He did not even seem to be interested in it. Despite that he is viewed as a significant figure not just in learning and memory, but experimental psychology as whole.

Due to Ebbinghaus, the study of learning became an area of objectivity, quantification, and experimentation. This became a central aspect of psychology in the 20th century. It was the vision of Ebbinghaus that brought about a shift in associationism, which is from speculation to formal scientific investigation. Many of the conclusions that Ebbinghaus had made with respect to learning and memory, remain valid even today – more than a century after he had come up with them.

It is suggested that the overall historical worth that a scientist has is measured by whether or not his or her position has stood the test of time. In that respect, Ebbinghaus is viewed to be highly successful and even more influential than Wilhelm Wundt.



Figure 3.9: Hermann Ebbinghaus (1850-1909)

Source: www.britannica.com

For the basic measure of learning Ebbinghaus adapted a technique from the associationists, who had proposed frequency of associations as a condition of recall. Ebbinghaus reasoned that the difficulty of learning material could be measured by this frequency, that is, by counting the number of repetitions needed for one perfect reproduction of the material. In order to study learning, Ebbinghaus invented what are known today as *nonsense syllables*. He made nonsense syllables the subject matter of his research (the material to be learnt). This usage of nonsense syllables revolutionized the study of learning. According to Titchener, the student of Wundt, and the founder of structuralism, the idea of using nonsense syllables marked the first significant advance in the field since the time of Aristotle.

To study learning, Ebbinghaus was looking for some alternatives to everyday words for his subject matter. He felt that there is an inherent difficulty in using stories or poetry as stimulus materials, because in such material meanings or associations have already been attached to words by people familiar with the language. These existing associations tend to facilitate

learning. In such material connections are already present at the time of the experiment, so they cannot be controlled by the experimenter. Ebbinghaus wanted to use material that would be uniformly unassociated, completely homogeneous, and equally unfamiliar—material with which there could be few, if any, past associations. The nonsense syllables he created, consisted of two consonants with a vowel in between (for example: *lef*, *bok*, or *yat*). He wrote all possible combinations of consonants and vowels on cards, yielding a supply of 2,300 syllables from which he drew at random, the stimulus materials to be learned.

3.4.2 Ivan Pavlov

Ivan Pavlov, the great Russian physiologist, has primary responsibility for shifting the kind of association studied to S-R connections rather than ideas. His research on the conditioned reflex, therefore, helped in making psychology more objective. Pavlov's work on learning helped to shift associationism from its traditional emphasis on subjective ideas to objective and quantifiable physiological events such as glandular secretions and muscular movements.

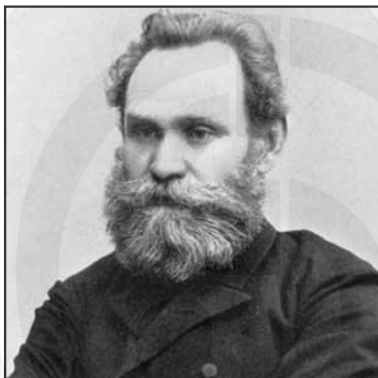


Figure 3.10: Ivan Pavlov
(1849-1936)

Source: www.biography.com

Box 3.10: Ivan Petrovich Pavlov

The research of Ivan Pavlov strongly influenced the discipline of psychology to shift towards greater objectivity. He continued in the tradition of mechanism and atomism – the views that had shaped the new psychology, right from when it was established by Wundt. Going along with that tradition, Pavlov believed that all animals – be it his laboratory dogs or humans – are machines. He admitted that humans are more complicated machines, but at the same time believed that they are as submissive and obedient as any other machine.

Apart from making psychology more object, Pavlov also brought about the trend in making the discipline of psychology to be more functional and practical. The conditioning methods of Pavlov could be applied in areas such as behaviour therapy. Systematic Desensitization, a type behaviour therapy, developed by Joseph Wolpe, is based on Pavlov's conditioning, suggesting the significance and implications of Pavlov's research.

The area of research of Pavlov that occupies a prominent place in the history of psychology, is the study of *conditioned reflexes*. The notion of conditioned reflexes was an accidental discovery. In working on the digestive glands in dogs, Pavlov used the method of surgical exposure to permit digestive secretions to be collected outside the body where they could be observed, measured, and recorded. One aspect of this work dealt with the function of saliva, which the dogs secreted involuntarily whenever food was placed in their mouths. Pavlov noticed that sometimes saliva flowed even before the food was given. For instance, the dogs salivated at the sight of the food or at the sound of the footsteps of the person who regularly fed them. This unlearned response of salivation got connected with, or conditioned to, stimuli previously associated with receiving food.

Pavlov, initially referred to such responses as *psychic reflexes*. These psychic reflexes were aroused in the laboratory dogs by stimuli other than the original

one (food). Pavlov suggested that this reaction occurred because these other stimuli (the sight and sounds of the attendant) had so often been related to feeding. This, however, was a very mentalistic explanation. Pavlov, later on, used a more objective and descriptive explanation, instead.

Pavlov's first experiments with dogs were simple. He held a piece of bread in his hand and showed it to the dog before giving it to them to eat. In time, the dog began to salivate as soon as it saw the bread. The dog's response of salivating when food is placed in its mouth is a natural reflexive response of the digestive system - learning is not necessary for it to occur. Pavlov called this an *innate or unconditioned reflex*.

Salivating at the sight of food, however, is not reflexive but must be learned. Pavlov now referred to this response as a *conditional reflex*, instead of the mentalistic term "psychic reflex" that he had used earlier. He used such a term (conditional reflex) because it was conditional or dependent on the dog's forming an association or connection between the sight of the food and the subsequent eating of it.

From this basic paradigm, Pavlov drew several principles:

- 1) Conditioning procedures represent the quantification and objectification of the acquisition and forgetting of associations. Pavlov had examined under experimental scrutiny the accepted concepts of association theory, discussed by such philosophers as David Hume, James Mill, and John Stuart Mill, and established what he argued was a complete explanation of the formation of associations on the basis of the materialism of physiological reflexology. In Pavlov's conditioning theory, there was no need for any mentalistic constructs. Instead, the nervous system, and especially the cortex, provided the mechanisms of reflexology.
- 2) The highly controlled experimental paradigm of conditioning offered the possibility of investigating all of higher nervous activity. Pavlov considered his procedures, involving careful experimenter control of environmental stimuli to produce response changes, to be ideally suited to investigating all types of behaviour.
- 3) Pavlov was firmly convinced that the temporal relationship, or contiguity, was the basic principle of the acquisition of associations.

3.4.3 Edward Lee Thorndike

Edward Thorndike developed the most complete account yet rendered by of psychological phenomena along associationistic lines. His system is said to be the most appropriate representative of associationism. One of the most important researchers in the development of animal psychology, Thorndike fashioned a mechanistic, objective learning theory that focused on overt behaviour. Thorndike believed that psychology must study behaviour, not mental elements or conscious experiences, and thus reinforced the trend towards greater objectivity. He interpreted learning in terms of concrete connections between stimuli and responses.



Figure 3.11: Edward Lee Thorndike (1874-1949)

Source: www.sciencephoto.com

Box 3.11: Edward Lee Thorndike

The work of Edward Lee Thorndike is considered to be among the most significant research programs in the history of psychology. His new method for analyzing the mind of animals launched a century of productive investigation on the issue of exactly how the animal learns. Thorndike led the rise of learning theory to prominence in American psychology. The emphasis on objectivity in his research had a strong influence in the beginning of behaviourism. According to Watson, the founder of behaviourism, it was Thorndike's research that laid the foundation for the school of behaviourism.

In 1998, the journal *American Psychologist*, had a special section to celebrate the 100th anniversary of Thorndike's doctoral dissertation on animal intelligence. In that section, Thorndike is described as one of the most influential figures in psychology, who brought about a shift from speculation to experimentation.

Thorndike referred to his experimental approach to the study of association as *connectionism*. According to him, the human mind has connections of varying strengths between (a) situations, elements of situations, and compounds of situations, and (b) responses, readiness to respond, facilitations, inhibitions, and directions of responses. He further stated that if all these connections could be completely inventoried, it would be very easy to understand human behaviour. This position was a direct extension of the older philosophical notion of association with one significant difference — instead of talking about associations or connections between ideas, Thorndike was dealing with connections between objectively verifiable situations and responses.

Although Thorndike developed his theory within a more objective frame of reference, he continued to invoke mental processes. He talked about satisfaction, annoyance, and discomfort when discussing the behaviour of his experimental animals, terms that are more mentalistic than behaviouristic. In this way, Thorndike retained the influence of Romanes and Morgan. His objective analyses of animal behaviours often incorporated subjective judgments about the alleged conscious experiences of animals.

Even though the work Thorndike had a mentalistic tinge, his approach actually followed the mechanistic tradition. He argued that behaviour must be reduced to its simplest elements, that is, the stimulus-response units. He carried forward the ideas of British empiricists of having a mechanistic, analytical, and atomistic point of view. He suggested that stimulus-response units are the elements of behaviour, not of consciousness, and are also the building blocks from which more complex behaviours are compounded. Thorndike developed laws of learning to explain his approach. He formally presented his ideas about the stamping in or stamping out of a response tendency as the *law of effect*. The law of effect suggests that any act which in a given situation produces satisfaction becomes associated with that situation, so that when the situation recurs the act is more likely than before to recur also. Conversely, any act which in a given situation produces discomfort becomes disassociated from that situation, so that when the situation recurs the act is less likely than before to recur.

Apart from the law of effect, Thorndike also gave the *law of exercise* or the *law of use and disuse*. This law states that any response made in a particular situation becomes associated with that situation. The more the response is used in the situation, the more strongly it becomes associated with it. Conversely, prolonged disuse of the response tends to weaken the association. In other words, simply repeating a response in a given situation tends to strengthen that response.

Further research persuaded Thorndike that the reward consequences of a response (a situation that produces satisfaction) are more effective than mere repetition of the response. Through an extensive research program using humans as subjects, Thorndike later re-examined the *law of effect*. The results showed that rewarding a response did indeed strengthen it, but punishing a response did not produce a comparable negative effect. He, therefore, revised his views to place greater emphasis on reward than on punishment.

Check Your Progress 3

- 1) Describe how Pavlov came up with the notion of conditioned reflexes?

.....

.....

.....

- 2) Describe how Thorndike's approach had a mentalistic tinge, even though he followed the tradition of mechanism?

.....

.....

.....

3.5 CONTEMPORARY ROLE OF ASSOCIATIONISM

Associationism is practically synonymous with an orthodox interpretation of science. It is a belief that the primary job of science is to relate phenomena, to look for functional relationships. In contemporary times, associationism is more of a methodological tool, instead of a systematic position. It has been incorporated into the discipline of psychology, in the sense that association of variables is generally recognized as a fundamental task of psychology.

It is clear that associationistic principle accorded a key role in psychology, whatever the ultimate fate of the various systems and theories which build upon it as a necessary and sufficient principle. Some kind of associationism is certainly necessary in a methodological if not a systematic or theoretical sense. The fact that associationism, an ancient and simplistic notion, has persisted for such a long time, gives an idea about its success. Added to that, it played a highly significant role in contemporary behaviour theory. Its long viability attests its vitality, especially when one considers that empirical tests have been applied since the work of Ebbinghaus and Pavlov.

3.6 SUMMARY

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

- Associationism is considered to be one of the oldest perspectives in psychology. It is regarded to be more of a principle rather than being a proper school of psychology.
- A major idea of associationism is that “complex ideas come from the association of simpler ideas”.
- The British empiricists majorly used associationistic principles in explaining mental activity. The associationistic concepts played a central role in many of the learning theories.
- Empiricism is the philosophy that emphasizes on experience in knowledge attainment and empiricists assert that sensory experience constitutes the primary data of knowledge.
- Thomas Hobbes is often referred to as the founder of British empiricism; he believed that all knowledge was derived from sensory experience. Hobbes used the principle of associationism to explain complex thought processes. The primary concern of John Locke was to understand how the mind acquires knowledge.
- Berkeley applied the principle of association in explaining about knowing objects in the real world. For this, Berkeley suggested that an association of different sensations takes place in order to understand the surroundings. Berkeley used association to explain visual depth perception.
- David Hume differentiated between two contents of mind, namely, impressions and ideas. In order to explain how ideas get combined, Hume gave three laws of association – resemblance or similarity, contiguity in time and space, and cause and effect.
- David Hartley suggested contiguity and repetition as two fundamental laws of association. By these laws, Hartley explained the processes of memory, reasoning, emotion, and voluntary and involuntary action, thereby expanding the scope of British empiricism.
- James Mill also had a mechanistic approach to the human mind, but with more directness and comprehension. James Mill was adamant in refuting the idea of subjectivity and psychic activities, which he referred to nothing but an illusion.
- In his major work *Analysis of the Phenomena of the Human Mind* (1829), Mill proposed the method of analysis to study the mind. According to this method, to understand the mind, it should be reduced to its elementary components.
- John Stuart Mill disagreed with the earlier empiricists in their mechanistic position. He suggested that the mind plays an active role in the association of ideas, opining that the mind is not passive.
- Alexander Bain took forward the idea of John Stuart Mill of the mind being active and carried forward with the approach of mental chemistry.

- Hermann Ebbinghaus caused a profound shift in the associationistic way of working.
- Ivan Pavlov is considered to be responsible for shifting the kind of association studied to S-R connections rather than ideas. Pavlov's work on learning helped to shift associationism from its traditional emphasis on subjective ideas to objective and quantifiable physiological events such as glandular secretions and muscular movements.
- Thorndike interpreted learning in terms of concrete connections between stimuli and responses. Thorndike called his experimental approach to the study of association connectionism. Thorndike explained his approach to learning by his law of effect and law of exercise.
- In contemporary times, associationism is more of a methodological tool, instead of a systematic position. It has been incorporated into the discipline of psychology, in the sense that association of variables is generally recognized as a fundamental task of psychology.

3.7 KEY WORDS

Associationism: The principle of associationism suggests that mental processes operate by the association of one mental state with the other that succeeds it. A major idea of associationism is that “complex ideas come from the association of simpler ideas”.

Empiricism: The philosophy that emphasizes on experience in knowledge attainment.

Law of Contiguity: When events are experienced together, they are remembered together and therefore are subsequently thought of together.

Tabula Rasa: Blank slate – indicating that the mind at birth is like a blank slate on which experience is written.

Mental Chemistry: The notion of ideas being compounded. According to this view, simple ideas are associated with each other forming complex ideas.

Impressions: Impressions are the basic elements of mental life. In the present-day, the equivalent of impressions are sensations and perceptions.

Ideas: Mental experiences that take place in the absence of any immediately present stimulating object. The equivalent of ideas in the present-day is image.

Method of Analysis: Reducing the mind to its elementary components, in order to understand it in a better way. This method was proposed because of the idea that a complex phenomenon like the mind needs to be broken down to its smallest components, in order to understand it in a better way.

Creative Synthesis: Mental elements always combine to produce some unique quality that was not originally present in the elements initially.

Law of Compound Association: Associations are usually links between many ideas at the same time, through contiguity or similarity, instead of just the linking of one idea with another. When this takes place, then there is compound association.

Law of Constructive Association: The mind has the power and ability to form new combinations different from the ones that were present during the course of experience. The mind reforms and rearranges memories of various experiences into infinite number of combinations.

Connectionism: The experimental approach of Thorndike to the study of association. According to Thorndike, if we were to analyze the human mind we would find: connections of varying strength between (a) situations, elements of situations, and compounds of situations, and (b) responses, readinesses to respond, facilitations, inhibitions, and directions of responses.

Law of Effect: Any act which in a given situation produces satisfaction becomes associated with that situation, so that when the situation recurs the act is more likely than before to recur also. Conversely, any act which in a given situation produces discomfort becomes disassociated from that situation, so that when the situation recurs the act is less likely than before to recur.

Law of Exercise: Any response made in a particular situation becomes associated with that situation. The more the response is used in the situation, the more strongly it becomes associated with it. Conversely, prolonged disuse of the response tends to weaken the association.

3.8 REVIEW QUESTIONS

- 1) is considered to be the founder of British Empiricism.
- 2) is the subject matter to be learned in Ebbinghaus's experiments?
- 3) The experimental approach of Thorndike is called
- 4) The laws of learning suggested by Thorndike are,
- 5) What is empiricism?
- 6) How was the approach of Ebbinghaus studying learning different from the pre-existing way of studying learning?
- 7) How did Thomas Hobbes explain the idea of train of thoughts?
- 8) Differentiate between simple and complex ideas as described by John Locke.
- 9) What is the mental chemistry approach to associationism?
- 10) How did George Berkeley use the principle of associationism to explain visual depth perception?
- 11) Describe the laws of associationism used by David Hume to explain the combination of ideas.
- 12) How did David Hartley describe higher systems of thought?
- 13) In what ways did John Stuart Mill differ from James Mill?
- 14) Describe the laws of associationism that were introduced by Alexander Bain.
- 15) What are the principles derived by Pavlov?

3.9 REFERENCES AND FURTHER READING

Brennan, J. F. (2014). *History and Systems of Psychology*. Harlow: Pearson Education Ltd.

Hergenhahn, B. R. & Henley, T. B. (2009). *An Introduction to the History of Psychology*. Wadsworth: Cengage Learning

Marx, M. H. & Hillix, W. A. (1963). *Systems and Theories in Psychology*. New York: McGraw-Hill

Schultz D. P. & Schultz, S. E. (2008). *A History of Modern Psychology*. Wadsworth: Thomson Learning, Inc.

3.10 REFERENCES FOR FIGURES

Biography.com (2014). Ivan Petrovich Pavlov <https://www.biography.com/scientist/ivan-petrovich-pavlov>

Cranston, M. (2020). David Hume. <https://www.britannica.com/biography/David-Hume>

Duigan, B. (2020). George Berkeley. <https://www.britannica.com/biography/George-Berkeley>

History.com Editors (2019). John Locke. <https://www.history.com/topics/british-history/john-locke>

Historyradio.org (2018). Alexander Bain, a neglected pioneer. <https://historyradio.org/2018/10/16/alexander-bain-a-neglected-pioneer/>

McCrum, R. (2017). 100 Best Non-fiction Books: No. 61 – On Liberty by John Stuart Mill (1859). <https://www.theguardian.com/books/2017/apr/03/john-stuart-mill-on-liberty-100-best-nonfiction-books-review-robert-mccrum>

McCrum, R. (2017). The 100 Best Non-fiction Books: No. 94 – Leviathan by Thomas Hobbes (1651). <https://www.theguardian.com/books/2017/nov/20/the-100-best-nonfiction-books-no-94-leviathan-thomas-hobbes-1651>

Science Photo Library (n.d.). Edward Thorndike, American Psychologist <https://www.sciencephoto.com/media/228951/view/edward-thorndike-american-psychologist>

The Editors of Encyclopaedia Britannica (2020). Hermann Ebbinghaus. <https://www.britannica.com/biography/Hermann-Ebbinghaus>

The Editors of Encyclopaedia Britannica (2020). James Mill. <https://www.britannica.com/biography/James-Mill>

Wikiquote.org (n.d.). David Hartley [https://en.wikiquote.org/wiki/David_Hartley_\(philosopher\)](https://en.wikiquote.org/wiki/David_Hartley_(philosopher))

3.11 WEB RESOURCES

Biography.com (2014). Ivan Petrovich Pavlov <https://www.biography.com/scientist/ivan-petrovich-pavlov>

Cranston, M. (2020). David Hume. <https://www.britannica.com/biography/David-Hume>

Duigan, B. (2020). George Berkeley. <https://www.britannica.com/biography/George-Berkeley>

Duncan, S. (2020). Thomas Hobbes, Stanford Encyclopaedia of Philosophy, <https://plato.stanford.edu/entries/hobbes/>

History.com Editors (2019). John Locke. <https://www.history.com/topics/british-history/john-locke>

Historyradio.org (2018). Alexander Bain, a neglected pioneer. <https://historyradio.org/2018/10/16/alexander-bain-a-neglected-pioneer/>

Macleod, C. (2020). John Stuart Mill, Stanford Encyclopaedia of Philosophy. <https://plato.stanford.edu/entries/mill/>

Mandelbaum, E. (2020). Associationist Theories of Thought, Stanford Encyclopaedia of Philosophy, <https://plato.stanford.edu/entries/associationist-thought/>

The Basics of Philosophy (n.d.). British Empiricism, https://www.philosophybasics.com/movements_british_empiricism.html#:~:text=British%20Empiricism%20is%20a%20practical,George%20Berkeley%20and%20David%20Hume.

The Editors of Encyclopaedia Britannica (2020). David Hartley: British Physician and Philosopher. <https://www.britannica.com/biography/David-Hartley>

The Editors of Encyclopaedia Britannica (2020). Edward L. Thorndike. <https://www.britannica.com/biography/Edward-L-Thorndike>

The Editors of Encyclopaedia Britannica (2020). Hermann Ebbinghaus. <https://www.britannica.com/biography/Hermann-Ebbinghaus>

The Editors of Encyclopaedia Britannica (2020). James Mill. <https://www.britannica.com/biography/James-Mill>

Answers to Review Questions (1-4)

(1) Thomas Hobbes; (2) Nonsense Syllables; (3) Connectionism; (4) Law of Effect, Law of Exercise

UNIT 4 STRUCTURALISM*

Structure

- 4.0 Introduction
- 4.1 Antecedents of Structuralism
 - 4.1.1 Helmholtz and Fechner
 - 4.1.2 Wundt
- 4.2 The Subject Matter of Titchener's Structuralism
 - 4.2.1 The Content of Conscious Experience
 - 4.2.2 Introspection
 - 4.2.3 Mechanistic Approach
 - 4.2.4 Elements of Consciousness
- 4.3 Criticisms
 - 4.3.1 Criticisms of Introspection
 - 4.3.2 Additional Criticisms of Titchener's System
- 4.4 Contributions of Structuralism
- 4.5 Summary
- 4.6 Key Words
- 4.7 Review Questions
- 4.8 References and Further Reading
- 4.9 References for Figure
- 4.10 Web Resources

Learning Objectives

After reading this Unit, you will be able to:

- Explain the subject matter of the school of structuralism;
- Discuss the contributions of Edward Titchener; and
- Elucidate the contributions of structuralism as a psychology.

4.0 INTRODUCTION

Structuralism, a systematic movement founded in Germany, can be thought of as a highly developed introspective psychology, which was represented in its final American form by the work of Edward Bradford Titchener. In 1898, in order to differentiate his perspective from the others, Titchener came up with the name *structural psychology* or *structuralism*.

Box 4.1: Edward Bradford Titchener

Titchener got interested in Wundtian psychology while he was at Oxford. He had a lot of enthusiasm to study at Leipzig, at that time considered to

* Dr. Saif R. Farooqi, Department of Applied Psychology, Vivekananda College, University of Delhi



Figure 4.1: Edward Bradford Titchener (1867-1927)

Source: www.verywellmind.com

be the place for scientific learning. In 1892, Titchener earned his doctoral degree, under Wundt, at Leipzig. From 1893 to 1900, Titchener was involved in many scholarly activities, such as establishing his laboratory, conducting research, and writing articles, eventually publishing more than 60 articles. In his 35 years at Cornell University, he supervised more than 50 PhD dissertations.

His notable books are *An Outline of Psychology* (1890), *Primer of Psychology* (1898), and the four-volume *Experimental Psychology: A Manual for Laboratory Practice* (1901-1905).

Titchener's system was the improved version of the psychology of his mentor, Wilhelm Wundt. He dramatically modified and revised Wundt's system of psychology when he brought it from Germany to the United States, despite claiming to be a staunch follower of Wilhelm Wundt. Structuralism gained huge popularity in the United States that lasted some two decades until it was replaced by newer movements.

Structuralism had the following aims:

- To describe the components of consciousness in terms of basic elements.
- To describe how these basic elements are combined.
- To explain the connections of the elements of consciousness to the nervous system (i.e., physical processes). Titchener suggested that physiological processes provide a continuous substratum that gives psychological processes a continuity they otherwise would lack. Therefore, some characteristics of mental events can be explained through nervous system, which itself does not cause conscious experience.

The definition of psychology, according to structuralism is as follows - "*psychology is the analytic study of the generalized adult normal human mind through introspection.*"

Box 4.2: Wundt-Titchener Controversy

Titchener always called himself to be a follower of Wundt. His structuralism is a representation of Wundtian Psychology. However, suggestions have been made that systems of Wundt and Titchener are very different from each other. It is said that Titchener came up with his own approach, which he called structuralism. The label "structuralism" is said to best fit to describe the psychology of Titchener, and has little to do with that of Wundt.

4.1 ANTECEDENTS OF STRUCTURALISM

4.1.1 Helmholtz and Fechner

In 1858, Wundt was appointed as assistant of **Hermann von Helmholtz** and the two worked together in the same physiological laboratory for the next 13 years. Wilhelm Wundt used the methods of Helmholtz and based his work on the sensory physiology of Helmholtz. Later, Titchener adopted these methods from Wundt, for his structuralism.

In 1860, approximately 15 years before Wundt began working in the field of psychology, **Gustav Theodor Fechner** published his book *Elements of Psychophysics*. Wundt acknowledged and accredited Fechner's work as the "first conquest" in experimental psychology. Titchener also referred to Fechner as the father of experimental psychology. Fechner's influence was so strong that Titchener used the experimental method for his structuralism.

4.1.2 Wilhelm Wundt

Even though there is the controversy that Titchener's system was very different from that of Wundt, it is completely impossible to talk about structuralism and not mention Wundt or Wundtian psychology. Wundtian psychology has its roots in natural science as it is the domain of psychology that adopts the methodology and analytic goals common to physics, chemistry, and biology. The approach emphasizes that psychology should be studied by defining psychological events in terms of variables and then utilizing analytic scrutiny of the experimental method to interpret these variables. Psychology within this system makes use of the method of *introspection*, in order to analytically study the generalized adult human mind. This approach was pioneered by Wilhelm Wundt and was later further promoted in the United States by Titchener. This system is sometimes also referred to as *content psychology*, as its aim was to study the content of the mind. Additionally, Titchener emphasized the *mental structures* and named this system *structural psychology* in his writings in 1898.

Irrespective of the name given to this system, its major goal was to carefully apply the experimental method of introspection, for the purpose of analysing the human mind, which was carried out by the trained scientists. By analogy, this system intended to develop the "chemistry of consciousness."



Figure 4.2: Wilhelm Maximilian Wundt (1832 – 1920)

Source: <https://en.wikipedia.org>

Check Your Progress 1

- 1) What are the aims of structuralism?
.....
.....
- 2) In what ways did Helmholtz, Fechner, and Wundt play an influential role in structuralism?
.....
.....

4.2 THE SUBJECT MATTER OF TITCHENER'S STRUCTURALISM

4.2.1 The Content of Conscious Experience

Titchener asserted that conscious experience is the subject matter of psychology as this conscious experience depends upon the person who is experiencing it real time. This kind of experience that psychologists study differs from those studied by scientists in other fields. For instance, phenomena such as sound or light can be studied by both physicists as well as psychologists. The difference is that whereas the physicists investigate

the phenomena by taking into consideration the physical processes involved, psychologists examine these phenomena by considering human beings observe and experience them. In this way, we can say that other natural sciences are independent of the individual's experience.

Titchener explained it further by taking an example from physics. The temperature in a room may be measured at, let us say, 85° Fahrenheit, irrespective of whether anyone is present in room to feel or experience it. However, it is only when the observers are present in this particular room that they can report of feeling uncomfortably warm. Therefore, this feeling, or the experience of warmth, is dependent on the individuals experiencing it, i.e., the people who are present in the room. According to Titchener, this type of conscious experience was the only appropriate focus for research in the field of psychology. In his book published in 1909, *A Textbook of Psychology*, Titchener differentiated between two kinds of experience-dependent experience and independent experience.

Titchener also warned against confusing the mental process with the object of observation while studying conscious experiences, which he named as *stimulus error*. For example, observers who see an apple and then describe that object as an apple, rather than giving an account of what they experience in terms of the elements of shape, colour and brightness etc. are actually committing the stimulus error. The object of observation is to be described in terms of the elements of conscious experience and not in everyday language.

Observers are unable to differentiate what they have learned about the object in the past from their own immediate experience, when they focus on the stimulus object in place of the conscious content. All that observers can really know about the object is that its colour, shape and texture. If the observers describe anything other than the colour, brightness, and spatial characteristics, they are not really observing the object but interpreting it. As a result, they would be dealing with mediate experience and not the immediate experience.

Consciousness was defined by Titchener as the sum or aggregate of our experiences as they exist at a given period of time. *Mind*, according to him, is the sum of our experiences accumulated over an entire lifetime. Consciousness and mind are almost similar, with only difference being that whereas consciousness consists of the mental processes occurring at a given moment, mind consists of the sum total of these processes.

Structural psychology, as envisaged by Titchener, was a pure science and he was not interested in applying psychological knowledge to it. According to him, the purpose of psychology was not to reform societies or cure sick minds, but to discover the facts of the structure of the mind. He was of the view that scientists should not only contemplate about the practical worth of their work. It was due to this reason that he did not favour the development of animal psychology, child psychology, and all other domains of psychology that was not in line with his introspective experimental psychology of the content of conscious experience.

4.2.2 Introspection

The form of introspection, or self-observation that Titchener promoted, depended on observers who were scrupulously trained to describe the

elements of their conscious experience instead of just reporting the name of observed or experienced stimulus that they were already familiar with. Titchener did realize that we all learn to describe our experiences in terms of the stimulus, for instance, that a red round object is an apple, and that in everyday life this is beneficial and necessary.

However, this practice had to be unlearned in his psychology laboratory. Titchener described his method of introspection by using the term *systematic experimental introspection*, which was given by **Oswald Külpe**. Titchener used subjective, detailed, qualitative reports of his subjects' mental activities for the purpose of introspection, in a similar way as used by Külpe. Also, Titchener opposed Wundt's approach to introspection, as he believed that with its focus on objective and qualitative measurements, the approach was not suitable for unveiling the elementary sensations and images of consciousness that were fundamental to his psychology.

Titchener differed from Wundt in that, whereas Wundt focused upon the synthesis of the elements through apperception, Titchener was concerned with analysis of complex conscious experience into its elements or component parts. In other words, it can be said that Titchener stressed on the parts and Wundt stressed upon the whole. Consistent with most of the British associationists and empiricists, Titchener's aim was to uncover the so-called atoms of the mind. Before Titchener even went to Leipzig to study with Wundt, his approach to introspection had already started developing. It has been suggested that while Titchener was influenced by the writings of James Mill while he was still enrolled at Oxford University (Danziger, 1980).

4.2.3 The Mechanistic Approach

The *mechanistic spirit* of philosophy also inspired Titchener, as can be seen in his image of the observers who used to bring in the data in his laboratory. The subjects were often referred to as *reagents* in the research reports published by Titchener. In natural sciences, reagent is a term used by chemists to denote substances that are used to detect, measure or examine other substances because of their capacity to undergo certain reactions.

A *reagent* is a passive agent used in chemical reactions so as to elicit or prompt responses from some other substance. Titchener applied this concept in his laboratory on his human observers and thought of his subjects to be like mechanical recording instruments, who objectively reacted and responded to the stimulus by noting its characteristics. The subjects were thought to be unbiased, detached machines. The trained observations would become so automatic and mechanized that subjects would no longer feel that they were carrying out some conscious process, which was also in accordance with the Wundt's idea.

It is then easier to suggest that all human beings are machines if we do consider the observers in the laboratory to be machines. This thinking was influenced by the *Galilean-Newtonian mechanical view* of universe, an idea that continued to exist even after the slow death of structuralism.

The image of *human-as-machine* continued to be the characteristic of experimental psychology throughout the first half of the twentieth century, which can be seen if we study the history of psychology. Titchener asserted to evaluate the introspective observation through experimental approach in his psychology. By carefully following the rules of scientific experimentation, he figured out that an experiment is an observation that can be repeated, isolated, and varied.

According to Titchener, if an observation is repeated more frequently, it will be more likely for to see clearly and describe accurately what has been seen. Moreover, the more stringent in isolating an observation, easier will be the task of observation, lesser will be the chances of getting distracted by irrelevant circumstances or of putting emphasis on the irrelevant point. Finally, if an observation is varied widely, it will be easier for to determine the generalizability of experience and higher will be the chances of discovering laws. The subjects or reagents in Titchener's laboratory gave lengthy, detailed observations of the elements of their experiences by introspecting on a wide variety of stimuli.

4.2.4 The Elements of Consciousness

Titchener proposed that psychology had three crucial goals:

- To reduce conscious processes to their simplest components.
- To identify laws by which these elements of consciousness were associated.
- To connect the elements with their physiological conditions.

Therefore, it is quite evident that the goals of Titchener's structural psychology were similar to those of the natural sciences. Once the scientists decide upon the part of the natural world that they intend to study, they work ahead to identify or discover its elements, exhibiting how these elements are compounded to form complex phenomena, and finally, formulating laws that govern these processes.

A large amount of Titchener's research focused upon the first goal, i.e., identifying the elements of consciousness. According to Titchener, there were three elementary states of consciousness:

- Sensations
- Images
- Affective states

Sensations are the basic elements of perception and can occur in the smells, sights, sounds, and other experiences that arise from physical objects present in the natural world. *Images* are the elements of ideas that can be found in the process that reflects past experiences, i.e., the experience that are not actually present at the moment, for example, the memory of a past event. *Affective states*, or affections, are the elements of emotion and are found in experiences like love, anger hate, happiness, sadness etc.

In his book, *An Outline of Psychology* (1896), Titchener gave a list of all the elements of sensation that he had discovered through his extensive research. The list included approximately 44,500 individual sensation qualities, out

of which 11,600 were identified as auditory sensations, whereas the rest 32,820 were identified as visual sensations. Titchener believed that each of these elements was conscious and different from all of the others that would combine with other elements to give rise to perceptions and ideas.

All these elements, however basic and irreducible, could be categorized, just as chemical elements are grouped into classes. All these mental elements have certain qualities and attributes that allow us to differentiate between different elements, despite their simplicity.

Titchener added clearness and duration to the Wundtian attributes of intensity and quality. He considered these four attributes to be fundamental to all sensations as according to him, all of them are present to some extent in all experiences:

- *Quality* is the characteristic, such as “warm” or “red” that explicitly differentiates each element from every other element,
- *Intensity* refers to the strength, weakness, loudness, or brightness of a sensation,
- *Duration* is the course or time till a sensation lasts
- *Clearness* is concerned with the significant role that attention plays in conscious experience; experience towards which our attention is directed is clearer than experience towards which our attention is not directed.

While all of these four attributes are present in sensations and images, only quality, intensity and duration are present in affective states. Clearness, as per Titchener, was lacking in affective states because he believed that focusing attention directly on an element of emotion or feeling was impossible. In an effort to do so, the affective quality of conscious experience, such as the sadness or the happiness, disappears. Some of the sensory processes, particularly the ones that involve touch and vision, possess one more attribute, called *extensity*, as they also take up space. It is possible to reduce all conscious processes to one of these attributes.

Check Your Progress 2

- 1) What do you understand by committing stimulus error?

.....

- 2) How is Titchener’s approach considered to be mechanistic?

.....

4.3 CRITICISMS

Historically speaking, it has mostly been the case that people gain prominence in a field when they reject or counter an older viewpoint. However, Titchener is an exception as he chose to stand firm even when everyone else was moving beyond him. The formal published statement of Titchener had remained the same, even when the intellectual climate of

thought in European and American psychology had changed, by around the second decade of the 20th century. Consequently, numerous psychologists came to view his structural psychology as a failed attempt to adhere to obsolete principles and methods.

Titchener assumed that he was laying a foundation for psychology, but his attempt turned out to be only one of the phases in the history of psychology. Although the domain of structuralism lost its charm with the death of Titchener, the fact that it successfully survived for so long points towards the commanding personality that he was.

4.3.1 Criticisms of Introspection

The criticisms surrounding the method of introspection in structuralism had more to do with the kind of observation practiced at Titchener's and Külpe's laboratories than with Wundt's internal perception method. Whereas Titchener and Külpe dealt with the subjective reports of the basic elements of consciousness, Wundt was concerned with obtaining objective and quantitative responses to external stimuli.

Although Titchener modified and refined the method of introspection used in his psychology, to make it more precise, so as it does conform to the requirements and tenets of science, the fault-finding continued:

- First criticism is related to the definition. Although Titchener attempted to define what he meant by introspective method by relating it to specific experimental conditions, he apparently failed at it. The course that an observer follows will vary extensively with the nature of the consciousness observed, with the objective of the experiment, and/or with the instructions given by the instructor. Thus, introspection can be thought of as a generic term that includes a large number of specific methodical procedures.
- The second source of criticism in Titchener's methodology was the training process of introspection, or precisely, the uncertainty about what the introspectors were trained to do. Titchener instructed his graduate student observers to ignore certain classes of words (or the so-called meaning words) that had become fixed in their vocabulary. For instance, the sentence, "I see a chair," does not hold any scientific meaning for a structuralist; the word "chair" is considered a meaning word, based on the previously learned and universally agreed upon knowledge about the specific combination of sensations that we learned to identify as chair. So, the observation "I see a chair" did not tell the structural psychologist anything about the elements of the observers' conscious experience. The structuralist was concerned with the specific elementary forms of the experience and not with the collection of sensations summed up in a meaning word. Observers who said "chair" were committing what Titchener referred to as the stimulus error. But how would the trainers describe their experience if ordinary words were to be removed from the vocabulary? It suggested that an introspective language would have to be developed. In order to determine the conscious processes with accuracy and precision, Titchener (also, Wundt) stressed on controlling the experimental conditions, such that any two observers would have identical

experiences and their results would substantiate one another. It also pointed towards the possibility of developing a working vocabulary for the observers, which was free of meaning words, as these highly similar experiences took place under controlled conditions. Ultimately, it is due to our shared experiences in routine life that we arrive at common meanings for familiar words. The idea of developing an introspective language, however, could only be conceived but never realized.

- Again, observers at different laboratories frequently obtained different results, even when experimental conditions were most rigidly controlled. Even introspectors at the same laboratory, focusing on the same stimulus material often failed to obtain similar observations. Regardless, Titchener firmly believed that identical results would be obtained and agreement would be reached eventually. Perhaps, the school of structuralism would have lasted longer than it actually did, had sufficient uniformity been achieved.
- Critics also argued that introspection was actually a form of *retrospection*, because there was a time gap between when the experience occurred, and when it was reported (Ebbinghaus had demonstrated through his experiment that most of the forgetting takes place immediately after an experience, so it is highly likely that some of the experience might be lost by the time it was reported for introspection). Structural psychologists answered the critiques on two grounds: first, they specified that there was very brief time interval between experience and reporting of it; and, secondly, they proposed that there exists a primary mental image, which according to them preserved the experience for observer until it was reported. However, it is possible for an experience to get altered as we examine it through the method of introspection. For instance, it is difficult to introspect the conscious state of anger. It is because in the process of being cognizant towards and trying to break the experience into its constituent elements, our anger may disappear or subside. However, Titchener still held that with continued practice and efforts, his introspectors would be able to perform their task of observation without altering it consciously.
- Yet another criticism of introspective method arose from the notion of the unconscious mind, which was proposed by Sigmund Freud in the early years of the 20th century. If Freud's claim, that a part of our mental functioning is unconscious, is to be believed, then it is also clear that it cannot be explored using introspection. One historian wrote: At the base of introspective analysis was the assumption that it is possible to access all of the mind's functioning through conscious observation. Introspection could not provide a complete picture of mental functioning, unless every thought and emotion of human mind was capable of being observed. If vast areas of our mind remained curtailed like an iceberg, behind powerful defensive barriers and consciousness was just like tip of that iceberg, then introspection was bound to be a failure.

4.3.2 Additional Criticisms of Titchener's System

- The structuralist movement was accused of being *artificial and sterile*, since it attempted to synthesize conscious processes into elements. Critics argued that it is not possible to capture the whole of an experience by the summation or combination of its elementary components. They also argued that experience comes to us as unified wholes and not as discrete individual sensations, images, or affective states. We inevitably lose some of the conscious experience in our effort to artificially analyse it. It was on this ground or base that a group of psychologists launched their revolt against structuralism in order to give rise to a new school of thought, Gestalt Psychology.
- The structuralist definition of psychology was also criticized. The structuralists chose to exclude several specialities that were emerging during the Titchener's later years, because it did not fit in their idea of psychology. For instance, Titchener did not even regard child psychology or animal psychology, as psychology. His conception of psychology was too narrow to appreciate and embrace the new work being done and the new directions being explored in the field. Psychology began to quickly move beyond Titchener.

4.4 CONTRIBUTIONS OF STRUCTURALISM

Despite these criticisms, Structuralism has also been given due credits for its contribution in the field:

- Their *subject matter, conscious experience*, was clearly defined.
- Their *research methods* were in the highest traditions of science, as they were based on *observation, experimentation, and measurement*. Self-observation was considered to be the most appropriate method for studying experience and the subject matter, because consciousness could only be perceived by the person having the experience.
- Even though the subject matter and goals of the structuralists are no longer significant, *the method of introspection*, which is defined as the examination of one's own thoughts and emotions by giving a verbal report based on experience, continues to be used in many areas of psychology. For instance, self-reports are requested from the person who has undergone an unusual experience, such as weightlessness for people going in space. Even in psycho physics, researchers still ask their subjects to report whether a second tone sounds softer or louder than the first. Also, responses on attitude scales and personality tests or inventories, and clinical reports from patients etc. are all introspective in nature.
- *Cognitive processes* such as reasoning that are based on introspection are commonly used in psychology today. For example, industrial/organizational psychologists may obtain introspective reports from employees about their interaction with computer terminals, which can later be used to develop user-friendly computer component. Such verbal reports, which are based on personal experience are reliable forms for obtaining data.

- Finally, cognitive psychology also put greater emphasis on introspection as its interest in conscious processes revived. Therefore, we can say that the introspective method stood the test of time and remained alive, though not exactly as how Titchener had envisaged.
- One of the most significant contributions of structuralism was that it served as *a target of criticism*. Structuralism turned out to be a strong, established orthodox school of thought, which could be targeted and criticized by the newly developing movements in psychology. These newer approaches owed their existence in great amount to their progressive reformulation of the structuralist approach. It is by opposing the existing systems or ideas that advancements in science occur. In analogy, having Titchener's structuralism as an idea to counter, psychology also moved far beyond the delineated boundaries of his rigid system.

Check Your Progress 3

1) What is the criticism of retrospection against introspection?

.....

2) How has the definition of structuralism been criticized?

.....

4.5 SUMMARY

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

- Edward Titchener was the founder of structuralism, a systematic school of psychology, after completing his doctorate under Wundt, claiming to have extended his mentor's ideas.
- Helmholtz, Fechner, and Wundt are considered to be antecedents of structuralism.
- The aims of structuralism were: to describe the components of consciousness in terms of basic elements, to describe how these basic elements are combined, and to explain the connections of the elements of consciousness to the nervous system (i.e., physical processes).
- One of the major subject matters of structuralism was studying the content of consciousness.
- Titchener used the method of introspection. He described his method of introspection by using the term *systematic experimental introspection*, which was given by Oswald Külpe.
- Titchener used the mechanistic approach, according to which humans are viewed as machines. This view was taken from the Galilean-Newtonian model, which suited Titchener well for conducting his laboratory experiments.

- According to Titchener, there are three elementary states of consciousness – sensations, images, and affective states.
- There were many criticisms regarding the method of introspection used by Titchener. Some of these criticisms were that there was no specific definition of introspection, there were faults in the training process involved, and that rather than being introspection, it was actually retrospection.
- The structuralist movement was accused of being artificial and sterile, since it attempted to synthesize conscious processes into elements. Arguments were made that it is not possible to capture the whole of an experience by the summation or combination of its elementary components.
- A major contribution of structuralism is that the method of introspection - the examination of one's own thoughts and emotions by giving a verbal report based on experience — continues to be used in many areas of psychology.
- Structuralism turned out to be a strong, established orthodox school of thought, which could be targeted and criticized by the newly developing movements in psychology.

4.6 KEY WORDS

Structuralism: The first school of psychology, a systematic movement established by Edward Bradford Titchener, who extended the psychology of Wundt, Structuralism aimed to break down consciousness into smaller elements, and understand their combination.

Consciousness: The sum or aggregate of our experiences as they exist at a given period of time.

Introspection: Self-observation involving describing the elements of conscious experience instead of just reporting the name of observed or experienced stimulus.

Sensation: Basic elements of perception and can occur in the smells, sights, sounds, and other experiences that arise from physical objects present in the natural world.

Images: The elements of ideas that can be found in the process that reflects past experiences, i.e., the experience that are not actually present at the moment, for example, the memory of a past event.

Affective States: The elements of emotion and are found in experiences like love, anger hate, happiness, sadness etc.

4.7 REVIEW QUESTIONS

- 1),, and are considered to be the antecedents to structuralism.
- 2) The three elements of consciousness are,, and
- 3) Titchener was inspired by model, in using the mechanistic approach.

- 4) What is the definition of psychology, according to structuralism?
- 5) What is the difference between mind and consciousness?
- 6) How is the method of introspection used by Titchener different from that of Wundt?
- 7) Describe the different ways in which the elements of consciousness are described.
- 8) Discuss the major criticisms against the method of introspection.
- 9) How did the school of structuralism play a role in the development of other schools and perspectives in psychology?
- 10) In what ways are the method of introspection still used in psychology?

4.8 REFERENCES AND FURTHER READING

Brennan, J. F. (2014). *History and Systems of Psychology*. Harlow: Pearson Education Ltd.

Hergenhahn, B. R. & Henley, T. B. (2009). *An Introduction to the History of Psychology*. Wadsworth: Cengage Learning.

Marx, M. H. & Hillix, W. A. (1963). *Systems and Theories in Psychology*. New York: McGraw-Hill.

Schultz D. P. & Schultz, S. E. (2008). *A History of Modern Psychology*. Wadsworth: Thomson Learning, Inc.

4.9 REFERENCES FOR FIGURE

Cherry, K. (2020). Edward B. Titchener and Structuralism. <https://www.verywellmind.com/edward-b-titchener-biography-2795526>

Wilhelm Maximilian Wundt

https://en.wikipedia.org/wiki/Wilhelm_Wundt

4.10 WEB RESOURCES

Cherry, K. (2020). Edward B. Titchener and Structuralism. <https://www.verywellmind.com/edward-b-titchener-biography-2795526>

Cherry, K. (2020). The Origins of Structuralism in Psychology. <https://www.verywellmind.com/who-founded-structuralism-2795809>

The Editors of Encyclopaedia Britannica (2020). Edward B. Titchener: American Psychologist. <https://www.britannica.com/biography/Edward-B-Titchener>

The Editors of Encyclopaedia Britannica (2020). Structuralism. <https://www.britannica.com/science/structuralism-psychology>

Answers to Review Questions (1-3)

- (1) Helmholtz, Fechner, Wundt; (2) Sensations, Images, Affective States; (3) Galilean-Newtonian model

UNIT 5 FUNCTIONALISM*

Structure

- 5.0 Introduction
- 5.1 Antecedents of Functionalism
 - 5.1.1 Charles Darwin
 - 5.1.2 Francis Galton
 - 5.1.3 George Romanes and C. Lloyd Morgan
 - 5.1.4 Herbert Spencer
 - 5.1.5 William James
- 5.2 The Founding of Functionalism
- 5.3 Functionalism: The Chicago School
 - 5.3.1 John Dewey
 - 5.3.2 James Rowland Angell
 - 5.3.2 Harvey Carr
- 5.4 Functionalism: The Columbia School
 - 5.4.1 Robert Sessions Woodworth
- 5.5 Criticisms
- 5.6 Contributions
- 5.7 Summary
- 5.8 Key Words
- 5.9 Review Questions
- 5.10 References and Further Reading
- 5.11 References of Figures
- 5.12 Web Resources

Learning Objectives

After reading this Unit, you will be able to:

- Describe the functionalist movement of psychology;
- Explain the subject matter of functionalism;
- Discuss the contributions of John Dewey, James Rowland Angell, Harvey Carr, and Robert Sessions Woodworth in functionalism; and
- Discuss the major contributions of the school of functionalism.

5.0 INTRODUCTION

The development of the first truly American school of thought of psychology, functionalism, is largely credited to the work of William James,

* Dr. Saif R. Farooqi, Department of Applied Psychology, Vivekananda College, University of Delhi

considered to be the greatest American psychologist. Unlike those before them, functionalists did not focus on the structure or composition of the mind; rather, they tried to study it in terms of its functionality. That is, functionalism looked at the mind as comprising numerous functions and processes that have consequences for an individual in the real world, and aimed to discern how these mental processes help individuals adapt to their environment.

The perspectives of Wundt and Titchener had failed to shed light on such consequences of mental processes, but that was never their goal. Practical issues like these were not in line with their purely scientific attempts to the study of psychological phenomena. Functionalism as a new school of thought arose in response to the already existing experimental psychology and structural psychology, both of which were seen as very limited in terms of their focus of study. Both of these systems failed to answer something that was imperative to the functionalists. Functionalists were looking for answers to questions like “what is the function of the mind?” and “how does the mind do what it does?”

Functionalists were typically interested in understanding how individuals’ behaviours and consciousness were functional in helping them adapt to their environment. That is, they focused on the utilitarian value of human consciousness and behaviour. This emphasis on functionality of mental processes and behaviours eventually led to the functionalists developing an increasing interest in applying psychological principles to day-to-day problems concerning how individuals adapt to and successfully function in different environments. The functionalist movement, thus, played a crucial role in the rapid development of applied psychology in America. As functionalists themselves admit, a single functionalism never truly existed in the same way that a single structuralism did. Rather, what were seen were multiple functional psychologies, each somewhat different from the others. Today, however, even these have ceased to exist. With the retirement of Harvey Carr from Chicago, functionalism as a school of thought all but disappeared.

Functionalism was not just an opposition to existing perspectives. When functionalism is understood as a set of values and procedures that emphasizes adaptability and empirically established relationships, its influence can be seen on psychology even today.

Box 5.1: The First School of Psychology: Structuralism or Functionalism?

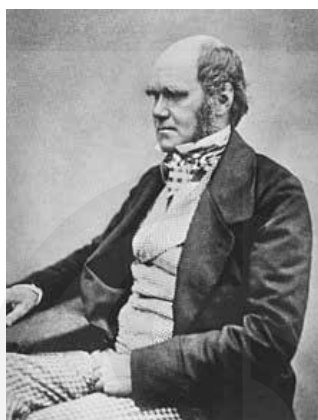
Functionalists have often opposed the idea of structuralism to be considered the first school of psychology. They claimed that their perspective was well existing before the beginning of structuralism. According to functional psychologists, in the time period preceding as well as during the development of the new psychology, the groundwork for functional psychology was being laid down. Influential work by Darwin, Galton, and students of animal behaviour established the roots of functional psychology. In 1859, Darwin published his book *On the Origin of Species*, a landmark in the study of evolution. This was a year before Fechner published *Elements of Psychophysics*, and 20 years before

Wundt established his psychological laboratory at Leipzig, Germany. By 1869, a few years before Wundt published *Principles of Physiological Psychology* (1873-74), Galton had begun working on understanding individual differences. Lastly, before Titchener's move from England to Germany to study under Wundt, experiments on animal behaviour had been underway in the 1880s.

Thus, significant advancements were being made in areas of study like animal behaviour, individual differences, and functions of consciousness, at the same time when other psychologists like Wundt and Titchener defined psychology without these aspects.

5.1 ANTECEDENTS OF FUNCTIONALISM

5.1.1 Charles Darwin



**Figure 5.1: Charles Darwin
(1839-1882)**

Source: Charles Darwin - Wikipedia

It was Charles Darwin and his ideas pertaining to evolution that brought about a shift in the focus of psychology from the structure to the function of consciousness. Explaining the observed variations among members of the same species, Darwin postulated that this variability was inheritable. He described the process of natural selection and explained how it leads to the survival of only those who are best suited for a given environment. Those who are not, are eliminated by the same process. At all times, thus, a struggle for survival takes place — the ones who survive are those that are able to successfully adapt to the demands of their changing environment. Those unable to adapt, on the other hand, do not survive.

With his work on evolution and natural selection, Darwin became an important antecedent to the rise of functionalism. Being an astute observer of both animal behaviour as well as morphology, through his work on evolution, Darwin was able to theorise the continuity between humans and animals. This was an important development as it justified the continuation of the study of animal psychology. Darwin's evolutionary emphasis on adapting to one's environment has been used by psychologists both as a direct as well as indirect explanation of behaviour, via instincts and principles of reinforcement respectively.

5.1.2 Francis Galton

Inspired by his cousin Darwin, Francis Galton chose to study heredity in human beings. More specifically, he studied the inheritance of intelligence. In 1869, he published *Hereditary Genius*, which described numerous studies on individual differences in intelligence. Galton's work opened the way for the emergence of the field of mental testing, a major aspect of the field of psychology.

5.1.3 George John Romanes and C. Lloyd Morgan

Both Romanes and Morgan are prominent figures in the field of animal behaviour. They represent different attitudes towards the man-animal relationship. Romanes carried Darwin's work on Comparative Psychology. In his work *Animal Intelligence* (1883), Romanes surveyed the mental abilities of animals from protozoa to apes. Morgan objected to Romanes's overestimation of animal intelligence.

5.1.4 Herbert Spencer

Besides being a major figure in social thought, sociology, and social psychology, Spencer is also known for producing the first complete evolutionary psychology. He observed that changes in an individual's life that occur as a result of learning are very similar to those that occur in other species via selection.

5.1.5 William James

William James is often regarded as one of the greatest psychologists ever. John Dewey referred him as the greatest American psychologist, and John Watson has called him the most brilliant psychologist in the world. Although James did not establish a formal system of psychology or train any disciples under him, his contributions to the development of psychology, particularly the school of functionalism, are crucial and widely recognised. The ideas he presented in the sphere of functional psychology inspired later generations of psychologists and indirectly, thus, propelled the functionalist movement.

William James, certainly, was not the founder of functionalism, but his ideas foreshadowed what was to become the functionalist movement. He was a big influence on the future generation of psychologists, especially the ones who were involved in the functionalist movement. The book by William James, *The Principles of Psychology* (1890), eventually became the central tenet of functionalism. According to which, the goal of psychology is to study how people adapt to their environment, instead of examining the elements of consciousness.

Check Your Progress 1

- 1) How does functionalism differ from structuralism?
.....
.....
- 2) How are the contributions of Darwin significant for functionalism?
.....
.....

5.2 THE FOUNDING OF FUNCTIONALISM

The goal of those associated with the founding of functionalism was never to establish a new school of thought. Rather, these scholars simply opposed the limitations and narrow view of Wundt and Titchener. Despite its proponents appearing content with modifying and not replacing the existing systems, over time, functionalism did incorporate many characteristics associated with a formal school of thought. Probably due to this disinterest in establishing a new system, functionalism was never as rigid and systematic a school as structuralism. While Titchener worked hard to establish a single structural psychology, there never was a single functional psychology. Rather, with the same interest of studying functions of consciousness, multiple functional psychologies existed simultaneously.

The emphasis of functionalism on mental processes and functions eventually led to an increasing interest in applications of psychology to everyday life.

More specifically, functionalists began looking at how people successfully function in and adapt to different environments. This broadening of interest played a key role in the development of applied psychology in the US. Ironically, it was Titchener, the founder of structuralism, who unwittingly helped formalise functionalism as a school of thought in psychology. In his 1898 article titled *The Postulates of a Structural Psychology*, Titchener tried to differentiate between structuralism and functionalism. While doing so, he also argued for why structuralism was the better of the two and should be adopted by psychologists.

However, in doing so, Titchener established functionalism as an opposing force to structuralism. He helped it attain an identity and status that it otherwise would have failed to achieve. Titchener was initially attacking a nameless movement until named it. In this way, he did more than anyone else in giving the name *functionalism*, and further strengthening it.

5.3 FUNCTIONALISM: THE CHICAGO SCHOOL

Although Titchener gave the name of functionalism, he certainly cannot be given the whole credit for founding functionalism. Two psychologists who are generally acknowledged for their direct contributions to the development of functionalism are John Dewey and James Rowland Angell. It was William James who believed that these two should be the ones considered the founders of the functionalist school, also referred to by James as the “Chicago School.”

5.3.1 John Dewey

A critical starting point for functionalism was the publication of John Dewey’s article *The Reflex Arc Concept in Psychology* in *Psychological Review* (1896). This article is referred to as the “opening shot” of the functionalist movement. The reflex arc refers to the connection between a sensory stimuli and motor responses to it. In his paper, Dewey criticised both Wundt and Titchener for attempting to break down behaviours and conscious experiences into discrete elements. He spoke against the ideas of psychological molecularism, elementism, and reductionism associated with the reflex arc.

While advocates of the reflex arc contended that a given unit of behaviour is limited to a stimulus and individual’s response to it, Dewey proposed the notion that reflexes form circles rather than arcs. The former viewpoint, for example, views a child’s behaviour of withdrawing their hand from a flame as one unit of behaviour. Dewey, however, reasoned that because of this one experience with fire, the child’s perception of the flame changes. Initially attracted by it, the child is now repelled by the same flame. He, thus, argued that perception and movement should be considered as one unit.



Figure 5.2: John Dewey
(1859-1952)

Source: www.britannica.com

Box 5.2: John Dewey

John Dewey received his PhD, in 1884, from Johns Hopkins University, Baltimore. He wrote his dissertation on the philosophy of Kant. In 1886, he published a book, entitled *Psychology*. This was the first American textbook in psychology, and became highly successful in USA and Europe, making Dewey a well-known person. It remained one of the most popular

psychology books, until the publication of *The Principles of Psychology* in 1890, by William James.

Dewey spent 10 years at the University of Chicago. He established a laboratory school, which was a radical innovation in education, becoming the cornerstone for the progressive education movement. In 1904, Dewey moved to Columbia University, New York. He continued his work of applying psychology to educational and philosophical issues, over there. His work can be viewed as a good example of the practical orientation that functional psychologists emphasized on.

In essence, Dewey argued that just as consciousness cannot be studied in terms of its basic elements, a reflexive response cannot be broken down into smaller sensorimotor elements. To engage in such artificial and reductionist analysis is to cause behaviour to become meaningless. Dewey, thus, was opposed to such analysis of behaviour. He proposed studying behaviour in terms of the role it plays in helping organisms adapt to their environment. The subject matter of psychology was, therefore, identified as the total organism as it functions in its environment.

The evolutionary perspective greatly influenced Dewey's ideas on what psychology should study. The evolutionary approach emphasizes organisms' struggle for survival, and both consciousness and behaviour play a role in ensuring one's survival. It, therefore, makes sense for functionalism to study these processes in relation to survival and adaptation. Dewey, however, never referred to his psychology by the name of functionalism. Although he was against structuralism's attempts at breaking down behaviour and consciousness into discrete elements, at the same time, he did not believe that structure and function in this regard could be studied independently. It was other psychologists, including James Rowland Angell, who advocated structuralism and functionalism as two opposing forces.

Dewey's major contribution to the field of psychology, thus, was his development of the philosophical framework for a new system. He also greatly impacted subsequent work in the area by inspiring other psychologists and researchers. Angell gained the leadership of the functionalist movement after Dewey retired from the University of Chicago in 1904.

5.3.2 James Rowland Angell

James Rowland Angell succeeded in making the psychology department at the University of Chicago an influential place so much so, that the department became an important training ground for functional psychologists. In 1904, Angell published a textbook titled *Psychology*. In it, Angell contended that the role of consciousness is to help an organism adapt and the goal of psychology, therefore, should be to study how the mind helps in the process.

Box 5.3: James Rowland Angell

James Rowland Angell completed his undergraduate work at Michigan, where he was a student of Dewey. He got highly influenced by William James's *The Principles of Psychology*. According to Angell, no other book influenced his thinking to such a great extent. He even worked under



Figure 5.3: James Rowland Angell (1869-1949)

Source: www.britannica.com

William James, for a year, at Harvard. After completing his Master's in 1892, Angell travelled to Europe to continue his studies. He attended lectures of Ebbinghaus and Helmholtz, at Berlin, Germany. He was very keen in attending lectures by Wundt, at Leipzig, but at that time, Wundt was not accepting more students for the year.

Angell could not complete his doctorate, at Halle, Germany, as he was given the condition to rewrite it in German, which meant that he would have to stay there without any source of income. He instead was appointed at the University of Minnesota. Despite being unable to complete his PhD, Angell was instrumental in granting many doctorates. Further, throughout his career, he received 23 honorary degrees. After spending a year at Minnesota, Angell moved to the University of Chicago, where he spent the next 25 years of his life.

In 1906, Angell was elected as the 15th president of APA. After retiring from academics, he became the member of the board of the National Broadcasting Company (NBC).

Later, in 1906, in his presidential address to the American Psychological Association (APA), Angell highlighted what he believed was the “province” of functional psychology. Angell argued that functionalism was not something new to psychology; rather, it was structuralism that was at odds with the older and functional form of psychology. He further emphasized the following three themes of the functionalist movement:

- 1) While structuralism focuses on mental elements, functionalism seeks to study mental operations. Functionalists aimed to elaborate upon how mental processes work, what they do, and under what conditions.
- 2) Functional psychology is the psychology of the functional role of consciousness. That is, consciousness is seen in terms of its functional, practical utility as a mediator between an organism's needs and the demands of their environment. Angell reasoned that since consciousness has survived over time, it must be because it serves a crucial function for the organism. Functional psychologists were, thus, urged to identify what this function was, not only for consciousness, but for specific cognitive processes as well.
- 3) Functional psychology also encompasses psychophysical (mind-body) relations. It focuses on the total relationship of the organism to its environment. As a result, functionalists do not recognize a distinction between mind and body. On the contrary, it regards them as belonging to the same order, making transfer from one to the other relatively easy.

5.3.3 Harvey Carr

Harvey Carr entered the picture at a time when functionalism had been established as a separate school of thought, no longer just an opposition to structuralism. He, thus, worked on elaborating the theoretical positions earlier put forward by Angell. It was under Carr that functionalism at Chicago gained maximum prominence as a formal system of psychology. Other contemporary schools that were also coming up, like behaviourism, Gestalt

psychology, and psychoanalysis, were regarded by Carr as concerned with only a restricted portion of the larger field of psychology. He did not believe that these had much to add to functionalism, which was seen as a broader, more encompassing viewpoint to psychology. He expressed his confidence in functional psychology by hailing it as *the American psychology*.

Box 5.4: Harvey Carr

Harvey Carr studied mathematics at DePauw University, Indiana, and the University of Colorado. He later on changed his interest to psychology, just because he liked his psychology professor. From the University of Colorado, he moved to the University of Chicago, where he studied experimental psychology. He was taught by James Rowland Angell.

In his second year at Chicago, he served as a laboratory assistant. Carr worked with John Watson, who was then an instructor, and later went on to become the founder of behaviourism. Carr was introduced to animal psychology by Watson. Carr completed his PhD in 1905, and took teaching positions at Texas and Michigan. He returned to Chicago, in 1908, where he replaced Watson, who had left for Johns Hopkins. He eventually succeeded James Rowland Angell as the head, Department of Psychology, University of Chicago.



Figure 5.4: Harvey Carr

Source: www.jstor.com

Carr further refined functionalism with the publication of his book *Psychology* in 1925. His work emphasized two points:

- 1) Mental activities like memory, perception, judgement, etc. were identified as the subject matter of psychology.
- 2) The function of such mental activities was thought to be to acquire, retain, organize, and evaluate experiences and then to use them to guide one's action. Specific actions in which mental activities appeared were referred to by Carr as "adaptive" or "adjustive" behaviour.

Like other functionalists before him, Carr, thus, propagated the importance of mental processes over content and elements of consciousness. Further, he defined what such mental processes entail and what they accomplish. By 1925, these notions had become accepted facts rather than areas of dispute in psychology. As functionalist psychology became mainstream psychology, most psychologists at that time began considering themselves functionalists to varying degrees. As a result, the label 'functionalist' started losing its significance. During that time, a psychologist was simply a psychologist. Their functionalist viewpoint as part of their identity as a psychologist was not required to be mentioned.

With regard to methodology, Carr was accepting of both introspective and experimental methods. Like Wundt, he believed that cultural creations (art, literature) can be sources of useful information about mental activities that resulted in them. Unlike structuralism, functionalism was not limited to a single methodology. However, the emphasis of functionalism on objectivity led to the use of various objective controls when introspection was to be used. Functionalists also gathered information from studies based on both human and animal subjects.

The functionalists played a major role in bringing about a shift in the focus of psychology from the subjective study of the human mind and consciousness

to the objective study of observable behaviour. They redefined American psychology to such an extent that it eventually ended up focusing only on overt behaviour, completely doing away with anything that had to do with subjective concepts like the mind. Thus, functionalism paved the way for the next revolutionary movement in psychology, which was the rise of Watson's behavioural psychology.

5.4 FUNCTIONALISM AT COLUMBIA SCHOOL

5.4.1 Robert Sessions Woodworth

While the basic development and founding of the school of functionalism occurred at the University of Chicago, Robert Woodworth at Columbia University also developed another functionalist approach. Woodworth was not a fan of the boundaries that are put on an individual simply by virtue of their membership of a particular school of thought. Unlike Angell and Carr, he did not formally belong to the functionalist school but his work embodied the spirit of functionalism. He also introduced the notion of dynamic psychology to functionalism.



Figure 5.5: Robert Session Woodworth

Source: www.psicologiaymente.com

Box 5.5: Robert Sessions Woodworth

Robert Sessions Woodworth was a science and mathematics teacher. When he heard a lecture of Granville Stanley Hall, the founder and first president of the American Psychological Association (APA), and read William James's book *The Principles of Psychology*, he decided to become a psychologist. He then, did his Master's from Harvard, and completed his PhD, in 1899, under James McKeen Cattell, at Columbia.

Some of his best works include *Dynamic Psychology* (1918), *Psychology* (1921), *Experimental Psychology* (1938), and *Dynamics of Behaviour* (1958). In 1956, Woodworth received the first Gold Medal Award from the American Psychological Foundation, for his unparalleled contributions to scientific psychology.

Woodworth did not consider his ideas as additions to psychology. Rather, he stated that this approach was one that good psychologists had been following long before psychology even became established as a science. His viewpoint, interestingly, did not arise out of opposition to existing approaches, but out of his attempts at elaborating and applying to his work what he considered desirable features of other approaches. Woodworth acknowledged that scientific psychological inquiry must begin with studying the objective, observable, external events, that is, the stimulus and response. However, it becomes problematic when psychologists try to explain behaviour simply by studying these. This is because in doing so, they are not taking into consideration what ought to be the most important part of the study — the living organism. Woodworth argued that this is important because a stimulus, in isolation, does not completely explain the cause of a particular behaviour. Rather, the organism, with internal factors like energy levels, past and present experiences, also determines response to a stimulus.

Woodworth, therefore, viewed the organism as interjected between the stimulus and the response. For this reason, he believed that the subject matter of psychology should include both consciousness and behaviour. This viewpoint was later adopted by both the humanistic and social-learning theorists.

Check Your Progress 2

- 1) How did the works of Dewey and Angell define the subject matter of functionalism?
.....
.....
- 2) Which of the views of Woodworth were later adopted by the social-learning and humanistic theorists?
.....
.....

Because it is not possible to objectively know what is going on inside an individual, Woodworth accepted introspection as a valid method for data collection. Introspection was used in conjunction with observational and experimental methods. Developing upon the work of John Dewey and William James, Woodworth also introduced the notion of dynamic psychology to functionalism. The word 'dynamic' in this context had been used by Dewey and James as early as 1884 and 1908 respectively. The main focus of dynamic psychology is motivation. When studying behaviour, Woodworth considered important the physiological events occurring inside the organism. Focusing on cause and effect relationships, he was primarily interested in understanding the forces that motivate people to behave in a particular way. In line with this, he argued that the goal of psychology should be to examine why people behave the way they do.

5.5 CRITICISMS OF FUNCTIONALISM

The greatest opposition to functionalism came from structuralism. With both approaches gaining prominence, American psychology appeared torn between Titchener's structuralism at Cornell and functionalism at Chicago.

A basic criticism of functionalism was that the term functionalism had not been very well defined. A student of Titchener, Ruckmick, investigated the use of the term *function* in 15 introductory psychology textbooks. He found two most common uses: a) function as an activity or process; and b) function as a service to other processes or to the whole organism.

In the first instance, 'function' is synonymous with activity. For example, the actions of remembering or perceiving were also being referred to as functions. In the second instance, use of the word 'function' highlights the usefulness of an action to the organism, e.g., digesting food is an action (of the digestive system).

Based on these observations, Ruckmick attacked functionalists for their ambiguity regarding what the term meant and the resulting inconsistency in its usage. Seventeen years after this criticism had been put forward, Harvey

Carr, in 1930, responded to it by saying that in both the instances, the same processes are being referred to, and therefore, the two definitions are not inconsistent.

Carr supported his response by arguing that functionalists do not just study a particular activity for its own sake (definition 1) but also for the relationship between that activity and others (definition 2). He observed that biologists also follow a similar approach in their field of study. Functionalists, though, used the concept first and defined it later; and this sequence of events is characteristic of the movement.

A second criticism from Titchener and other structuralists was against the definition of psychology given by functionalism. They claimed that because the functionalist school did not abide by the subject matter and methods put forth by structuralism, functionalism was not psychology at all. This argument arose largely from Titchener's belief that if anything deviated from studying the mind and its smaller elements via introspection, it was not psychology at all.

Following the pure versus applied psychology debate, other critics focused on the interest of functionalists in applying psychology and its principles to the real world. Structuralists were resistant to the idea of applying psychological knowledge to practical problems of everyday life. Functionalists, however, remained unapologetic and showed no interest in contributing to psychology simply as a pure science.

Carr was of the opinion that both pure and applied psychology can incorporate empirical methodologies, and that meaningful researches can be conducted in all sorts of settings from classrooms and laboratories to factories and offices. The method, and not the subject matter, was believed to be a more important determinant of scientific worth of any research.

The debate between pure and applied psychology is not as extreme today as it was then. This is mainly because of the great extent to which applied psychology has become ubiquitous — psychological principles are being applied across situations for practical reasons. This widespread application of psychological principles to everyday problems has become a significant contribution of the functionalist movement.

5.6 CONTRIBUTIONS OF FUNCTIONALISM

By opposing structuralism and its basic tenets, functionalism brought about a significant shift in the focus of study from structure to function of consciousness. Another contribution of this school of thought was that it resulted in animal studies also becoming incorporated in psychological researches. Besides studies with animal subjects, functionalists also emphasized studies on infants, children, and those with mental disabilities. The methods deemed acceptable to be used in psychological researches also broadened with the rise of functionalism. In addition to the method of introspection used by the structuralists, functionalists also relied on the use of physiological measures, mental tests, questionnaires, and objective descriptions of behaviour.

By the time Wundt and Titchener passed away in 1920 and 1927 respectively, both experimental and structural psychology had been surpassed by functionalism in the United States. The most significant contribution of functionalism remains its emphasis on the applications of psychological concepts and principles to resolve practical problems.

Check Your Progress 3

- 1) How did the structuralists criticism of functionalism bring about the debate of pure versus applied psychology?
.....
.....
- 2) How did functionalism broaden the scope of psychology?
.....
.....

5.7 SUMMARY

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

- The development of the second school, and the first truly American school of thought of psychology, functionalism, is largely credited to the work of William James, considered to be the greatest American psychologist.
- Functionalism tried to study the mind in terms of its functionality. That is, functionalism looked at the mind as comprising numerous functions and processes that have consequences for an individual in the real world, and aimed to discern how these mental processes help individuals adapt to their environment.
- Functionalists were typically interested in understanding how the behaviour of individuals and consciousness were functional in helping them adapt to their environment.
- Charles Darwin, Francis Galton, George Romanes, Thomas Morgan, Herbert Spencer, and William James are regarded as the antecedents of functionalism.
- William James was not the founder of functionalism, but his ideas foreshadowed what was to become the functionalist movement.
- The book by William James, *The Principles of Psychology* (1890), eventually became the central tenet of functionalism. According to which, the goal of psychology is to study how people adapt to their environment, instead of examining the elements of consciousness.
- Titchener, the founder of structuralism, helped formalise functionalism as a school of thought in psychology. In his 1898 article titled *The Postulates of a Structural Psychology*, Titchener tried to differentiate between structuralism and functionalism.
- John Dewey and James Rowland Angell, directly contributed to the development of functionalism. It was William James who believed

that these two should be the ones considered the founders of the functionalist school, also referred to by James as the “Chicago school”.

- A critical starting point for functionalism was the publication of John Dewey’s article *The Reflex Arc Concept in Psychology* in *Psychological Review* (1896). This article is referred to as the “opening shot” of the functionalist movement. The reflex arc refers to the connection between a sensory stimuli and motor responses to it.
- In 1904, Angell published a textbook titled *Psychology*. In it, Angell contended that the role of consciousness is to help an organism adapt and the goal of psychology, therefore, should be to study how the mind helps in the process.
- It was under Harvey Carr that functionalism at Chicago gained maximum prominence as a formal system of psychology. Other contemporary schools that were also coming up, like behaviourism, Gestalt psychology, and psychoanalysis, were regarded by Carr as concerned with only a restricted portion of the larger field of psychology.
- Carr, propagated the importance of mental processes over content and elements of consciousness. Further, he defined what such mental processes entail and what they accomplish. By 1925, these notions had become accepted facts rather than areas of dispute in psychology.
- Robert Sessions Woodworth at Columbia University also developed another functionalist approach. Woodworth viewed the organism as interjected between the stimulus and the response. For this reason, he believed that the subject matter of psychology should include both consciousness and behaviour. This viewpoint was later adopted by both the humanistic and social-learning theorists.
- Woodworth introduced the notion of dynamic psychology to functionalism. The main focus of dynamic psychology is motivation. He argued that the goal of psychology should be to examine *why* people behave the way they do.
- A basic criticism of functionalism was that the term functionalism had not been very well defined. A student of Titchener, Ruckmick, found two most common uses of the term *function*: a) function as an activity or process; and b) function as a service to other processes or to the whole organism.
- With respect to the pure versus applied psychology debate, critics focused on the interest of functionalists in applying psychology and its principles to the real world. Structuralists were resistant to the idea of applying psychological knowledge to practical problems of everyday life. Functionalists, however, remained unapologetic and showed no interest in contributing to psychology simply as a pure science.
- By opposing structuralism and its basic tenets, functionalism brought about a significant shift in the focus of study from structure to function of consciousness.

- Functionalism resulted in the widening of the scope of psychological research. Functionalists emphasized on research with animal subjects, infants, children, and those with mental disabilities.
- The methods deemed acceptable to be used in psychological researches also broadened with the rise of functionalism. In addition to the method of introspection used by the structuralists, functionalists also relied on the use of physiological measures, mental tests, questionnaires, and objective descriptions of behaviour.

5.8 KEY WORDS

Functionalism: Looked at the mind as comprising numerous functions and processes that have consequences for an individual in the real world, and aimed to discern how these mental processes help individuals adapt to their environment. This made it markedly different from the structuralism that looked into the structure of mind.

Applied Psychology: Functionalists were interested in understanding how individuals' behaviours and consciousness were functional in helping them adapt to their environment, making them focus on the utilitarian value of human consciousness and behaviour. This emphasis on functionality of mental processes and behaviours eventually led to the functionalists developing an increasing interest in applying psychological principles to day-to-day problems concerning how individuals adapt to and successfully function in different environments. The functionalist movement, thus, played a crucial role in the rapid development of applied psychology in America.

Chicago School: The proper beginning of functionalism was at Chicago University, with the founders being John Dewey and James Rowland Angell. Due to this, functionalism, initially was referred to as the Chicago school of thought.

Reflex Arc: The concept given by John Dewey, the reflex arc refers to the connection between a sensory stimuli and motor responses to it. Dewey proposed studying behaviour in terms of the role it plays in helping organisms adapt to their environment. The subject matter of psychology was, therefore, identified as the total organism as it functions in its environment.

Functional Role of Consciousness: Consciousness is seen in terms of its functional, practical utility as a mediator between an organism's needs and the demands of their environment.

Adaptive Behaviour: The function of such mental activities is to acquire, retain, organize, and evaluate experiences and then to use them to guide one's action. Specific actions in which mental activities appeared were referred to by Harvey Carr as "adaptive" or "adjustive" behaviour.

Dynamic Psychology: The main focus of dynamic psychology is motivation. Woodworth considered important the physiological events occurring inside the organism. Focusing on cause-and-effect relationships, he was primarily interested in understanding the forces that motivate people to behave in a particular way. The goal of psychology should be to examine *why* people behave the way they do.

5.9 REVIEW QUESTIONS

- 1) Name the founders of functionalism.
- 2) What were the different types of methods used by the functionalists?
- 3) What is psychology according to functionalism?
- 4) How is functionalism associated with applied psychology?
- 5) In what ways did William James have an influence on functionalism?
- 6) How was Dewey's idea different from Wundt and Titchener?
- 7) Discuss the themes of the functionalist movement as suggested by Angell.
- 8) In what ways did Harvey Carr refine functionalism?
- 9) How did Woodworth carry forward the work of William James and John Dewey?
- 10) What was Ruckmick's criticism against functionalism?

5.10 REFERENCES AND FURTHER READING

Brennan, J. F. (2014). *History and Systems of Psychology*. Harlow: Pearson Education Ltd.

Hergenhahn, B. R. & Henley, T. B. (2009). *An Introduction to the History of Psychology*. Wadsworth: Cengage Learning

Leahey, Thomas H. (2017). *A History of Psychology. From Antiquity to Modernity*. Routledge.

Marx, M. H. & Hillix, W. A. (1963). *Systems and Theories in Psychology*. New York: McGraw-Hill.

Schultz D. P. & Schultz, S. E. (2008). *A History of Modern Psychology*. Wadsworth: Thomson Learning, Inc

5.11 REFERENCES OF FIGURES

Charles Darwin: [Charles Darwin - Wikipedia](#)

Gouinlock, J. S. (2020). John Dewey: American Philosopher and Educator. <https://www.britannica.com/biography/John-Dewey>

The Editors of Encyclopaedia Britannica (2006). James Rowland Angell: American Psychologist and Educator. <https://www.britannica.com/biography/James-Rowland-Angell>

Pillsbury, W. B. (1955). Harvey A. Carr: 1873 – 1954. The American Journal of Psychology, 68 (1), 149 -151 <https://www.jstor.org/stable/1418404>

Martinez, G. G. (n.d.). Robert Sessions Woodworth: biografía de este psicólogo estadounidense. <https://psicologiyamente.com/biografias/robert-sessions-woodworth>

5.12 WEB RESOURCES

The Editors of Encyclopaedia Britannica (2017). Functionalism. <https://www.britannica.com/science/functionalism-psychology>

Biography (2020). John Dewey. <https://www.biography.com/scholar/john-dewey>

Encyclopaedia.com (2020). Angell, James Rowland. <https://www.encyclopedia.com/people/medicine/psychology-and-psychiatry-biographies/james-rowland-angell>

The Editors of Encyclopaedia Britannica. (2005). Robert S. Woodworth. <https://www.britannica.com/biography/Robert-S-Woodworth>

Answers to Review Questions (1-2)

(1) John Dewey and James Rowland Angell (2) introspection, experimental method, observation, physiological research, mental testing

