PSYCHOLOGICAL FOUNDATION OF EDUCATION

MA [Education]

First Semester

II (EDCN 702C)

[ENGLISH EDITION]

Directorate of Distance Education

TRIPURA UNIVERSITY

Reviewer

Dr Sitesh Saraswat

Reader, Bhagwati College of Education, Meerut

Books are developed, printed and published on behalf of Directorate of Distance Education, Tripura University by Vikas Publishing House Pvt. Ltd.

VIKAS® PUBLISHING HOUSE PVT. LTD.
E-28, Sector-8, Noida - 201301 (UP)
Phone: 0120-4078900 • Fax: 0120-4078999
Regd. Office: 576, Masjid Road, Jangpura, New Delhi 110 014
• Website: www.vikaspublishing.com • Email: helpline@vikaspublishing.com

SYLLABI-BOOK MAPPING TABLE

Psychological Foundation of Education

Syllabi	Mapping in Book
Unit: I **Educational Psychology:** Concept, Nature and Scope of Educational Psychology, Relationship between Education and Psychology, Educational Psychology as Applied Field Contribution of the Following Schools of Psychology Towards Education: Behaviourism, Gestalt, Psychoanalytical.	**Unit 1:** Educational Psychology **(Pages 3-23)**
Unit: II **Process of Growth and Development** – Physical, Social, Emotional and Cognitive – Development of Concept, Logical Reasoning, Problem Solving, Language. Individual Differences: Determinants, Role of Heredity and Environment, Educational Implications.	**Unit 2:** Growth and Development **(Pages 25-102)**
Unit: III **Intelligence:** Concepts, Theories and Measurement **Creativity:** Concepts, Process, Identification, Measurement and Fostering Relationship between Intelligence and Creativity.	**Unit 3:** Creativity and Intelligence **(Pages 103-143)**
Unit: IV **Theories of Learning:** Thorndike's Connectionism; Pavlov's Classical and Skinner's Operant Conditioning; Learning by Insight; Hull's Reinforcement Theory and Tolman's Theory of Learning, Lewin's Field Theory – Gagne's Hierarchy of Learning – Factors Influencing Learning – Learning and Motivation – Transfer of Learning and its Theories.	**Unit 4:** Theories of Learning **(Pages 145-202)**
Unit: V **Psychology and Education of Exceptional Children:** Creative, Gifted, Backward, Learning Disables and Mentally Retarded. **Personality:** Type and Trait Theories–Measurement of Personality Mental Health and Hygiene–Process of Adjustment, Conflict and Defense Mechanism, Mental Hygiene and Mental Health. Sex Education.	**Unit 5:** Psychology and Education of Exceptional Children **(Pages 203-260)**

CONTENTS

INTRODUCTION

NOTES

Psychology contributes to a better understanding of the aims of education by defining them and making them clearer. Psychology makes ideas of educational aims clearer. It influences education very strongly due to its blend with different features pertaining to learning and teaching. If a teacher has no knowledge about psychology, he/she will not be able to understand the needs and problems of a child. Psychology guides to comprehend the differences individually and counter them with suitable educational strategies. It also helps teachers in guiding students and counselling them.

Psychology provides a scientific base to education. It also gives a dignified appearance and discipline to it. One can use the methods of experimentation, due to psychology's contribution to education. An analysis has been carried out on the tendency and power of the mind, by using psychological methodologies. Measuring the capacity of the mind has become feasible with psychology as an objective science. In addition, one can also demarcate the different dimensions of mental operations.

This book, *Psychological Foundations of Education*, has been designed keeping in mind the self-instruction mode format and follows a simple pattern, wherein each unit of the book begins with an *Introduction* to the topic followed by *Unit Objectives*. The content is then presented in a simple and easy-to-understand manner, and is interspersed with '*Check Your Progress*' questions to test the reader's understanding of the topic. A list of *Questions and Exercises* is also provided at the end of each unit, and includes short answer as well as long-answer questions. The *Summary* and *Key Terms* section are useful tools for students and are meant for effective recapitulation of the text.

UNIT 1 EDUCATIONAL PSYCHOLOGY

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Structure

1.0 INTRODUCTION

Educational psychology involves the study of how people learn, including concepts such as student outcomes, instructional process, and individual differences in learning and learning disabilities. Educational psychology is one of the many branches of psychology dealing mainly with the problems, processes and products of education. It is an attempt to apply the knowledge of psychology in the field of education. Here we try to study human behaviour, particularly the behaviour of the learner in relation to his educational environment. This branch of psychology involves not just the learning process of early childhood and adolescence, but also includes the social, emotional and cognitive processes that are involved in learning throughout the entire lifespan. The field of educational psychology incorporates a number of other disciplines, including development at psychology, behavioural psychology and cognitive psychology.

In other words, educational psychology may be defined as that branch of psychology which studies the behaviour of the learner in relation to his educational needs and his environment. Educational psychology has been defined by various psychologists and scholars. For the sake of understanding what educational psychology is, let us analyse a few important definitions.

NOTES

- **B. F. Skinner (1958):** Educational psychology is that branch of psychology, which deals with teaching and learning.
- **Crow and Crow (1973):** Educational psychology describes and explains the learning experiences of an individual from birth through old age.
- **E. A. Peel (1956):** Educational psychology is the science of education.

The definition given by Skinner considers educational psychology to be the psychology of teaching and learning, i.e., psychology applied in the field of education for improving the methods and products of the teaching–learning, and it is this which helps the teacher and the learner.

The definition given by L. D. Crow and Alice Crow describes educational psychology as that subject area of the curriculum through which one can study the development of an individual in terms of his learning achievement during his life-span. How one goes on learning as a result of interaction with the environment and how one can learn effectively is covered by educational psychology.

Learning, however, on account of its close association with experience, often said to be a great teacher, is never independent of teaching. Therefore, what we find in the process of development is nothing but a planned spontaneous scheme of teaching and learning. All our efforts and energies in the field of education are directed to planning and devising the appropriate means of better teaching and effective learning. Educational psychology is mainly meant for solving the practical problems related to the field of education, especially the process of teaching and learning.

It is these considerations that led E. A. Peel to define and describe educational psychology as the science of education, i.e., a discipline that can be used to improve the process and products of education in a scientific way.

1.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- State the meaning of educational psychology
- Describe the scientific as well as artistic nature of educational psychology
- Explain the nature and scope of educational psychology
- Discuss the relationship between education and psychology
- Assess the contribution of different schools of psychology towards education

1.2 EDUCATIONAL PSYCHOLOGY: A SCIENCE OF EDUCATION

Science and technology have made it possible for us to carry out all our tasks efficiently, effectively and speedily. With the help of minimum input in terms of labour, energy and time, science helps us to derive maximum output in terms of the quality and quantity of the finished products or outcomes. Science and technology have, thus, made our life quite comfortable.

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Let us try to evaluate educational psychology against this criterion. What role can it play in the field of education? Does it help the persons connected with the task of arranging and providing education or getting the fruits of education in the same way as science and technology help those connected with other tasks in our day-to-day life? Surely it does. It helps in realizing the objectives of education in a better way. Education aims at shaping the behaviour of the students in a desirable way and bringing about all-round development in their personality. The task is carried out through the process of formal or informal teaching and learning. Educational psychology comes in here for planning the process of teaching and learning by adopting the scientific principle of minimum input for maximum output. As a result, with the help of educational psychology, a teacher can teach effectively by making minimum use of his energy in terms of time and labour. Similarly, the students can learn effectively by spending less time and effort.

Educational psychology, thus, helps to carry out the process and produce the results of education. It supplies the necessary knowledge and skills, especially for the teacher, to realize the objectives of education. It equips the teacher by supplying the essential scientific skills, technological expertise, and advice in moulding and shaping the behaviour of his or her students for the desirable all-round development of their personality much in the same way as the persons connected with the actual construction of a bridge are helped by an engineer or mechanic equipped with the essential civil, mechanical or electrical technology. Educational psychology, therefore, pays the same role as other sciences or technology in helping the teachers and other persons connected with the building of the future of the youngsters in their change. Thus, we are justified in describing educational psychology as the science and technology of education.

1.3 EDUCATIONAL PSYCHOLOGY: NATURE AND SCOPE

In the foregoing discussion, we have substantiated Peel's definition of educational psychology as a science of education and established that the nature of educational psychology is scientific.

1.3.1 Nature of Educational Psychology

In discussing the nature of psychology, we have clearly shown that the basic nature of the subject is scientific. Since educational psychology is an offshoot, and part and parcel of psychology, its nature cannot be different from the main subject. The following points further confirm the nature of educational psychology as scientific:

- Educational psychology possesses a well-organized, systematic and universally accepted body of facts supported by the relevant psychological laws and principles.
- It is constantly in search of the truth, i.e., studying the behaviour of the learner in relation to his educational environment. Moreover, the findings of such a study are never taken as absolute and permanent. The results of any study in

educational psychology can be challenged, and are modified or altered in terms of the latest explanation and findings.

1.3.2 Scope of Educational Psychology

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Scope means the limit of a particular subject in the field of its operation (what is to be included in it or what subject matter does it contains comes under its scope). Educational psychology is the science of education, and it helps the teacher to mainly deal with the problems of teaching and learning. It is the task of modifying the learner's behaviour and bringing about an all-round development in his personality. Therefore, in psychology, the scope of study and the field of operation are extended to cover the behaviour of all living organisms related to all their life activities. The psychologist who deals with the problems of education are concerned with what to teach, when to teach and how to teach. In educational psychology, the scope of such behavioural study has to be limited within the confines of the teaching–learning process, i.e., studying the behaviour of the learners in relation to their educational environment, specifically for the satisfaction of their educational needs and the all-round development of their personality. Specifically, the subject matter of educational psychology must be centred on the process of teaching and learning, enabling the teacher and learners to do their jobs as satisfactorily as possible.

Henry Clay Lindgren, an emeritus professor of psychology at San Francisco State University, points out that educational psychology is concerned with understanding the learner, the learning process and the learning situation. The scope of educational psychology may be discussed under the following points:

- Who is being taught or educated?
- By whom is he or she to be taught or educated?
- Why is education to be provided to the child or what are the values or objectives that are to be aimed at through the teaching–learning process?
- What is to be taught or what learning experience is to be imparted to the learner for achieving the desired educational objectives?
- How, when and where should these learning experiences be satisfactorily provided to the learner for achieving the desired educational objectives?

Educational psychology seeks to provide satisfactory solutions and answers to all the questions raised above except the 'why' of education, as it is purely the concern of educational philosophy, a matter to be decided by society or the government.

Educational psychology states that the development of the human brain can be traced and classified four stages, which are levels of the child's relationship with the surroundings. In these four stages, a child develops cognitive abilities and social understanding. These four stages also determine the abilities of creativity, intelligence, morality and motivation in a child. Educational psychology also studies the much-debated heredity versus environment aspect of a child's mental and behavioural development. There are instances when children of the same class have varied levels of understanding regarding a concept; in this case, educational psychology aims to analyse the reason for the difference.

CHECK YOUR PROGRESS

1. How have science and technology helped us?
2. How does educational psychology help in planning the process of teaching and learning?
3. How does Lindgren refer to educational psychology?

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1.4 RELATION BETWEEN EDUCATION AND PSYCHOLOGY

Psychology has a very important role to play in the field of education. Psychologists work in schools and universities to guide students in their educational and vocational problems. They also work to solve problems of adjustment. Conducting aptitude, intelligence and personality tests is a part of their counselling sessions.

The psychologists working in schools also help teachers in developing skills in solving classroom problems, and develop and improve teaching methods to increase class effectiveness.

Some students are unique and require special teaching assistance. Psychologists also help in designing programmes for such special children.

Educational psychology is the application of psychological findings in the field of education. It is the systematic study of the development of the individual within the educational settings. Educational psychology helps the teacher to transform a student into a responsible and participating citizen, a sensitive and reflective human being, and a productive and creative person.

American psychologist John B. Caroll (1965) defined educational psychology as 'the study of school learning in all its aspects'. Klousmier *et al.*, (1975) suggest that it is the science that studies the student behaviour in educational settings. Student behaviour and the educational process set the boundaries of its content and methodology. Another psychologist N. L. Gage (1967) opined that educational psychology should deal with the psychology of different methods of teaching, characteristics of learners and the conduct of teachers.

American educational psychologist Charles Hubbard Judd describes educational psychology as 'a scientific study of the life stages in the development of an individual from the time he is born until he becomes an adult'.

Educational psychology is applied to the educative process from birth to death of an individual. Lindgren (1976) has pointed out that there are three elements or focal areas in education that concern educational psychologists and teachers. These are as follows:

- **The Learner:** The learner is the most important of the three elements, not only because people are more important than processes or situations but also primarily because without the learner, there is no learning. A

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great deal of what happens in the classroom (or is expected to happen) can be explained in terms of the personalities of students, individual differences, developmental characteristics, mental health, intelligence and psychological problems of students.

- **The Learning Process:** By learning process, we mean whatever people do when they learn. What they 'do' includes behaviour that is not directly observable, such as perceiving, thinking, remembering and identifying; as well as the behaviour that can be directly observed, such as writing, computing, attending and talking.
- **The Learning Situation:** It refers to the environment in which the learner finds himself/herself, and in which the learning process takes place. It includes factors or conditions that affect the learner and the learning process. The teacher is one element and another is the classroom setting (ventilation, light, noise and arrangement of seats, and so on).

1.4.1 Importance of Educational Psychology for the Teacher

Educational psychology helps the teacher in the following ways:

1. Contributions to Theory of Education

- ***Better understanding of developmental characteristics:*** Children pass through different stages of development, such as infancy, childhood and adolescence. These developmental stages have their own characteristics. If the prospective teacher knows the characteristics of learners emerging at different stages of development, he/she can utilize these characteristics in imparting instructions and moulding their behaviour according to the specified goals of education.
- ***Knowledge of the nature of classroom learning:*** The knowledge of educational psychology provides a teacher the knowledge of learning process in general and problems of classroom learning in particular. It also helps in developing a comprehensive theory of classroom learning. We know from our daily experience in schools that some teachers are successful in the classroom than others. Some communicate very effectively in the class to students and some fail irrespective of their knowledge of the subject matter. What makes this difference? Definitely to be successful in the class, a teacher must know something other than the subject matter. It is the knowledge of science of behaviour which makes the difference. He/She must understand the students whom he/she teaches, their developmental characteristics, their abilities and the influence, and the contribution of heredity and environment in the process of an individual's personality development.
- ***Better understanding individual differences:*** No two individuals are alike in the world. The teacher has to face a class of 30 to 50 students who have a great range of individual differences. The teacher with the help of the knowledge of the kind of individual differences may adjust his/her teaching to the needs and requirements of the class.

NOTES

- ***Knowledge of effective teaching methods:*** Everyday experience shows that the lack of proper methods of teaching sometimes results in failure of communication in the classroom. Educational psychology gives us the knowledge of appropriate methods of teaching. It helps in developing new strategies of teaching. Valid psychological principles not only suggest new techniques of teaching–learning but also eliminate many traditional practices that have become obsolete in the present context.
- ***Better understanding of problems of children:*** By studying educational psychology, a teacher may understand the causes of the problems of children, which occur at different age levels, and can successfully solve them. There is a great difference in the method of solving problems of children by a trained teacher and an untrained teacher.
- ***Knowledge of mental health:*** Mental health of the teacher and the students is very important for effective teaching–learning process. The teacher from the study of psychology can know the various factors which are responsible for the mental ill-health and maladjustment. He/She can be very helpful to prevent maladjustment in children provided that the prospective teacher is equipped with the fundamental knowledge of mental hygiene.
- ***Curriculum construction:*** Psychological principles are also used in formulating curriculum for different stages. Needs of the students, their developmental characteristics, learning pattern and needs of the society—all these are to be incorporated in the curriculum. The curriculum in recent years includes the needs of the individual and society so that maximum transfer may occur from school to social situations.
- ***Measurement of learning outcome:*** Psychological tools help the teacher to assess the learning outcomes of the students. He/She can also evaluate his/her teaching methods, and in the light of the performance of his/her students, he/ she can modify his/her strategy of teaching.
- ***Research:*** Educational psychology helps in developing tools and devices for the measurement of various variables which influence the behaviour and performance of students. Teachers can control, direct and predict the behaviour of students on the basis of research studies in classroom teaching.
- ***Guidance for the education of exceptional children:*** The most important single contribution of educational psychology is the provision and organization of education for the exceptional children who had been neglected and devoid of educational facilities.
- ***Development of positive attitude:*** If we examine the activities and curriculum of a training college, we find that the teachers' training programme aims to develop positive attitudes towards teaching profession and provide the prospective teachers with the necessary competencies to meet the classroom challenges.

  They develop confidence in trainees to face the problems and adaptability to deal with unexpected problems in daily classroom teaching.

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- ***Understanding of group dynamics:*** In recent years, educational psychologists have recognized the importance of social behaviour and group dynamics in classroom teaching–learning. The teacher must know about the operations which work in total social environment and their effect on learning.

So far, we have mainly concentrated on the theoretical side of the contribution of educational psychology to education. Psychology has also influenced the practical aspect of education.

2. Contribution to Practice of Education

- ***Problem of discipline:*** 'Spare the rod and spoil the child' was the slogan of traditional teachers who tackled the problems of indiscipline by dint of corporal punishment. Now teachers who have the knowledge of modern educational psychology realize that the use of corporal punishment is inhumane. They have changed their attitude from an autocrat to a democrat.
- ***Use of audio-visual aids:*** Before Independence, the teachers hardly made use of audio-visual aids in their teaching. Rote memorization was the only method of learning. It has been experimentally proved now that the use of audio-visual aids makes the difficult concept more clear and definite, and learning is more lasting. It is the contribution of educational psychology that teachers make use of various types of audio-visual aids in classroom teaching.
- ***Democratic administration:*** Former autocratic methods of administration in school and classroom have been changed by a democratic way of life. Both administrators and teachers are democratic, cooperative and sympathetic. Problems of administration are now solved by mutual discussion among the various agents of school.
- ***Time table:*** There was a time when arithmetic and geometry were taught from morning till evening. No consideration was given to the principles of psychology. Now subjects are kept in the time table, taking into consideration their difficulty level and fatigue index. No two difficult subjects are taught in successive periods.
- ***Co-curricular activities:*** Earlier, teachers used to give undue importance to the theoretical subjects in schools. Activities like debate, drama, scouting and games were supposed to be a wastage of time. Now we give these activities due importance for the harmonious development of the personality of children.
- ***Use of innovations:*** Several innovative ideas have been introduced to improve the teaching–learning process. Activity-centred teaching, discussion method, micro-teaching, programmed instruction and non-graded school classes at the primary stage are some of the important innovations.
- ***Production of textbooks:*** Educational psychology has helped the planning of textbooks. We now write textbooks taking into consideration the intellectual development of children, their needs and interests at different age levels.

The objectives of educational psychology may be summarized as follows:

- Provide teachers with some basic skills related to teaching
- Give teachers guidelines to solve problems of teaching–learning process
- Help teachers to understand the scientific knowledge
- Instil in teachers a spirit of inquiry for their professional growth

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CHECK YOUR PROGRESS

4. Cite a usage of 'educational psychology' to a teacher.
5. What is meant by a 'learning situation'?
6. State the objectives of educational psychology.

1.5 SCHOOLS OF PSYCHOLOGY AND THEIR CONTRIBUTION TO EDUCATION

It is a well-known fact that psychology has been influenced by a number of disciplines.

Psychology as an independent field of study has emerged recently. It is very important for the prospective teacher to have an adequate knowledge of the systematic development of psychology in order to understand the behaviour of learners for bringing about desirable changes in them. There are different viewpoints or approaches or systems or schools of psychology.

1.5.1 Experimental Psychology and Experimentalist Psychologists

Four German scientists, namely, Ernst Weber (1795–1878), Gustav Fechner (1801–1887), Hermann von Helmholtz (1821–1894) and Wilhelm Wundt (1832–1920), were intimately associated with the making of psychology as an experimental science. It was through research in physiology that each became interested in psychological problems. Wundt brought together the various lines of research in his first systematic book of psychology entitled *Physiological Psychology* (1873). He also founded the first experimental laboratory of psychology in Leipzig (Germany) in 1879. Earlier, William James (1842–1910), an American philosopher and scientist, had set up a small demonstration laboratory at Harvard in 1871, which he used as an adjunct to teaching.

After receiving his M.D. degree in 1858, Wilhelm Wundt started his career as a physiologist, but soon became interested in the more complex mental processes and was convinced that experimental methods of the physiologist could be applied to research on consciousness. Wundt is called the 'father of experimental psychology'. Wundt's psychology was transplanted to the United States by his most outstanding student, Edward Bradford Titchener (1867–1927). His another brilliant student James McKeen Cattell (1860–1944) of Columbia University worked on the psychology of individual differences.

NOTES

E. B. Tichener conducted systematic research on the lines of Wundtian tradition. He believed that the science of psychology should deal only with things as they are found to exist. The main objective of psychology is to study and understand human mind, and its structure that is isolating elementary processes from the complexity of consciousness. In his own words, 'No concrete mental process, no idea of feeling that we actually experience as part of a consciousness is a simple process, but that all alike are made up of a number of really simple processes blended together. These simple processes are called "mental elements". They are numerous; there are probably some 50,000 of them; but they all be grouped into broad classes, as sensations and affections.' Scientific enquiry goes from 'parts to the wholes'. So, one must begin with the atoms of a total situation.

Educational implications: Structuralism has been criticized on the ground that general system of psychology was too narrow to embrace all aspects of human behaviour. Since structuralism emerged out of laboratory experiments in Germany, it gave a careful method of data collection. It laid stress on the spirit of science and experimentation in treating educational matters. It emphasized systematic observation of the activities of mind. Experiments in the field of educational psychology were initiated on the basis of experimentation of structuralism.

1.5.2 Functionalism and Functionalist Psychologists

Functionalism is the name given to a system of psychology which studies mind as it functions in adapting the organism to its environment. The roots of this viewpoint go back to the evolutionary biology of Charles Darwin (1809–1882) and the pragmatic philosophy of William James (1842–1910). The functionalist viewpoint came into educational psychology and developed into a movement under the leadership of John Dewey (1859–1952), James Rowl and Angell (1869–1949), and Harvey Carr (1873–1954).

American philosopher and psychologist **William James** spent most of his academic career at Harvard University. He was in turn a physiologist, psychologist and philosopher. His outstanding contribution in psychology was his brilliant book *Principles of Psychology* (1890). His another book *Talks to Teachers* (1899) is also of great significance. James made it clear that mind, as it is revealed in habits, knowledge and perception, is constantly engaged in active give-and-take relations with the environment. Mind, therefore, is useful or functional in adjustment. He emphasized the role of interest in learning. He stated, 'the great thing in all education is to make the nervous system our ally instead of our enemy.'

John Dewey (1859–1952) was a great philosopher, educator and psychologist. Dewey developed an interest in psychology while working for his doctorate on German philosopher Immanuel Kant (1724–1804). It was at Michigan University where he taught psychology as well as philosophy, and Dewey wrote his functionally oriented textbook entitled *Psychology* (1986), which became highly popular with undergraduate students. In keeping with his functional viewpoint in psychology, Dewey's philosophy saw social change as inevitable and capable of being directed for man's benefit. He treated ideas as plans for action that help the individual solve

problem, of living and adjustment. In 1896, Dewey published his famous paper 'The Reflex Act Concept in Psychology' in which he argued that reflexes and other forms of behaviour ought to be interpreted in terms of their significance for adaptation. He believed that the study of the 'organism as a whole functioning in its environment' was the proper subject-matter for psychology. In due course, Dewey became world famous as an exponent of the pragmatic viewpoint in philosophy and for his advocacy of progressive education.

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Contribution of Functionalism to Education

Following is the chief contribution of functionalism to education:

- Functionalism stresses that behaviour is adaptable to new situation of life.
- Accordingly, the teachers and the principal should provide such an environment to the students for learning as is conducive to arouse and sustain their motivation in learning.
- Functionalism tended to replace theoretically overloaded curriculum by practical approaches.
- Learning by doing was given a central place in the methods of teaching-learning.
- Functionalism emphasized the study of the various problems of the individual and their solutions.
- It contributed a lot to child psychology and mental testing.
- It pointed out the importance to understand the needs of children at different age levels.
- It stressed the aspect of utility. In other words, it indicated that only those subjects should be included in the curriculums which were useful in society.
- It led to the development of scientific enquiry in education.
- It initiated new methods of teaching and learning.

1.5.3 Behaviourism and Behaviouristic Psychologists

John B. Watson (1878–1958) was an American psychologist who became an ardent proponent of behaviourism. As a graduate student at the University of Chicago, during formative years of functionalistic movement, he became interested in animal research and founded an animal laboratory. He emphasized the study of behaviour by experiments. Watson explained his behaviourism in an article 'Psychology and the Behaviourist' which was published in the *Psychological Review* (1913). He explained his point of view in three books—*An Introduction to Comparative Psychology* (1914), *Psychology from the Standpoint of a Behaviourist* (1919) and *Behaviourism* (1925).

He believed that concepts like mind-consciousness and image have no place. He stated that psychology was the *Science of Behaviour.* According to him, behavioural acts are to be described objectively in 'terms of stimulus and response, in terms of habit formation, habit integration and the like'. Watson discarded mentalistic

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concepts such as consciousness and mind, and proposed the following methods for behavioural research:

- Observation, with and without instrumental control
- Conditioning reflex method
- Verbal report method
- Testing method

Watson showed how the objective, analytic methods of animal laboratory could be applied to human beings, particularly through the use of the conditioning response. In his book *The Psychological Care of the Infant and Child* (1929), he pointed out the use of infants and children as subjects for psychological investigation. Watson suggested that the behaviouristic psychology had much to offer such professions as advertising, law, industry and education.

Contribution of Behaviourism to Education

Eminent psychologist P. Symonds has given the following implications of behaviourism for teaching and learning: 'The most potent reward (reinforcement) for class-room learning is the teacher's acceptance what the pupil does and the way he does it because this acceptance becomes a guide in his future activities. This acceptance on the part of the teacher can take the form of tangible tokens, such as gold stars, honours rolls and the like. But there is a tendency to short-circuit so that a "correct or right" will do equally well.'

Following are the chief contributions of behaviourism to education:

- Behaviourism has given new methods and techniques of understanding the child behaviour.
- It has contributed to the understanding of the emotions of the child.
- It has given new methodology of teaching known as 'programmed learning', which has been successfully employed in several countries.
- It points out that all behaviour is learnt in the process of interaction with environment.
- It emphasizes the importance of environment and its impact on human growth.
- It has led to the development of new approaches, methods and techniques of dealing with maladjustment in children.
- It has brought psychology out from the controversy of mentalistic approach to human behaviour.
- It has greatly contributed to the psychology of learning.
- It has indicated the importance of motivation.

1.5.4 Psychoanalysis School and Psychoanalysists

In the words of well-known psychologists J. P. Chaplin and T. S. Krawiec (1979), 'Of all the schools of psychology, psychoanalysis has captured the imagination of the general public to the extent that many laymen erroneously equate psychology with psychoanalysis.'

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This highly influential movement got underway in Vienna at die end of the 19th century under the leadership of Austrian neurologist Sigmund Freud (1856–1939). Freud obtained a degree in medicine with specialization in neurology. As a practising physician, he became aware that many of his patients were in reality suffering from mental conflicts that were manifested as physical ailments and disorders. He was convinced that what the patient needed was psychotherapy rather than physical therapy. He became associated with a French practitioner J. M. Charcot (1825–1893) and a German J. Breuer (1842–1925), who had been utilizing hypnotic treatment in the case of hysteric patients.

Freud deeply studied the technique of hypnotherapy and found that its scope, was limited and in several cases, the cure was superficial. The illness subsequently broke out in another form with a different set of symptoms. Freud eventually recognized that the real value lay in the psychic analysis. The psychoanalysis usually consists of having the patient relax on a couch and freely tell whatever comes to his or her mind. This is the method *of* free association.

The psychoanalyst listens to and observes the patient as unobstructively as possible for emotional reactions, signs of distress and resistance to treatment. Out of his clinical experience, Freud developed a number of important concepts—the division of the personality into *id*, *ego* and *superego.* He emphasized the importance of unconscious in mental life. He considered the *dream* a main route into the unconscious process.

Dream interpretation became an important part of both the therapeutic process and the theory of psychoanalysis. Freud also felt that sexual malfunctions underlie hysteria and other neurotic disorders. His conclusions that neurotic disturbances originate in early childhood have made everyone who is engaged in the care, training and education of children, extremely child-centred. The impact of Freudian psychoanalysis had a profound influence on the direction of development psychology which considers the child no longer as a miniature adult but as an individual with his or her own needs, potentials and problems.

Freud's collected works consist of 24 volumes. His landmark publications include the following:

- *The Interpretation of Dreams* (1900)
- *The Psychopathology of Everyday Life* (1904)
- *The Three Essays on the Theory of Sexuality* (1905)
- *Beyond the Pleasure Principle* (1920)
- *The Future of an Illusion* (1928)
- *Civilization and Its Discontents* (1930)

Contribution of Psychoanalysis to Education

- Psychoanalysis has brought out the need for early childhood education.
- Freud emphasized that unconscious motivation plays an important role in the process of learning.

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- Psychoanalysis emphasizes the importance of the experiences of early childhood in the process of learning and education. These early experiences play an important role in laying down the foundation of the personality of the child.
- Among the major factors leading to the development of positive attitudes in the child towards life are affection, love and sympathy.
- Psychoanalysis states that children should get opportunities to express their emotions freely in and outside the class. This is very conducive to the healthy development of children.
- Psychoanalysis throws a lot of light on the causes leading to maladjustment in children.
- Psychoanalysis appeals to the teachers to be positive in their outlook.

1.5.5 Constructivism

Constructivism is a basic theory that elaborates on how knowledge is built (or 'constructed') when new information pours in and comes in contact with the already existing knowledge bank, which has been developed in the course of time by various researchers. Constructivism finds its roots in cognitive psychology as well as human biology. It is that approach to education which gives due emphasis to the various methods followed in the creation of knowledge, and that finds adaptability in the changing education scenario.

Constructs are the special types of filters that are selected in order to place over those realities to bring change in the existing reality—from the state of 'chaos' to the state of 'order'. Philosopher and Emeritus Professor of Psychology at the University of Georgia, Ernst von Glasersfeld describes constructivism as 'a theory of knowledge with roots in philosophy, psychology, and cybernetics'. Constructivism finds its implications in the theory of instruction. Discovery, hands-on, experiential, project-based and task-based learning process, and collaborative are a number of applications that base teaching and learning on constructivism.

It is not at all necessary that constructivist learning theory implies that a learner must follow a 'constructivist' pedagogical strategy. Rather, it is the opinion of most of the researchers that knowledge is constructed, but a few (for instance, mainstream instructional designers) do not adopt an instructional design pattern, which can be tagged as being 'constructivist'. In a normal situation, a constructivist teaching strategy is based on the assumption that learners learn best when they gain knowledge through exploration and active learning. In place of textbooks, hands-on materials are utilized, and the learners are motivated to think and reason. Moreover, they need to give explanation on their reasoning, rather than memorizing and reciting facts fed to their memory. Education revolves around the themes and concepts, and the relationship between them, rather than isolated information.

Under the theory of constructivism, educators focus on building relations between facts and promoting new understanding in students. Instructors tailor their teaching strategies to student responses and encourage their students to analyse,

interpret and predict information. Teachers/Instructors also rely heavily on open-ended questions and promote extensive dialogue among learners. Constructivism calls for the elimination of grades and standardized testing. Rather, the theory of constructivism suggests that assessment becomes a part of the learning process with the intention that learners can play a bigger role in evaluating their own growth.

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1.5.6 Gestalt Theory of Learning

Gestalt is a German word whose equivalent in English is 'form' or 'pattern' or 'configuration'. Famous psychologist Max Wertheimer has explained the term *Gestalt* as the whole being greater than the parts. For example, a flower is just not a total of sepals, petals, calyx, corolla, colour, honey and fragrance. However, the total of the part is not equal to the whole. This is known as a *Gestalt* viewpoint. According to this view, learning is the organization and reorganization of behaviour that arises from the interaction of a maturing organism and its environment. It is the development through this interaction of new forms of perception, imagination motor coordination and other organic behaviour. The sudden appearance of a solution is an essential characteristic of insight learning. A sudden coherent pattern of a solution appears at once. The individual does not perform random activities but preserves the situation as a whole, and intuitionally reaches the goal through an awakened insight by continuous, definite and seemingly purposive reactions. Insight is the perception of relationship between at least three factors—an agent, goal and intervening conditions or obstacles. An insight is often termed as the AHA experience, a flash of understanding that comes to us all of sudden. Insight, when it occurs, is characteristically accompanied by statements like 'I got it'.

The *Gestaltians* tend to place great emphasis on the intrinsic organizing capacity in the brain of the individual and emphasize on the dynamic interaction of the elements in the entire perceptual feel. The *Gestalt* theory of learning essentially consists of problem solving by understanding the relative position of the elements in the entire perspective or situation. When a problem arises, it tends to disturb the equilibrium of the organism who seeks the balance and the organism. We are all now well aware that a moving picture, as in cartoons, is not moving but, a series of still pictures. The focal point of this theory is the fact that when two optical stimuli are perceived by the human eye in quick succession, the reaction is one of simultaneous patterning.

Principles of *Gestalt* Theory

The *Gestaltians* have mentioned some laws involved in learning. The age at which memory develops is determined chiefly by the growth of a sufficient number of association fibres to bring about recall. There are different modes of connection or association among precepts and ideas. Suggestive force works according to certain laws that are as follows:

- ***Law of similarity:*** This makes the individual grasp things that are similar. These similar things are selected from the total context. Thus, similar ideas and experiences get associated together. An object receives another object that resembles it, for example, seeing a man and remembering an intimate

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friend by some resemblance in his personal appearance. A photo reminds us of the person who it represents.

- ***Law of proximity:*** According to this law, proximate or things lying close to each other are perceived as together. In other words, perceptual groups are favoured according to the nearness of their respective parts. Items tend to form groups if they are spaced together. For instance, the example of a triangle and a circle is enough to illustrate this point.
- ***Law of closure:*** The law of closure implies that closed areas are more stable and satisfying than unclosed ones. Closed areas more readily formed in groups. This law also means that when the perception of the situation is incomplete, the individual is not able to solve the problem. The problem is solved when he is able to bring separate parts of the situation together into a closed perceptual figure, consisting of the goal, and the means of achieving the goal.
- ***Law of continuity:*** This law makes the individual grasp things that are joined together in a string or a line as opposed to objects that are disconnected, disjoined or scattered. In other words, experiences which occur together either simultaneously or in close succession, tend towards reviving one another, for example, the perception of a ripe mango suggests the idea of its sweet taste and flavour because they are perceived together in the past or the idea of an inkpot suggests the idea of a pen.
- ***Law of contrast:*** A perception or an idea tends to suggest its contrary opposite. For instance, adversity reminds a person of his days of prosperity. Similarly, the heat of the summer suggests the cold of winter. These laws of learning highlight *Gestalt's* viewpoint that the organizational capacity of the brain grasps the whole in priority to the parts.

Keeping in view these principles for learning, the teacher should present all curricular material to students in the form of simple, concrete and patterned units of experience that constitute a whole. Children should be taught a tune or a melody rather than separate notes, whole dance patterns rather than separate steps and simple meaningful sentences, rather than discreet words and meaningful words than separate letters for alphabets.

Educational Significance

Gestalt psychology's contribution to education lies in its concepts of the organization of stimuli and of insight. The world of the classroom in which the child is living and learning is not just a body of discrete stimuli nor is his responses to it are those of trial and error adoptions. The world is organized and it has a meaning. The child can react with understanding as he has an insight. Arithmetic is not isolated fact but a system of numbers. History is not names and dates but a sweep of events through time, with one thing leading to or following another. The child can respond to 3 and 4 because he can add three and four. Learning is meaningful. So say the educators and so says *Gestalt* psychology.

Gestalt psychologists suggest educators to conceive the problem of learning in more comprehensive terms. The teacher should organize the learning situations

so that significant relations emerge resulting in advanced levels of understanding. The learning experiences should be so arranged that the learner discovers and generalizes the relationship for himself. The subject matter should be organized into larger units or in meaningful wholes. The concept of unit planning is based on the same.

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In most classrooms, the daily lesson plan is fragmentary. It may encourage mere accumulation of facts, principles, concepts and skills, and the student fails to get a clear picture of the whole. A lesson of prose may be taught in four or five steps or periods. However, if the matter taught on the first day and the last day fail to connect in the minds of students, they tend to get confused. It is, thus, said that the whole is not equal to its parts. Whenever students appreciate the beauty of a poem, the sip of a soft drink or the beauty of a song or picture, they appreciate as a whole. A flower is not merely equal to its various parts. Similarly, the taste of lemonade cannot be analysed based on coldness, yellowness and taste. Thus, it has been seen that for a more complete aesthetic appreciation, poetry should not be taught in the same manner as prose. It should be taught, as far as possible, as a whole, not merely as an amalgamation of meaning, grammar or translation. There is no clarity of connection between an activity and a goal, when the parts are offered one at a time, so that a view of the whole is not possible. When the level of performance is not in congruence with a student's equipment and experience, blunders occur and consume a lot of time and effort. However, the use of proper and graded steps, and sufficient preparing of expectancy from one stage to another can reduce this to a bare minimum. The presence of blundering is, thus, a barometer that measures the intelligence of the teacher and not merely of the performer.

There are two important stresses with regard to the presentation of material. Firstly, where possible, visual presentations, outlines, maps, charts and graphs may be used. In short, devices that permit a survey of the whole problem, which bring out configurational and relational factors—simultaneously presenting what otherwise would remain discrete—have special value. A child who is learning about colours finds it difficult to dissociate the colour from the object itself. To overcome this difficulty, the teacher will have to discover the gaps that exist between the student's perceptual tendencies, and that which appears to be clear and definite. Secondly, there is an obvious difference between a 'psychological' and a 'logical' way of presenting. The logical process will begin from the smallest unit, and from there, the whole framework of the object has to be elaborated. For example, in teaching 'matter' one will proceed as, sub-electronic particles—electrons—atoms molecules—matter. However, satisfying this might look to an expert, who can appreciate the significance of each step of the process, the *Gestaltists* insist that it is not pedagogically sound.

The abstract conceptual items that govern the working of science are really the last items to result in knowledge. If this is correct, one should begin with the living totality and reach the last of all abstract formulations, the unitary process. We can further make this point clear by taking an example from geography. A teacher begins teaching geography by comparing the world map with an orange, and explaining the relation between the sun and the earth. Now, on one hand, this represents one way where the whole is considered before its parts, while on the other hand, it

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represents the worst possible use of the method. An orange has some meaning, but it fails to have the remotest connection with the problems of geography.

It would sound more meaningful to consider the world of the child, for instance, his own house and the houses around him or his school, home and surrounding area of the locality. These are complete units too and make sense to the child. These can be used to establish a basic foundation of geography.

A major point in this learning is that initial insight is only instinctive and automatic. This insight can be brought about through maturation, experience and good arrangement of the environmental forces. The teacher must postpone the task until circumstances are more propitious. If, for example, a child is unable to appreciate a poem, no amount of analysis into rhymes, schemes, grammatical constructions and similes will supply the want. Details must always follow general grasp or vague emotional insight. Further, since it is required for perceptual fields to take shape and relationships to appear, motivation is very critical. It is more of the nature of expectancy, a goal orientation, an awareness of all but complete relationships.

Briefly speaking, this type of learning is very important in education because it discards the memorizer type of learning. It does not consume much time and emphasizes upon meaningfulness, organization and interpretation of the lesson. Here, the individual is engaged in a problem-solving environment that encourages reasoning, develops thinking, and trains imagination and creative activity of the child. Learning by insight can be cultivated. Thus, the teacher should emphasize it by encouraging, helping and guiding the child. This aspect of teaching is also called the Dalton plan or the project method by John Dewey and those who advocate creative activity.

CHECK YOUR PROGRESS

7. Give a drawback of 'structuralism'.
8. Cite a benefit of 'behaviourism'.
9. What is the basic contribution of Gestalt psychologists to education?
10. What is the basic role of an educator as per the theory of constructivism?

1.6 SUMMARY

- With the help of minimum input in terms of labour, energy and time, science helps us to derive maximum output in terms of the quality and quantity of the finished products or outcomes.
- Educational psychology pays the same role as other sciences or technology in helping the teachers and other persons connected with the building of the future of the youngsters in their change.
- Educational psychology is the science of education, and it helps the teacher which mainly deals with the problems of teaching and learning.

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- Henry Clay Lindgren, an emeritus professor of psychology at San Francisco State University, points out that educational psychology is concerned with understanding the learner, the learning process and the learning situation.
- Educational psychology states that the development of the human brain can be traced and classified in four stages, which are levels of the child's relationship with the surroundings.
- Psychologists work in schools and universities to guide students in their educational and vocational problems. They also work to solve problems of adjustment.
- Educational psychology is the application of psychological findings in the field of education. It is the systematic study of the development of the individual within the educational settings.
- American psychologist John B. Caroll (1965) defined educational psychology as 'the study of school learning in all its aspects'.
- It is very important for the prospective teacher to have an adequate knowledge of the systematic development of psychology in order to understand the behaviour of learners for bringing about desirable changes in them.
- Four German scientists, namely, Ernst Weber (1795–1878), Gustav Fechner (1801–1887), Hermann von Helmholtz (1821–1894) and Wilhelm Wundt (1832–1920), were intimately associated with the making of psychology as an experimental science.
- The main objective of psychology is to study and understand human mind, and its structure that is isolating elementary processes from the complexity of consciousness.
- Structuralism emphasized systematic observation of the activities of mind. Experiments in the field of educational psychology were initiated on the basis of experimentation of structuralism.
- Functionalism is the name given to a system of psychology which studies mind as it functions in adapting the organism to its environment.
- The impact of Freudian psychoanalysis had a profound influence on the direction of development psychology which considers the child no longer as a miniature adult but as an individual with his or her own needs, potentials and problems.
- Constructivism is a basic theory that elaborates on how knowledge is built (or 'constructed') when new information pours in and comes in contact with the already existing knowledge bank, which has been developed in the course of time by various researchers.
- *Gestalt* is a German word whose equivalent in English is 'form' or 'pattern' or 'configuration'. Famous psychologist Max Wertheimer has explained the term *Gestalt* as the whole being greater than the parts.
- *Gestalt* psychology's contribution to education lies in its concepts of the organization of stimuli and of insight.

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1.7 KEY TERMS

- **Cognitive abilities:** These are brain-based skills that we need to carry out any task from the simplest to the most complex.
- **Personality test:** It is a questionnaire or other standardized instrument designed to reveal aspects of an individual's character or psychological makeup.
- **Personality development:** It is the development of the organized pattern of behaviours and attitudes that makes a person distinctive.
- **Corporal punishment:** It is the use of physical force causing pain, but not wounds, as a means of discipline.
- **Rote memorization:** It is a memorization technique based on repetition. The idea is that one will be able to quickly recall the meaning of the material the more one repeats it.

1.8 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Science and technology have made it possible for us to carry out all our tasks efficiently, effectively and speedily.
2. Educational psychology helps in planning the process of teaching and learning by adopting the scientific principle of minimum input for maximum output.
3. According to Lindgren, educational psychology is concerned with understanding the learner, the learning process and the learning situation.
4. Educational psychology helps the teacher to transform a student into a responsible and participating citizen, a sensitive and reflective human being, and a productive and creative person.
5. A 'learning situation' refers to the environment in which the learner finds himself/herself and in which the learning process takes place. It includes factors or conditions that affect the learner and the learning process. The teacher is one element and another is the classroom setting (ventilation, light, noise and arrangement of seats, and so on).
6. The objectives of educational psychology may be summarized as follows:
   - Provide teachers with some basic skills related to teaching
   - Give teachers guidelines to solve problems of teaching–learning process
   - Help teachers to understand the scientific knowledge
   - Instil in teachers a spirit of inquiry for their professional growth
7. Structuralism has been criticized on the ground that general system of psychology was too narrow to embrace all aspects of human behaviour.
8. Behaviourism has given new methods and techniques of understanding child behaviour.

9. *Gestaltists* give importance to the perception of relation, organization and whole in learning. They state that it is the whole which determines the behaviour of its part. This implies that the teacher should present his subject-matter as a whole in the class.
10. Under the theory of constructivism, educators focus on building relations between facts and promoting new understanding in students.

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1.9 QUESTIONS AND EXERCISES

Short-Answer Questions

1. Write suitable definitions of educational psychology.
2. How did L. D. Crow and Alice Crow define educational psychology?
3. Which are the four stages classified by educational psychology during the development of a human brain?
4. Name the important methods and techniques of collecting data.
5. Which method of educational psychology will you call objective?

Long-Answer Questions

1. Distinguish between psychology and educational psychology.
2. What is the nature and scope of educational psychology?
3. Describe a problem of education in the solution of which educational psychology can be of help.
4. What is the meaning of experimental method? Give one example of the experimental method. Describe its limitations.

1.10 FURTHER READING

Mangal, S. K. 2007. *Essential of Educational Psychology.* New Delhi: Prentice Hall of India.

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UNIT 2 GROWTH AND DEVELOPMENT

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Structure

2.0 INTRODUCTION

Everyone would like to know how to bring up children in the best possible way, such that they grow up to be healthy, happy and productive individuals. Developmental psychology focuses more specifically on this domain.

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Infancy, in general, is the term used for the first two-and-a-half years of life. Neonatal period comprises the starting two months of infancy. This is the period wherein the primary priority of life is to satisfy one's basic needs: sufficient milk (preferably mother's milk), being warm and dry, and of course, toilet needs to be taken care of. More specifically, the infant needs to be protected from harm and infection. Infection is the biggest hazard during this period of life.

In a way, the neonate (newborn) is a foetus out of its element. The foetus undergoes a great deal of neurological development. In view of the fact that the neurons are still replicating and multiplying their axons, the neonate's nervous system maintains an extensive amount of agility, which means that there is fairly diminutive specialty of function. If injury were to occur to a division of the brain, for instance, a different part of the brain could still make up for it.

Infants have eyesight when they are born. However, they are very near-sighted and their eye movements are not well coordinated. Their hearing sense, on the other hand, already begins to function when they are in the womb, by the 20th week approximately. They have a good sense of smell and taste when they are born. This is the reason that infants prefer sweets, which does not coincidentally comprise mother's milk.

It is evident that the neonate has some fundamental actions and reactions, which are in the form of reflexes, such as rooting (searching for its mother's milk) and the startle reflex. We can also see certain instinctive patterns: The orientation of infants seems to be in the direction of faces and voices, particularly feminine ones and they have an instinct to recognize their mother's voice and scent.

All infants are different, yet they exhibit similar developmental aspects. The cognitive development of infants is a domain of developmental psychology that investigates the internal psychological state of infants and toddlers. In infants, since they do not understand the importance of words, language development is in the form of gestures, voice tones and non-verbal sounds.

In this unit, you will study about the process of growth and development with a focus on the physical, social, emotional and cognitive aspects. The unit will also discuss the development of concept, logical reasoning, problem solving and the importance of language. Finally, you will learn the role of heredity, environment and educational implications on individual differences.

2.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Explain the concept of infant development
- Paraphrase emotional development in different stages of growth
- Describe the different stages of motor development
- Identify the different stages in the transition from infancy to childhood
- Explain the various aspects of cognitive and language development
- Discuss the reasons and concept of individual differences.

2.2 PROCESS OF GROWTH AND DEVELOPMENT

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'Healthy mind lies only in a healthy body' is an old adage and is true to the core. The physical, social, emotional and cognitive development of a child is very important for a number of reasons. In this section, we will discuss each of these categories in detail.

2.2.1 Physical Development

Appropriate physical development gives an invaluable contribution to the all-round development of an individual. When a child is busy in some physical activity, he is emotionally as well mentally involved in it. Physical development of the individual is important both for the individual and social development. It is also important for ethical, moral and spiritual development. A physically unhealthy person, other things being assumed equal, is unable to perform his duties to himself, to the community and to God. He cannot offer his prayers effectively.

By not giving proper attention and care to the physical development of the child, we may be guilty of causing serious handicaps to his total development, including his emotional, intellectual, social, ethical and even spiritual development. A knowledge of the process of the physical growth of the child and development will enable the teacher to equip him for setting his/her programmes according to the needs of the children.

Meaning and Dimensions of Physical Growth and Development

Physical growth and development refer to processes which bring about bodily and physiological changes—which are internal as well as external—in an organism from the conception till his death. Generally, these changes take place in the following dimensions:

- **Gross physical structure or physique:** It involves changes in height, weight, body proportions and the general physical appearance.
- **Internal organs:** It involves changes in the functioning of glands, nervous system and other body systems—circulatory, respiratory, digestive, muscular, lymphatic and reproductive.

General Pattern of Growth and Development

Although there are wide individual differences among children, physical growth and development seem to follow to some extent a general pattern. This general pattern of growth and development may be summarized as follows:

(i) Increase in height and weight: Table 2.1 illustrates increase in height and weight at different ages.

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Table 2.1 *Mean Height and Weight of Male and Female Children (All India)*

Age Group	*Mean Height (cm)*		*Mean Weight (kg)*	
	Male	*Female*	*Male*	*Female*
3 months	56.2	55.0	4.5	4.2
4–6 months	62.7	60.9	6.7	5.6
7–9 months	64.9	64.4	6.9	6.2
10–12 months	69.5	66.7	7.4	6.6
1 year	73.9	72.5	8.4	7.8
2 years	81.6	80.1	10.1	9.6
3 years	88.8	87.2	11.8	11.2
4 years	96.0	94.5	13.5	12.9
5 years	102.1	101.4	14.8	14.5
6 years	108.5	107.4	16.3	16.0
7 years	113.9	112.8	18.0	17.6
8 years	119.3	118.2	19.7	19.4
9 years	123.7	122.9	21.5	21.3
10 years	128.4	128.4	23.5	23.6
11 years	133.4	133.6	25.9	26.4
12 years	138.3	139.2	28.5	29.8
13 years	144.6	143.9	32.1	33.3
14 years	150.1	147.5	35.7	36.8
15 years	155.5	149.6	39.6	36.8
16 years	159.5	151.0	43.2	41.1
17 years	161.4	151.5	45.7	42.4
18 years	163.1	151.7	47.4	42.4
19 years	163.5	151.7	48.1	42.4
20 years	164.1	151.7	49.2	43.5

Source: *Growth and Physical Development of Children, All India - Indian Council of Medical Research, New Delhi, 1968.*

There are differences of weight and height at all ages for all species. On an average, a human baby is about 56 cm in height, and between 4 and 5 kg at birth. In weight, boys can be slightly taller and heavier. During the first two years, there is rapid increase in both height and weight. There is a steady and slower growth from the third year till the on-set of puberty. By the age of five years, the height of the child, approximately increases by 80 per cent and he acquires almost 3½ times his birth weight. During the period of adolescence, we find a sudden increase in both height and weight. Girls reach puberty about a year or two earlier than boys. Therefore, at the age of twelve, they are found slightly taller and heavier than boys. However, they are again surpassed by the boys at the age of fourteen. By the end of adolescence, the young men are generally higher and heavier than the young women. Generally, both men and women get their maximum height and weight up to the end of adolescence. There can be variations in weight as it is more susceptible to

environmental influences. Therefore, it is no surprise to note the sudden increase or decrease in weight in later years after attaining maturity.

The weight of the brain increases rapidly in the early years of life. By the time the child completes four years, his brain gains almost 80 per cent of its final weight, another 10 per cent is added by the time he completes his eight years. By the twentieth year, the brain gains almost all its weight.

(ii) Changes in body proportions: There are changes not only in the size of the body of the child but also marked changes in the proportion of the different parts of the body. For instance, the head constitutes about one-fourth of the height of the body at birth. The size of the head is relatively much larger than the arms and legs. As the child grows older, the proportion of the head decreases. By the end of the adolescence, head becomes one-eighth of the body. The other parts of the body, legs, arms, and so on, also change in proportion.

Anatomical Growth and Development

Anatomical growth and development is essential to understand for the purpose of understanding development as a whole. The various parts of the body, and their growth and development process is listed below:

- **Bones:** Most of the bones are soft at birth. The child's bones contain relatively a great amount of water and smaller quantity of mineral matter than those of an adult. More blood flows through the bones of a child than through the bones of an adult. Children are, therefore, more pliable.
- **Teeth:** Teeth begin to appear in a systematic order after the age of six months. On an average, at around seven months of age, the first two front teeth in the lower jaw erupt and are followed by four molars, one on both sides of the front teeth on both jaws. By the time the baby is between two to two and half years old, he/she will have twenty teeth. Girls show more advanced growth of teeth than boys, except in the wisdom teeth, where boys are usually ahead of girls.

Growth and Development of Internal Organs

Internally, the body undergoes a wide range of changes during the growth phases. Each organ multiplies and grows within itself, and performs its functions simultaneously. The growth pattern of the internal organs is outlined below:

- ***Nervous System:*** There is a marked growth in the nervous system during the pre-natal period and the first four years after birth. Before birth, the development primarily consists of increase in the number and size of nerves. After the age of four years, the growth of the nervous system proceeds at a relatively slow rate.
- ***Muscular System*:** Muscles at the time of birth are more delicate and less firmly attached to the bones than those of adult muscles. The movements of the muscles are random and uncoordinated. Gradually, muscles get themselves changed in shape, size and composition, and become firmer and stronger.

NOTES

- ***Circulatory and Respiratory System*:** During early childhood, both the lungs as well as the heart are very small but gradually they grow in volume and height. The veins and arteries do not follow the same growth pattern as that of the heart and lungs. They grow rapidly prior to adolescence but show little growth during adolescence.
- ***Digestive System*:** The young child has a small tabular-shaped stomach as compared with the bag like shape stomach of the adult. A young child needs more feeding in the earlier years.
- ***Lymphatic System*:** It is concerned with the elimination of waste and destruction of bacteria in the body. From birth onwards, this system shows the sign of rapid development until it reaches to its maximum between the age of eleven and twelve years. After twelve years of age, it decreases rapidly.
- ***Reproductive System*:** The development of sex organs is very slow during early childhood but pick up its speed as the child advances towards adolescence.

American psychologist and educator G. Stanley Hall has given the following description of children from eight to twelve years of age in his book *Adolescence*: 'The age from 8 to 12 years constitutes the unique period of human life.... the brain has acquired nearly its adult size and weight, health is almost at its best, activity is greater and more varied than ever before or it will ever be again and there is peculiar endurance, vitality and resistance to fatigue. The child develops a life of his own outside the home circle and its natural interests are never so independent of adult influence.'

Another American psychologist George G. Thompson (1979) has described the physical development in childhood in these words: 'Neither shoulder breadth nor pelvic breadth increases as rapidly as trunk length, but the pelvis broadens, more rapidly than the shoulders. The total configurational change is a longer-legged, longer-bodied and more rectilinear and flatter-bodied child.'

Table 2.2 shows the physical development characteristics of males and females.

Table 2.2 *Development of Males and Females*

Boys	*Girls*
1. Growth of pubic hair	1. Growth of pubic hair
2. Growth of hair on the under arms	2. Growth of hair on the under arms
3. Growth of hair on the face	3. Light growth of hair under the face
4. Growth of larynx	4. Light growth of larynx
5. Change in voice	5. Moderate lowering in voice
6. Widening of shoulders	6. Widening of hips
7. Thickening of muscles	7. Slight thickening of muscles
8. Increase in perspiration	8. Increase in perspiration
9. Sometimes slight and temporary	9. Development of breasts

Special needs of both the sexes require different treatment. Table 2.3 shows the physical characteristics and needs of children from 5 to 8 years and 9 to 11 years of age.

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Table 2.3 *Physical Characteristics and Needs of Children*

Physical Characteristics	*Needs*
From 5 to 8 years	
1. Average increase in height of about 5 cm	1. Adequate sleep for ten to twelve hours
2. Girls mature faster than boys	2. Frequent periods of rest and recreation
3. Legs lengthen rapidly	3. Active play and large space for play
4. Nose and throat difficulties are frequent	4. Guidance in eating and protection of health
5. Tend to consume more food than their stomachs can hold	5. Preventive measures against childhood diseases like measles
6. Show resistance in taking a bath	6. Appropriate clothing according to weather
7. Average gain in health	7. Care of teeth, hair, and so on
8. Gradual improvement in speed, steadiness of movement and accuracy	
From 9 to 11 years	
1. Children are extremely active	1. Careful eye examination
2. Relatively free from diseases	2. Correction of postures
3. Relatively healthy and sturdy	3. Frequent change of physical activity
4. Choosy about food but eat a great deal	4. Independence in caring for physical needs
5. Girls increase steadily in physical skills	5. Adequate nutrition
6. Girls usually have less stamina than boys	6. Supervision of strenuous physical activities
7. Interested in competitive games which require skill	7. -do-
8. More easily fatigued after physical activity	8. -do-

Important General Characteristics of Child's Development

- Development is very rapid during infancy (from birth to three years).
- Period of pre-childhood (four to six years) is the period of fixation, i.e., what is acquired in infancy is fixed or stabilized.
- Period of early childhood (seven to nine years) shows again a period of growth and development but the speed is slow in comparison to infancy.
- Later childhood (ten to twelve years) is again a period of fixation.
- The first three years of adolescence are marked as the years of rapid growth and development. This is followed by a period of slow growth.
- All the sensory and motor organs of the child's body are in the process of growth.
- The urge for motor activities like walking, running, jumping, catching, throwing, and so on, is at its peak.
- Muscular development takes place rapidly.
- In the middle and later stages of childhood, coordination of hands and fingers becomes possible.

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- Children take delight in strenuous physical activities.
- Children enjoy movement.
- There is an urge among children to participate in activities which involve speaking, seeing and manipulating.

Common Causes of Delayed Motor and Physical Development

- Poor physical conditions caused by illness, malnutrition, and so on.
- Lack of opportunities to develop manual skills.
- Nagging, scolding and ridiculing of the child by parents and teachers when he does not succeed in an activity.

Factors Affecting Physical Growth and Development

- Traits and characteristics inherited at the time of conception
- Physical as well as mental health of the mother during pregnancy
- Nutrition received by the embryo within the womb of the mother
- Conditions and care at the time of delivery
- Normal or abnormal delivery
- Single birth or multiple births
- Care of the baby and its mother
- Presence or absence of physical defects
- Presence or absence of illness and disease
- Proper or improper medical care
- Nutrition received by the child after birth
- Living conditions of the child—physical, social and cultural
- Opportunities for recreation, self-expression, play and exercise
- Adequate or inadequate rest and sleep
- Emotional and social adjustment of the child

Suggestions for the Guidance of Parents and Teachers

It has been observed by American educator and experimental psychologist W. F. Dearborn that, 'There is organic need for strenuous, physical activity. Skeletal muscles are developing and require exercise. Nine to eleven years old dash breathlessly from place to place, never walk when they can run, never run when they can jump or do something more strenuous.'

Some of the important activities which facilitate physical development are as follows:

- Provision of nutritious diet
- Regular medical check-up and follow-up
- Provision of a healthy environment

- Free and guided play activities
- Activities involving handling of tools and materials
- Exercise and morning walk
- Yogic exercises
- Preparing charts and models
- Proper postures
- Games and sports
- Opportunities for skipping, hoping, jumping, throwing, grasping, and so on
- Excursions
- Community cleanliness programmes

2.2.2 Social Development

Social development implies the development of an individual in a way in which he becomes a useful member of society or the group to which he belongs. He conforms to the norms of the group or the society to which he belongs. An individual becomes a human being only as a member of the society. By nature, he cannot live alone in isolation. He is compelled by biological, psychological and social needs to live in a group or society. Each of us is largely a social product. The process of the development of such qualities which bring desirable changes in the social behaviour is referred to as social development or socialization of the child.

Various thinkers have tried to define social development in the following ways:

1. Freeman and Showel (1940) wrote, 'Social development is the process of learning to conform to group standards.'
2. L. D. Crow and A Crow (1944) wrote, 'Social development means acquisition or the ability to behave in accordance with social expectations.'
3. Herbart Sorenson (1948) thought, 'By social growth and development we mean increasing ability to get along well with oneself and others.'
4. James Drever (1952) stated, 'Socialization (social development) is a process by which the individual is adapted to his social environment (by attaining social conformity), and becomes a recognized, cooperating and efficient member of it.'
5. E. B. Hurlock (1956) noted, 'Social development means the attaining of maturity in social setting'.
6. H. E. Garret (1968) was of the view that, 'Socialization or social development is the process whereby the biological individual is converted into a human person.'

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Characteristics of Social Development

From the above-mentioned definitions, we derive the following characteristics of social development:

- Social development begins with the infant's first contact with other people.
- Social development continues throughout life.
- Social development is the net result of the child's constant interaction with his social environment.
- Social development helps in learning and acquiring social qualities of character.
- Social development enables the child to adjust himself to his social environment and to maintain social relationships.

According to Gessel, bright children accelerate in social development while dull children are retarded in their progress towards social maturity.

Social Behaviour of the Pre-School Child

The child at this stage is ready to expand his social contacts. By the age of two years, he can obey certain commands given to him. He calls attention of other persons to objects he feels interested in. He is more or less self-centred. The pre-school child is active. A pre-school child has usually one or two friends. He plays through only for short intervals. Race, caste, colour or sex or social and economic status have no effect in the selection of friends at this stage. Nursery school experiences contribute in acquiring acceptable social habits.

Social Behaviour of the Elementary School Child

By the time a child enters school, he wants to have many friends. At this stage, he is not just satisfied by the company of his parents. He is interested in the play activities of his group, of the same age and sex. However, quarrels are also common among friends. Boys of this stage tend to be more aggressive. Girls are more frequently engage in bickering. Bullying and teasing are more common. Children are interested in group activities and team work. Team games become more interesting than individual work. The social behaviour of the child is greatly influenced by the social environment in which he lives.

Social Development of the Child during the Early Stages of Schooling

- The period is marked by a greater degree of social awareness.
- There is a great expansion of child's social world.
- A child tries to be independent of his parents and other elders.
- A child becomes an active member of a peer group.
- There is a sort of segregation among boys and girls of the same age.
- Up to the end of the stage of childhood, i.e., 11th or 12th year, the child enters the peak of 'gang age'. There is increasing loyalty towards his own gang and conflict with other gangs. The gang life develops many good as well as bad social qualities in the child.

Sequences in the Development of Social Behaviour of the Child

General sequence in the development of social behaviour in the first two years is as under:

Duration of Age	*Pattern of Social Behaviour*
During First month	Cannot differentiate between the human voices and other noises.
Second Month	Recognizes the sounds of a human being and gives smiles to the person.
Third Month	Recognizes its mother and feels unhappy on separation.
Fourth Month	Shows selective attention to the human face and feels happy in company.
Fifth Month	Reacts differently to smiling and scolding and distinguishes between friendly and angry voices.
Sixth and Seventh Months	Recognizes familiar persons with a smile and shows definite expressions of fear of strangers.
Eighth and Ninth Months	Attempts to imitate the speech, simple acts and gestures observed in others.
Between the Tenth and Twelfth Months	Plays with his image and even kisses it as if it were another person.
At Twelfth Month	Can refrain from doing things in response to 'no-no' or some other form of request.
At Two Years	Can cooperate with adults in a number of routine activities and becomes an active member of the family.
From Five to Eight Years	1. Resists adult control. 2. Accuses adults of being too bossy and too strict. 3. Highly self-assertive, competitive and independent. 4. Likes to work and play with others. 5. Is selective of friends. 6. Begins to show group loyalty. 7. A boy tends to have more lasting friendships. 8. Develops a recognition of the needs of other children. 9. Boasts constantly. 10. Generally has poor table manners. 11. Follows the style of clothing, language and ideas of the group. 12. Tells secrets. 13. Has intense personal rivalry.
From Nine to Eleven Years	1. Acts and dresses like rest of the group. 2. Is ready for widening social contacts. 3. An eleven-year boy begins to take interest in girls. 4. Does not give due care to appearance. 5. Grows in independence and self-reliance. 6. Has keen sense of right and wrong. 7. Takes parts in jokes. 8. Takes parts in skills. 9. Wants some social approval from adults. 10. Wants to be a member of the group.

Hindrances in the Social Development of the Child

- Social evils like untouchability and caste prejudices, and so on
- Coeducation
- Language barriers
- Miscellaneous factors like income, occupations and religion of the family

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Factors Affecting Social Development of the Child

1. **Family:** Among the various social groups, the family makes the first and the most significant influence on the social development of the child. It provides the hereditary transmission of basic potential for his development. It also provides environmental conditions and personal relationship. Parent-child relations have various dimensions of interaction. As such, they remain basic for social development of the child. Parent-child relationships determine behavioural adjustment of the child in the family as well as outside.
2. **Religion:** Like home, religion has long been regarded as a primary social institution. Religion plays a dominant role in the social development of the child.
3. **Peer Groups:** The child is introduced to the social world outside his family, mainly for play purposes. The peer groups satisfy various needs of the children like acceptance, achievement, affection, approval, belongingness, fame, recognition, expression of thoughts and opinions, and so on. According to eminent psychologist AT Jershid (1947), peer association is a meaningful process through which the child changes with his age group into youth and adulthood.
4. **School:** The school life plays an important role in the social development of the child. Its curriculum, co-curricular activities and teacher's influence have a great bearing on the social development of the child.
5. **Community and Neighbourhood:** The environment prevailing in the community has a great influence on the social development of the child.
6. **Mass Media:** Agencies like cinema, newspapers, radio and television, and so on, also play a vital role in bringing about social changes in children.
7. **Bodily Structure and Health:** A healthy child has more ability and strength to make himself adjust in the challenging social settings. A child with poor health or any physical deformity or defect develops feeling of inferiority as well as insecurity in social settings.
8. **Intelligence:** The more intelligent a person is, the more chances of his social adjustment.
9. **Emotional Development:** Emotional development of the child bears a positive correlation with his social development. Emotional adjustability is one of the very important elements of social adjustment.

Influence of Culture on Social Development

A child's social behaviour is regulated and influenced by the culture of the society he lives in. The ways of behaving by the people of one generation, pass on from generation to generation.

Our *sanskaras* shape our outlook, and finally, personality. There are two ways in which the behaviour patterns of culture are transmitted to the next generation:

(a) Directly and formally as in educational programmes at various stages of education

(b) Informally through interactions between parents and their children which occur in the course of bringing up children

These interactions include the parent's expression of attitudes, beliefs, interests and values, and so on. Some of the informal social development takes place through interactions with relatives, neighbours, peer groups and teachers.

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Educational Implications in Social Development

A noted French sociologist Emile Durkheim defines education as a socialization of the younger generation. According to her:

'Education is the influence exercised by adult generations on those that are not yet ready for social life. Its object is to arouse and to develop in the child a certain number of physical, intellectual and moral traits that are demanded of him by both the political society as a whole and the special milieu for which he is specially destined, more briefly, education is a socialization of the young generation. Education is the means by which every society prepares, within their children, the essential conditions of its very existence. It is idle to think that we can rear our children as we wish. There are customs which we are bound to conform: if we flout them too severely, they take their vengeance on our children.'

Functions of Educational Institutions in Social Development

The function of the school has considerably changed in the rapidly changing civilizations. The traditional function of imparting the basic skills of the three Rs is now no longer considered to be adequate to meet the present challenge. The present day school also has to perform some of the functions of the family. It must develop certain desirable moral attitudes and good social habits. It is through co-curricular and extra-curricular activities that the task of socialization can be achieved more successfully. In India, we find that the number of first generation learners in schools and colleges are increasing. However, they are not all sophisticated. They do not know the decorum and the dignified behaviour expected of them. It is only the sympathetic understanding and sincere desire of the teacher to act positively in an unprejudiced manner that can help in these situations.

Role of Classroom in the process of Social Development

The class provides innumerable opportunities to the children to move and mix with an egalitarian group. This is the beginning of the socialization of the child for his future life. Here children get many chances to mix without any distinction of caste, colour or creed. The children who are selfish or self-centred learn to adjust their behaviour in terms of class norms. The teachers are expected to be vigilant to ensure that the students do not think in terms of untouchability, caste distinctions and other prejudices.

- **In a nursery school:** Instruction imparted in a nursery school is very informal. The greatest accent is put on developing good manners and etiquettes, and so on. There is a major emphasis on training the children to become less dependent on their parents and siblings. Children are trained to imbibe and practise equality by sharing toys, play materials, and so on.

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- **In an elementary school:** Efforts are made to turn students into responsible citizens of the school community. Work habits are inculcated among students. They are trained to cooperate with fellow students as well as to take orders ungrudgingly from the teacher. The school provides experience of relationship with the senior generation as well as with equals.
- **In the middle school:** As against the elementary school, greater emphasis is placed on academic achievement in the middle school. It is a stage at which many students terminate their education. In the middle school, too much emphasis is placed on socialization. At this level, the peer group's relationships are more meaningful.
- **At higher secondary school:** At this stage, the greatest premium is put on achievement—both scholastic and co-curricular. Students develop various skills and aptitudes which may enable them to chart their future life. An ideal peer group relationship is much needed at this stage. Development of adaptive skill is emphasized in group work.

Role of the Teacher in the Social Development of the Child

A teacher can play a vital role in the social development of the child under his charge.

A teacher exerts a great influence upon the development of the personality of the child. Durkheim pointed out that teachers as well as parents must be for the child, duly incarnate and personified.

Following are the important suggestions for the social development of the child:

- Teachers and parents should encourage the children to mix in inter-caste rather than intra-caste and inter-regional rather than intra-regional groups.
- The teachers and the parents should respect the personality of children.
- The mechanism of praise and blame, reward and punishment should be carefully used to socialize the children.
- Proper social education may be provided to parents so that they understand the significance of the socialization of the children.
- The teachers should demonstrate a democratic outlook.
- The teacher should refrain from projecting their class images on students. They should not show any discrimination. They must ensure a safe and healthy social environment in which the children may imbibe desirable values of freedom, equality, integrity, honesty, patriotism, and so on.
- Community activities like camps, common meals, social service, and so on, should be frequently organized.
- There should be a close cooperation between the teachers and parents on matters relating to the proper socialization of the children.

NOTES

- Various aspects of socialization, anxiety of children and juvenile delinquency should be discussed by the heads of schools, inspecting officers, teacher-educators and professional organizations in seminars or small forums.
- Adequate stress must be laid on group activities.
- Exhibitions on 'Know Our Country' should be organized from time to time.
- Stories depicting self-sacrifices made by great men for the cause of general good should be told to children so that they are motivated to rise above petty gains and work for the betterment of the humanity.
- With proper guidance and responsibilities, the students' council can build up a sense of shared responsibility among children.
- A proper socialization of children very much necessitates that the ideology of the common school system is allowed to function in letter and spirit in India.
- Children should be taken from time to time to public places like museums, courts, places of historical importance, and so on.
- People engaged in different economic activities or vocations may be invited to school for giving a faithful description of what they do and how useful their work is to the nation. This will enable the children to be acquainted with those around them in the society. This will also develop vocational socialization in children.
- Work experience should be introduced in schools. This will enable the children to have first-hand experiences of the activities pursued in farms and factories.
- Children should be acquainted with the social events like the celebration of the birthdays of leaders.
- The school or college programme should be full of numerous co-curricular and curricular activities in which children meet, cooperate and learn from each other's personalities.
- Children should be told about socially accepted institutions in their society.
- The introduction of common school dress, common lunch, and so on, in the schools and colleges will prevent children of poor and lower middle classes from suffering due to the superiority sometimes felt by the children of the well-to-do families.

Concluding Remarks—Complex Task of Social Development of the Child

In traditional societies, the process was very simple as there were only a few well-established roles. An individual was usually required to learn and play one or more of the roles about which he knew at least something in the course of his upbringing in the family and the community. He did not face many stresses and strains as the socio-psychological demands made upon him were not many.

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The situation has become very complex and difficult in the modem industrial society wherein an individual is expected to learn diverse roles. The family cannot help him at all times. The schools, colleges and other educational institutions also have the responsibility of socializing the child by inculcating in him appropriate values, behaviour patterns and the knowledge so that he adapts himself to a democratic, secular and egalitarian society.

Lastly, the task of social development of the child is not an easy one. The educational thinkers point out very emphatically that certain conditions in the learning-teaching situation must be created and made available in the school so that it may become an effective instrument of socialization. These conditions are as follows:

- A democratic social climate in the school
- Effective interpersonal relationships
- Motivated learning situations
- Group methods of teaching
- Social discipline
- School-community interrelationships
- Student participation and involvement in the school administration
- A rich programme of co-curricular activities

CHECK YOUR PROGRESS

1. In which dimensions do bodily and physiological changes take place in an organism from the conception till his death?
2. List the common causes of delayed motor and physical development.

2.2.3 Emotional Development

The development of emotions is extremely important for the harmonious development of the personality of an individual. Emotions influence all the aspects of an individual's personality. Proper training and education will go a long way to enable the young people to control their emotions and obtain mental balance and stability. Emotions are the prime motive forces of thought and conduct and their control is very important. It has been rightly said, 'to keep one's emotions under control and be able to conceal them is considered a mark of strong character.'

Meaning of Emotions

Etymologically, the word 'emotion' is derived from the Latin word *Emovere* which means to stir up, to agitate or to excite.

Eminent psychologist Woodworth (1945), by making use of this explanation, has defined emotion in this way: 'Emotion is a *moved* or *stirred up* stale of an organism. It is a stirred up state of feeling that is the way it appears to the individual

himself. It is a disturbed muscular and glandular activity—that is the way it appears to an external observer.'

According to Crow and Crow (1973), an emotion 'is an effective experience that accompanies generalized inner adjustment and mental and psychological stirred up states in the individual, and that shows itself in his own behaviour.'

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Another well-known psychologist McDougall (1949) says: 'An instinct is an inherited or innate psycho-physical disposition which determines its possessor to perceive and to pay attention to, objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object, and to act in regard to it in a particular manner, or, at least, to experience an impulse to such an action.' This statement gives us the nature of emotions as well. According to McDougall, instinctive behaviour has three aspects. These are as follows:

- Cognitive or knowing or perceptual aspect
- Affection or feeling or emotional effect
- Conative or doing or striving or executive, active or behavioural aspect

Let us take an example. A child sees a bull coming towards him. He experiences an instinctive fear and undergoes the above three processes. Firstly, he perceives the bull, secondly he experiences an emotion of fear and thirdly, he tries to run away. It is, therefore concluded that an emotion is an affective experience that one undergoes during an instinctive excitement.

McDougall discovered 14 basic instincts, and pointed out that each and every emotion, whatever may be, is the product of some instinctive behaviour.

Kimball Young notes, 'Emotion is the aroused psychological state of the organism marked by increased bodily activity and strong feelings directed to some subject.'

Characteristics of Emotions

The chief characteristics of emotions are as follows:

- The emotional experiences are associated with some instincts or biological drives.
- Emotions, in general, are the product of perception.
- The core of an emotion is feeling which is essentially linked with some sort of urge or impulsive act to do. There is only a difference of degree between feeling and emotion.
- Every emotional experience involves several physical and psychological changes in the organism. Some of these changes like the bulge of the eyes, the flush of the face, the flow of tears, the pulse rate, and so on can be easily observed. There are also internal physiological changes like circulation of blood, the impact on the digestive system and the changes in the functioning of some glands, and so on.
- Emotions are frequent.

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- Emotions are expressed in relation to the concrete objects or situations.
- Emotions are temporary.
- Emotional expressions in early childhood are intense irrespective of the intensity of the stimulus.
- Small children fail to hide their emotions and express them indirectly through different activities like crying, nail-biting, thumb-sucking and speech difficulties.
- Emotions are prevalent in every living organism.
- Emotions are present at all stages of development and can be aroused in young as well as in old.
- Emotions differ from person to person.
- Same emotion can be aroused by a number of different stimuli objects or situations.
- Emotions rise abruptly but die slowly.
- Emotions are subject to displacement. The anger aroused on account of one stimuli gets transferred to other situations. The anger caused by the rebuking of the officer to his/her subordinate may be transferred in beating the children at home.
- One emotion may give rise to a number of likewise emotions.

Simple and Complex Emotions

Grief and joy are examples of simple types of emotions, while love and hate are complex types of emotions.

Grief is an emotional state that you find yourself in when your desires are not fulfilled. Contraction of the chest, tears, crying, fainting, and sobbing are some of the expressions of the emotional state of grief.

Joy is the opposite of grief. Joy is reflected by expansion of chest, lighting up of face, dancing, clapping, and so on. It is the state caused by the fulfilment of your desires. Success after conflict brings joy. Love is a complex emotional state. It is a combination of sympathy, affection and sexual feelings. It is sometimes manifested as a permanent emotional tendency as in the case of a mother's love for her child. It is also transformed into a sentiment.

Hate is also a complex emotional state. It includes anger, fear and apathy. You become angry when you see a person you hate. Sometimes, you are afraid of them and want to stay away from them.

Internal Bodily Changes

During strong emotions, many changes occur in the body. These changes are interesting and help to explain many of the varied reactions that the emotionally aroused person displays.

- **Change in heartbeat:** The heartbeat increases when we are agitated and also when we are excited. Generally, the heart beats faster or slower if the individual is disturbed. The face is flushed or the blood shoots up in anger,

because the alternate contraction and expansion of the blood vessels sends an excess of blood to that part of the body.

- **Blood pressure changes:** Blood pressure increases because of emotions. In some cases of shock, fear, and excitement, the blood pressure may also go down. The volume of blood, in case of extreme situations, also goes up as the large arteries contract driving blood towards the skin. The resulting flush is one of the signs of emotion.
- **Change in galvanic skin response:** There are significant changes in the electrical or galvanic skin responses. The hair tends to stand on end causing goose flesh. The sweat glands of the skin secrete excessive amounts of perspiration or the well-known cold sweat. The additional acid changes the galvanic or electric response of the skin. Unlike the sweat glands, the salivary glands are inhibited by emotion. The saliva is not secreted which results in a dry mouth feeling when a person is emotionally disturbed.
- **Chemical changes in the blood:** Due to a change in emotional state, the secretion of adrenaline takes place from the adrenal gland, which puts more sugar in the blood. There is more sugar in the urine also. Adrenalin makes the heart beat faster, makes the liver release sugar into the blood for muscular energy and increases the ability of the blood to clot quickly. Thus, it actually reinforces all of the other effects.
- **Changes in respiration rate:** We all must have experienced that when we are extremely excited, we run out of breath. When a person is very sad, he or she cries and after some time, starts feeling breathless. Thus, emotions cause changes in the rate of respiration.
- **Metabolic changes:** Digestion process also changes because of emotions. Many studies have proved that under the current of emotions, our stomach and intestine work quite slowly and sometimes even become inactive. The secretion of the digestive glands, including saliva, is also decreased resulting in the malfunctioning and inactivity on the part of digestive system. That is why extremely emotionally charged individuals are mostly found to suffer from the malfunctioning of their digestive system.

External Physical Changes

The emotions can be assessed on the basis of external physical changes. When we are extremely happy, our face lights up but when we are in grief, our eyes are filled with tears.

- **Facial expression:** When under the influence of emotion, the facial expression of a person is the first to be altered. Crying, smiling, compressing the lips wrinkling the nose, shaking head from one side to another are emotional responses which actually reveal the presence of particular feelings in a person. It is commonly said that every emotion has its own particular facial expression. While the way of expressing emotions may vary from culture to culture, some expressions remain common throughout. For example, we frown when we are angry and smile when we are happy.

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- **Vocal expression:** Emotions are also expressed through voice. If a person is angry, his or her voice is different from the person who is expressing his or her love. Thus, emotions can be distinguished by hearing one's voice. Laughing, weeping, whistling, murmuring, hesitation, talking in sweet and loving manner actually reflect various types of emotions a person is experiencing. However, it is not always a reliable method of assessing the emotions.
- **Postural expression:** When a person is emotionally aroused, the facial expressions and voice change. Also, when a person is afraid or frightened of something, he or she trembles, hides or runs away. Rubbing hands, standing erect, sitting with head down are all indicative of some emotional state.

Effects of Emotions

Emotions have a profound effect on the life of an individual. They can make or mar one's life. There are two types of effects of emotions which are described below.

A. Good effects of emotions

1. ***Source of motivation:*** Emotions work as motives which drive the organism for an action. Love, fear, anger and curiosity may help us to achieve our goal. Classical stories are evidences when young men sacrificed their lives for their beloved. Fear of failure motivates one to study hard for the examination. Emotions prove a motivating agent to further our action towards goal.
2. ***Source of enjoyment*:** Pent-up emotional feelings and routine activities create monotony in the individual. Emotions, particularly positive, add enjoyment in our life. They add excitement. Adolescents read novels, see movies, theatres and TV, and so on, which overcome the deficiency of emotional excitement.
3. ***Source of strength and endurance to body:*** Emotions give strength to our body. An individual can do unusual work under emotional excitement which appears difficult in normal conditions. As an illustration: An individual chased by a dog can jump a 5 feet high wall which he cannot jump in normal conditions. Emotions give strength and endurance to our body. Fatigue does not set in during the emotional state. If a child loves his subject, he can work hours together without any sign of fatigue.
4. ***Media of communication:*** Emotions serve as an effective media of communication between individuals.

B. Bad effects of emotions

The most damaging effect of emotions is on the physique of the individual. Constant emotional tension may cause lack of sleep, restlessness, headache, chronic fatigue, insomnia and lack of appetite.

Well-known psychologist Kuhlen in 1952 conducted research on the effects of continuous emotional tension. It also affects the memory. Forgetfulness increases in emotional state. The individual cannot reason, think and concentrate on a problem. Constant emotional pressure disturbs learning ability. Fear and anger, and so on cause the most powerful effect on thought process—moodiness and irritability, and

so on. They bring change in our attitudes towards life. Negative emotional experiences for a long period disturb the total personality of an individual and may lead to neuroticism.

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Theories of Emotions

Important theories advanced to explain the nature and origins of emotions are as follows:

1. **McDougall's Theory of Emotions:** This theory of emotions tries to relate the stimulus situation to the state of the organism and the bodily situations. An instinct is an innate disposition which determines the organism to perceive a certain emotional excitement of behaviour in relation to that object. The instinctive tendencies determine the end of all activities. According to 20th century psychologist William McDougall, in the operation of an instinct, the first step is cognition, that is, perception which is followed by emotion and it is the emotion which gives rise to certain organic changes in the body.
2. **James-Lange's Theory of Emotions:** This theory was developed by 19th-century scholars, William James and Carl Lange. James-Lange reverses the process described above. According to this theory, the experience of emotion is merely a mental reverberation of the massive bodily changes that take place during an organism's response to the situation. Bodily changes follow directly upon the perception of an exciting fact (stimulation) and our feeling of these changes as they occur in emotions. The sequence, according to traditional theory is: *situation—mental state—bodily expression.* James Lange's theory rejects this sequence and states this sequence: *situation—bodily disturbance— mental state.* In other words, we should not say 'we meet a bear, are frightened and then run' rather we should say 'we meet a bear, we run and we are frightened'. Therefore, James Lange's theory may be said to insist on two propositions:
   - Emotion is nothing but an organic sensation
   - Bodily expressions and organic disturbances which are said to be effects of emotions are really their causes
3. **Sherrington's Theory of Emotions:** English neurophysiologist, histologist, bacteriologist, and a pathologist C. S. Sherrington performed certain nerve-cutting operations on his laboratory dog and came to the conclusion that animals gave evidence of emotional character and showed anger, disgust, fear and joy. These experiments indicated that the emotions were not the results of some organic changes in the body. Organic changes can even be produced artificially without the presence of emotions.
4. **Cannon-Bard's Theory of Emotions:** Eminent psychologists W. B. Cannon and Philip Bard conducted physiological experiments on a cat. Cannon cut off the sympathetic nerves of the cat making impossible the organic state of anger dependent on those nerves. He concluded that the bodily changes are neither consequents nor antecedents of conscious states: they are simply the accompaniments.

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Physiologists Walter Cannon (1927) and Philip Bard (1934) theorized that the emotion and the physiological arousal occur more or less at the same time. Cannon, an expert in sympathetic arousal mechanisms, did not feel that the physical changes caused by different emotions were distinct enough to allow them to be perceived as different emotions. Bard expanded on this idea by stating that the sensory information that comes into the brain is sent simultaneously (by the thalamus) to both cortex and organ of sympathetic nervous system. The fear and the bodily reactions are, therefore, experienced at the same time—not one after the other; for example, a person is afraid and running and aroused.

This theory, known as the Cannon-Bard theory of emotion, also had its critics. Well-known psychologist and behaviorist K. S. Lashley (1938) stated that the thalamus would have to be pretty sophisticated to make sense of all the possible human emotions and relay them to the proper areas of the cortex and body. It would seem that other areas of the brain must be involved in processing emotional reactions. The studies of people with spinal cord injuries, that seemed to suggest that emotions can be experienced without feedback from the sympathetic organs to the cortex and cited as a criticism of the James-Lange theory, seemed at first to support the Cannon-Bard version of emotions. People do not need feedback from those organs to experience emotion. However, there is an alternate pathway that carries information from these organs to the cortex; this is the vagus nerve—one of the cranial nerves (LeDoux, 1994). This makes the case for Cannon-Bard a little less convincing.

5. **Schachter and Singer Theory:** This theory postulates that arousal produced by emotion provoking events, makes an individual to search for the cues outside in the environment. Thus, an individual labels the emotion that one is experiencing.

   According to the Two-Factor Theory of Emotion, developed by famous psychologists Stanley Schachter and Jerome Singer (1962), emotion is determined by physiological arousal and cognitive labelling. They argued that we look at the external world to find an explanation as to why we are aroused; for instance, if we feel good at someone's pleasant comment, we may call the emotion 'happy'. If we feel bad after doing something wrong, we may call the feeling 'guilty'. To test their theory, epinephrine was injected into the volunteer participants by Singer and Schachter (1962).

   Epinephrine is a drug that produces high arousal. Then the volunteers were made to observe others behave in either an angry way (stomping out of the room) or a euphoric way (shooting papers at a wastebasket). As predicted, the volunteers' cognitive interpretation of their own arousal was influenced by the angry and euphoric behaviours. They said that they were happy when they were with a happy person, and angry when they were with an angry person. However, this effect only occurred when the volunteers were not aware of the injection's true effects.

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When they were informed that the drug would make them jittery and increase their heart rate, they said that the other person's behaviour was the reason for their own arousal. Psychologists have faced difficulty replicating Schachter and Singer's experiment, but in general, research supports the belief that misinterpreted arousal intensifies emotional experiences (Leventhal and Tomarken, 1986).

6. **Opponent-Processing Theory:** Emotional reaction to any incident is followed by an opposite reaction. Repeated exposure to the same incident would weaken initial reaction and strengthen opposite reaction.

Factors Influencing Emotional Development

Emotional development of an individual is influenced by a number of factors. They are health and physical development, intelligence, family environment, school environment, peer groups' environment, neighbourhood, community and society's environment.

- **Health and physical development of an individual:** There is a positive correlation between health and physical development and emotional development. Any deficiency in health and physical development—internal or external—leads to emotional disturbance. Children who are weak in structure or who suffer occasional illness are more emotionally upset and unstable than children whose health is better. Any abnormal increase or decrease in the normal functioning of the glands creates obstacles in the proper emotional development.
- **Intelligence and emotional development:** Meltzer (1937) as quoted by Hurlock has observed, 'There is less emotional control, on the average, among those of the lower intellectual level than among children of the same group who are bright.' An intelligent person, with his/her thinking and reasoning powers, is in a better position to exercise control over his/her emotions.
- **Family environment and emotional development:** A cordial environment, i.e., healthy relationships between the parents is very conducive to the emotional development of the child. The treatment meted out to the child by the parents and other members of the family influences his emotional development. The order of birth (whether the first or the younger child), sex (son or daughter), size of the family, socio-economic status of the family, discipline in the family, the parental attitude towards the child (pampered, overprotected or neglected), are all are important factors in the emotional development of the child.
- **School environment:** The attitude of the teachers, school discipline, academic facilities available, physical facilities, methods of teaching, co-curricular activities, and so on, all influence emotional development of children.
- **Peer group relations and emotional development:** The influence of the classmates and other members of the group affects emotional development.
- **Neighbourhood, community and society's environment and emotional development:** A child lives in the society and he/she picks up so many traits of his/her emotional behaviour from his/her surroundings.

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Emotional Development at Different Stages

The development of emotions begins right from birth. There is a development of emotions at each stage of one's life; the expression of the emotions change with the developmental stages.

C. T. Morgan emphasizing the importance of emotions in life writes that emotions are basic, primeval forces of great power and influence designed by nature to enable the organism to cope with circumstances which demand the utmost effort for survival or success or to add colour and spice to our living. If there had been no emotion in life of the organism, life would have been without any aspiration. In absence of emotions, social and family life would have ceased and progress would have been checked. P. T. Young offers the definition of emotion as: 'An emotion is disturbed state of organism: an emotion includes Visceral changes due to increased activity of autonomic nervous system and an emotion originates within the psychological situation.' It is expressed in love, fear, anger, laughter and tears, and so on. It involves feelings of jubilation or depression and impulse to action and awareness of perception. Basically human beings are creatures of feelings or emotions. Our emotions control our behaviour.

Emotion in the organism is a dynamic internal adjustment, that operates for the satisfaction and welfare of the individual. Heightened emotionality is evident from nail biting tension, conflicts, quarrels with parents, sibling and classmates, and so on.

Here, we will discuss the emotional development in infant stage and early childhood.

1. Emotional Development in Infants

Emotional development in infants can be divided into two sub-stages—first, from birth to six months and second, from six to twelve months.

At birth, most of the body movements are reflexes. The nervous system is not fully developed till the fifth month; hence a baby's vision is not clear. By six months, the vision of an infant further develops. A baby begins to develop trust in its parents/caregivers who take care of its basic requirements like feeding, changing the diapers, or cuddling when it cries. When frightened, an infant cries. It usually cries to express hunger, pain or even anger. Crying, therefore, is a way of communicating for a baby. Babies are very sensitive—they can be upset or excited instantly if their needs are not met on time. For instance, a baby sleeps at some particular hour of the day, say at noon after bath and feeding. But one day, this time schedule gets changed and the baby is not only hungry but also sleepy. The baby will instantly turn cranky.

Infants need to be cradled and comforted. They smile in response to a pleasant sound or a full stomach. At about six weeks, the responses of infants are well-developed, like they smile on particular sound. By four months, they smile broadly, laugh when pleased, and learn to recognize faces and voices of parents/caregivers.

Infants babble and chuckle. They study their hands and feet, and turn to locate the source of sounds. Gradually, the babies can focus on and follow moving

objects with their eyes. They explore objects with their mouths. The memorizing power being underdeveloped, the babies easily forget about objects out of their sight.

By the time an infant completes six months; its time schedule for any and every activity is regularized. For instance, it takes a nap in the morning hours and afternoon. The feeding and sleeping time gets fixed. By the eighth month, an infant can reach for and hold objects. It can pick up a light object with its thumb and forefinger and then drop it. It turns out to be playful act for babies to start throwing things. They respond when their names are called out and fear being with strangers or being left alone (especially when they wake up and find themselves alone in the room). The expression of anger is quiet strong with the growing age when their requirements are not met in a reasonable time. Infants start talking (babbling) to their reflection in front of a mirror. Eye contact begins to replace some of the physical contact like touch that younger infants seek.

Infants start making gestures when taught, like waving goodbye or playing pat-a-cake. They respond to simple directions and even look for things not in sight. Infants make sounds like 'mama', 'papa', 'nana' or 'dada'. They try to imitate the activities they are familiar with. Growing infants make peculiar sounds to grab the attention of the people who know them. By the 12th month, most of the infants speak their first comprehensible words and even phrases. As the nervous system keeps on growing before and after the birth, the process of mental development continues accordingly.

2. Emotional Development in Childhood

Every emotional experience involves several physical and psychological changes in growing years. Small children fail to hide their emotions and express them indirectly through different activities like crying, nail-biting, thumb-sucking and speech difficulties. Children's emotions are more frequent and of brief duration when compared to the emotions of adults. For instance, a child can have bouts of anger and happiness within a single day. A child's emotions are transitory and there is a shift in his/her emotions. Moreover, children's emotions are relatively intense. If children are to weep, they weep aloud. It is also observed that children usually express their emotions, while adults may try to conceal their emotions.

A cordial environment, i.e., healthy relationships between the parents is very conducive to the emotional development of the child. The treatment meted out to the child by the parents and other members of the family influences his/her emotional development. The order of birth (whether the first or the younger child), gender (son or daughter), size of the family, socio-economic status of the family, discipline in the family, the parental attitude towards the child (pampered, overprotected or neglected)—all are important factors in the emotional development of the child.

During the pre-school age (about 3–6 years), the mental abilities of children develop very rapidly. Their perceptual powers increase and their curiosity get aroused to a great extent. In the early childhood, the sensory powers increase rapidly and children becomes more accurate in their observations. From a make-believe type of imagination, they now start thinking on creative lines. During this period, the likes

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and dislikes of children, their interests, thoughts and plans begin to shape themselves. They begin to imagine things. Children's power of deductive and inductive reasoning increases, and they are able to generalize from data given to them. For instance, they develop the concepts of length, time and distance; and learn to express themselves in various ways.

The main aim of education is to modify and direct the behaviour of children so that in future they become contributing members of the society. In this task, instincts and their potential allies i.e., the emotions have to be refined by training. The attitude of the teachers, school discipline, academic facilities available, physical facilities, methods of teaching, co-curricular activities, and so on—all influence emotional development of a child.

Children pick up many traits of their emotional behaviour from their surroundings. It is common to note that children experience too many unpleasant emotions like anger, fear and jealousy than positive emotions of affection, joy and pleasure. Here, it may be stressed that it is the experience of positive emotions on life. However, it is also true that the experience of only positive emotions in life is not always possible for everyone. One does come across a number of both pleasant and unpleasant situations. This means that a child must learn to accept unpleasant emotional experiences in such a way as he/she does not show undue concern and disturbance. The child must learn to adjust to such experiences, situations, events, ideas and persons that cause annoyance. As much as possible, the home and the school should create more and more situations in which pleasant experiences predominate for emotional development in childhood.

3. Emotional Development in Adulthood

The emotions become stable during this stage. The individual becomes mature and has a control over his or her emotions and feelings. Sudden outburst of emotions becomes rare. An adult mostly takes decisions based on facts and experience rather than emotions.

Effects of Emotions on the Developing Individual: Following are the important effects of emotions on the developing individual:

- Emotions provide energy to an individual to face a particular situation
- Emotions work as motivators of our behaviour
- Emotions influence our adjustment in the society
- Highly emotional conditions disturb the mental equilibrium of an individual
- Highly emotional conditions disturb the reasoning and thinking of an individual

Interrelation of Physical and Emotional Factors: There is a close relationship between the physical and emotional factors. An imbalance or disturbance in the child's physical growth is most likely to be reflected in his/her intellectual functioning and personality adjustment. An unhealthy emotional climate is likely to affect the physical health of the child and it may hinder his/her normal physical growth. A child under emotional strain is likely to be physically unhealthy and show signs of physical ailments.

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Kinds of Emotions: Positive and Negative

Emotions, in general can be categorised into two kinds: positive emotions and negative emotions. Emotions like affection (love), amusement, curiosity, happiness and joy which are very helpful and essential to the normal behaviour are termed as positive emotions. Unpleasant emotions like anger, fear and jealousy which are harmful to the individual's development are termed as negative emotions. It should be borne in mind that it is not to be assumed that all the positive emotions are always good and the negative emotions are bad. The excess of everything is bad. Whether an emotion will prove to be helpful or harmful to an individual depends upon the following factors:

- The frequency and intensity of emotional experience.
- The situation, occasion and the nature of stimulus which arouses the emotion.
- The kind of emotional experience. Emotions that have too much intensity and frequency whether positive or negative bring harmful effects.

Signs of Emotions: Emotions may be external or physiological and internal or psychological. Important signs of emotions in an individual are: increase in heart rate, rise in blood pressure, occurrence of changes in blood composition, increase in respiration, hair standing on end, dilution of eye-pupil, increase in muscle tension, increase in perspiration, and so on.

Techniques of Modifying Emotions

Emotions can be modified through the following devices:

1. **Redirection:** An emotion is dynamic in nature and cannot be suppressed totally. It cannot be destroyed. It is just like a tumultuous stream which cannot be obstructed permanently without giving some outlet. But as we can harness a wild stream by building a dam against it and giving new channels to the powerful waters, quite in the same way, emotional waves can also be re-channelled for the advantage of the organism itself and for the whole society to which he/she belongs. Let us take the example of anger. It is a furious emotion. It exists in its wild form in every organism. We have simply to tame and redirect it to broader and beneficial channels for the benefit of the person and the society.
2. **Sublimation:** Sublimation is also a sort of redirection with this difference only that in the former case the emotion does not lose its original form, while in the latter case it is so much elevated that it changes its form. It takes up much nobler and higher form. *Lust* is transformed into *love* for fine arts or social services or devotion to some deity. *Anger* turns to be *zeal* and *enthusiasm. Fear* takes the form of *anxiety for the betterment* of mankind.
3. **Catharsis:** Intensity of emotions is dangerous for health especially when they do not find expression. Even their expression in original form is very costly for the mind and the body. Therefore, catharsis of pent-up emotions is necessary for the well-being of the organism. Play and extracurricular activities are very useful devices for this purpose.

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4. **Inhibition:** Human life is very complex in the present civilization. We need to control our emotions at every step. Redirection, sublimation and catharsis are not possible always and at every moment. Often we have to suppress our emotions for a short time or for a long time. It can be done with the help of strong will. But we should know that inhibition should not be permanent and we should give some outlet to the pent-up emotions as soon as possible.
5. **Mental Occupation:** Empty mind is a devil's workshop. If a child is busy in some mental or even physical activity, other stimuli cannot disturb his/her emotions. Moreover, he/she is already undergoing the process of catharsis. Even if his/her emotions are stirred up when he/she is quite exhausted after enough mental activity, the stimulation will not be too intense for him/her.
6. **Positive Suggestions:** Suggestions may be used as an effective tool by the teacher for the formation of positive sentiments in pupils. Negative suggestions should be avoided.
7. **Affectionate Environment:** For healthy emotional development, a child should be given a feeling of belongingness and security by sympathetic behaviour and affectionate attitude.
8. **Example is better than Precept:** The parents and teachers should reflect maturity in expression of emotions. Whatever form of behaviour is expected from the students, the teacher should adopt the same in his/her own dealings.

Control and Training of Emotions: Guidelines for Teachers and Parents

Developing proper emotions and controlling them is a very essential objective of education during adolescence. Meeting social demands as well as to eliminate the damaging effects of the emotions on attitudes, habits, and physical well-being, control of emotions is essential. Control does not mean repression but learning to approach a social situation with rational attitude and repression of those emotions which are socially unacceptable. The teacher can play an important role to reduce pressures that interfere with the child's emotional development:

1. ***Proper training*:** Parents, teachers and social workers may use devices and methods to control fears of inadequacy in various situations by developing competencies and skills in some activity in which adolescents are interested to create self-confidence which helps to meet different situations of life boldly. The teacher should emphasize the interpersonal relationship for the facilitation of learning.
2. ***Development of resistance*:** Adolescents should be encouraged to examine critically the causes of their failures and frustration, and so on, and teachers should develop resistance to counselling. Thwarting should be properly rationalized.
3. ***Guidance and Counselling*:** Adolescence is a period when an individual is overwhelmed by a number of simultaneous developments, therefore, to meet this situation proper guidance is needed in this period.
4. ***Proper understanding:*** Parents and teachers should change their altitude towards adolescents. They should provide proper environment for the

NOTES

expression of pent-up feelings. Fair treatment, sympathy, cooperation and freedom of action within a reasonable limit should be given to adolescents and unnecessary restriction should not be imposed. A variety of interests should be developed to avoid frustration. Teach the adolescents to relax by providing opportunity for hobbies, curricular activities, catharsis through play, free discussion, and dramas, and so on.

The teacher and the school can encourage the development of affective maturity in adolescents by providing:

- Skills that will enable the child to deal effectively with the threatening aspects of his/her environment.
- An atmosphere that permits the adolescent to admit the feelings he/she is experiencing.
- Identification of proper model and constructive ways of expressing feelings. Adolescents should be trained in self-control of emotions. They should be provided with a variety of opportunities to participate in activities leading toward the acceptance of responsibility. This participation by adolescents will foster a spirit of tolerance, cooperation, habits of confidence and spirit of fair play. An important method which a classroom teacher can encourage is to help the students to express their emotions in constructive ways. Students should be trained to express their emotions to others in whom they have full confidence. Verbalization of pent-up emotional feelings releases mental tension and as emotions are put into words, they become diffused, less intense and manageable. The teacher must develop a clear recognition of the desirability of achieving free and more constructive expressions of emotions which will result in progress toward the desired goal.
- Picnics, excursions and tours for students to provide them opportunities to understand each other and come closer. Adolescents should be encouraged to examine critically and rationally the causes of failure and frustration and resistance to frustration should be developed. Unnecessary restrictions should not be imposed on the students. Schools should provide identification of proper models and constructive ways of expressing feelings. Adolescents should be trained in self-control of emotions. Students should be given opportunities to participate in activities leading to the acceptance of responsibility. This will foster the spirit of tolerance, cooperation confidence and fair play. This will resolve many problems of adolescents which are created by lack of communication among the members of the class and school.

2.2.4 Motor Development

Motor development may be defined as the development of strength, speed and accuracy in the use of muscular parts of the body such as arms, eyes, legs and neck muscles. Motor abilities involve bodily movements of various organs and coordinated functions of nerves and muscles. Skill in motor activity depends on not so much on

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gross body movements but fine coordination of the smaller muscles. Motor development is closely related with emotional, mental, physical and social development.

Process of Motor Development

Motor development starts in the prenatal period. Adequate motor development during the prenatal period provides the neonate (newborn baby), great potentiality to be active. Movements of the foetus are reported during the third month and these are considered fundamental to later development. The world of the infant expands and the stimulation increases greatly when it learns to move about by the end of the first year.

One of the most important responses shown by a newborn is called Moro reflex. When there is a sudden change in the head position of the infant, it throws it arms out to the side and then brings them back, as if it were embracing someone. Any sudden change in stimulation, like hitting the sides of the pillow elicits the Moro reflex. It vanishes when the infant is three or four months of age. As the infant matures, it is able to exercise control over its various parts and coordinate functioning of nerves and muscles. Studies done by Skinner and Harriman (1941), and Shirley (1960) report the developmental sequences of sitting up, standing and walking.

Motor Development Characteristics

Three years:

A child:

- Manipulates play materials
- Alternates feet going upstairs
- Rides a tricycle
- Counts to three
- Feeds self with little spilling
- Throws objects overhead
- Fashions objects with clay
- Stands on one foot
- Jumps upward

Four years

- Skips on one foot
- Laces shoes
- Dresses and undresses
- Cuts on lines with scissors
- Runs broad jump
- Saws with handsaw
- Throws overhead with less body participation

Five years

- Ties shoelaces
- Skips on alternate feet
- Draws recognizable figures
- Picks up small items skilfully
- Draws alphabet letters

Six years

- Engages in all five-year activities but with more skill and feeling
- Throws and catches ball
- Climbs up rope, swings
- Builds blocks shoulder height with lighter touch
- Cuts, pastes, models and colours skilfully
- Builds crude items in workshop

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Principles of Motor Development

1. ***Development takes place from head to tail:*** This principle explains that head starts developing first and other parts of the body in the direction of legs mature later.
2. ***Development takes place from near to far:*** This principle states that parts near the brain or spinal cord will develop earlier to which are those away from spinal cord such as arms and fine muscles of the fingers.
3. ***Development of specific movements proceeds from mass activity:*** The newborn babies tend to move away their whole body later on. As they develop, they are able to move a specific body part.
   - Both motor coordination and strength increase with age.
   - The development of motor skills depends not only on neuro-muscular maturity, but also on environmental opportunities, particularly the availability of equipment, the opportunity to observe and imitate other children and the opportunity to experiment.

Sex difference in motor development: The development level for doing or performing a task increases with age. However, a wide variation in the motor ability of children of the same age is noticed after infancy. This variation is more pronounced if there is difference in the sex of children. The average boy is superior to the average girl in tests of strength, speed and in many motor skills. These differences are aggravated with the increase in age. Girls further reach their maximum at about the age of 14 in the ability to perform motor acts, while the boys continue to improve even up to 18 years. Boys are found to be superior to girls in activities that require brute force and speed. Girls surpass boys in activities requiring greater concentration, accuracy and precision and delicate coordination. In activities like badminton, tennis, table tennis, folk dance, dramas, and so on, both girls and boys can participate on almost equal footing.

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Educational Implications of Motor Development

Pointing out the educative value of motor skills in education, Gates and his associates, (1948) express the view: 'The acquisition of motor skills is of value not only from the point of view of the personal satisfactions that accrue from competence in self-help and independence of adult aid, but also from the point of view of good social and emotional relations with others.' Children grow up well if they have a motor development environment that makes it possible for them to run about, jump, climb, and so on. Motor development is of great significance at the pre-school stage. At the middle and secondary stages of education, we need to organize varied types of activities in the form of handicrafts, woodcraft, gardening and various types of outdoor programmes and experiences.

Guiding motor control and development: It must be remembered that development of motor skills depends largely on environmental opportunities, particularly the availability of equipment, and the opportunity to observe and experiment. Some important principles of guidance of motor control are given below:

- Children should be encouraged to manipulate, handle and use different objects and implements to provide sensory activity and eye-hand coordination. At the earlier stages, activities like clay work, colouring, tearing, cutting, painting, threading and sewing, and so on, should be planned.
- Through play activities, children learn motor skills by assembling and constructing and so on.
- Proficiency of motor control depends on regular practice.
- Demonstrations in motor skills are very valuable for beginners. Manual guidance is more effective than verbal lessons.
- A correct start in motor control is essential.
- Independent activity accompanied by strong motivation leads to speedy motor development.
- Supervision should be moderate.

Early Cognitive Foundations: Sensation, Perception

The stages of processing of the senses of human beings and other animals like pain senses, vestibular, auditory and vision are known as sensation and perception. Sensations are the first stages in the functioning of senses to represent stimuli from the environment, and perception is a higher brain function about interpreting events and objects in the world.

Sensation occurs when any stimuli interacts with the sensory receptors. It includes hearing, touching, tasting and smelling.

Perception is how we put the impulses received from our senses together so that they make sense. Although a person may see perfectly, if they cannot perceive or correctly process the impulses it will not make sense. For example: sensing a touch is sensation and being able to judge if it is a bad touch, is perception.

Ecological View: According to Gibson, all objects have affordance. It is the opportunity of interaction offered by the objects which are necessary for any activity to be performed by them. He has proposed that people perceive information directly from the environment. Perception is a process which brings people in contact with the environment in order to interact with it and adapt to it.

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Early Controversies: Sensory and Perceptual Development

Some of the early controversies on sensory and perceptual development are discussed in this section.

A. Nature *vs* Nurture

1. Empiricist philosophers believed that an infant was a *tabula rasa* (blank slate) who must learn to interpret sensations.
2. Nativists argue that many basic perceptual abilities are innate.

B. Enrichment *vs* Differentiation

1. Enrichment theory claims that sensory stimulation is often fragmented or confusing. To interpret such ambiguous input, we must use our available cognitive schemes to add to or 'enrich' it.
2. Differentiation theory argues that perception involves detecting distinctive features or cues that are contained in the sensory stimulation we receive.

Infant Sensory Capabilities

A. Vision is the least mature of the newborn's sensory capabilities:

1. Newborns are more likely to track faces (or face-like stimuli) that other patterns although this preference for faces disappears within a month or two.
2. Using the habituation method, researchers have found that neonates see the world in colour, although they do have trouble discriminating blues from greens and reds from yellows.
3. Rapid development of the visual brain centres and sensory pathways allows their colour vision to improve quickly. Young infants do not resolve fine detail very well. Studies of visual acuity suggest that a neonate's distance vision is about 20/600, which means that she sees at 20 feet what an adult with excellent vision sees at about 600 feet.

B. Hearing:

Using the evoked potential procedure, researchers have found that soft sounds that adults hear must be made noticeably louder before a neonate can detect them. Habituation studies indicate that neonates are capable of discriminating sounds that differ in loudness, duration, and frequency (Bower, 1992).

1. Reactions to voices
   (a) Young infants are particularly attentive to voices, especially high-pitched feminine voices.

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(b) Research by Anthony DeCasper (University of North Carolina at Greensboro) and his associates reveals that newborns suck faster on a nipple to hear a recording of their mother's voice than a recording of another woman.

2. Reactions of language
   (a) Not only do babies attend closely to voices, but they are also able to discriminate basic speech sounds—called phonemes—very early in life.
   (b) Infants 2 to 3 months old can distinguish consonant sounds that are very similar (i.e., 'ba' and 'pa').
   (c) Infants less than one week old can tell the difference between the vowels A and I and can even segment words into discrete syllables.
3. Consequences of hearing loss
   (a) Otitis media, a bacterial infection of the middle ear, is the most frequently diagnosed among infants and preschool children.
   (b) Antibiotics can eliminate the bacteria that cause this disease but will do nothing to reduce the build-up of fluid in the middle ear, which often persists without any symptoms of pain or discomfort.
   (c) This fluid may produce mild to moderate hearing loss that can last for months after an infection has been detected and treated.
   (d) Otitis media strikes hardest between 6-months and 3-years of age.

C. Taste and Smell

Infants are born with some very definite taste preferences. Different tastes elicit different facial expressions from newborns

(a) Sweets reduce crying and produce smiles and smacking of the lips.
(b) Sour substances cause infants to wrinkle their noses and press their lips.
(c) Bitter substances often elicit expressions of disgust —a down-turning of the corners of the mouth, tongue protrusions, and even spitting.

D. Touch, Temperature and Pain

1. Receptors in the skin are sensitive to touch, temperature and pain.
2. Even while sleeping, neonates habituate to stroking at one locale but respond again if the tactile stimulation shifts to a new spot (i.e., from the ear to the chin).
3. Later in the first year, babies begin to use their sense of touch to explore objects first with their lips and mouths, and later with their hands. So touch is a primary means by which infants acquire knowledge about their environment, which contributes so critically to their early cognitive development.

CHECK YOUR PROGRESS

3. In what ways are the behaviour patterns of culture transmitted to the next generation?
4. When do emotions become stable?

2.3 CONCEPT FORMATION

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Concept is a dense form of prior experience. We see many kinds of animals moving around. They generally move on four legs. Their movement on four legs is a general trait on the basis of their prior experiences. It is a concept. We see birds flying. Flying is a common trait of birds. It is a dense generalization of prior experience. Thus, flying is a concept with respect to birds.

Abraham Spulling has defined concept as: 'Concept is an idea formed by dissociating a quality from the various other qualities with which it is associated in objects of environments.' According to Woodworth, concepts are those thoughts that mention things, incidents, qualities, and so on. Bowring and others have described a concept as a mental image of a seen thing.

2.3.1 Process of Concept Formation

How is a concept formed? Its process proceeds from the following mental processes:

1. **Observation:** A child observes a thing or situation at first. He/she perceives a few things directly by making images. A concept of things is also formed by him/her.
2. **Analysis:** Analysis of the qualities that direct things is the second step. After analysing the qualities of cow, horse, camel, buffalo, and so on, a child proceeds with the formation of concepts.
3. **Comparison:** Having passed through the first two stages, a child finds out during the comparison of a dog and a cat that the qualities found in a cat are missing in a dog. He/she gets the concept of 'cat' by comparing it with other animals.
4. **Differentiation of abstraction:** In this step, the child differentiates similar and dissimilar things. Through differentiation, he/she comes to know about the contrast between a horse and a cow. In the same way, he/she knows the difference between an animal and a human. One walks on four legs and the other uses two legs. One speaks, laughs and the other speaks different but does not laugh. He/she conceives it by differentiation. The general quality found in various things alongside differentiation and classification is called abstraction.
5. **Generalization:** After observation, analysis, comparison, differentiation and abstraction, a student comes to know about the quality of a certain class.

2.3.2 Concept Development

Concept development constitutes of four steps that are as follows:

- **Concrete level:** Picturization of a thing by the medium of a sense organ
- **Identity level:** Knowledge of differences in unity and general quality
- **Classification level:** To understand the differences correctly
- **Formal level:** To know a thing or concept by name

NOTES

Ross has explained the process of concept formation, with reference to thoughts and logic in an interesting way. He states that, 'The debate between factualism and nomenclatures is in fact for philosophy and not for a psychologist; the latter is concerned with the condition of conceptualization.' There may or may not be the existence of real objects of extensive characteristics, yet there is no doubt that our minds have the power to interact with the samples of extensive qualities and things and with the things themselves. In doing so, they function at the highest level of a thought process.

Until now, we have been explaining the extensive things as mind-based, but thought of such forms points towards ordered cognitive situations in our minds that are a part of the high order. We can use the word 'concept' for such instincts in an extremely beneficial way. From this viewpoint, cognitive patterns, samples and mental forms are the base by which we can analyse the subjects of our thinking, whether they are cognitive or imaginary. We should take them for active cognitive attitudes, which direct our knowledge. For example, when we see something, the arousal of a thought depends on the sample or pattern. It proves the edict 'you see what our mind sees'.

It all depends on the concept or pattern of the mind, which is put to analyse the sense organ's tools, which are common to all. Take an example, when a pattern is seen on a wall or floor, the untrained mind sees only that pattern, while a mathematician sees in it some universal truth. The English poet Wordsworth has drawn a picture of unimaginative Peter Bell for us:

A Primrose by a river's brim, a yellow primrose was to him, and it was nothing more, but, for the poet himself: The mean of the flower that blows can give thoughts that do often lie too deep for tears. A mind has real concepts which are related to the general things.

How do we get such images? The general description relates to the analysis and synthesis of experienced things. The mind analyses things that are common to all, synthesizes it, which is specific to it and overlooks it. Thus, for example, the concept of the 'cat-family' seems to have been made on the basis of the commonality in cat, lion, cheetah, leopard, puma, and so on, which is the synthesized common factor of the concept. We can see the example of such mental synthesis and analysis in a general law of mathematics. We illustrate several numeral examples, such as calculating simple interest on a given capital. The result is calculated by the student by applying the general rules and he/she learns to pay attention to the activity and not on any specific numerical details.

The analysis-synthesis method, as mentioned above, is very important in making concepts, but the description is very immature. From a logical point of view, a concept is a produced thing in the mind that is only a dry model, which lacks all details that can prove to be valuable to it. It is, in fact, doubtful if the result of this activity can be called a concept, because the general facts are too different in their specific illustrations.

2.4 LOGICAL REASONING

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Reasoning plays a significant role in one's adjustment to one's environment. It controls not only one's cognitive activities but it may also influence the total behaviour and personality by proper or improper development of one's reasoning ability. It is essentially a cognitive ability and is akin to thinking in many aspects like the following:

- It has a definite purpose or goal.
- It is also an implicit act and involves problem-solving behaviour.
- It involves the use of one's previous knowledge and experiences.
- It involves mental exploration of the reason or cause of an event or happening instead of motor exploration.
- It is a highly symbolic function. The ability to interpret various symbols, development of concepts and language aids reasoning.

In view of the foregoing points of similarity, it is not easy to clearly distinguish between thinking and reasoning as separate functions. Reasoning is said to be a productive and advanced stage in the complex process of thinking. In comparison to thinking, it may be seen as a more serious and complex mental process that needs a well-organized brain and deliberate effort.

The following definitions given by some eminent scholars can throw more light on the meaning and nature of the process of reasoning:

Reasoning is step wise thinking with a purpose or goal in mind.

— Garrett

Reasoning is the term applied to highly purposeful controlled selective thinking.

—Gates

In reasoning, items (facts or principles) furnished by recall, present observation or both; are combined and examined to see what conclusion can be drawn from the combination.

— Woodworth

Reasoning is the word used to describe the mental recognition of cause and effect relationships. It may be the prediction of an event from an observed cause or the inference of a cause from an observed event.

—Skinner

Reasoning is combining past experiences in order to solve a problem which cannot be solved by mere reproduction of earlier solutions.

—Munn

A close analysis of the foregoing definitions may reveal that reasoning depicts a higher type of thinking, which is a very careful, systematic and organized function. It may follow some logical systematic steps like the following:

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- Identification of the goal or purposes to which the reasoning is to be directed.
- Mental exploration or search for the various possibilities, cause and effect relationships or solutions for realizing the set goal or purposes based on the previous learning or experiences and present observations or attempts.
- Selection of the most appropriate possibility or solution by careful mental analysis of all the available alternatives.
- Testing the validity of the selected possibility or solution, purely through mental exercise and, thus, finally accepting or rejecting it for the actual solution of the problem.

Reasoning may, thus, be termed as highly specialized thinking, which helps an individual to explore mentally the cause and effect a relationship of an event or solution of a problem by adopting some well-organized systematic steps based on previous experiences combined with present observation.

2.4.1 Types of Reasoning

Reasoning may be classified into two broad types– inductive reasoning and deductive reasoning.

1. **Inductive reasoning**: In this type of reasoning, we usually follow the process of induction. Induction is a way of proving a statement or generalizing a rule or principle by proving or showing that if a statement or a rule is true in one particular case, it will be true in all cases in the same serial order and it may thus be applied generally to all such cases. Therefore, in inductive reasoning one can formulate generalized principles and conclusions on the basis of certain facts and specific examples. For instance:

   (i) Mohan is mortal, Radha is mortal, Karim is mortal and Edward is mortal. Therefore, all human beings are mortal.

   (ii) Iron expands when heated, water expands when heated and air also expands when heated. Therefore, all matter – solid, liquid and gas – expands when heated.

   Inductive reasoning may thus be considered to be a type of specialized thinking aimed at the discovery or construction of a rule or generalized principle, by making use of particular cases, special examples and identity of elements or relations.

2. **Deductive Reasoning**: Deductive reasoning is the exact opposite of inductive reasoning. It may be defined as the ability to draw logical conclusions from known statements or evidences. Here, one starts with some already known or established generalized statement or principle and applies it to specific cases.

   Henry L. Roediger and others (1987), in their book, *Psychology*, have mentioned three types of deductive reasoning—conditioned reasoning, categorical reasoning and linear reasoning. Let us see what they mean.

3. **Conditioned Reasoning**: Conditioned reasoning is the reasoning tied down by some specific conditions, for example, if there is a solar eclipse, the street will be dark. There is a solar eclipse. Therefore, the streets are dark.
4. **Categorical Reasoning**: This type of reasoning is based on some categorical statements like:

   All robins are birds. All birds lay eggs. Therefore, all robins lay eggs.
5. **Linear reasoning**: This type of reasoning involves straightforward relationships among elements, for example:
   (i) If Ram is taller than Mohan and Mohan is taller than Sohan, Ram is the tallest.
   (ii) If Sita is taller than Gita and Gita is not as short as Rita, then Rita is the shortest.

Man's life is an endless stream of problems, for which the individual has no readymade formula or solution. Being unequipped with the proper solution, he requires to think and reason before he can solve the problem. Reasoning is the highest form of thinking that needs a well-organized brain. In the process of reasoning, the individual reasons from the past known circumstances to the present or future unknown conditions, on the basis of past experience. In this manner, reasoning helps to reach certain conclusion concerning the future without anything having been achieved in actual practice. Evidently, such an application needs some imagination as an essential part. To see an object lying on the table is to perceive it, when we think of it we are thinking, but if we try to know how that particular object came to be on the table at all, we fall into the process of reasoning.

Evolution of Reasoning Power

In different individuals, the extent of reasoning ability is different. Consequently, some individuals find it easier to solve difficult problems than others. Generally, the person who is a specialist in a particular sphere has greater facility in reasoning about problems relating to than one who is a novice to it. The power of reasoning gradually develops in human beings. Children embark on reasoning out solutions to their problems even before they begin going to school. As they develop, their ability to reason grows and becomes stronger. Knowledge of a particular subject also makes it easier to reason out problems relating to it.

2.4.2 Steps of Reasoning

American philosopher and psychologist John Dewey described reasoning as speculative thinking and analysed it, describing the following steps in it:

- **A felt difficulty:** An individual starts reasoning only when he/she is confronted by some specific problem. Hence, it is essential that he/she should experience the presence of some particular difficulty that requires solution. It may be a theoretical or a practical problem.
- **Locate and define difficulty:** The second step in reasoning, after the presence of a difficultly has been established, is the location and defining of it. For this

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one is required to analyse the problem of difficulty and track it down to a specific position, besides defining or elaborating it. Experience and ability of a student are called into play in this effort.

Before the individual embarks on reasoning upon a problem, it is only natural for him to require all possible information concerning it and for this he/she must collect such data. It is not an uncommon occurrence for well-reasoned solutions to prove wrong because they were formulated on insufficient data. It is for this reason that in solving problems in many spheres, the reasoning of specialists is accepted without question by others who accept their results. Before looking for the solution of a problem, it is necessary to see whether one is in a position to gather all relevant data. Once information has been gathered, it is essential that it be evaluated because some pieces of information are more valuable than others. In the investigation of a crime, for instance, one bit of information may help to clear the whole picture for an individual if the reasons are substantial. Hence, the evaluation of all available information is an important part of solving problems. After information has been evaluated, it should be organized and classified. The classes into which specific information is to be divided depend upon the insight of the examiner.

- **Evaluation of hypothesis:** Classification of concepts help to bring to light the patterns concealed in the information, on the basis of which an individual can evaluate any hypothesis that he/she has formed in solving the problem. In solving problems an individual proceeds by first forming some hypothesis and as new information continues to pour in, his first hypothesis is strengthened or is contradicted, in which case it has to be discarded in favour of a more appropriate hypothesis. After the pattern of concepts is precisely known, one's preconceptions of hypothesis can be evaluated and the correct one decided upon.
- **Apply the solution:** The next step is the application of solution or inference to solving the problem, since it can only validate the inference.

2.4.3 Training in Rational Thinking

The steps in the process of reasoning that Dewey has pointed out can be utilized in the solution of problems concerning education. For this, it is required for the thinker to possess a scientific attitude, self-confidence and patience. The teacher himself must be capable of scientific and unbiased reasoning, as he/she cannot otherwise teach his/her students to reason with clarity. In training the children to think rationally in school, it is necessary to keep following things in mind.

1. **Acquaintance with problems of daily life:** In order to acquaint the child with the problems, the subject that he/she is taught should be related to real life. It is only when illustrative examples in study are taken from daily life that the child can think of the problems with any facility.
2. **Development of necessary qualities:** Rational thinking requires experience, intellect, firm determination and other qualities, such as persistence and application. Out of these, with the exception of intelligence, all the other can

be developed through efforts. Hence, efforts should be made to develop these in the child.

3. **Solution of problems of practical utility:** Children should be asked to solve problems of practical utility. One such problem could be the following: Draw nine posts in such a manner as to create three lines, each of which contains three spots and, without lifting the pencil from the chart draw lines that connect all the spots. The ability to solve such problems can be developed through practice. In addition to this, children should be made cognizant of the problems that occur in daily life and inspired to solve them.
4. **Knowledge of special subjects:** Solution of specific kinds of problems inevitably requires skill in the appropriate subjects. Hence, the teacher should pose problems before the students only after they have gained adequate knowledge of the subject.
5. **Acquaintance with environment:** Problems on which the student is required to cogitate should bear relation to his life. For this, it is essential that he/she be acquainted with his/her environment. Knowledge of the individual, associations, institutions and processes that occur around him/her will make it possible for the child to comprehend their problems and he/she will be inclined to reason out a solution. The mistakes that they make in such reasoning should be concerned in a debate to prove their point. Sensible means, when concerned in a debate to prove a point, can be used by a sensible teacher after the debate is over. These may be used individually or collectively and brought to the notice of the student to explain the fallacies of their reasoning.
6. **Knowledge of logic:** A study of the general principles of logic will be especially beneficial to training in reasoning. The teacher should be well acquainted with the general rules of logic and should impart them to the student.

Thus, knowledge of the subject is concerned with the problem and knowledge of the rules of logic. In addition to this, when students get adequate opportunities of reasoning and arguing, they develop good reasoning ability.

CHECK YOUR PROGRESS

5. What is reasoning?
6. Define deductive reasoning.

2.5 PROBLEM SOLVING

Henry Kaiser stated, 'Problems are only opportunities in work clothes.'

From birth onwards, everybody in this world is beset with some problem or the other. There are needs and motives that are to be satisfied. For this purpose, definite goals or aims are set. In an attempt for their realization, one experiences

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obstacles and interferences in one's attempt to achieve them. This creates problems and serious as well as deliberate efforts have to be made to overcome these impediments.

The productive work involved in the evaluation of the situation and the strategy worked out to reach one's set goals is collectively termed as problem-solving. This is an essential exercise for individual advancement and advancement of society. The meaning and nature of problem-solving is further clarified by the following definitions:

Woodworth and Marquis (1948)

Problem-solving behaviour occurs in novel or difficult situations in which a solution is not obtainable by the habitual methods of applying concepts and principles derived from past experience in very similar situations.

Skinner (1968)

Problem-solving is a process of overcoming difficulties that appear to interfere with the attainment of a goal. It is a procedure of making adjustment in spite of interferences.

An analysis of the above definitions highlights the following observations about the meaning and nature of problem-solving behaviour:

- In the satisfaction of one's needs and realization of the set goals, problem-solving behaviour arises only when the goal is purposeful and essential for the individual. There is serious interference in the realization of this goal and this interference of obstacle cannot be overcome by simple habitual acts or mechanical trial and error methods.
- One has to utilize one's thinking and reasoning powers and engage in serious mental work by systematically following some well-organized steps for the removal of the difficulties and obstacles.
- The problem-solving behaviour involves quite deliberate, conscious and serious efforts on the part of the problem-solver.
- Problem-solving behaviour helps in the removal of or adjustment with, interferences and ultimately helps an individual to reach his goal and satisfy his motives.
- Problem-solving behaviour helps an individual in the growth and development of his personality, making his life happier by appropriate adjustment. It also contributes significantly to the progress and development of society.

Problem-solving is the highest level of learning in the hierarchy proposed by Robert Gagne, which depends on the mastery of next lower types of learning. It involves the application of principles and facts to explain and solve new phenomena or predict consequences from known conditions. Problem-solving is a key skill and can make a huge difference in their career. At work, problems are at the centre of what many people do every day. It is either solving a problem for a client (internal or external), supporting those who are solving problems, or discovering new problems to solve. The task of problem-solving requires prediction, analysis of facts and

principals to develop cause-effect relationship in the physical phenomena of the environment.

Generally, our daily life activities are followed in routine and we do not face any problem to perform our routine duties. However, it is not always so, sometimes we are not confronted with a problem situation and we have to think as well as identify an appropriate solution to reach the goal. A problem situation is basically any obstacle that may be physical, social and economic, or in any other form, which may hinder the progress of the individual or person to reach the goal. There are a number of different obstacles that can interfere with our ability to solve a problem quickly and efficiently. For example, problem-solving can be impaired by biases of personal beliefs, a misunderstanding of information relevant to solving problems and overconfidence.

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When dealing with a problem, people often make assumptions about the constraints and obstacles that prevent certain solutions and create obstacles in the progress of a problem; sometimes a mental set also creates an obstacle in problem-solving like the tendency to approach a new problem with the same approach that worked previously for different problems. People have to only use solutions that have worked in the past rather than looking for alternative ideas. It can often work as a heuristic, making it a useful problem-solving tool. However, it can also lead to inflexibility, making it more difficult to find effective solutions. While part of learning is developing effective strategies for dealing with problems, the automatic or rote application of a strategy to a problem can lead a person down the wrong path and impede problem-solving.

Much of effective problem-solving lies in knowing which approach to use to solve the problem. Functional fixedness is the tendency to view physical objects in terms of their traditional uses. By doing so, we greatly limit the possibilities for creative uses of objects in non-traditional ways. It prevents people from seeing all of the different options that might be available to find a solution. It helps to view a problem only in their customary manner For example, a hammer not only can be used for driving or removing nails, but also serves as an effective paperweight, nutcracker or a pendulum weight.

The problems you face can be large or small, simple or complex and easy or difficult to solve. Regardless of the nature of the problems, a fundamental part of every manager's role is finding ways to solve them. Thus, being a confident problem solver is important to your success. Much of that confidence comes from having a good process to use when approaching a problem. With a good process, you can solve problems quickly and effectively, contrary to which your solutions may be ineffective, or you will get stuck and do nothing, with sometimes painful consequences. Problem-solving is basically a mental process that people go through to discover, analyse and solve problems. This involves all of the steps in the problem process, including the discovery of the problem, the decision to tackle the issue, understanding the problem, researching the available options and taking actions to achieve your goals. Before problem-solving can occur, it is important to first understand the exact nature of the problem itself. If your understanding of the issue is faulty, your attempts to resolve the problem will also be incorrect or flawed.

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2.5.1 Approaches to Problem-Solving

Traditionally, two different approaches have been mentioned by psychologists, adhering to two families of learning theories: (i) Cognitive field theory and (ii) Stimulus-response theory.

Cognitive field theory emphasized the importance of the perception of total situation and relationship among its components and restructuring the cognitive field. Kohler conducted his classical experiments on Sultan to study the process of problem-solving in animals. He, from his study on problem-solving, proposed the solution of a problem is arrived at, all of a sudden, after some initial efforts by the individual. Many studies have been conducted on children and adults to confirm that a solution of a problem is reached, all of a sudden through insight into the situation.

The second point of view has been advanced by stimulus-response theorists who emphasize the importance of trial and error. They hold that a problem is solved through a gradual process of elimination of error and putting together correct responses. There has been considerable controversy as regards the superiority of one approach over the other as an interpretation of problem-solving. Some psychologists are of the opinion that the cognitive field theorists approach is most effective for solving problems that require higher mental processes. The stimulus-response approach is effective for solving simple problems. To do away with the controversy of cognitive and stimulus response approach, eminent psychologist Harlow proposed a third explanation. His approach is more realistic and rational in nature. He conducted a series of experiments on monkeys and human subjects of low mental abilities. He presented his human subject with simple problems of discrimination. He observed that in the beginning his subjects showed trial and error behaviour to solve a series of problems but he noticed that when similar problems were presented to the subjects in future for the first time they made correct discrimination. The later stage appears to be insightful learning, i.e., suddenly getting the problem solved. According to Harlow, the underlying assumption is that in the previous trial and error learning, the subjects have learned 'how to learn'. They acquired what he called a learning set. They acquired a method of learning that transferred positively to other problem situations of similar type.

Harlow says, 'Generalizing broadly to human behaviour, we hold that original learning within an area is difficult and frustrating, but after mastery of the basic facts, learning with the same area becomes simple and effortless.'

2.5.2 Steps in Effective Problem-Solving Behaviour

Psychologists have tried to study the behaviour involved in the process of problem-solving in animals as well as in human beings. They have suggested different steps involved in the process of problem-solving according to their respective findings and viewpoints.

John Bransford and Barry Stein (1984) advocated five steps that are basically associated with the task of problem-solving. They referred to these steps as 'IDEAL' thinking and arranged them in the following order:

I = Identifying the problem

D = Defining and representing the problem

E = Exploring possible strategies

A = Acting on the strategies

L = Looking back and evaluating the effects of one's activities

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Bourne, Dominowski and Loftus (1979), on the other hand, enumerated the following three steps or stages in problem-solving: preparation, production and evaluation, by proclaiming 'we prepare, we produce and we evaluate in the task of problem-solving.'

Problem-solving is an individual phenomenon and involves the exercise of cognitive abilities of a high order and continuous and persistent struggling on the conscious as well as unconscious levels. Often, there is a considerable movement back and forth as one moves from one step to another in the task of problem-solving. In general, the following steps may be followed in the task of problem-solving.

1. ***Problem-awareness:*** The first step in the problem-solving behaviour of an individual is concerned with his awareness of the difficulty or problem that needs to be solved. He/she must face some obstacle or interference in the path of the realization of his/her goals, needs or motives and consequently he/she must be conscious of the difficulty or problem.
2. ***Problem-understanding*****:** The difficulty or problem encountered by the individual should next be properly identified and analysed so that its exact nature becomes clear. This should be followed by relating the problem to specific goals and objectives. Thus, all the difficulties and obstacles in the path of the goal or solution must be properly named and identified and what is to be achieved through the problem-solving effort should be clearly known in very specific terms.
3. ***Collection of the relevant information*****:** In this step, the individual is required to collect all the relevant information about the problem by all possible means. He may consult experienced persons, read the available literature, recall his own experiences, think of the numerous possible solutions and put in all possible efforts to collect comprehensive data and knowledge concerning the problem.
4. ***Formulation of hypotheses or hunch for possible solutions:*** After understanding the nature of the problem and collecting all relevant information, one may start some cognitive activities to think out the various solutions to the problem.
5. ***Selection of the correct solution:*** In this important step, all the possible solutions, thought out in the previous step, are closely analysed and evaluated. Gates and others (1946) have suggested the following activities in the evaluation of the assumed hypotheses or solutions:

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(i) Identify the conclusion that completely satisfies all the demands of the problem.

(ii) Find out whether the solution is consistent with other well-established or accepted facts and principles.

(iii) Make a deliberate search for negative aspects, which might cast any doubt upon the conclusion.

The above suggestions will help the individual select the proper solution of the problem out of the numerous solutions that may be available. In the final analysis, however, he/she has to use his/her own discretion by utilizing higher cognitive abilities to properly identify the appropriate hypothesis or solution by rejecting all other hypotheses.

6. ***Verification of the concluded solution or hypothesis:*** The solution arrived at or conclusion drawn must be further verified by applying it in the solution of various similar problems and only if the derived solution helps in the solution of these problems, should on consider the solution to be acceptable. Such a verified solution may then become a useful product of one's problem-solving behaviour and be utilized in solving other future problems.

2.5.3 Phases of Problem-Solving

Psychologists and educators who worked on problem-solving have distinguished several phases in the process of problem-solving. It is not necessary to pass through all the phases in every problem. Table 2.4 shows the steps which have been given by different research workers on problem-solving.

Table 2.4 *Problem-Solving*

S. No.	*Rossman*	*Dewey*	*Merrifield*	*Klausmeier*
1.	Need or fell difficulty	1. Sensing difficulty Locating and defining	1. Preparation	1. Attending and cognizing difficulty
2.	Information gathered	2. Suggesting hypothesis	2. Analysis	2. Stating the general requirements
3.	Solution tested	3. Testing hypothesis	3. Production	3. Recalling existing knowledge
4.	New ideas formulated, tested and accepted		4. Verification	4. Applying substantive knowledge
			5. Re-application	5. Inferring possible solutions
				6. Evaluating the quality of the accepted solution.
				7. Transfer of new acquired knowledge

- ***Confrontation with a problem:*** The process of problem solution is mutated by the felt need or problem in the environment, which calls for a solution. The confrontation of problem may be due to two reasons,

i.e., someone else has created a problem for the individual or the individual himself has experienced a problematic situation.

- ***Search of the solution:*** When the individual feels motivated to solve a problem, he/she starts analysing the situation, identifying the problem in definite terms. He/she formulates certain hypotheses that guide him/her to reach the goal. He/she collects relevant information from different sources that have bearing on the problem. Appropriate tools are gathered, books and magazines are collected. After collecting information from various sources, the individual analyses the data and attempts to find out the solution of the problem.
- ***Solution of the problem:*** Finally, the endeavour is crowned with success, that is, the obstacle is removed and a state of satisfaction is attained. Sometimes it has been experienced that final solution occurs in a flash of inspiration, yet the foregoing trials, though not immediately successful, must have paved the way for it.
- ***Verification:*** The routine checking of hypothesis is the search for the solution. In many cases, however the need arises for final testing of the solution, or for the elaboration of detail, as for instance, in case of designs for new machinery. The final testing may some time lead to the introduction of certain changes in the original device.

The process of problem-solving in each case depends upon the type of the problem, the circumstance of the research for the solution and on the individual's personality.

2.5.4 Problem-Solving and Role of the Teacher

How can a teacher help the students in problem-solving? This is an important question, which every class-room teacher faces. No universal law can be formulated for solving each and every type of problem. Problem-solving in an individual process that requires various strategies to tackle. A classroom teacher can develop a scientific approach to solve problems, which the students are expected to face in social life. Tentative suggestions are provided for teachers that can prove useful in developing the right attitude to approach a problem. Some of these are discussed as follows:

- ***Moderate motivation:*** It has been pointed out by experimental studies that extreme motivation or excessive emotional involvement in a problem hinders productive thinking. The teacher should create moderate motivation in the students. If he/she finds that students show high motivation, he/she should drop the problem and return to it when he/she finds the students in a calmer state but on the other hand motivation should be sufficient to sustain the interest of the class. The teacher can create motivation by utilizing various techniques.
- ***Encourage divergent thinking*:** The teacher should not emphasize confirmatory behaviour in students. He/she should encourage divergent thinking in students. Students should be encouraged to tackle problems in a variety of ways. The teacher should allow flexibility and encourage original

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approach to problems. Reasoning should be developed through guided discussions in the class.

- ***Problem should be presented as a whole:*** The teacher should present problems in the class as a whole so that students may have the perception of the total situation for the solution.
- ***Level of difficulty:*** The teacher should see that the problems are not too difficult for the class. The maturation level and the level of developmental task to create motivation in the students should be kept in mind. The problem should be neither too difficult nor too easy for the class. The problem should create a moderate level of anxiety in the students.
- ***Active manipulation:*** The teacher should present a problem in a planned way. He/she should try towards an active involvement of the class in the process of solving a problem. Use of diagrams, figures and manipulation of concrete material should be made to conceptualize the abstract problems. The teacher can shift the functional properties of process and then evaluate the environment in these terms.
- ***Practice:*** The teacher should provide a variety of problems for practice in order to develop mental skills in students aiding them to solve similar types of problems in future.
- ***Incomplete solution:*** It has been proved that incomplete tasks are retained more than complete. The implication of this is that the teacher should never provide complete solutions to problems. Some unanswered question should be left for the students for solution. The teacher can develop the spirit of formulating tentative conclusions of the problem. He/she should make an effort to develop a scientific attitude in students.

2.5.5 Thinking and Problem Solving

Thinking is very significant in problem-solving. A problem stimulates a thinker. A thinker thinks about the solution when faced with a problem. Words have great significance in the thinking process. The names and concepts of things have a great role in thinking, analysing the importance of words in thinking. Some scholars conclude that thinking is always verbal, but sometimes children can resort to mental patterns and physical postures. However, symbolic thinking is often verbal.

Thinking, no doubt, solves a problem, but all kinds of problems do not arouse thinking. If a problem is not experienced, it is possible that the thinking might not begin at all and the problem would remain in the same form. For example, experiencing a hardship and being acquainted with the extensiveness of a difficulty helps to find the symbolic means of conquering a problem. When a means to problem solving is found, it is tested. All kinds of problems do not lead to thinking and all kinds of thinking is not the solution to problems. When thinking inclines towards problem-solving, it adopts the scientific approach. From the scientific and logical viewpoint, problem-solving has the following stages:

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- **Experience of difficulty:** When a need is felt or a hurdle is faced, the person concerned is perplexed, troubled and restless. He/she wants to achieve, wants to adopt a thought or ideal, or wants to possess something. However, if he/she has no means to get what he/she wants or he/she is not able to recognize the thing, ideal or tool, or is not able to clarify an incident, he/she experiences difficulty. When he/she sees that his need is not being fulfilled by the available means and his/her present knowledge in not able to reduce his/her restlessness, then he/she reaches the threshold of thinking. This problem can arise any time in our daily life, such as expenses being more than income, car accident, sickness, rising prices, and so on. Such problems do not solve by present knowledge or means, giving rise to complexities.
- **Explanation and definition of problem:** When a difficulty arises, it is very unclear in its initial form. A difficulty gives rise to tension, anxiety, perplexity and restlessness, but keeps itself under wraps. A difficulty resides behind veils and cannot be seen without unveiling. Common people experience its presence, but commit error in recognizing it or do not attempt to recognize it at all. Recognizing a problem means to mark its extent or limit and define it. If a person wants to solve a problem, he/she has to understand and clarify it. If a difficulty does not resolve, the means employed to solve it can prove misleading. A person cannot conquer a difficulty in the absence of its definition.
- **Suggestions for problem-solving:** Facts, information and other related aspects present suggestions for problem solving. An attempt is made to guess from the observation of the facts and go beyond the present facts. The thinker guesses with the help of facts, imagines, or in scientific language forms a concept. Conceptualization is a task of great courage. Carefulness is observed in its formation. The thinker decides the presented suggestions for problem-solving, determines the objective of each suggestion and then adopts one of the suggestions as a conclusion. If a suggestion does not seem appropriate, the thinker rejects it and evaluates another. Thus, testing various suggestions, the thinker accepts one such suggestion, which presents the correct solution to the problem, or the person sits down dejected and the flow of thinking interrupts. An able thinker can present several suggestions and can recognize a good suggestion by testing it. He/she can recognize a good suggestion from a bad one.
- **Solution of the problem:** When a suggestion is accepted, it is used for problem-solving. Experiments are conducted in some problems while in others the solution is found without any experiment. The use of experiments constitute the fifth stage of thinking; if the problem is not experimented, the solution is may be found out by inner vision, the solution representing the fifth stage.
- **Testing the solution:** When solution to a problem is found, it is used for remedying the problem and validating its appropriateness. When discussions on problem-solving were carried out, many suggestions were

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considered and the best solution was accepted as a temporary solution. This temporary solution is used to experiment. In *Gestalt Psychology*, it is in this stage that a person is able to find a solution by the similarity of a situation. John Dewey has described these stages of discussion on thinking in this book *How We Think* as:

(i) Experience of difficulty

(ii) Definition of difficulty

(iii) Suggestion or concepts for problem-solving

(iv) Consideration of suggestions

(v) Testing the concepts by activity

These five steps of problem-solving recommend both methods of inclusion and exclusion. Inclusion is used to prepare the base of the imagination, but exclusion considers the suggestions facilitated by which the thinker reaches logical conclusions from imagination and once again takes refuge of inclusion to prove other cognitive solutions.

The development of discussion thinking cannot happen all of a sudden. It is related with learning. Children learn by thinking and develop their ability to think by learning. An inexperienced child learns by trial and error. He/she uses more of his intellect when grown and takes the help of prior experiences. The ability to logical thinking develops gradually. Students can be trained for logical thinking in problem-solving.

CHECK YOUR PROGRESS

7. Define problem-solving.
8. What are the two approaches to problem-solving?
9. What is the first step in the problem-solving behaviour of an individual?
10. Differentiate between inclusion and exclusion.

2.6 COGNITIVE AND LANGUAGE DEVELOPMENT

This section discusses the cognitive and language development in detail.

2.6.1 Theories of Cognitive Development

In this sub-section, we will discuss Jean Piaget's theory of cognitive development and Vygotsky's socio-cultural theory.

I. Jean Piaget's Theory of Cognitive Development

Jean Piaget is regarded as one of the pioneers in psychological investigation of children, although he neither undertook formal study nor passed any examination in psychology. He was a biologist by training. At the age of 22, he obtained his Doctorate

Degree in Zoology on Mollusks of Valias. He worked on child development for more than 50 years and produced enormous literature on developmental psychology. He read philosophy, psychology and sociology, and so on Piaget pursued clinical research at the Alfred Binet Laboratory at Paris. By observing and working with children, he developed his educational theory regarding cognitive development or learning by children. Piaget's work as a Professor of child psychology at the University of Geneva (Switzerland) made him famous throughout the world.

Basic Concepts of Piaget's Theory

Piaget introduced four concepts in the building of his theory. They are as follows:

1. **Schemas:** Piaget called 'schemas' as cognitive structures or the patterns of behaviour that children and adults use in dealing with objects in their environment. These patterns can be simple as well as complex. As the development proceeds, each pattern enlarges and changes. It is coordinated with other patterns to form more complex patterns. The infant sucks the breast of its mother, it looks at the objects of its environment, listens to different voices in its environment; and finally it tries to comprehend, conceptualize the articles, animals, space and many other behaviour patterns or structures.
2. **Assimilation:** Assimilation implies incorporation of something from the environment. New ideas, concepts and stimuli are taken in and incorporated into one's existing set of schema. A scheme is the organized pattern of behaviour which the child develops when he/she is engaged in any activity. For example, when a child is engaged in sucking, there is a certain pattern of movements of the cheeks, lips and hands. When a child is confronted with a new object, he/she will try to understand the new object by applying his/her old schema to it. He/She grasps and adapts himself/herself to a new object by assimilating it. His/Her old schema does not change in the process.
3. **Accommodation:** Accommodation involves modification or change of some elements of an old schema or learning new schema which is more appropriate for the new object. A baby who has already got a schema of sucking mother's breast accommodates to the object placed in the mouth—finger, nipple, pencil, a toy—depending on its shape, form and the size. The baby develops a new schema or a modified schema. This is called accommodation.

   Thus a baby assimilates when it understands and perceives the new in the light of its old perceptions. A baby forms a new schema and modifies or changes its old perception to suit the new. This implies adjusting or accommodating. In this way/her a baby forms new structures or new schemes, and consequently develops cognitivity.
4. **Equilibration:** The structures or the schemes change from one stage to another by the process of equilibration—maintaining balance between the child and his/her changing environment. According to Piaget, when by the existing scheme, the new situation is not fully handled, then a state of disequilibrium or an imbalance between what is understood and what is encountered is created. In such a case, the individual tries to reduce such

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imbalances. This is done by him/her by focusing his/her attention on the stimuli that has caused the disequilibrium and by developing new schemas or adapting old ones until equilibrium is restored. This process of restoring balance is called equilibration. Piaget believes that learning depends on this process.

Stages of Cognitive Development

Jean Piaget divided the stages of cognitive development in the following categories:

1. ***The period of sensorimotor adaptation* (*since birth to 2 years*):** The period from birth to two years is marked by an extraordinary development of the mind. The infant starts from reflex domination and reaches the stage of sensorimotor schemas in a means to end a relationship. The development of this period is very important for future life.

   The intellectual development at this age is marked by the following four fundamental characteristics:

   - Object concept formation
   - Coordinated space
   - Objectified causality
   - Objectification of time

   The objects exist in the psychological world of an adult irrespective of their physical presence before the adult but in the world of the child, they only exist when they are physically present and the child looks at them, grasps them and acts with them. As soon as they move out of his/her range of acting, grasping and listening, they stop existing for the child. In the first year of life, the child develops the concept of permanence of objects. He/She then attempts to retrieve an object that disappears from his/her range of action. When the child acquires the scheme of object permanence, he/she is likely to exercise it at every opportunity; he/she will drop objects of his/her play and then try to find out them.

   The second characteristic of coordinated space is integrated with the formation of the object concept. The spatial world at first is totally uncoordinated. Each sensory modality has its own space and is centred on the child's current activities. By the end of two years, the child develops the concept which is characterized by relationship among objects and between objects and his/her own body.

   The concept of causality depends on the activity of the child. Any action of the child which brings about an effect is taken as the cause of that event. The child, by a number of activities, develops the concept of causality by the end of two years of age.

   The infant does not have any real sense of duration at the beginning of life. By the middle of first year of life, a rudimentary sense of duration is present, but it is entirely a subjective phenomenon. By the end of the first year, the infant frees itself lf from this personal concept of time and the beginning of objective existence of time takes place. The infant can establish temporal

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relations between events in which it does not directly participate. Appearance of representations during its second year of life gives a considerable boost to the time concept. The infant can now recall events of long ago as well as those that occurred in the immediate past. Time is conceived as a dimension in which events occur, not just as a by-product of behaviour.

2. ***The development of symbolic and pre-conceptual thought (2 to 4 years)*:** At the end of the sensorimotor period, the child starts dealing with the world by means of ideational representations. By imitation and other forms of behaviour, he/she demonstrates that he/she is capable of extending his/her world beyond here and now. These actions of the child indicate the use of symbols. By the age of 4, the child develops way of representing the environment in the absence of perceptual cues and will build a set of symbolic schemes.
3. ***The period of intuitive thought (4 to 8 years)*:** At this stage, the child is able to use concepts as stable generalization of his past and present experiences. His/Her reasoning is not logical and is based on intuition rather than on systematic logic. The intuitive thought of the child is mainly concerned with stages or static configurations and neglects transformation. The child talks about this or that momentary static conditions, but he/she cannot adequately link a whole set of successive conditions into an integrated totality by taking into account the transformations which unify them and render them logically coherent.
4. ***The period of concrete operations (8 to 12 years)*:** Concrete operation means that stage of cognitive development when the child is able to direct his attention away from the static conditions and can focus on the whole set of successive changes that occur in the process of transformation. At this stage, the child can reason well. Transformation could return to its starting point. Piaget has given a long list of operations which make possible the handling of numbers in various relations to each other, the arrangement of objects into classes and sub-classes and the ordering of objects according to one or more attributes. He has coined a term 'grouping' to describe a set of operations.

   The starting point of concrete operations is always the real father than potential. The child of 7–11 years acts as though the primary task were to organize and order what is immediately present. During the period of concrete operations, there are some logical inconsistencies in the child's thinking. Piaget calls this efficiency 'Syncretism'.
5. ***The period of formal operations (from 12 years to adolescence)*:** At this stage the child's thought process becomes quite systematic and reasonably well-integrated. These qualities of the child's thought process are evident when events are present. Reality guides his contemplation of possibility. He starts a form of hypothetico-deductive reasoning. The use of formal operations is what is called the 'controlling aspects of comprehending'.

The child at this stage in his/her formal thinking can free himself/herself of the here and now in a lawful and systematic way. His/Her wisdom lies in the masterful

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administration of the unforeseen. When an adolescent is faced with a problem, he/she uses formal operations to identify the variables that seem relevant to the solutions, and then considers all the possible combinations of these variables.

The formal thought of adolescent is of propositional nature. The adolescent using formal operations views the concrete data as inducing a set of propositions and he/she then applies operations to these propositions which are themselves primary operations. Formal thinking is, thus, inter-propositional and inter-operational and entails working out propositions on propositions or applying second-order operations to primary ones.

The development of formal operations enables the adolescent to transfer understanding from one situation to another.

The adolescent shows a particular orientation to problem solving. He/She analyses and organizes his/her approach before attempting a specific empirical test.

The hallmark of formal operations period is the development of the ability to think in symbolic terms and comprehend content meaningfully without requiring physical objects or even visual or other imagery based on past experience with such objects. Formal operations are the logical and mathematical concepts which are used in advanced conceptualization and reasoning, and so on, that is difficult to represent concretely.

Piaget's: Aspects of Learning

1. **Meaning of learning:** Learning includes the wide range of activities. Rigid distinctions like classroom for instruction, laboratory for practicals, recess for amusement, mathematics for developing computational ability, athletics for strengthening the body muscles, and so on, are unnecessary. Piaget's approach helps to tie together what have been treated as separate subjects.
2. **Role of learner's actions:** Action stresses the role of active exploration. A child is active when he stares at objects. A child is active when he stares at an organism. A child is active when he/she studies his/her body parts. A child is active when he lifts something. A child is active when he/her carries things. A child is active when he/her arranges things. Children are usually active for most of their time. There is no doubt that some of these activities may be rather aimless or unnecessary. However, most of these activities are purposeful.
3. **Role of practice:** An important part of Piagetian model is repetition of an act by a child. The role of practice varies with development. Concepts are the products of a long history of action. A child may take three or more days to complete a puzzle. Each day he/she appears to go through the same sequence. A child's actions upon the environment are repeated again and again with slight modifications each time. Piaget depicts the child as somewhat slower and methodical and systematic in acquisition of new ideas.
4. **Motivation:** According to Piaget, a learner desires to reduce his/her internal conflicts by keeping his/her thoughts harmonious and in equilibrium. It is only through playing, imitating, exploring and questioning that a child gradually

comes to distinguish the achievable from non-achievable, and logical from the illogical. To Piaget, the progress towards this end is inherent, a property of cognitive style as are eating, drinking and breathing in the physiological field.

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5. **Memory:** Memory is a symbolic representation of how the child has schematized what he/she sees. Experiments conducted by Piaget reveal that after six months, 61 per cent of the children from 4–8 years of age regressed in their memory ability if tested by recall or evocation.

   A reconstruction test involving the child with some material showed regression in 4–5 years olds but 48 per cent progression among 6–7 year olds. Piaget holds that recognition is perceptual and reconstruction is internalized imitation. Each experiment reveals that the pattern of accuracy, improvement and regression (gradual loss of memory) is determined by initial conceptual understanding and is altered by new understandings.

6. **Interest:** According to Piaget, the interest of the child at any given movement depends upon the system of ideas he/she has acquired plus his affective perception. A child tends to fulfil his/her interests in the direction of greater equilibrium. According to Piaget, equilibrium is development and the ability to think in a logical and natural manner.

Educational Implications of Piaget's Cognitive Theory of Development

- It provides a broad development perspective to the educator for building a curriculum for the children.
- The description of developmental stages and qualitative aspects of intellectual growth is very useful in providing suitable educational practices.
- The cognitive theory states that the child is to be actively involved in the teaching–learning process for his intellectual growth.
- Piaget-based curriculum requires that children should not skip any stage.
- The pre-school child is at the pre-operational level. The educational programme at this stage should provide concrete operations.
- An educational programme should enable the child to integrate the information.
- A child should be helped to develop internal consistency of the system.
- Most of the activities of the Piaget type require simple equipment and material.
- Drilling in skills is to be avoided.
- Teaching–learning situation should be geared to a point where the child is neither too familiar nor too unfamiliar with the objects and ideas.
- Variety of cognitive activities like storytelling, rhymes, singing, and so on, are included in the programme in a systematic manner. There is a deliberate attention of developing cognitive growth.
- A child's development is retarded if he/she is not allowed a fairly wide sensory and motor experience in his/her early years.

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- Real events and concrete objects play an important role in learning.
- In science and mathematics, learning from physical environment is more important than what is learnt from people, books or television.
- A teacher should arouse curiosity of the child through planned activities.
- Children like to find out by themselves by their own spontaneous activity.
- Children learn speedily if we provide concrete material to them.

Criticism of Piaget's Theory of Development

Several psychologists do not agree with Piaget's theory of cognitive development. According to Gagne (1968), stages described by Piaget are not necessarily the inevitable result of an inborn time-table. Instead they are a consequence of children having learned sets of rules that are progressively more complex, and these rules are taught by their physical and social environment. Gagne thinks that Piaget was indifferent to the role of learning in developmental changes.

Some psychologists do not agree with the view of Piaget that infants are born with some elementary mental structures that are starting points for their attempts to deal with their environment.

Piaget's views are not new to educational thought. What is new is that they have been stated in the context of the classroom situations. Instruction in the classroom would serve the function of setting into motion the processes of assimilation and accommodation for a particular area of exploration.

Vygotsky's Socio-Cultural Theory

Vygotsky (1962) believed that children are active seekers of knowledge, but emphasized that rich social and cultural contexts profoundly affect their thinking. The main points of Vygotsky's theory were:

- Rapid growth of language leads to profound change in thinking.
- It broadens pre-schoolers' participation in social dialogues with more knowledgeable individuals, who encourage them to master culturally important tasks.
- Young children start to communicate with themselves in the same way as they converse with others.

Hence, basic mental capacities are transformed into uniquely human, higher cognitive processes.

2.6.2 Language Acquisition and Speech Development

A major feature that distinguishes human beings from animals is their ability to use vocal speech as a means of communication. Sometimes the words 'speech' and 'communication' are used as if they mean the same thing. Speech is the most important form of communication. Communication has these forms:

- Speech
- Facial and bodily movements that show different emotions

- Touch
- Sign language used by the deaf
- Arts such as music, dance and painting
- Written symbols of words

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Broadly speaking, the tools of communication may be categorized under two heads—signs and symbols. Symbols are unique to human beings. Language permits the communication of information from one generation to the other. It makes available the wisdom as well as the errors of the past to the present generation.

Also, language performs the following functions:

- Language helps to communicate ideas to others
- Language helps in the formation of concepts
- Language helps in the analysis of complex wholes
- Language helps us to focus attention on ideas which would otherwise be difficult to keep in mind

A psychologist takes interest in the structure of a language because in it he/she finds some aspects of human structure of thinking.

Sequence of language development

The sounds, words and sentences are the stages in language development. The first cry or sound uttered by a child is its cry of birth. Crying, babbling and gestures are all important forms of pre-speech communication. The mother starts talking to the child right from the moment of birth. She converses when she changes the clothes of the infant. She converses when she feeds the infant. She converses when she gives a both to her infant. In this way, the sound making behaviour is reinforced. It is pleasant for the parents to listen the sounds made by the infant. It becomes a rewarding experience for the child.

Crow and Crow (1962) pointed out the sequential steps of progress in language development:

- Feeble gestures and sounds
- Babbling
- Use of simple spoken vocabulary
- One word sentence
- Combination of words into sentences
- Development of skill in reading
- Improved mastery of the tools of communication

Gessel and Thompson (1934) reported about language growth that most babies observe cooing when they are 12–16 weeks old. They are able to combine some vowels and consonants and repeat them in succession when they are five to six months old. They can speak one word or more when they are one-year old.

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Lynip (1951) recorded voice samples of an infant for 56 weeks beginning with its birth cry. With a sound spectrograph, he analysed these records and noted that the infant did not produce a single vowel or consonant sound comparable to adult vowels or consonants until about the age of one year. Thorndike and Lorge (1944) spent a number of years in counting the words which were used in popular magazines and children's books, and so on, in America. It was found that the word 'I' was used most often.

2.6.3 Development and Levels of Language

Language use has two aspects—production and comprehension. In the production of language, we start with a thought, somehow translate it into a sentence, and end up with sounds that express the sentence. In the comprehension of language, we start by hearing sounds, attach meanings to the sounds in the form of words, combine the words to create a sentence, and then somehow extract meaning from it. Language use seems to involve moving through various levels. At the highest level are sentence units, including sentences and phrases. The next level is that of words and parts of words that carry meaning (the prefix or the suffixes, for example). The lowest level contains speech sounds; the adjacent levels are closely related. The phrases of a sentence are built from words and prefixes and suffixes, which in turn are constructed from speech sounds. Language is therefore a multilevel system for relating thoughts to speech by means of word and sentence units (Chomsky, 1975). The following are the levels of language:

- **Speech sounds:** We do not perceive the person's speech as a continuous stream of sound but rather as a sequence of phonemes, or discrete speech categories. For example, the sound corresponding to the first letter in 'boy' is an instance of a phoneme symbolized as 'b'. Every language has a different set of phonemes. When phonemes are combined in the right way, we perceive them as words. Each language has its own rules about which phonemes can follow others.
- **Word units:** Unlike phonemes, words carry meaning. However, they are not the only small linguistic units that convey meaning. Suffixes such as 'ly' or prefixes such as 'un' also carry meaning. They can be added to words to form more complex words with different meanings. The term 'morpheme' is used to refer to any small linguistic unit that carries meaning. The most important aspect of a word is its meaning. Some words are ambiguous because they name more than one concept.
- **Sentence units:** As listeners, we usually combine words into sentence units, which include sentences as well as phrases. An important property of these units is that they can correspond to parts of a thought, or proposition. Such correspondences allow a listener to extract propositions from sentences.
- **Phrases and propositions:** Analysing a sentence into noun and verb phrases, and then dividing these phrases into smaller units like nouns, an adjective, and verbs, is syntactic analysis. Syntax deals with the relationships between words in phrases and sentences. Syntax primarily serves to structure the parts of a sentence.

2.6.4 Roots of Language and its Use

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Development occurs at all three levels of language. It starts at the level of phonemes, proceeds to the level of words and other morphemes, and then moves on to the level of sentence units, or syntax.

Phonemes and Combinations of Phonemes

Although children learn which phonemes are relevant during their first year of life, it takes several years for them to learn how phonemes can be combined to form words. When children first begin to talk, they occasionally produce difficult words like dumber for lumber. By age four, however, children have learned most of what they need to know about phoneme combinations.

Words and Concepts

When they are a year old, children begin to speak. One-year olds already have concepts for many things (including family members, household pets, food, toys, and body parts), and when they begin to speak, they are mapping these concepts onto words that adults use. The beginning vocabulary is roughly the same for all children. Children who are 1 to 2 years old talk mainly about people (dada, mama, baby, and so on). Thereafter, the child's vocabulary development virtually explodes. At a year and a half, a child might have a vocabulary of 25 words, at six years, the child's vocabulary grows; children have to learn new words at the rate of almost ten per day (Miller and Gildea, 1987). Children seem to be attuned to learning new words.

From Primitive to Complex Sentences

Between the ages of 11/2–21/2 years, the acquisition of phrase and sentence units, or syntax begins. Children start to combine single words into two-word utterances. Children progress rapidly from two-word utterances to more complex sentences that express propositions more precisely.

Learning Process

Innate factors must also play a role. That is why children raised in English-speaking households learn English, whereas children raised in French-speaking households learn French.

Imitation and Conditioning

One possibility is that children learn language by imitating adults. Although imitation plays some role in the learning of words (a parent points to a telephone says, 'phone' and the child tries to repeat the word), it cannot be the principal means by which children learn to produce and understand sentences. A second possibility is that children acquire language through conditioning. Adults may reward children when they produce a grammatical sentence and correct them when children make mistakes. For this to work, parents would have to respond to every detail in a child's speech. However, psychologists Brown, Cazden, and Bellugi (1969) found that parents do not pay attention to how the child says something, as long as the statement is comprehensible. Also, attempts to correct a child (and, hence, apply conditioning) are often futile.

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Hypothesis Testing

The problem with imitation and conditioning is that they focus on specific utterances. However, children often learn something general as a rule. They seem to form a hypothesis about a rule of language, test it, and retain it if it works.

Innate Factors

Some of our knowledge about language is inborn or innate. If our innate knowledge is very rich or detailed, the process of language acquisition should be similar for different languages, even if the opportunities for learning differ among cultures unique to the human species.

Richness of Innate Knowledge

All children, regardless of their culture and language, seem to go through the same sequence of language development, which is as follows:

- When children are one, they speak a few isolated words
- At about two years of age, they speak two- and three-word sentences
- At three years, sentences become more grammatical
- At four years, the children's speech sounds much like that of an adult

Cultures differ markedly in the opportunities they provide for children to learn from adults. In some cultures, parents are constantly speaking to their children, whereas in others parents verbally ignore their children. The fact is that this sequence is so consistent across cultures which indicate that our innate knowledge about language is very rich. Indeed, our innate knowledge of language seems to be so rich that children can go through the normal course of language acquisition even when there are no language users around them to serve as models or teachers.

Critical Periods

More recent research indicates that there is also a critical period for learning syntax. With respect to understanding and producing words with multiple morphemes, such as 'untimely', which consists of the morphemes 'un;, 'time', and 'ly', native signers did better than those who learned ASL when entering school, who in turn did better than those who learned ASL after age twelve (Meier, 1991; Newport, 1990).

2.6.5 Factors Influencing Language Development

Following are the important factors affecting the development of language:

- Imitation of the language of parents, other adults and teachers
- Cultural factors
- Environmental factors
- Degree of maturity
- Level of intelligence
- Physical conditions

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- Number of children in the family
- Socio-economic status of the family
- Child's emotional development
- Teacher's language competence

McCarthy (1920) noted consistent difference in favour of upper social class children in language maturity. Deutsch (1963) found that the home of the lower class child had few objects to provide a variety of stimulation.

Hess and Shipman (1966) taped samples of the mother's language. It was found that middle-class mothers used more complex sentences than used by the low-class mothers.

In India, a study on language development of children was conducted in 1971 by Kuppuswamy. The responses of 480 children studying in Kindergarten, first, third and fifth grades using Kannad were considered. The rural children were found to be definitely inferior to urban children.

The child in the village or in the slum in the urban areas in India has few things to observe and play with. Moreover, he/she lacks facilities like television, and so on. This provides opportunity for the child from the middle-class home to learn more words and have a good vocabulary by the time he/she goes to school.

2.6.6 Perspectives of Language Development

The various perspectives of language development are as follows:

1. The Behaviourist Perspective

- This perspective considers language development to be entirely a result of environmental influences.
- Through operant conditioning, parents reinforce their baby's sounds that mostly sound like words.
- Imitation combines with reinforcement to promote language development.

2. The Nativist Perspective

- This view states that children are born with a biological based system—called the language acquisition device (LAD)—for mastering language.
- Chomsky maintained that the LAD contains a set of rules common to all languages; thus, children speak in a rule-oriented way from the beginning.
- Children all over the world tend to master language milestones in a similar sequence—evidence that fits with Chomsky's ideas.

3. Perspective of Interactionists

- This view postulates that the language achievements happen due to the interaction of innate abilities and environmental influences.
- Native capacity, a strong desire to interact with others, and a rich linguistic and social environment contribute to promoting a child's language capacities.

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CHECK YOUR PROGRESS

11. State the functions of language.
12. What are the two aspects of language?
13. What are the different levels of language where development begins?
14. Identify any four factors that affect the development of language.

2.7 INDIVIDUAL DIFFERENCES

We have seen how children differ in various aspects. It is quite clear that the same curriculum, same methods of teaching and same discipline, and in some cases, even the same educational institution will not serve the individual needs of children. Ideally speaking, each student needs a particular setting and individual instruction with a lot of group interaction. This, however, is not feasible in normal life. At the same time, individual differences of children must be catered to.

2.7.1 Factors Affecting Individual Differences

These may be classified under two heads:

- Hereditary factors
- Environmental factors

Heredity of an individual is contained in the seed while the environment comprises factors like sunlight, soil, temperature and traditions, customs, rites, a code of ethics, philosophy, literature, contact with other individuals, etc. Parents, teachers, community and society are expected to play a significant role in providing a rich social environment for a balanced development of its members.

All human beings need help. The same is true with all students. Of course, the degree of guidance needed differs from student to student in view of individual differences.

Dimensions of Individual Differences

Broadly speaking, there are two dimensions of individual differences—psychological differences and physical differences.

Psychological Differences

These include:

- Emotional differences
- Intelligence
- Readiness
- Curiosity and eagerness to learn

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- Experience of success
- Attention span
- Academic performance
- Difference in abilities, attitudes and traits
- Difference in achievement
- Difference in social behaviour
- Sex difference

Psychological differences are being discussed in detail below:

1. **Emotional differences:** Some children are calm most of the time. Some are generally irritable. Some are very peaceful and some become angry very easily. Anger is common to all people but its intensity and depiction differs in different people. Differences in personality characteristics among children also range from very slight to extreme. They are also found to behave differently in different situations. One child may be bold and talkative at home, but may be very quiet and subdued in the school. We also note different children reacting differently in similar situations. For example, when two children are scolded by the teacher for not doing their homework; one child may take it in his stride and decide to be regular in future, whereas the other may cry and refuse to go to school the next day.
2. **Intelligence:** Children differ immensely in intelligence as well. Intelligence refers to (*i*) capacity to learn with speed and accuracy (*ii*) capacity to solve problems, (*iii*) capacity to adjust in the society. Terman has classified mental ability on the basis of intelligence quotient (IQ) as under:

Level of mental ability	IQ range
Genius	140 and above
Superior	Between 140 and 110
Normal	Between 110 and 90
Dull	Between 90 and 80
Borderline mentally deficient	Between 80 and 70
Feeble-minded	Below 70

Performance of the individual as a teacher, as a person, as a citizen, as a worker and as a student largely depends upon the intelligence he possesses.

Testing of intellectual abilities led to the discovery that intelligence continues to increase from birth till it reaches a peak about the middle of adolescence. According to some studies, 50 per cent of that development (which is realized at age of seventeen), takes place between conception and the age of four, about 30 per cent between ages four and eight and about 20 per cent between ages eight and seventeen. An example of a test that shows the growth of intelligence is the number of digits a child is able to repeat. The number increases as follows:

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Age of child	Digits he/she is able to repeat
2 years 6 months	Repeats 2 digits, e.g., 4-7, 6-3, 5-8
3 years	Repeats 3 digits, e.g., 6-4-1, 3-5-2, 8-3-7
7 years	Repeats 5 digits, e.g., 3-1-8-5-9, 4-8-3-7-2, 9-6-1-8-3, or alternatively repeats 3 digits backwards, e.g., 2-9-5, 8-1-6, 4-7-3
9 years	Repeats 4 digits backwards, 8-5-2-6, 4-9-3-7, 3-6-2-9
10 years	Repeats 6 digits, 4-7-3-8-5-9, 5-2-9-7-4-6, 7-2-8-3-9-9
12 years	Repeats 5 digits backwards, 8-1-3-7-9, 6-9-5-8-2, 9-2-5-1-8

3. **Readiness:** Readiness for learning is different in different children; not all children are at the same stage of readiness for learning when they enter school or when they are promoted to thenext class or even when a new topic or unit is to be introduced in a subject. This makes a difference in the new situation.
4. **Curiosity and eagerness to learn:** Considerable difference can be detected in the degree of curiosity and eagerness that the students display. These differences may be partly due to their early upbringing and experiences at home and the family influences.
5. **Experience of success:** It is observed that children with a history of early success persist in their efforts to succeed further.
6. **Attention span:** Difference in the attention span, or the length of time for which a child can pay attention continuously to one activity is also responsible for the difference in the level of academic and other performances.
7. **Academic performance:** Even though all the children are taught by the same teachers and by the same methods in a particular class, they show different levels of performance. All children do not learn at the same speed. Some learn slowly, some with average speed and some learn very fast.
8. **Difference in abilities, attitudes and traits:** Wide variations have been observed among children in the field of creative abilities, special aptitudes and personality traits.
9. **Difference in achievements:** Through achievement tests, it has been found that children differ in their achievement abilities. This difference is more pronounced in learning mathematics and in reading. Difference in achievement is also seen between those children who are at the same level of intelligence.
10. **Differences in social behaviour:** Differences in social behaviour are observed in children in the same class because they come from different socio-economic backgrounds, from different communities, from different regions, from different localities, etc. These differences are seen in the way children walk, the way they talk, the way they dress, the way they behave and so on. These differences are reflected in their motivation, readiness and achievement.
11. **Sex differences:** There is a general belief that motor skills requiring great endurance, muscular strength and persistence, can be better tackled by men than women.Women are supposed to excel in skills involving close coordination

of small muscles and attention to detail. Bergen (1943) found that differences in sex are not significant in pre-school and primary grade children. Sex differences as observed in various fields are reported as under:

- Sex differences in intelligence have not been found.
- Girls are found higher in word fluency, memory and fine motor coordination.
- Boys are found superior in numerical reasoning and spatial ability.
- Girls have higher interest in aesthetics, social service, domestic science and literary fields. Boys have higher scientific, mechanical and theoretical interests.
- Girls are more emotional and social.
- Girls are more jealous.
- Boys are more aggressive and dominant.
- Boys are more ambitious and independent.
- Girls show better performance in language, speech, art and music.
- Boys are better in social sciences and mathematics.

All the above factors influence learning behaviour of boys and girls. G Fifer (1962) made several studies on grade placement of pupils in relation to age and ability and found that at elementary levels, the girls score higher than boys on achievement test. F R Pauly (1958) concluded that the boys' education should begin after six months from the beginning of the education of the girls. R. S. Carter's (1953) studies show that the teachers tend to give higher marks to the girls on their own tests as compared to the scores which they obtain on a standardized test. The boys are awarded lesser marks than the girls on the teacher-made tests. According to F. S. Sobel (1956), girls are given higher marks than boys at elementary level. At secondary level, the lady teachers tend to give more marks to girl students.

Physical Differences

Among the physical differences, important differences are:

- Differences in chronological age
- Differences in physical maturity
- Differences in health status
- Physical fitness and fatigue
- Differences in appearances

1. **Differences in chronological age:** There is a general belief that children learn better than adults. Many studies have been made on the relation between age and learning. The results indicate that the ability to learn new material increases until about 16 years. Thereafter, it remains constant till 20's. After that there is a slight drop. Round about 50 years, the drop becomes sharper. A result of an experiment to test the retention of items at different intervals of time after viewing a motion picture is given below:

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Group	No. of Items Retained After		
	1 day	6 weeks	12 weeks
8 to 9 years	52	47	48
11–12 years	66	59	56
15–16 years	81	71	65
Adult	88	72	73

Difference in the speed of learning and retention does not depend upon age but more on the mental age or levels of intelligence. Variation in methods and motivation may make it possible for children to learn a given task even at an earlier or later age.

2. **Difference in physical maturity:** It is noted that even though the children may be more or less of the same age they may not necessarily have the same level of mental and emotional maturity for learning. This may be on account of different levels of physical maturity. The capacity to learn is vitally connected with the growth and maturity of the nervous system, the development of muscles, body proportions and the functioning of the sensory organs. Physical maturity, thus, affects readiness to learn. It is also one of the underlying reasons for differences in interests in early and late maturers. It must be remembered that adequate physical development is essential for satisfactory mental functioning.
3. **Health status:** The teacher must realize how a child's general health status affects his behaviour including learning and academic work. Undernourishment or malnourishment of the child may affect learning efficiency.
4. **Physical fitness and fatigue:** It is often seen that some children look rather tired when they reach school. Naturally their response in learning situation will be different in quality from those who arrive feeling fresh. Some children are required to travel long distances either by foot or by bus to reach school. They are tired and fatigued by the time they arrive. They have to put in more effort. There are children who come from underprivileged households and they may have to do many tasks at home to help their parents in different ways. Thus they may not find enough time to devote to their studies.
5. **Difference in appearance:** Body-built may influence the self-concept of an individual on account of the expectations of adults and other children. Usually, a tall boy may be chosen as leader by classmates. In the class, some children are outstanding in their looks which are perceived to be good, others are ordinary, a few are plain and one or two border on ugliness. These differences in looks do affect interrelationships among the pupils as well as between pupils and teachers, as they determine to some extent how others react. These interpersonal relationships, in turn, affect the child's self-concept, attitude to life and interest in school work. Teachers must highlight other strong points of children to build their confidence and to lay the foundation of a healthy life.

2.7.2 Educational Implications in Individual Differences

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There are five broad areas in which a lot of work could be done to take into consideration educational implications in the individual differences. These are as follows:

1. **Streaming or Grouping of Children:** Many methods are adopted to group children. Some schools divide students of the same age into classes and each class is further divided into different sections so that the number of students taught together is reasonably manageable. Many schools, while adhering to age, divide students into different sections as homogenous groupings. Usually this grouping is based on intellectual attainments or on intelligence tests, and so on. In homogenous groups, the children of high ability, of medium ability and of low ability are kept together in separate sections. Different methods of teaching-learning are followed in different sections. Some psychologists oppose homogenous groupings and favour the division of children in heterogeneous groupings. The gifted as well as the low achieving students are taught together in such groupings. Usually, following arguments are cited by the protagonists of this type of grouping:
   - The dullards can get incentives and motivation from the normal children.
   - Normal children can get motivation and incentives from the gifted.
   - The gifted get opportunities to lead other children.
   - In homogenous groupings, some sections take the position of privileged groups and others as unprivileged groups. There is rivalry among the teachers as all teachers tend to prefer to teach intellectually normal or superior children and avoid teaching weak students. This does not happen in heterogeneous grouping.
2. **Curriculum Planning and Individual Differences:** In progressive schools, teachers provide a rich and flexible curriculum. Efforts are made to take into consideration the three As, i.e., age, ability and aptitude of the children. Some schools make provision for advanced and ordinary courses in some subjects. They also provide a variety of curricular activities.

   Often it is noted that some children are weak in science and mathematics but good at language, art and music. It is not a wise policy to prepare such children for the engineering or medical courses. The result would be disastrous both for the children as well as the society.

   Some students tend to go faster than others. Such students may be given double promotion or separate streams can be formed. Some additional work can be given to them so that their progress is not stunted due to the slow learners. Similarly, steps will have to be taken to ensure that the slow learners also make satisfactory progress commensurate with their capacity and ability to work.

   A deaf, dumb, or blind child would need guidance in the selection of such a vocation where his physical defect may not be a handicap and he can be

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made able to earn his living in an honourable manner. Such students need special educational courses. Ordinary schools fail to do justice to them.

3. **Disciplinary treatment:** Circumstances pave the way for different individuals. As each person goes through the journey of life, their background and ethics may infer that they demand or need disciplinary treatment. There are some students whose parents are very dominating with the result that their children develop inferiority complex. Too lenient parents allow their children to be free-lancers and such children suffer from other complexes and develop bad habits. Children of the rich and the poor have altogether different situations to be faced with.
4. **Methods of teaching:** The learning and other experiences of children who come from backward homes are usually limited. Hence, methods of teaching should be adopted which may broaden their outlook. Gifted children learn very rapidly. Therefore, they need to be provided with more opportunities to explore. Remedial teaching should be adopted in the case of weak students.

   The Dalton Plan of Helen Parkhurst and Winnetaka Plan of Carletone Washbume are various attempts to individualize instruction. Project method of Kilpatrick is the middle way of individual instruction and group instruction.
5. **Guidance:** The programme of proper guidance is not confined to the selection of subjects, schools, vocations, and so on. All children need guidance in every aspect for their harmonious development. They need guidance in fields such as recreational, moral and religious, social adjustments, cultural pursuits, physical development, and so on.

   (i) ***Educational Guidance***: Educational guidance should begin as soon as a child enters the school and should continue till he leaves and even after that. In the words of Jacobson, 'Neglect of guidance service at any stage in the progress of pupils may result in serious complications at a subsequent stage. As a result, a pupil may experience mal-adjustment not only difficult to resolve but also costly to the school system.'

   Any attempt to separate different aspects of guidance would result in one-sided point of view and prove to be unwise and ineffective guidance. However, for the sake of convenience, we take up various areas of guidance for meeting the needs of individual differences. These are closely related to the educational development of the child.

   (ii) ***Health Guidance*:** Parents adopt an indifferent attitude towards the health of their children. As a general rule, the responsibility of looking after the health of the child falls upon the teacher. Need for health guidance is apparent as soon as the child enters the school. It lasts throughout the stay of his life in the school. The teacher or the counsellor should distinguish a child with good health from one with bad health.

   Children suffering from physical ailments should at once be referred to the school doctor or nurse as the case may be. It is not very difficult for the teacher to locate eye defects, ear defects and cases of abnormal speech.

(iii) ***Social Guidance*****:** Schools must train students to participate effectively and harmoniously in the affairs of the social group to which they belong. Situations have to be provided in the school whereby children learn the 'art of living together'.

(iv) ***Recreational Guidance*****:** A rich programme of the school's co-curricular activities provides opportunities to the students to use their leisure profitably. The school magazine, school farm, school clubs, playground, and so on, are the various means to provide suitable outlets for the energies of the students. Such programmes should be conducted under the guidance of those teachers who have the capacity to guide the students in accordance with their interest and abilities.

(v) ***Ethical Guidance*****:** Lack of guidance at home necessitates that the schools should cultivate moral and spiritual values among the students. The best way of doing this is to provide opportunities to the students through which they practise the various virtues that are required to be cultivated in them. No amount of sermons from the elders will be of much help. Ethical values must be learnt through practical situations. Of course the teachers are required to set a high standard of ethical code before their wards.

(vi) ***Gender related Guidance*****:** Individual needs of different sexes should be properly attended to. Students should be helped to select appropriate courses suiting their sex.

2.7.3 General Guidelines for Meeting the Needs of Individual Differences

The general guidelines for meeting the needs of individual differences are as follows:

- The school programme, administration and management should be made flexible enough to allow for adjustment to individual differences.
- A wide range of experiences to pupils should be provided in the school.
- Courses should be selective to meet the needs of individual students.
- School programmes should take into account the needs of those students who are not likely to go to college as well as those who would join college.
- Opportunities for acquiring manual and mechanical skills should be provided to students.
- Remedial instruction should be made available to students who need it.
- Counselling should be provided to students.
- Courses should be organized in such a way as bright students can learn at their own speed and slow students follow their own speed.
- Guidance regarding co-curricular activities should be provided.
- Outlets for the release of children's tensions through provisions of plays in the form of dramatics, games, sports and a variety of other self-expressive and creative activities should be provided.

NOTES

- Assignment should be adapted to the needs of students.
- Special care should be taken to accept the under-achieving child as a unique individual. His particular needs should be immediately attended to.
- Efforts should be made to re-establish child's confidence in himself/herself.
- The teacher should seek the cooperation of other teachers and the parents of the under-achievers.
- In case of deep-rooted emotional problems which lie at the root of under-achievement, referral may be made to a child guidance clinic after taking the parents into confidence.
- Students should be taught to recognize their handicaps, and can be counselled through methods to overcome or compensate for them.
- Some programme of parents' education may be taken up as many problems of the students result from unsatisfactory home conditions.
- It is very important to observe absolute honesty and frankness in dealing with parents about their children's problems.
- Good working relations should be established by the school with community agencies like the juvenile court and youth council.
- Much responsibility may be given to the students for organizing their programmes.
- Undue reliance should not be placed on tests and measurements.
- School marks should not be accepted as the sole evidence of successful student development.
- Case histories of each child from kindergarten through higher secondary school must be made available to concerned persons and kept up-to-date.
- Small classes may be organized.
- Time for home visits or conferences with parents should be provided.
- Opportunity to secure advice from specialists in diagnosis of difficulties should be provided.
- A good system of accessible cumulative records must be developed.
- Time table should be arranged in a way that the teachers may compile and use them (cumulative records).
- School personnel and parents should accept the statement that honest labour performed to the best of one's ability is worthy of commendation, whether the work be in the shops or offices, factories or farms.
- Professional service to aid teachers in developing the attitudes, skills, and techniques necessary for successful counselling should be provided.
- Necessary material for testing and recording data necessary to understand the individual child's needs, aptitudes and interests be provided.

2.7.4 Role of Heredity

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Scholars have viewed the influence of heredity and environment on the development of an individual differently. There are extreme views also. However, the fact remains that the functioning of heredity and environment is similar to that of two eyes, two hands, two feet, two legs, and so on, on the development of a person. Each one is complementary and supplementary to the other. Sometimes one plays a more dominant role and the other a relatively less dominant role. For the balanced and harmonious development of an individual, a balanced and harmonious interaction between heredity and environment is very essential. Of course, each has its limitations. Each can influence the development of the individual to a limit. The role of the home and the school is to ensure that optimum use is made of these limits.

Some basic principles of heredity are as follows:

1. ***Like tends to beget like:*** Black-coloured parents generally have black children, tall parents tall children, bright parents bright children, and so on. This holds good species or genus breeds true to type, save where there are laws governing occasional deviations.'
2. ***Principle of variance:*** Only certain traits follow hereditary laws. Common observation shows that although like tends to beget like, yet the resemblances of parents and their offsprings are never perfect. Black-eyed children may be born to brown-eyed parents. Even the two twins are not exactly alike.
3. ***Principle of convergence of two-life streams:*** A portion of inheritance comes from the maternal side and the remaining portion is contributed by the paternal side, i.e. the child's maternal and paternal lines, both contribute about 50 per cent each of his inheritance. More specifically, it is generally assumed that 1/2 comes from parents, 1/4 from his grand-parents, 1/8 from his great grand-parents and so on from all the other more remote ancestors.
4. ***Principle of chance:*** Chance plays an important role, making any absolute prediction almost impossible. This is on account of several reasons:
    - The pairing of the chromosomes in the state of flux.
    - Cell to which the set of maternal or paternal chromosomes goes during the reduction division.
    - The particular cell which unites with another in the maternal and paternal lines.
    - The pattern of genes in any chromosome.
    - Genes carried in any particular chromosome.
    - Crossing over of genes from one paired chromosome to another.
    - How dominant and recessive traits will be distributed according to the three to one ratio, according to Gregor Mendel's Law (1866), especially if there are less than four children in the family.
    - Determination of sex.

NOTES

5. *Principle of dominant and recessive traits:* Some traits are dominant while other are recessive causing apparent exceptions to the principle of like produces like. The union of the best traits of the father with the best traits of the mother produces talented children. Therefore, a talented father or mother must be the offspring of the best combination of the determiners in the germ cells of his or her parents. But such gifted parents may carry on the determiners of genes which are average. There are many chances that when they produce a child, their average traits combine and a child of average calibre may be the result.

The reasons of variation' are still a mystery. All that can be said about variations is that it is a fact.

Hereditary Traits

Hereditary traits may be divided into two categories: physical traits and mental traits. Physical traits include eye-colour, white forelock of hair, colour-blindness, blood type, skin colour, height and several other bodily features. Mental traits include intelligence and musical talents, and so on.

It must be remembered that each parent is the inheritor in equal parts from both parents who in turn, inherit equally from their parents. The stream of life flows on and the child inherits his capital not from his parents but through his parents. This fact explains why a child has the chin of his mother, the forehead of his father, the blue colour of eyes from his grandfather, the hair from his uncle, the nose from his aunt and so on. Why no two individuals of the same family are perfectly identical!

A good number of observations have shown the presence of some sort of determiners in the human life-producing cell, which determine, even before birth, certain traits of the individual. It, however, does not mean that a child must always be exactly like his parents—father or mother. Actually, we observe often that the children do not inherit some of the most distinguishing traits of their parents. For example, the parents are of black colour while the child is white. The parents are extraordinary genius while the child is an idiot. The child does not resemble his brothers and sisters. Why is it so?

The answer according to one view is that the characteristics of the child depend not only upon the parents alone but also grandparents and even great grandparents. Variations are also on account of the chance factor.

It is purely by chance that a particular sperm fuses with a particular ovum to form a zygote. Moreover, in zygote, there are 23 pairs of chromosomes, 23 of which are contributed by the sperm of the father and 23 by the ovum of the mother. Which chromosomes from the ovum will pair with which chromosomes from sperm is a sheer chance. Millions of permutations and combinations are possible for the union of chromosomes, which contain genes. That explains why no two individuals are perfectly identical.

The traits of the ancestors besides those of immediate parents are also transmitted to the offspring through these genes. Therefore, it is possible that the child will possess certain traits that are traceable to one or more of the ancestors, even though they may not be found in either of the parents.

Recent Researches

Revolutionary discoveries in genetics have been made in recent years. Even artificial or synthetic genes have been produced under laboratory conditions. After the test tube baby, there has occurred a phenomenal advancement in genetic surgery. The task of controlling production of future human beings involves the control of two genetic chemicals—DNA (Deoxyribonucleic acid which molecule is the throbbing centre of life) and the RNA. DNA molecule governs our past, our present and our future and controls all aspects of body formation. It is like a computer containing in its arrangement of atoms, the key to heredity, ageing, disease, mind and memory. Any control of the genetic material in DNA will involve the synthesis in the laboratory of artificial DNA with the atoms arranged in a specific order to produce a particular type of individual the new man.

2.7.5 Role of Environment

In simple terms, environment means the society, the fields of society and even the whole world. However, in this case, the word 'environment' refers to the environment within a mother's womb and a newborn, as well as the environment around the individual.

Like heredity, environment also plays a very significant role in influencing the behaviour and personality development of an individual. The environmental influences are those which act upon the organism at the earlier stages of development, i.e., before and after birth.

Environment includes all the external powers, effects and circumstances which affect the life, nature, behaviour, growth and development of a living organism.

Therefore, it can be said that environment refers to all of that which is found around the individual. The zygote is surrounded by a jelly like substance known as 'cytoplasm'. The cytoplasm is an intracellular environment which influences the development. Though the life begins with a single cell, in the process of cell division, many new cells are formed and a new internal environment comes into existence.

The endocrine glands are formed as the foetus develops. The hormonal secretion by these glands leads to another intracellular environment. Hormones are important for normal development, but defects in hormone secretion, such as over or under secretion, may result in congenital deformities.

Amniotic fluid surrounds the growing embryo in the uterus which creates another environment. This fluid provides the necessary warmth and protection against the dangers due to organisms and other chemical effects on the foetus.

Moreover, the umbilical cord connects the foetus to the mother through which it gets nourishment. Sufficient nourishment is important from the mother. If adequate nourishment is not given to the mother, then the child will suffer from malnutrition. The defects in mother, such as drug or alcohol addiction, smoking, malnutrition, diabetes, endocrinal disturbances, small uterus and such other problems, cause many problems in the child. Besides, the psychological state of the mother such as over excitement and depression may also have a damaging effect on the child.

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After nine months, when the child is born, it enters a new environment which is entirely different. A new life begins in a new environment. This new environment will have a different culture, ideology, values, and so on, which will influence the growth and development of the child.

Following this, the home atmosphere, parental love and affection, association with sibling, neighbours, peers, teachers, and so on, will create an entirely different and new environment. This is known as social environment. The personality of the child is influenced by all these social factors as stated above.

However, the importance of heredity and environment continues to face a long-standing controversy. Supporters of heredity say that the environment cannot change a goat into a dog. On the other hand, the environmentalists are of the opinion that for the development of a plant, only seed is not important but also environment like sunlight, manure, water, and so on.

Various studies have been carried out on both these fields. However, the results indicate that heredity and environment are interdependent on each other. Whatever the heredity supplies, the favourable environment brings it out. Personality characteristics attained by heredity are shaped by the environment.

CHECK YOUR PROGRESS

15. What do you mean by homogeneous groupings?
16. What are the two categories of heredity traits?
17. What is social environment?

2.8 SUMMARY

- Physical development of the individual is important both for the individual and social development. It is also important for ethical, moral and spiritual development.
- Physical growth and development refer to processes which bring about bodily and physiological changes—which are internal as well as external—in an organism from the conception till his death.
- Social development implies the development of an individual in a way in which he becomes a useful member of society or the group to which he belongs.
- A child's social behaviour is regulated and influenced by the culture of the society he lives in. The ways of behaving by the people of one generation, pass on from generation to generation.
- A teacher can play a vital role in the social development of the child under his charge. He exerts a great influence upon the development of the personality of the child.
- The development of emotions is extremely important for the harmonious development of the personality of an individual. Emotions influence all the aspects of an individual's personality.

- Etymologically, the word 'emotion' is derived from the Latin word *Emovere* which means to stir up, to agitate or to excite.
- Grief and joy are examples of simple types of emotions, while love and hate are complex types of emotions.
- Emotional development of an individual is influenced by a number of factors. They are health and physical development, intelligence, family environment, school environment, peer groups' environment, neighbourhood, community and society's environment.
- Motor development may be defined as the development of strength, speed and accuracy in the use of muscular parts of the body such as arms, eyes, legs and neck muscles. Motor abilities involve bodily movements of various organs and coordinated functions of nerves and muscles.
- The stages of processing of the senses of human beings and other animals like pain senses, vestibular, auditory and vision are known as sensation and perception.
- Reasoning plays a significant role in one's adjustment to one's environment. It controls not only one's cognitive activities but it may also influence the total behaviour and personality by proper or improper development of one's reasoning ability.
- The productive work involved in the evaluation of the situation and the strategy worked out to reach one's set goals is collectively termed as problem-solving.
- Traditionally, two different approaches have been mentioned by psychologists, adhering to two families of learning theories: (i) Cognitive field theory and (ii) Stimulus-response theory.
- The development of discussion thinking cannot happen all of a sudden. It is related with learning. Children learn by thinking and develop their ability to think by learning.
- A major feature that distinguishes human beings from animals is their ability to use vocal speech as a means of communication.
- Symbols are unique to human beings. Language permits the communication of information from one generation to the other. It makes available the wisdom as well as the errors of the past to the present generation.
- Hereditary traits may be divided into two categories: physical traits and mental traits. Physical traits include eye-colour, white forelock of hair, colour-blindness, blood type, skin colour, height and several other bodily features. Mental traits include intelligence and musical talents, and so on.
- In simple terms, environment means the society, the fields of society and even the whole world. However, here, the word 'environment' refers to the environment within a mother's womb and a newborn, as well as the environment around the individual.

2.9 KEY TERMS

- **Cognitive development:** It is the development of the ability to think and reason.

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- **Depth perception:** It is the visual ability to perceive the world in three dimensions.
- **Infancy:** It refers to the very early childhood, usually the period before being able to walk.
- **Intellect:** It is a series of mental operations, which occur to manufacture the perception of an image
- **Motor development:** It is the development of strength, speed and accuracy in the use of muscular parts of the body such as arms, eyes, legs and neck muscles.
- **Perception:** It is the process by which information is interpreted in order to give some sensible meaning to the world.
- **Schemas:** It refers to the cognitive structures or the patterns of behaviour that children and adults use in dealing with objects in their environment.
- **Sensation:** It refers to the feelings like hearing, touching, tasting and smelling that occur when any stimulus interacts with the sensory receptors.
- **Senses:** It refers to the elementary impressions gathered by sense organs.

2.10 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Bodily and physiological changes take place in an organism from the conception till his death in the following dimensions:
   (a) Gross physical structure or physique: It involves changes in height, weight, body proportions and the general physical appearance.
   (b) Internal organs: It involves changes in the functioning of glands, nervous system and other body systems—circulatory, respiratory, digestive, muscular, lymphatic and reproductive.
2. The common causes of delayed motor and physical development are as follows:
   (a) Poor physical conditions caused by illness, malnutrition, and so on.
   (b) Lack of opportunities to develop manual skills.
   (c) Nagging, scolding and ridiculing of the child by parents and teachers when he does not succeed in an activity.
3. There are two ways in which the behaviour patterns of culture are transmitted to the next generation:
   (a) Directly and formally as in educational programmes at various stages of education
   (b) Informally through interactions between parents and their children which occur in the course of bringing up children
4. The emotions become stable during the adulthood stage. The individual becomes mature and has a control over his or her emotions and feelings. Sudden outburst of emotions becomes rare. An adult mostly takes decisions based on facts and experience rather than emotions.
5. Reasoning is essentially a cognitive ability and is akin to thinking in many aspects.

NOTES

6. Deductive reasoning is the ability to draw logical conclusions from known statements or evidences.
7. The productive work involved in the evaluation of the situation and the strategy worked out to reach one's set goals is collectively termed as problem-solving. This is an essential exercise for individual advancement and advancement of society.
8. Traditionally, two different approaches to problem-solving have been mentioned by psychologists, adhering to two families of learning theories: (i) Cognitive field theory and (ii) Stimulus-response theory.
9. The first step in the problem-solving behaviour of an individual is concerned with his awareness of the difficulty or problem that needs to be solved. He/she must face some obstacle or interference in the path of the realization of his/her goals, needs or motives and consequently he/she must be conscious of the difficulty or problem.
10. Inclusion is used to prepare the base of the imagination, but exclusion considers the suggestions facilitated by which the thinker reaches logical conclusions from imagination and once again takes refuge of inclusion to prove other cognitive solutions.
11. Language performs the following functions:
    (a) Language helps to communicate ideas to others
    (b) Language helps in the formation of concepts
    (c) Language helps in the analysis of complex wholes
    (d) Language helps us to focus attention on ideas which would otherwise be difficult to keep in mind
12. The two aspects of language are production and comprehension. In the production of language, we start with a thought, somehow translate it into a sentence, and end up with sounds that express the sentence. In the comprehension of language, we start by hearing sounds, attach meanings to the sounds in the form of words, combine the words to create a sentence, and then somehow extract meaning from it.
13. The different levels of language where development begins are the level of phonemes which proceeds to the level of words and other morphemes, and then moves on to the level of sentence units, or syntax.
14. The following factors that affect the development of language:
    (a) Imitation of the language of parents, other adults and teachers
    (b) Cultural factors
    (c) Environmental factors
    (d) Degree of maturity
15. Usually, homogeneous grouping is based on intellectual attainments or on intelligence tests, and so on. In homogenous groups, the children of high ability, of medium ability and of low ability are kept together in separate sections.

16. Hereditary traits may be divided into two categories: physical traits and mental traits. Physical traits include eye-colour, white forelock of hair, colour-blindness, blood type, skin colour, height and several other bodily features. Mental traits include intelligence and musical talents, and so on.

NOTES

17. The home atmosphere, parental love and affection, association with sibling, neighbours, peers, teachers, and so on, create an entirely different and new environment for a child. This is known as social environment. The personality of the child is influenced by all these social factors as stated above.

2.11 QUESTIONS AND EXERCISES

Short-Answer Questions

1. What are the dimensions of physical growth and development that take place in an organism?
2. What are the three aspects of instinctive behaviour, according to McDougall?
3. What are the good and bad effects of emotion?
4. What are the factors that influence emotional development?
5. Differentiate between children's and adult emotions.
6. What are the major characteristics of motor development?
7. Define the 'principles of motor development'.
8. List some aspects of psychological differences in children.

Long-Answer Questions

1. How does a baby's exposure to experiences affect his/her development?
2. Discuss the various theories of emotions in detail.
3. What guidelines should teachers and parents follow to control and train emotions?
4. What are Piaget's views on various aspects of learning?
5. Explain the concept of individual differences. State their educational implications.
6. Explain the educational implications of individual offenders.

2.12 FURTHER READING

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UNIT 3 CREATIVITY AND INTELLIGENCE

NOTES

Structure

3.0 INTRODUCTION

Creativity has evolved as an important concept in the past few years. A large amount of management related literature has been written with an increased focus on ways to increase the level of creativity at the workplace, in order to cope with constant changing environments.

This unit aims at building a basic understanding of research on creativity and exploring its development by the use of statistical devices. Thus, this unit focusses on measuring the development of creativity in an internationally comparative environment.

It can be understood that the phenomenon of creativity is very complex. There are different perspectives and approaches to the study of creativity.

3.1 UNIT OBJECTIVES

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After going through this unit, you will be able to:

- State the meaning of creativity and intelligence
- Describe the concept of creativity
- Explain the nature of creativity and creative performance
- Discuss the manual for creative test performance or test
- State the relationship between intelligence and creativity

3.2 CREATIVITY

Mc Kenon defines creativity as, 'a process extended in time and characterized by originality and realization.' The other writers consider it useful to distinguish between creative behaviour and original behaviour. They say that original behaviour is that which is comparatively less frequent and uncommon in the given conditions and is typical in those conditions. In this way, the definition of originality is easily translated in behavioural language and is studied in connection with the solution of problems. On the other hand, creative behaviour is that which is visible to those productions that are considered creative by the associated judges.

According to Barron, the making of thoughts is the most common instance of psychic creation. Barron says, 'these rare contributions are creative instances of a stronger sense of the term; they not only are the result of creativity but they themselves in turn create new conditions of human existence. The theory of relativity was such a creative act, so was the invention of the wheel. Both resulted in new forms of power and human life was changed, thereby.'

J.E. Drevdahl, author of *Journal of Clinical Psychology*, states, 'creativity is the capacity of a person to produce compositions, products or ideas which are essentially new or novel and previously unknown to the producer.' According to Wilson, Guilford and Christensen, 'the creative process is any process by which something new is produced—an idea or an object including a new form or arrangement of old elements, the new creation must contribute to the solution of some problem.'

By incorporating all these perspectives, we may describe creativity as the capacity or ability of an individual to create, discover or produce new or novel ideas or objects, including the rearrangement or reshaping of what is already known to him, which proves to be a unique personal experience. The whole difference between construction and creation is exactly stated by Charles Dickens, 'A thing constructed can only be loved after it is constructed; but a thing created is loved before it exists'.

The term 'creativity' has been defined in the following ways:

- According to Spearman (1931), 'Creativity is the power of the human mind to create new contents by transforming relations and thereby generating new correlates.'

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- According to Drevdahl (1956), 'Creativity is the capacity of a person to produce compositions, products or ideas, which are essentially new or novel and previously unknown to the producer.'
- According to Berlett (1958), 'Creativity is an adventurous thinking or a getting away from the main track, breaking out of the mould, being open to experience and permitting one thing to lead to another.'
- According to David Ausubel (1963), 'Creativity is a generalized constellation of intellectual abilities, personality variables and problem-solving traits.'
- According to Wallach and Kogan (1965), 'Creativity lies in producing more associations and in producing more that are unique.'
- According to Wilson, Guilford and Christensen (1974), 'The creative process is any process by which something new is produced an idea or an object including a new form or arrangement of old elements. The new creation must contribute to the solution of some problems.'
- According to Stein (1974), 'Creativity is a process which results in novel work that is accepted as tenable to useful or satisfying a group of people at some point of time.'
- According to M. J. Levin (1978), 'Creativity is the ability to discover new solutions to problems or to produce new ideas, inventions or works of art. It is a special form of thinking, a way of viewing the world and interacting with it in a manner different from that of the general population'.
- According to Paplia and Olds (1987), 'Creativity is the ability to see new things in a new and unusual light, to see problems that no one else may even realize exist, and then to come up with new unusual, and effective solutions.'

Some of the above definitions consider creativity to be purely a function of the mind, a component of the cognitive behaviour, some maintain it to be an attribute of the person, a whole. Some opine that besides being novel, a creative product must be useful from the cultural and social angles. From the analysis of all definitions, creativity can be described as 'the ability to discover or produce a new idea or object, which includes the rearrangement of what is already known.'

3.2.1 Concept of Creativity

Creativity is a general ability possessed by all essentially healthy individuals, to some degree. All people think in terms of different levels of creativity. A great deal of confusion surrounds the word creativity. Since a person can behave creatively in many ways, it is not strange that there are many definitions of creativity, but there is no universally accepted definition of creativity.

To give a bird's eye of the overall function of creativity, its definitions may broadly be divided into five groups. They are as follows:

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- **Creativity as a talent:** Carl Roger (1975) defined creative process as an action of the rational and novel product. Rhodes (1961) defined creativity as a process and as a talent found in some individuals.
- **Creativity as a process:** Maslow (1966) stated that creativity is a process, which is preconscious rather than conscious and includes elements of the checking and corrective process. Tayler Chamber (1973) described creative thinking as a process which has been considered as bipolar in which the interaction between the person and the environment will be studied.
- **Creativity as novel idea:** Thurston (1952), Stein (1953) and Raina (1989) described creativity as a novel idea. Creativity involved responses to that of novelty, statistically frequent to some extent of adoption. It is concerned with something, which is new rather than unexpected or non-traceable.
- **Creativity as a new thinking:** Getzel (1972) held the view that creativity consisted of two important components, i.e., convergent thinking and divergent thinking. Convergent thinking refers to intellectual ability whereas divergent thinking refers to the method adopted by individuals to attain their goals and objectives. Torrance (1969) described creative thinking as the capacity of sensing the gaps in missing elements, identifying the difficulty, searching for solution, formulating hypotheses, testing and retesting them and finally communicating the results.
- **Creativity, as the capacity to solve problems:** Kilpatrick (1906) defined creativity as a problem-solving method. According to him, it is the best method to solve the problems or our daily life. According to Guilford (1952), creativity is essentially a problem- solving method.

3.2.2 Nature of Creativity

Creativity may be said to possess the following characteristics:

- Creativity is universal and not confined to any individual groups, caste, age, location or culture. Every person is capable of demonstrating creativity to some degree.
- Creativity is innate as well as acquired. It is a natural endowment and also influenced by the cultural background experiences nurturing etc.
- Creativity implies the ability of a person to produce something new. It should not be repetition or reproduction or what the individual has been experienced.
- Creativity encourages complete freedom to express a multiple response and action. It is a kind of adventurous thinking.

3.2.3 Creativity and Divergent Thinking

According to Guilford (1959), creative thinking means divergent thinking and uncreative thinking means convergent thinking. An example will make it clear.

Suppose the teacher is teaching about forests. He may ask the students about the various benefits that we derive from forests. Here divergent thinking will be

required. The teacher is not asking about any particular advantage but a variety of advantages. The students may think about a number of benefits.

In a lesson prepared for elementary classes, a child may be asked to perform different roles at different times i.e., role of a dwarf, role of a giant, role of a king, etc. All this would provide him with a scope to enhance his creativity.

The following representation will make clear the distinction between divergent thinking and convergent thinking.

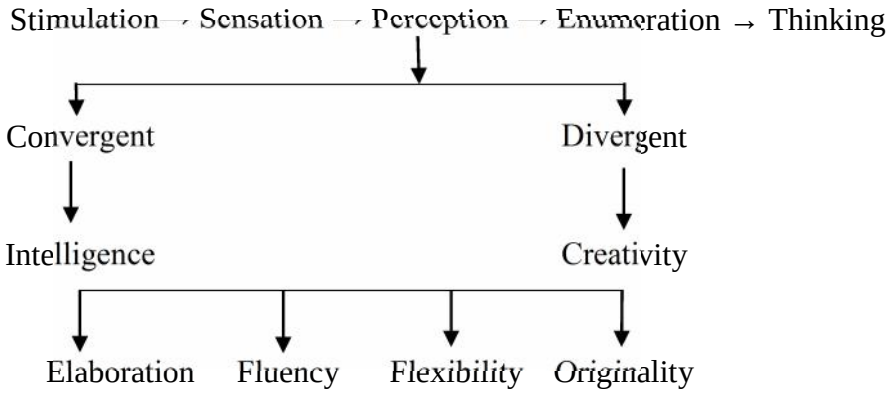

Fig. 3.1 *Analysis of Thought Process*

Creativity and Intelligence

J. P. Guilford clearly distinguished between the intellectual operations of 'divergent thinking' (creative process) and 'convergent thinking' (which represents intelligence). According to him, every intelligent person may not be creative but a very high percentage of creative people possess a great degree of intelligence.

A large number of co-relational studies undertaken indicated that intelligence and creativity go hand in hand up to a certain limit and get separated after that limit. However, it is wrong to suppose that intelligence and creativity are two independent variables or that one always develops at the cost of other.

The findings suggest that while intelligence and creativity are positively correlated, the relation between the two is not entirely linear.

Difference in Achievement and Home Backgrounds of the Highly Intelligent and Highly Creative Students: Investigations by Gatzels Jackson on students of a private school in Chicago revealed that the two groups of children, i.e., the creative and the intelligent were equally superior in academic performance as measured by standard achievement tests. Highly creative students tended to come from somewhat less well-educated homes and experienced greater independence from their mothers.

The essence of these differences may be summed up in one sentence. 'The adolescent with high IQ may be seen as preferring the anxieties and delights of safety, and those with high creativity as preferring the anxieties and delights of growth.'

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Creativity and Age

Lehman concluded on the basis of his studies that although some outstanding creative accomplishments appear at advanced ages, superior creativity generally rises rapidly to its highest or peak points in the thirties and declines slowly afterwards. Lehman also pointed out that apart from age there are numerous social, emotional and physical factors that retard creativity.

Creativity and Mental Abilities: Guilford mentioned the following mental abilities:

- Fluency (the ability to produce large ideas)
- Flexibility (the ability to produce a variety of ideas or approaches)
- Originality (the ability to produce uncommon responses)
- Redefinition (the ability to define or perceive in a way that is different from the usual)
- Sensitivity to problems (the ability to evaluate implications)

Theories of Creativity

- **Creativity as Divine Inspiration:** According to Plato, a creative writer is an agent of a super-power.
- **Creativity as Madness:** Creativity is sometimes taken to be a sort of 'emotional purgative' that kept a man insane. Van Gough, the great master painter was said to be half-mad. Freud stated, "A neurotic is an artist san art."
- **Creativity and Intuitive Genius:** According to this viewpoint, a creative person intuits directly and immediately.
- **Creativity as Association:** It is said that new ideas are manufactured from the older ones. Hence, more association leads to more ideas and more creativity.
- **Gestalt Theory and Creativity:** Restructuring patterns or gestalts that are structurally deficient is called creativity.
- **Psychoanalysis and Creativity:** According to Freud, creativity originates in a conflict within the unconscious mind. Creativity is a tension-reducing process.

Creative Process

Wilson, Guilford and Christensen observed that creative process is any process which produces something new—an object or an idea including a new form or arrangement of old elements. The new creation must contribute to the solution of some problem.

Torrance was of the view that the process of creativity is similar to the steps in scientific method. The central element of both is the production of something new.

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Nature and Characteristics of Creativity

- Creativity is the resultant of some interaction.
- Creativity is the ability to synthesize ideas or objects.
- Creativity is the ability to create new ideas, theories or objects.
- Creativity is the ability to develop something original.
- Creativity has several dimensions.
- Creativity is a process as well as a product.
- Creativity is a complex, dynamic and serious process.
- Creativity knows no special medium, place, person or time.
- Creativity is the capacity to accept challenges.
- Creativity is the freedom to exercise choice.
- Creativity is the readiness to change self and environment.

Creativity to Different Professions is Different

- To the artist, creativity is the ability to evoke an emotional mood.
- To the architect, creativity is the ability to evolve new approaches, forms and new materials.
- To the scientist, creativity is the ability to explore new way of extending knowledge.
- To the teacher, creativity is the ability to discover and apply dynamic methods of teaching-learning.
- To the student, creativity is the ability to use words and phrases in new situations, to solve sums speedily, to prepare new types of charts and projects, to write essays and stories depicting new ideas and so on.

Characteristics of a Creative Personality

Torrence compiled a list of 84 characteristics describing the traits of a creative personality. Some of these are:

- Adventurous.
- Curious by nature
- Desirous to excel
- Flexible in his thinking, feeling and doing
- Intuitive
- Keen to explore and invent
- Non-conformist
- Self-disciplined
- Visionary
- Willing to take risk

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Creative children are constantly probing, discovering, imagining, fantasizing, asking questions, guessing and wondering. Therefore, they should be encouraged to ask unusual questions, to explore new ways of thinking, to try novel approaches to problem-solving, to play with ideas and material and use divergent ways of dealing with traditional topics.

Role of the School and Teachers in Promoting Creativity in Children

School is, in fact, the proper place where an organized effort should be made to develop the basic foundations for creativity in children. Deliberate attempts need to be made to develop an environment of creativity among them. Some methods useful in promoting creativity are:

1. **Identification of the Creative Child:** Both test and non-test techniques can be used to identify the creative child. Guilford and Merrifield developed test techniques that measured fluency, flexibility, originality, redefinition and sensitivity to problems.

   Getzels and Jackson, on the other hand, used five different measures of creativity in their research.

   - **Word-Association Tests:** Students are required to give as many definitions and number of different categories into which they could be placed.
   - **Uses of Things Tests:** A student is asked to give as many uses as he can for a common object.
   - **Hidden Shapes Tests:** A student is required to find more complex form of figures and shapes on cards, presented to him in a simple form.
   - **Three Different Endings:** A student is required to suggest three different endings to incomplete short fables.
   - **Make-up Problems:** A student is required to make-up or form as many mathematical problems he can on the basis of information given in a complex paragraph.

   Besides these, the Minnesota tests of creative thinking comprising non-verbal tasks like picture construction, creative design, circles and squares, etc. and Torrence's check-list comprising 84 characteristics for identifying the creative children, are also very helpful.

2. **Factors in the School that Hinder Creativity:** The present curriculum and methods of teaching are rigid and tradition bound. The current educational system largely encourages acquisition of knowledge and lays emphasis on rote memory. It rarely calls upon children to think and use their creativity. Most of the school activities and curriculum are usually teacher-centred.
3. **Strategies for Developing Creativity:** It is often said that creativity needs to be identified, energized and guided almost from birth. Research findings suggest that the development of creativity cannot be left to chance. Creativity is likely to flourish in an environment which values independent and free thinking.

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4. **Types of Programmes for the Education of Creative Children:** Following are the programmes for educating and guiding creative children.
   - Identification of the creative children in the school.
   - Formulation of general and specific goals for guiding creative talent.
   - Providing appropriate learning environment.
   - Stimulating creativity among those children who do not apparently show it.
5. **Providing Creative Learning Environment and Experiences in the Classroom:** The teachers should follow the given guidelines to promote creativity in children.
   - Inspire the students to learn to disagree constructively
   - Inspire the students to emulate creative persons
   - Provide for exciting experiences to the students
   - Provide a safe, permissive and warm environment
   - Develop student's ideas through constructive criticism and through referral to competent authorities
   - Provide necessary guidance and counselling for developing motivation and overcoming emotional fears
   - Allow the students ask unusual questions
   - Appreciate imaginative and unusual ideas of the students
   - Assure students that their ideas have values
   - Evoke originality in thinking
   - Provide opportunities to students for self-initiated learning
   - Provide materials which develop imagination of the students
   - Ask challenging and thoughtful questions
   - Rewards rather than punishment helps to increase creativity in students or children
   - Shower love on them and let them know it
   - Provide activities like drama, dance, music
   - Encourage debates, discussions, quiz
   - Show wit and humour in the class
   - Encourage them to do intensive and extensive reading
   - Arrange lectures of creative personalities
   - Encourage students for self-evaluation
   - Follow gaming technique
   - Follow brain storming strategies

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Brain Storming as a Strategy for Developing Creativity

It is a technique which emphasizes the importance of divergent thinking. It involves generating ideas in response to some problem in a group. It allows children to attack and solve a problem without any inhibition or restriction. Literally speaking, it is 'storming' a problem by a number of possible ideas and solutions.

To start with, students may be provided with a focus, i.e., a particular problem like 'Students' Self-government in the School', 'Checking Late Coming', 'Improvement in the Examination System', 'Organizing the Annual Function', etc. Thereafter, students are asked to suggest ideas. In this context, following guidelines need to be kept in view:

- Students are encouraged to suggest as many ideas as possible; however, unusual these might be.
- Students are allowed to express their ideas freely.
- Students' ideas should not be criticized.
- Students may be encouraged to build new ideas on the basis of ideas already suggested by the fellow students.
- Main points of all the ideas should be written on the blackboard.
- In the end, attempts should be made to find out a meaningful solution.

Role of Home in the Promotion of Creativity

The home environment greatly influences the creativity aspect. Neither too much love nor too much fear promote creativity in children. Students should be permitted to ask questions freely. They should be provided with stimulating learning material. Appropriate toys and reading material may be made available to children.

3.2.4 Creative Teacher

A creative teacher will have adequate mastery over his subject and a strong desire to acquire more and more of it. In fact, he/she is an explorer of truth. He/she strives continuously to grow professionally. Occasionally, he/she practices self-education, analyses personal shortcomings as well as tries utmost to get rid of them and is always prepared to welcome the knowledge acquired as a consequence of new experiences. Further, a creative teacher is always very cautions not to develop any sort of prejudice, making sincere efforts to learn something from all types of experiences.

A creative teacher understands the laws of learning and keeping in view these laws, makes appropriate and desirable changes in the methods of teaching. He/she also tries to understand each and every student and plans the teaching technique in accordance with the interests and abilities of the students. In addition to this, he/she studies maladjustments present in the student's personalities and strives hard to release their creative potential by making a multi-prolonged attack on the problem. Thus, he/she tries to enable them to lead life with sound mental and physical health. A creative teacher always yearns that his/her students should become

broadminded instead of becoming rigid and obstinate, that is, they should always be receptive to the ideas and opinions of others. He/she also tries to develop among his students habits like keeping decisions suspended until complete information is gathered, analysing the causes of a problem by plunging deep into it, evaluating and event or behaviour on the basis of available facts, which in turn helps to develop positive values.

In creative teaching, role memory and blind imitation are not encouraged, whereas special emphasis is laid on independent thinking. Besides protecting the creativity of children, creative thinking helps further development of their creative potential. A creative teacher possesses abilities constituting the creativity syndrome in abundance and makes use of them in various teaching–learning situations. Creative teaching is always constructive. Efforts are made to ensure that students do not remain passive listeners only. On the other hand, they are encouraged to acquire knowledge actively. According to Torrance (1970) creative teaching usually results in increased creative growth, involvement and participation in creativity.

Check Your Progress

1. How does Mc Kenon define creativity?
2. What is creativity, according to Stein (1974)?
3. State any two characteristics of creativity.

3.3 CREATIVITY TESTS

Creativity tests may be used in the identification of the creative instinct in the same way as intelligence tests are used for the assessment of intelligence. There are many standardized tests available for this purpose in India and abroad. Some of these are now enumerated:

The following tests were standardized abroad:

- Minnesota tests of creative thinking
- Guilford's divergent thinking instruments
- Remote association tests
- Wallach and Kogan creativity instruments
- A.C. test of creative ability
- Torrance tests of creative thinking

The following tests were standardized in India:

- Baqer Mehdi's tests of creative thinking
- Passi's tests of creativity
- Sharma's divergent production abilities test
- Saxena's test of creativity

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Creativity is a complex blend of a number of abilities and traits and hence all the creative tests mentioned above attempt to measure several dimensions of one's creative behaviour through their test items—verbal and non-verbal. The factors or dimensions of creativity, commonly measured through these tests are: (i) fluency (ii) flexibility (iii) originality (iv) unusual response (v) resistance to premature closure and elaboration, etc.

Let us try to illustrate components and functioning of the creative tests with the help of two creative tests, one developed abroad and the other in India.

3.3.1 Non-Verbal Tests of Creative Thinking

The non-verbal tests of creativity are as follows:

1. Creative Research

Recent advances in the area of creativity research have necessitated the development of suitable measuring tools and devices to assess reliably the creative potential of pupils for their proper education and training. Several attempts have been made to develop tests of creativity, especially in the United States. Torrance, Guilford, and Wallach and Konan have brought out their own batteries of creativity tests, which are being extensively used not only in the United States but also in other countries including India either in the original form or with some minor adaptations.

It goes without saying that all psychological tests whether verbal or non-verbal are culturally loaded and as such are not wholly applicable to a different culture. The need for developing tests, which would be specifically relevant to a given culture, is therefore obvious. The present battery is an attempt to meet this need.

The battery is meant to identify creative talent at all stages of education except pre-primary and primary. The types of tasks included in the test have been chosen so that they could be most easily and economically administered over a wide age range of sample, starting form middle school and going up to the graduate level. The tests are now being extensively used in researches on creativity in all parts of country. Prasad (1979) and Singh (1984) have used the tests to ascertain the effect of teaching methods like problem-solving and specially designed teaching strategies on creativity. Both the methods were found effective to develop creative thinking abilities of the children. Singh (1980) found the relationship between creativity and variables like adjustment, frustration, and level of aspiration. Significant relationship was found between creativity and level of aspiration and adjustment, insignificant relationship was found between creativity and frustration. Mehra and Singh (1982) found low correlation between creativity and intelligence. Agarwal and Shushila (1982) found a relationship between risk taking and creativity. Singh (1981) studied the relationship between creativity and teacher behaviour. Singh (1981) compared the personality profiles of high and low scientific creativities. Singh (1984) also found that planned, active and responsible personality characteristics may lead to high creativity among rural children.

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Preparation of the Battery

The theoretical framework for the preparation of the battery was provided by empirical studies on the nature of creativity. Especially useful in clarifying the concept of creativity has been the distinction Guilford has made between two types of thinking abilities, namely, convergent thinking and divergent thinking. Guilford defines divergent thinking as a kind of mental operation in which we think in different directions, sometimes searching, sometimes seeking variety. Unlike convergent thinking, where the information leads to one right answer or to a recognized best or conventional answer, divergent production leads to novel responses to given stimuli. The unique feature of divergent thinking is that a variety of responses is produced. Guilford relates divergent thinking to certain well-known ability factors, which seem to go with creative output. The primary traits related to divergent thinking and therefore to creativity have been enumerated by Guilford as follows:

- Sensitivity to problems, a trait best indicated by tests asking examinees to state defects or deficiencies in common implements or in social institutions, or to state problems created by common objects or actions.
- Fluency of thinking, which has to do with fertility of ideas.
- Flexibility of thinking, consisting of two factors, namely, spontaneous flexibility (defined as 'the ability or disposition to produce a great variety of ideas, with freedom from inertia or from perseveration'), and adaptive flexibility which facilitates the production of a most unusual type of solution.
- Originality, indicated by unusualness of responses, clever responses, or remote associations and relationships. One must stay away from the obvious, the ordinary, or conventional in order to make a good score.
- Redefinition, a factor that causes an ability to give up old interpretation of familiar objects in order to use them or their parts in some new ways. Improvising, in general, probably reflects the ability of redefinition.
- Elaboration, indicated by a task in which an examinee is given one or two simple lines and told to construct on this foundation a more complex object.

While preparing verbal and non-verbal tests of creativity, tasks pertaining to four of the above six traits, viz., fluency, flexibility, originality and elaboration have been used. The remaining two could not be included as the test would have become very time-consuming. Moreover, the 'for' traits used in the tests were considered to be the most important ones and it was felt that taken together they would give valid information about the creative potential of the individual.

Description of the Non-verbal Test

The non-verbal test that has been described in the present manual is part of the total battery, which consists of both verbal and non-verbal tests. The non-verbal test of creative thinking is intended to measure the individual's ability to deal with figural content in a creative manner. Three types of activities are used for this purpose, viz., picture construction, picture completion, and triangles and ellipses. The total time required for administering the test is 35 minutes, in addition to the time necessary for

giving instructions, passing out booklets and collecting them back. A brief description of these activities are as follows.

- **Picture Construction Activity**

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This activity presents the subject with two simple geometrical figures, a semi-circle and a rhombus and requires him/her to construct an elaborate picture using each figure as an integral part. The subject is allowed to turn the page in order to use the figure in any way he/she likes. Emphasis is on originality and elaboration. Originality is emphasized by the instruction that the subject should try to make as novel a picture as possible, such that no one else is able to reproduce. Elaboration is emphasized by the instruction that the subject may add as many details as he/she thinks necessary, in order to make the picture tell a complete and interesting story as possible. Ten minutes are allowed for the two tasks.

The pictures are scored on the basis of elaboration and originality. The subject is also asked to give an interesting and unusual title to each picture. The titles may also be scored for verbal elaboration and originality and the scores added to the verbal creativity score obtained on the verbal creativity test. The scoring of titles is however optional.

- **Incomplete Figure Activity**

This activity consists of 10 line drawings, which could be made into meaningful pictures of different objects. The subject is asked to make a picture that no one else in the group will be able to think of. He/she is also asked to give an interesting and suitable title to each picture he/she makes. The subject is given 15 minutes for the 10 items. Each item is scored for elaboration and originality. Titles may also be scored for verbal elaboration and originality and the scores added to the verbal creativity score obtained on the verbal creativity test. The scoring of titles however is optional.

- **Triangles and Ellipses Activity**

In this activity, the subject is provided with 7 triangles and 7 ellipses and is required to construct different meaningful pictures based on the two given stimuli. As the subject is encouraged to make multiple associations with a single stimulus, the responses could be scored for flexibility, besides elaboration and originality. However, as this is the only activity in which flexibility scoring is possible, it is recommended that here too, the test user should confine himself to elaboration and originality by scoring alone. A total time of 10 minutes is allowed for this activity.

The subject is also asked to give an interesting and suitable title to each picture, which should also be scored for verbal elaboration and originality and the scores added to the verbal creativity score obtained on the verbal creativity test. The scoring of the titles however is optional. The three activities taken together provide ample opportunity to the subject to use his/her imagination with different types of figural tasks and generate some novel ideas.

3.3.2 Rationale for the Activities Included in the Test

Following are the rationale included in the activities tests. 5.4.2 Rationale for the Activities Included in the Test

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1. Picture Construction Activity

Picture construction has long been used as a measure of a child's creative thinking. Torrance has used this test in his battery of creativity, tests, but in a slightly different manner. Here the subject is provided with a fixed structure, which he can convert into a meaningful picture building on his own imagination, children vary in their response to these stimuli both in terms of elaboration and originality of response. This activity allows for unrestricted fluency of ideas, which may enable the subject to use his unconscious mind to help him think and structure.

2. Incomplete Figures Activity

This activity has also been used by a number of psychologists to study the personality and thought patterns of children. In terms of *Gestalt Psychology*, 'an incomplete figure sets up in an individual tension to complete it in the simplest and easiest way possible. Thus, to produce an original response, the subject usually has to control his tensions and delay gratification of this impulse to closure' (Torrance, 1966). The test can be scored for originality and elaboration.

3. Triangles and Ellipses Activity

This activity is based on the idea of Torrance's parallel lines and circles where repeated figures are given and the subject's novelty can well be assessed by the construction of different types of figures from the same given structure. Generally, non-creative subjects fail to construct new patterns out of the same figure, but creative subjects originate new patterns and also practice a good deal of elaboration.

3.3.3 Technical Information about the Test

The technical information about the test are as given below.

1. Item validity

The test was conducted on two samples—urban and rural, consisting of 300 and 175 pupils respectively, studying in classes VI and VIII. Each item was scored for elaboration and originality. Flexibility scoring for Activity III was ignored in the final analysis. The raw scores for each item were converted into T scores where a mean of 50 and a standard deviation of 10 were added up to get the total score for each item. The item scores were converted first with the total activity scores and, secondly, with the grand total, i.e., the total of all the four activities. Correlations among the three activities of the test were also obtained.

Another method for studying the usefulness of items in a given activity was to obtain separate scores for elaboration and originality for each set of items under a given activity, in order to see how the factor scores were correlated with the grand total.

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Tables 3.1 and 3.2 show the results for validity of items.

Table 3.1(a) *Correlation of Items with the Total Activity Scores and the Grand Total*

Activity	Item	Correlation with the Activity Total	Correlation with the Grand Total
I	1	.92	.58
	2	.29	.63
	1	.61	.59
	2	.54	.35
	3	.37	.35
	4	.17	.20
II	5	.53	.49
	6	.62	.57
	7	.54	.52
	8	.68	.65
	9	.60	.56
	10	.58	.56
III	1	.93	.64
	2	.93	.64

All correlations are significant at or beyond .01.

Table 3.1(b) *Correlation of items with the Total Activity Scores and the Grand Total (Urban Sample, N = 175)*

Activity	Item	Correlation wth the Activity Total	Correlation with the Grand Total
I	1	.47	.22
	2	.70	.34
	1	.33	.26
	2	.33	.18*
	3	.32	.34
	4	.36	.53
II	5	.50	.53
	6	.40	.28
	7	.30	.21
	8	.34	.35
	9	.44	.36
	10	.35	.27
III	1	.62	.36
	2	.55	.23

All correlations are significant at or beyond .01, except one marked asterisk, which is significant at .05 level.

Table 3.1 (a) and (b) show, firstly, that the items in each activity are correlating highly with the total activity scores. This indicates that the items in each activity are internally consistent and second, that their correlations with the grand total are also considerably high, again pointing to the fact that each item is contributing significantly to the total. This is more clearly shown in the urban sample than in the rural sample, but the correlations in the rural sample are also considerably high and have no room for any doubt about the internal validity of the test.

Table 3.2 *Correlation between Test Activities and the Total Creativity Score on Urban and Rural Samples*

Activity	Urban (N = 300)	Rural (N = 175)
I	.63	.43
II	.94	.85
III	.66	.31

All correlations are significant beyond .01.

All correlations of the Table 3.2 show a significantly high degree of relationship, between the activities and the total creativity score (all being significant beyond .01). The correlations range from .63 to .94 for the urban sample and from .31 to .85 for the rural sample. Such high correlations again show the usefulness of the three activities in measuring the creative thinking ability of the individual, which the test purports to do. The inter correlations among the three activities were found to range from .30 to .47.

2. Factor validity

The correlations between the different factors of creativity and the total creativity score for the urban and rural samples are shown in Tables 3.3 and 3.4.

Table 3.3 *Inter-Correlation Among Various Factors of Creativity and the Total Creativity Score on the Urban Sample. (N = 259)*

Factor	Elaboration	Originality	Total Creativity
Elaboration	--	.53	.78
Originality	--	--	.87

All correlations are significant beyond .01.

Table 3.4 *Inter-Correlations Among Various Factors of Creativity and Total Creativity Score on the Rural Sample (N = 175)*

NOTES

Factor	Elaboration	Originality	Total Creativity
Elaboration	--	.36	.60*
Originality	--	--	.53*

Significant beyond .01.

Table 3.3 and 3.4 show that the two factors, namely elaboration and originality, are moderately correlated to each other, but they correlate sufficiently highly with the total creativity score, which is exactly what should be expected when factor scores are used to predict a composite criterion, which in the present case is the total creativity scores.

3. Correlation between creativity and intelligence

An important finding that enables us to place high reliance on the tests is their significance but considerably low correlations with verbal and non-verbal tests of intelligence. In the rural sample where Raven's Progressive Matrices was used, the correlations with verbal and non-verbal creativity tests were found to be .19 and .18 respectively. In the urban sample, where Mohsin's verbal and non-verbal group test of Intelligence was used, the correlations with verbal and non-verbal creativity tests came out to be .17 and .17 respectively.

4. Correlation between the verbal and non-verbal tests of creativity

The correlation between verbal and non-verbal tests of creativity, based on the total creativity scores was found to be .45 and .35 for urban and rural samples respectively. These indicate that while two of our tests seem to measure the same construct, namely, creativity and creativity, they are giving somewhat different information about it. It is recommended that both the tests should be used to obtain a complete information about the creative individual. Validity studies will indicate the type of creativity score that is more specifically related to creative performance in a particular field.

3.3.4 Reliability of the Test

The test-retest reliabilities of the factor scores and the total score were obtained on a small sample of 50 pupils.

Table 3.5 *Reliability Scores*

Elaboration	Originality	Total Creativity Score
.93	.94	.94

As seen, the reliabilities of factor scores and the total creativity scores are considerably high, ranging from .93 to .91. The inter-scorer reliabilities using 34 test-scripts were found to be .98, .98, and .91 for elaboration, originality and total creativity scores respectively.

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3.3.5 Validity of the Test

The validity coefficients against the teacher ratings for each factor and the total creativity score are shown in Table 3.6.

Table 3.6 *Validity Coefficients for Factor Scores and the Total Creativity Score Against Teacher Ratings. (N = 50)*

Elaboration	Originality	Total Creativity Score
.34	.32	.38

Significant beyond .01.

1. Preparing for the test

It is recommended that the test administrator should first get himself fully acquainted with the test by carefully going through the test-booklet that contains both, general instructions and instructions for each activity. The timing given for each activity should be strictly adhered to.

Before administering the test, the following points should be carefully noted:

- The place for administering the test should be such that children may work comfortably and without disturbance. The usual setting for test administration is the class-room. Care should be taken that the class is not over crowed. A maximum of 30 to 35 students may be taken up for group administration.
- The students should be properly motivated to take the test. The word 'test' however should never be used throughout the session. Rather, it should be presented as a set of interesting tasks, which the children would enjoy doing. What is important is to avoid a threatening situation, which is frequently associated with testing. The students should be told that they would soon be involved in an interesting activity in which they would be required to be given interesting and novel responses to certain activities provided in the booklet.
- The language used by the test administrator in giving instructions to children should be as simple as possible so that each one understands what is required from them.
- The test administrator should see that each child has a pen or a pencil. He should, however, have a stock of pencils with him for emergency situation.
- The test administrator should preferably have a stopwatch for timing each activity. A wrist watch with a centre second can also be used.

NOTES

- If both non-verbal and verbal tests are to be administered, it is recommended that they be given in two different sittings; the verbal test may be given first. If the two tests are to be administered the same day, a break of about two to three hours should intervene between the two sittings.
- For well-rounded information about the creative thinking abilities of a student, it is strongly recommended that both the tests be used.

2. Preliminary instruction to students

The preliminary instructions to be given to students are recorded on the test booklet. After the instructions for motivating the children, as mentioned in the second point above, have been given, the test administrator should distribute the test booklets and ask them to fill in the columns for name, class, etc. After they have filled in the required columns, the test administrator should ask them to put down their pens and pencils. He should then ask them to look at the general instructions that the test administrator should read aloud, letting the children go through with him silently.

The instructions may be translated into any regional language, which the test administrator wants to use. Some of the instructions are as follows:

- Novelty, originality and creative ability play an important role in man's life. All inventions are the result of man's ability to think differently. There are many things in this world, which can be made more interesting and useful by the use of our imagination and creative thinking. People who possess this ability have been responsible for many new inventions and discoveries.
- You have been given three activities to do. Each activity is separately timed for your convenience. Try to work as quickly as possible on each activity. If you finish an activity before time, do not go to the next activity till you are told to do so. Use your time to make your picture more elaborate by adding new ideas to it. You will be given five minutes extra at the need of the three activities so that if you have got any new idea for any of the three activities or its parts you may add it during the extra time allowed to you.
- Attempt every task of the three activities. When you are asked to begin, immediately start your work. If you have to ask any thing, please do it now. If you have no difficulty now but find one, quietly raise your hand from your seat so that your difficulty may be removed.

After the general instructions have been given, the test-administrator should make sure that the children have understood everything. He/she should then ask them to open the booklet and read the instructions for the first activity asking the children to repeat silently. The instructions given in the test booklet are in Hindi. An English rendering of the instructions is given below:

Instructions for Activity I

The next page of the training manual has two simple line drawings. Using each as a base, you have to draw picture, which in your opinion no one else will be able to

NOTES

think of. You can turn the page in any direction you like-upside down, right, left, etc., in order to draw your picture. Try to make your picture as novel and interesting as possible by adding new ideas to it. When you have completed the picture, give a title to it in the space provided. Try to make the title as interesting and unusual as possible. You need not place much emphasis on accuracy and exactness. What is expected of you is that your picture should be as unusual as possible. You will get ten minutes to construct the two pictures. The test-administrator should then point to the example given on the same page. He/she should point out that by using the line-drawing given at the top, two different pictures have been constructed, one in which that part has been used as a turban and the other in which the same part has been used as a nest by turning the page around. He/she should also point out how in drawing the two pictures many ideas have been added over and above the main picture.

When the test-administrator has finished explaining the example, he should ask the children to go ahead with their work. At the end of five minutes the test administrator should ask the children to construct the next picture. When the five minutes for the second picture are also over, the test-administrator should ask the children to put down their pens and open the page to Activity II. He/she should then read the instructions for Activity II.

Instructions for Activity II

On this and the following two pages you have been given ten incomplete figures. In order to complete the drawings you have to draw, with the help of new lines added to each, a novel and interesting picture, which in your opinion, no one else will be able to make. You may add as many lines as you like in order to make the picture as interesting as possible. When you have finished making the picture, give a title to it in the space provided. Try to make the title as unusual and interesting as possible.

You will get fifteen minutes to draw the pictures. At the end of every five minutes, the test administrator should announce the time so that children may move on with a uniform speed.

When the time for this Activity is over, the test-administrator should ask the students to put down their pens and open the page for Activity III. The instructions for Activity III are as follows.

Instructions for Activity III

The following pages contain few triangles and ellipses. Taking each drawing as a base, you have to make your picture as interesting as possible. Your picture should be such as, in your opinion, no one else will be able to make. Try to make each picture different from the other. In other words, each picture should represent a new idea. Also, remember that each picture should be complete.

Write a title for each picture in the space provided. The title should be as interesting and unusual possible. It is not necessary that you first finish all the triangles and then start the ellipses. When you are unable to think of a new idea with regard to triangles, you may go over to the ellipses and make your pictures based on them. You will get ten minutes for this task. The test administrator should announce the time so that children may move on a uniform speed.

NOTES

After the time for this activity is over, the test-administrator should announce that 5 minutes extra will be allowed so that anyone who wants to do additional work at any time may now do so.

As there are no right or wrong responses for the test, much care has to be exercised at the time of scoring. The test user has to get fully acquainted with the method of scoring and the use of scoring sheet.

The following points have to be kept in mind while scoring the test:

- Each item is to be scored for elaboration and originality. Only the items in Activity III may be scored for flexibility. Scoring, however, is optional.
- The definitions of these terms are as follows.

3.3.6 Elaboration

Elaboration is represented by a person's ability to add pertinent details (more ideas) to the minimum and primary response of the stimulus figure. The minimum and primary response to the stimulus figure is that response, which gives essential meaning to the picture. The title of the response often states what exactly the student is trying to make. However, responses that can be reasonably interpreted and identified should be scored. In some cases, the test booklets will have to be turned around or rotated in order to know exactly what the student has drawn. Sometimes the response represents some abstract idea instead of a thing and thus needs to be scored.

Some difference of opinion may arise in determining the minimum and primary response, especially in the case of human figure, birds, animals and several other objects. It is recommended, as a general rule, that the criterion for determining the primary and minimum response is what is most essential for identifying the response; in other words, only those parts will be considered most essential without which a figure cannot be identified what it is meant to be. Thus, in a human head, eyes and an indication of nose and mouth will be enough to identify it as head and so all other parts like hair, ear, neck, etc., should be considered as elaboration.

It is important for the scorer to see that the primary and minimum response is meaningful and relevant to the stimulus before it is scored. If the figure is not relevant and meaningful, it should be ignored. The total elaboration scores will consist of a score of one for the primary and minimum response plus one score each for all the additional new ideas. An idea once scored in a picture should not be scored again in the same picture.

3.3.7 Scoring of the Title

It has to be kept in mind that titles too are to be scored for elaboration and originality. These scores will be considered as verbal rather than non-verbal and will have to be calculated separately. In scoring the title for elaboration, again care has to be taken to identify the primary and minimum response and all additions should be taken as elaborations over it. For examples, if a picture is of an airplane and the title reads 'Pilot returning after bombarding the enemy', the elaboration score for this title will be the number of ideas included in the title-one for pilot, one for returning, one for bombardment, one for enemy (total score = for pilot, one for returning, one for

bombardment, one for enemy (total score = 4). As the word airplane is not verbally mentioned, no scores will be given for airplane. The primary response here, however, is the airplane. As the title is conveying an interesting and novel idea, which is relevant and meaningful, it is to be scored.

NOTES

Originality: Originality is the feature that is represented by the uniqueness of a given response. Responses given only by less than 5 per cent of the group are considered, and are given differential weights. The weights have to be determined on the basis of the following scheme. If a response has been given by 1 per cent to 99 per cent of the testees, the response will get an originality weight of 5; if a response has been given by 2 per cent to 2.9 per cent of the testees, then the response will get an originality score of 3, if a response has been given by 3 per cent to 3.9 per cent of the testees, then the response will get an originality weight of 2; if the response has been given by 4 per cent to 4.9 per cent of the testees, then the response will get an originality weight of 1. Responses given by 5 per cent or more of the testees will get an originality weight of zero.

In the scoring guide, the original weight has been given for all original responses, and should be used as such. The scores may be directly entered on the answer sheet by closely following the scoring guide.

The weights are based on an analysis of responses from a sample of 300 urban children of Aligarh city studying in classes VII and VIII. In this revised edition, some more originality weights for new responses obtained in another study have been given at the end, which may also be used. It is difficult to say that all possible original responses have been obtained. However, if the test-user finds in his own sample, responses that have not been mentioned in the scoring guide, he/she should briefly mention them on the back side of the answer-sheet and score them for originality after all the test scripts have been scored.

The instructions for scoring the new responses for originality are also given on the scoring-sheet. The test scorer should work out the originality weights for these responses based on the scoring scheme given above and then add these scores by putting a plus sign in the appropriate box where he has already noted the originality scores based on the originality weight given in the scoring guide.

Originality Scoring for the Title

- A zero score will be given to a title, if it just names the object, such as cat, dog, man, etc., these are obvious 'thing' titles.
- A score of one will be given to a title, if it attempts to describe the object in somewhat elaborate terms, such as 'A fat man' 'A hungry cat', 'A beautiful bird', etc.
- A score of two will be given to a title, which is imaginative and goes beyond a more physical description of the object. For example, 'A king from Mars', 'A cat that never mewed'.
- A score of three will be given to a title, which is abstract but appropriate and says something that goes beyond what can be observed. For example, 'A pilot returning after bombarding the enemy'.

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Flexibility: Flexibility is represented by a person's ability to produce ideas, which differ in approach or thought trend. All ideas that differ in approach or trend are considered the same for purposes of flexibility scoring. Thus, if five ideas are produced, and all belong to only one category of approach or thought trend, the score for flexibility will be one but if all the five ideas are based on five different approaches or thought trends, then the flexibility score will be 5. There could be intermediate scores for flexibility, depending on the number of categories of thought trends to which the responses belong.

In the non-verbal test, only Activity III, i.e., triangles and ellipses may be scored for flexibility, as the testee is asked to make different pictures form the same given stimulus. However, as has been noted above, since this is the only activity on which flexibility scoring is possible and the scores have to be based on two items alone, not much confidence can be placed on the reliability of these scores. Moreover, the labour involved in scoring and conversing raw scores into T scores to obtain the total flexibility score does not justify its use as a constituent of the improvement by the use of the flexibility score in the non-verbal test. It was for these reasons that the flexibility score in the non-verbal test scored items. The test users may therefore confine themselves only to elaboration and originality scoring for the non-verbal test, if desired.

3.3.8 Score Summary

A table has been provided in the answer-sheet to summarize the scores for elaboration and originality both for the pictures and titles. The total elaboration and originality scores is entered in the appropriate columns of the table. The composite creativity score is entered after converting the raw scores into standard scores. This is necessary because standard deviations of the two scores sometimes markedly differ, and an aggregate of the raw scores will greatly affect the ranking.

Procedure for converting raw scores into 'T' scores

Once the total raw scores have been obtained for dimensions of creativity like originality and elaboration, the following procedure for converting raw score into 'T' scores should be followed:

- Calculate M and SD for the total raw scores of each dimension.
- For converting raw scores into 'T' scores with M = and SD use the following formula

$$T = \frac{10(x - M)}{SD} + 50$$

- For making the calculations easier the formula can be written (X – M) + 50, where will be a constant value by which each X – M can be multiplied; the add 50. In the total, the same raw score may occur a number of times, so the calculation of T scores can be further facilitated by first preparing a conversion table. The conversion table can be used easily for converting the actual raw scores by merely looking at the conversion table.

- The mean and SD of different dimensions of creativity can be easily calculated with the help of a hand calculator.

3.3.9 Interpretation of Scores

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Norm tables for urban and rural samples of classes VII and VIII have been provided for different types of scores obtained on the test. It is however suggested that norms should be used only as a guide, if the test user thinks that his/her sample is different from the sample for which norms have been provided.

Norms for special groups and for pupils of different age levels may be developed as new data collected on the test.

The following points have been mentioned in order to facilitate interpretation of scores by the test user.

- The scores on the test gives information about those thinking abilities that are not measured by intelligence tests. These abilities have been found to be related to creative thinking.
- In the absence of norms for different groups, interpretation has to be based on high and low scores on the test if the group is sufficiently heterogeneous. It is recommended that scores that are I.S.D. above the mean, should be used to mark out the 'high creativity' group and those which are I.S.D. below the mean should be used to designate the 'low creativity' group.
- The raw scores for elaboration and originality scores should not be added to obtain a composite creativity score without converting them to standard scores. The composite creativity score should be based on standard scores instead of raw scores. As has been pointed out above this is because of differences between standard deviations of fluency, flexibility and originality scores.
- In the absence of information about the use of separate factor scores, it is recommended that only the composite creativity score should be used for grading pupils on creativity.
- In research work, whoever uses the test on a specific sample should prepare their own norms, if needed.

3.3.10 Title Scores

Elaboration and originality scores for titles have not been analysed. The scoring of the titles has been explained in the manual and should therefore present no problem for the test user. As has been mentioned in the manual, the title scores are essentially verbal scores and should be used as such. For working out validity coefficients, it is suggested that they be used along with the verbal creativity score. Their separate use is also recommended in certain cases. The author believes that the title scores will be good predictors of creativity in writing, whereas the figural scores will predict creativity in art better than will the verbal scores.

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Table 3.7 *Verbal Scores*

Percentile	Elaboration	Originality
P_{99}	44	37
P_{95}	38	32
P_{90}	34	29
P_{80}	30	24
P_{70}	24	20
P_{60}	23	16
P_{50}	20	14
P_{40}	18	14
P_{30}	14	10
P_{20}	13	8
P_{10}	10	6
P5	8	5

Table 3.8 *Percentile Norms for Non-Verbal Factors of Creativity for Class VIII*

Urban (N = 155)		Percentile	Rural (N = 175)	
Elaboration	Originality		Elaboration	Originality
44	34	P_{99}	23	6
38	29	P_{95}	19	2
32	24	P_{90}	16	2
28	20	P_{80}	15	1
26	18	P_{70}	14	1
24	15	P_{60}	14	0
21	13	P_{50}	13	0
20	10	P_{40}	13	0
17	8	P_{30}	13	0
14	6	P_{20}	12	0
10	4	P_{10}	12	0
8	5	P5	12	0

Note: Scores for Elaboration are based on Activity and I and II only.

Table 3.9 *Scoring Guide*

Activity	Item	Responses		Originality Weight
I *(Picture Construction)*	1	1.	Balloon	5
		2.	Ball	
		3.	Basket	3
		4.	Bulb	3
		5.	Bulb shade	3
		6.	Can	5
		7.		

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CHECK YOUR PROGRESS

4. Why are creativity tests used?
5. How does Guilford define divergent thinking?
6. What is common in all inventions?

3.4 INTELLIGENCE

Educational psychology is primarily concerned with psychological principles, facts and categories that are responsible for the modifications or changes brought about in a child, so that he/she is fashioned into a citizen of the particular society or community. It has also been highlighted that education is the name attributed to the process and practice of bringing about these modifications and changes. However, these modifications and changes, or the whole process of educating the individual do not entirely depend on the environmental forces or factors, but in a great measure, on the genetic constitution and the innate capacities. They also depend on the qualities or attributes of the individual in various aspects of development, intellectual capacity or intelligence, which is also referred to by some psychologists as mental energy (as compared to physical energy, stamina or physical strength).

The teachers or the educationists, who are responsible for the education of individual children since the beginning, are supposed to know that intelligence portrays its real nature; whether it is a unitary quality and a faculty or is composed of certain elements or factors.

Sometimes, teachers in the classrooms and even many educational administrators are not quite clear about the concept of intelligence. It is, for example noted that if a teacher is asked to point out the most intelligent student in the class, he/she very often points out to a quiet and a shy child who gives no trouble, comes to the class regular, does his homework regularly and causes no problem to the teacher. The teacher aligns good behaviour with routine class work to intelligence.

NOTES

On the other hand, the teacher may point out another child who is rather aggressive, rowdy, misses classes, ignores homework and questions the teacher in the class or enters in an argument as bad or unintelligent. However, if the intelligence of these two boys is judged, the former may be found to have an I.Q. of about 90 or 100 whereas the second child who is active and restless may be found to have an I.Q. of 125. To the teacher, ordinarily good behaviour stands for high intelligence but known good behaviour is quite different from intelligent behaviour. The confusion therefore arises when the meaning of intelligence as a concept is not understood. In educational psychology attention is devoted to the study of intelligence with regard to its meaning, nature, variation as well as to the various methods and means of assessing its level in different individuals.

Since the interest taken in its study by psychologists in modern times, after the pioneering work of Binet, intelligence has been understood in different ways and has been defined by many psychologists from their own points of view. However, now there seems to be almost a consensus about the meaning of intelligence, although definitions of the term have differed so widely during all these decades. Binet, for instance, himself thought of intelligence as the capacity to think in abstract terms or the capacity to reason well, to judge well and be self-critical.

Thorndike thought of intelligence as the power of good responses from the point of view of truth or fact. According to him, the mind was a host of highly particularized and independent abilities and he even identified three types of intelligences:

- ***Abstract intelligence*:** It involves understanding abstract ideas, concepts and symbols and their effective use.
- ***Concrete intelligence:*** It is the ability to deal with concrete objects, things or material as in skilled traders or working with appliances, apparatus and tools used in physical sciences or in practical tasks.
- ***Social intelligence:*** It is the ability to understand people in life and to make one's headway through them by dealing with them or handling them. Political leaders in society, for example, may be said to possess a higher social intelligence, though they may have failed in academics.

Cyril Burt, while working on various investigations at Oxford and Liverpool, thought of intelligence as 'the inborn general intellectual efficiency.' Similarly, Lewis Terman, who was a great contributor in the field of intelligence testing in USA, understood that a person was intelligent in proportion to his capability of abstract thinking.

Freeman, in 1940, also defined intelligence as the ability to learn action or to perform new actions that were functionally useful. William Stern in Germany (who first give the idea of I.Q. as a ratio between mental age and chronological age multiplied by 100) defined intelligence as a general capacity of the individual to consciously adjust his thinking to new requirements.

NOTES

Intelligence has now generally been understood

- As the capacity to integrate experiences and to meet a new situation successfully by means if appropriate and adaptive responses of varied nature and of numerous types,
- It is also the capacity to learn new things to the extent one is educable
- As a capacity to perform intellectual task requiring the use of concrete media
- As a capacity to perform intellectual tasks by carrying on abstract thinking by using symbols and concepts, which may be verbal or numerical
- Intelligence is also considered as the capacity to deal with social situations and also to deal with different types of people, to make a successful career, as we find in the case of social or political workers and leaders. Considering all these areas with which the individual is concerned in actual life, intelligence is considered by Wechsler as the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his/her environment.

Woodworth, in a similar manner, thought of intelligence as the mental capacity to deal with novel situations successfully. In both these definitions, the reference is to all sorts of situations in the environment, which the individual has to face and his/her intelligence involves dealing with all those new situations as effectively and successfully as possible and the degree of success or effectiveness will lie in the level of his/her mental capacity. Another writer, Stoddard defined intelligence as 'the ability to undertake activities that are difficult, complex and abstract and which are adaptive to a goal, and are done quickly and which have social value and which lead to the creation of something new and different'. Here again the meaning of intelligence is understood, as the capacity to handle new situations. So, on the whole, investigators concerned with the study of intelligence have understood it as the mental capacity or mental energy (as called by Burt in later years), which enables the individual to handle his/her environment involving abstract and concrete of social situations as successfully as the level of his/her mental capacity could warrant.

The word 'mental energy' is used for intelligence in contrast with physical energy, strength or stamina, which means that intelligence is a function of the quality of the brain cells. Sometimes in ordinary parlance, it is said that intelligent people have big heads or brain and the working class has big feet. This popular statement is not scientifically correct like many such popular sayings which are 'half truths'. Big heads with big brains do not necessarily mean high intelligence. One study, for example, conducted by Dunlop to find the correspondence between the size of the brain in the head and the level of mental alertness revealed a low correlation as .112, which meant that there was hardly any relationship between intelligence and the size of the brain or the head or cranium (skull). What actually mattered was not so much the size, shape or the dimensions of the brain or head, but what actually was contained in the head. This meant that the quality of the brain and not so much the size of the brain in the head was important. The quality of the brain means the type

NOTES

of nerve cells in the brain cortex in the frontal lobe of the cerebrum, which is said to be the seat of cognitive functioning. The nerve cells in the brain cortex of an intelligent man seem to be different in quality than the nerve cells of a less intelligent person. If mental energy made available by the type of the nerve cells is used to deal with novel situations, success will depend on the amount of the nervous energy supplied by the nerve cells. By analogy the supply of the nervous energy could be understood if we consider the amount of water passed on to a spot by various pipes or tubes from a reservoir or the flowing river. The amount of water carried by these tubes or pipes to the spot will depend upon:

- The numbers of the pipes put in action.
- The bore of the pipes which measures its capacity to transfer the water.
- The ease and smoothness with which the water flows through the pipe, i.e., if there is any obstruction inside or the pipes are constructed intricate, zigzag and lying in a confused state, the flow of water will be slower and comparatively less.

In a similar manner, when a new task is to be handled its success would depend upon the supply of the mental energy. The mental energy supplied would depend upon the number of cells coming into operation at the moment, the amount of energy carried by the nerve cells as well as the ease and the smoothness with which the energy is supplied by the nerve cells. Neurologically, therefore, an intelligent man seems to possess nerve cells in the brain cortex which are so sensitive that a large number of them come into operation and carry energy quickly to be thrown, as it were, in the task and the success depending on the amount of mental energy or intelligence available at the moment. It is not so simple or certain to say that intelligent behaviour depends actually on such a neurological framework. However, to understand intelligence as nervous energy is one-way to explain the phenomenon by taking the analogy of supply of the quantity of water from a source by a network of pipes.

People not so keen on the role of nerve cells in intelligence think of intelligence as a faculty like other faculties, such as memory, attention, perceptions, imagination, reasoning, etc. Faculty psychologists like Ebbinghause, Galton and others believed that the mind constituted a number of faculties and that intelligence was one of those faculties. However, studies conducted from the epoch making work of Binet (when he tried to measure mental level of school children) reveal the nature of intelligence. The enquiry was to find out whether intelligence was a unitary quality or a faculty or that it was constituted by or composed of certain factors. This enquiry started with Binet's work to assess the mental level of children and led to the mass of knowledge and investigations resulting in a host of intelligence tests in which the investigators were led to study the nature of intelligence itself and a number of theories of intelligence were propounded. Binet had thought that there were three characteristics of intelligent behaviour:

- Tendency to maintain and take a definite line of thinking
- To make adaptations for attaining the right goal
- Power of self-criticism to judge the success

Binet's contribution in the study of intelligence was to give out the concept of general mental level as well as the concept of an individual's mental age. He, however, did not go into the question of further analysing the nature of the thinking process or of the intelligent behaviour.

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3.4.1 Assessment of Intelligence

The efforts of intelligence testing or assessing have a long history starting, of course, with the systematic and pioneering work of Binet in France. However, there were earlier attempts to measure the mental process by measuring the powers of the body, sensitivity and other functions. The earlier investigators, like Levator, studied the facial expressions. Dr. Fall, the Phrenologist, in Germany, tried to analyse the mental powers and functions by mapping out the skill or the head and divining mental powers from the depressions or projections on the surface of the head. Limbroso, the Italian Criminologist, tried to study the character of criminals from physical formations. Galton in 1883, first announced the possibility of measuring intellectual abilities by simple laboratory tests. He had the belief that some sort of correspondence existed between certain bodily traits and intellectual power which, to an extent, led to researches in that direction, such as the Bartillon system of identification of some character qualities from fingerprints, although the physical correlates of intelligence were still undiscovered.

Physical qualities, like stamina or getting fatigued easily or to carry on the work longer were studied by ergography and by the use of dynamometer and an aesthesia-meter was used for judging sensitivity. Some psychologists, particularly the faculty psychologists, had another line of approach to measure mental functions, Ebbingaus, for example, devised techniques with the use of nonsense syllables to study retention, recall or recognition in memory. There were other methods and means to measure mental faculties like attention, perception, imagery or imagination, reasoning, etc.

In 1906, Karl Pearson published the results of an investigation into the relationship between intelligence and the size and shape of the head. His conclusion was that the connection between intelligence and the size and shape of the head, if at all it existed, was so insignificant that no valid inference could be drawn about the quality of brain from the size of the head.

Although Galton had hit upon the idea that there could be some methods of measuring intellectual abilities, it was left to Binet to devise such methods of measurement of mental qualities. Binet thought that mental powers or intellectual capacity could only be judged by mental symptoms and his method to obtain a general knowledge of the mental capacities of a man was by 'sinking shafts', as it were, (an expression used by Galton for Binet's method), at a few critical points. Binet laid the foundation of modern mental measurement. It was in 1904, that the French minister of Public Instruction, worried by the problem of mentally retarded children to know if there was any method of assessing the mental level of those children, appointed a commission consisting of physicians, educators and scientists, under the chairmanship of Alfred Binet, a Parisian doctor (who was then the Director of the Physiological

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Laboratory at Sarbonne) to find out any method of intelligence testing for the guidance of retarded children. Binet in collaboration with Thomas Simon put out the first rough scale for measuring general intelligence in 1905. This test was enlarged and revised in 1908 and the last version or revision of the test was published in 1911 just before Binet's death. Binet framed the single mental scale composed of a number of miscellaneous questions, drawn from practical situations of everyday life. Binet's two outstanding contributions to the theory of psychological measurement were:

(i) Concept of general level of intelligence

(ii) Mental age

It is sometimes wrongly believed that the familiar concept called I.Q. (Intelligence Quotient) was given by Binet. The idea of I.Q. was first given by William Stern, a German psychologist, who stated the formula for finding I.Q. as:

I.Q. = (Mental Age * 100)/Chronological Age

In any case, the work of Binet crated a stir among psychologist and there was almost a race starting in England, USA and many other European countries. After considering Binet's work J.A. Green, in England, suggested to K. L. Johnson to go to Paris to study the new methods devised by Binet. She on return contributed the English translation of Binet's 1908 scale to Green's Journal.

Later Taylor and Moore investigated the use of the English translation of Binet's test with English children, while Wines also experimented with a modified form of the scale. Although Burt claimed that he had started his investigation in Oxford in 1905, when Binet published his first series, a complete Binet – Simon Scale called the London Revision was published by Burt in 1921. Ballard, published his mental tests in 1920. In less than ten years, after the publication of Binet's final revision, his scale was extensively being used in America, Canada, England, Australia, New Zealand, South Africa, Germany, Italy and even in Japan and Turkey, with Japanese and Turkish translations.

In 1921, at the request of the Northumberland Education Authority, Thomson constructed the famous Northumberland Tests. Moray House tests were more carefully standardized and in 1928, the Scottish Council for Research in Education was formed. In USA, Goddard introduced Binet's tests in 1911 and translated them into English. There were certain changes indroduced by Terman. From 1916 and even 1915, the point scale method was introduced by Bridges, Yarkes, Henring and others. The best revision in USA was that of L.M. Termon of Stanford University, known as Stanford revision or simply Stanford–Binet. He found certain test items in Binet's scale in some age groups too difficult and some items were found to be misplaced. Terman also noted that the instructions for giving the tests were often indefinite. He added 36 more tests to Binet's 1911 revisions, which contained 54 items. Terman made six test items (with one alternative) for every age group and assigned the credit of two months for every test item correctly done in the entire scale. This was a great improvement over the Binet test in which one could earn credit for a particular age only if he answered all the items assigned to that age group, correctly. In Terman's revision, the test was started with an item of two or

more age groups below the age of the child when he could answer all the items and was given test items for higher age groups. His total credit on the basis of two months credit for every item correctly done was also determined, which constituted his mental age.

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In actual, Binet's 1908 revision contained 59 test items and some people even preferred the 1908 revision to the 1911 revision, in which fifty tests were retained and nine were added in the new scale. In order to score the test items as right or wrong, sample answers were written down. For example, in answer to the question, 'what would you do if your house is on fire?', the intelligent answer is to ring the fire alarm, call the fire brigade and put water on the fire other answers were, 'get another house', 'go to a hotel', 'cry for help', similarly in reply to the question, 'what will you do if you are getting late?', the intelligent answer would be, hurry up, walk faster, take a vehicle and an unintelligent answer would be, get punished, not do it again or start earlier next time.

To understand these tests, one must understand Binet's concept of intelligence. To him intelligence constitutes the higher mental processes, such as reasoning, imagination, judgement, retention, sensitivity, commonsense, initiative, ability to adapt oneself, insight into one's own capabilities, ability to adjust one's behaviour to a definite goal, persistence in sticking to a task one has undertaken, etc. He distinctly marks off intelligence from mere information, which may be acquired in school or in a cultural environment. He, however, insisted that an intelligent person in a normal environment will always acquire more information than an unintelligent one.

One important criticism against Binet's test was pointed out by Decroly and his associate Degand in Belgium as well as Bobertag in Germany. It said that the test items were verbal and so the children, who were linguistically backward as well as those who were rather dull and more practical-minded, were penalized on these verbal test items. It was also pointed out that this test was not suited to deaf and dumb children or children suffering from articulation difficulties. Another case was that the test judged the performance of the children, as it depended more on the training and social surroundings of the child than his native ability. For example, S.S. Calvin (1922), found that children from a wealthy area in Boston, ranked on an average two years in mental age above the children from the poor section of another large city. Cyril Burt, also found differences in Binet's test performance in favour of children of superior social status. Even differences due to superior and inferior schools where children studied were noted. Against the first criticism in the final revision, Binet included certain items that were not calling for verbal answers but were involved performing some task or answering by judgement or merely highlighting something. For example, comparing two lines, counting four pennies, coping a square or a diamond, uniting two halves of a divided rectangle, pointing out omissions from a picture or pointing uglier and prettier faces. Another criticism was that Binet was fully aware that his tests did not measure innate abilities, completely divorced from the effect of schooling, training or of superior social environment. His tests were devised with the explicit idea of minimizing the effect of environmental conditions. In fact, fresh items had to be drawn from actual situations and some children, who had some knowledge, information and training of some skill in were bound to do

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better in knowing the contents of those items or the tasks to be performed. He, however, held that unless the cultural gap was too wide or the deprivation from normal contact with the environment was so serious, the mental ages of children in normal environment were usually closer estimates of real abilities. In short, although the Binet—Simon scale drew heavily upon language, it exacted high degree of sagacity, cleverness and mental alertness rather than the ability simply to reproduce what had been learned earlier. It brought out the abilities to see relations, to interpret meanings, give sensible definitions, detect absurdities or incongruities and comprehend other situations demanding reasoning and judgement. In the first scale, Binet had selected 30 questions or items, which were arranged in a rough order of difficulty determined by experimenting on about 300 normal children. The tests were not grouped according to ages and Binet simply indicated how many tests a normal child of, say 5 or 7 years, should be expected to perform. In his second scale of 1908, the tests were for the first time arranged into age groups, constituting the first age scale. Binet assigned the particular age to the particular tests if two third or from 60 to 70 percent of the children of that age group did the test successfully. This was the method of validation, which was known and accepted, although later investigators like Burt, Terman and others used more advanced statistical techniques of item analysis. An important contribution of Binet was assigning the mental age to various tests in order to arrange them in order for various age groups starting with three years and going upto 15 years and some items for adults. In conclusion, it could be said that the Binet—Simon scale was a valid measure of general intelligence when it was given and scored in a standard manner on subjects in normal environments, or when they neither suffered from any language handicaps nor were they in any way privileged.

3.4.2 Relation between Intelligence and Creativity

Most of us have a general concept of what intelligence is but, similar to the intangible concepts of happiness and love, our personal definition of intelligence is influenced by our own understanding of the concept.

We tend to define intelligence in many ways:

- The capacity to learn
- The faculty of understanding
- An aptitude in grasping tasks
- General knowledge and wisdom
- The ability to reason
- Mental agility and quick cognitive response

Creativity is another term influenced by our own viewpoint of the world and is open to personal interpretation. However, the term itself is usually described as one's ability to think of original ideas and concepts. Man has devised a number of instruments to try and test for intelligence. The most notable of them is the IQ test. Creativity has proven to be a little harder to test so there are fewer scientific testing instruments, but they still exist.

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Around the 1950s, scientists began trying to find a link between creativity and intelligence, but all the published correlations between the two concepts were low enough to justify treating intelligence and creativity as distinct cognitive attributes. From the long discussions of the use of various tests and inventories for measuring and assessing the mental level of children and adults coming from different environment, the impression probably is that the mental level of an individual in terms of I.Q. can be determined and that intelligence can be measured.

3.4.3 Theories of Intelligence

Theories of IntelligenceTheories of Intelligence

Psychologists have attempted to understand the structure of intelligence for which they have formulated several theories. Among the important theories, the following deserve special mention.

- Spearman's Two-Factor Theory or Eclectic Theory
- Thurstone's Group Factor Theory or Anarchic Theory
- Unitary Theory or Monarchical Theory
- Oligarchic Theory or Sampling Theory
- Guilford's Theory
- Thorndike's Multifactor Theory

1. Spearman's Two-Factor Theory or Eclectic Theory

In 1904, Spearman, an English psychologist produced strong evidence based on his own researches that there was one fundamental ability underlying all cognitive functions. According to him, every task involving intellectual activity depended upon a general ability or 'g' factor and a separate ability or "specific" factor. This view is popularly known as two-factor theory of intelligence, i.e., 'g' factor and 's' factor. This 'g' factor represents native intelligence. Thus, when we respond to any situation or perform an intellectual task, our general mental ability or 'g' factor is responsible for part of our reactions and our specific ability in that particular task is responsible for the rest, as shown in Figure 3.2.

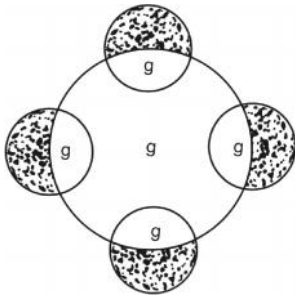

Fig. 3.2 *Eclectic Theory or Two-Factor Theory*

Fig. 3.2 *Thurstone's Anarchic Theory, or Multiple Factor Theory*

There are a large number of specific abilities, such as ability to draw inferences, ability to complete sentences, ability to continue series of numbers, ability to code messages, etc.

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2. Thurstone's Group Factor Theory or Anarchic Theory

L L Thurstone, an American psychologist, propounded the group factor theory of intelligence. According to him, intellectual activity is neither an expression of numerous highly specific factors as claimed by Thorndike, nor the expression primarily of a general factor which prevails in all mental tasks as Spearman believed. Instead, as revealed by factor analysis, certain mental operations have in common, a primary factor which gives them psychological and functional unity, and which distinctly separates them from other mental operations. These mental operations are said to constitute a group 'A', similarly, another group of mental operations have their own unifying primary factor and may be said to constitute a group 'B' and so on. Thus, there are a number of groups of mental abilities, each of which has its own primary factor.

Thurstone proposed seven factors and called them primary mental abilities. These are:

1. M—*Memory*: To be able to learn and retain information. Also, to be able to recall the learned material.
2. N—*Number*: To be able to understand quickly and with accuracy simple arithmetic computations.
3. P—*Perceptual*: To be able to identify objects quickly and accurately.
4. R—*Reasoning*: To be able to perceive and utilize abstract relationships. To be able to put together past experiences in the solution of new problems.
5. S—*Spatial*: To be able to deal with objects in space.
6. V—*Verbal*: To be able to understand and utilize verbal ideas.
7. W—*Word fluency*: To be able to think of words rapidly.

Spearman's theory is also known as '*electic theory'* because it harmonizes elements from all the main types of abilities. Thurstone's theory is also known as the '*anarchic theory'* because he conceived that the mind consists of a number of independent facilities.

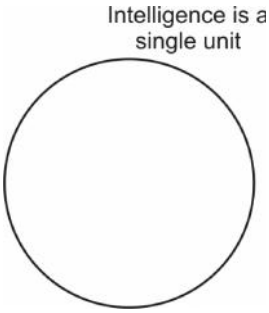

Fig. 3.3 *Unitary Theory or Monarchic Theory of Intelligence*

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3. Unitary Theory or Monarchic Theory

According to monarchic attitude, intelligence is regarded as an adaptability which enables a creature to adjust itself to the changing environment. This is a popular view which regards intelligence as a unitary (monarchic) faculty that determines the level of man's achievement in any intellectual enterprise he may take. Accordingly, inborn all round mental efficiency is a sign of intelligence. Accordingly, had Newton turned his mind to poetry, he could have as well been a poet.

4. Oligarchic Theory or Sampling Theory

This theory is criticized by the advocates of Oligarchic Theory. A person cannot be expert in all fields; moreover, a single factor alone cannot be mentioned which means intelligence.

This theory is sometimes known as sampling theory of intelligence. It was put forward by Prof. Thompson. According to it, intellectual abilities belong to certain groups. It maintains that cognitive abilities are manifestations not of a single commanding faculty, but of a few main intellectual powers or a group of abilities. For example, a child who is intelligent in one group of knowledge may not be intelligent in the other group. But he may be equally intelligent in the various subjects of that particular group (Figure 3.4).

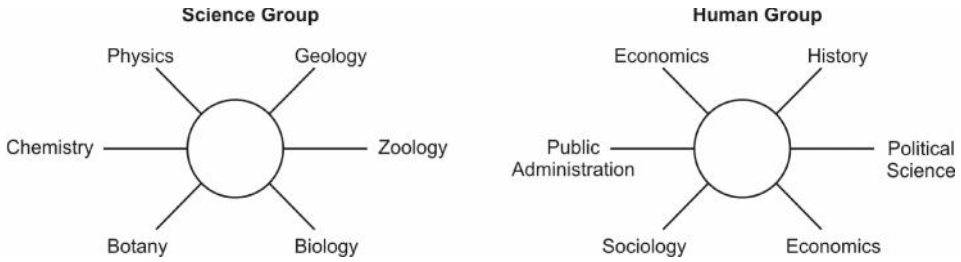

Fig. 3.4 *Oligarchic Theory or Group Factor Theory of Intelligence*

5. J P Guilford's Theory of Structure of Intellect (SOI)

This three-dimensional theory was developed by Guilford and his associates in psychology laboratory at the University of Southern California in 1966. Work on it began in 1956. Guilford conceived the idea of intellectual functioning as having three dimensions: (i) operations, (ii) content and (iii) products.

Operations are the processes involved in intellectual behaviour-cognition, memory, divergent thinking, convergent thinking and evaluation.

The content of these operations may be figural, symbolic (letters, numbers), verbal (information about other persons), behaviour, attitudes, needs, etc.

The products may be—units, classes, relations, systems, transformations and implications. Thus, the model contains 120 cells (5 operations 4 contents 6 products); each of which represents a distinct factor which is measured by a separate test. Diagrammatically, the model can be represented as shown in Figure 3.4.

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Guilford suggested that the five processes act on the four units to produce one of six cognitive products. The six products are units of a single word or idea, classes, a relationship between or among units or classes, systems, an organized sequence of ideas, transformations, a change or redefinition or a unit or class, and implications, predictions of the future.

Guilford believed that each person is a unique composite of a great many different intellectual abilities. Each intellectual functioning involves three components: a cognitive operation, specific content and a specific product.

Evaluation and Educational Implications of Theories of Intelligence

Spearman's theory is criticized on the main ground that it fails to take into account sufficiently specific types of abilities and towards the later years of his life, Spearman himself had begun to realize the existence of 'group factors.'

Thorndike's theory accords undue weightage to abstract intelligence.

Guilford's theory of intelligence seems to be the most comprehensive theory as it attempts to take into consideration all possible aspects of intellectual activity. This theory has several educational implications.

The SOI model provides knowledge about the specific ability of the students to guide them in the right direction. An analysis of the students' abilities by the guidance worker can suggest a reliable base on which future learning could be based

The SOI model is useful in finding out the reasons of the unsatisfactory performance of students in spite of their adequate intelligence. It points out that for understanding human learning and higher mental processes of thinking, problem-solving and creativity, etc., some drastic modifications would be required in our theory of curriculum construction and methodology of instruction.

The model explored 120 intellectual abilities which enables us to know whether or not we are paying adequate attention to each of them. If not, how should we improve them? The model guides us to devise enrichment programmes for the creative and the gifted children. The model discards the ideas of transfer of learning and stresses that learning of specific skills should be our focus of attention.

Check Your Progress

7. What is educational psychology primarily concerned with?
8. What did Thorndike think of intelligence?
9. Name Binet's two outstanding contributions to the theory of psychological measurement.

3.5 SUMMARY

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- Intelligence may be understood as a mental energy that is available with an individual, which enables him to cope with his environment in terms of adaptation and dealing with novel situation, as effectively as possible.
- The factor theories of intelligence throw light on the structure of intelligence by pointing out the number of factors or situations.
- Cognitive theories of intelligence try to analyse and describe intelligence in terms of certain fundamental cognitive processes, for example, Cattell and Horn's theory of intelligence states that intelligence is of two types– fluid intelligence and crystallized intelligence. The other cognitive theory, namely Jensen's theory of mental functioning describes one type of intelligence as maturation with a little difference among social classes and races and conceptual abilities.
- The concept of mental age and I.Q. is used for interpreting the scores earned on intelligence tests. The mental age of a child signifies comparison with a particular mental level, which is normal for the majority of children of his age.
- In a standardized test of intelligence, we can read the mental age of an individual directly from the table provided in the manual, on the basis of scores.
- Creativity is a unique characteristic of the human mind, which may be defined as the capacity of an individual to create or produce an entirely new or novel idea or object, by the rearrangement or reshaping of what is already known. It is both, innate as well as an acquired process or a product.
- Creativity is characterized by qualities like universality, being adventurous and open-minded, a craving for change and novelty, ego involvement and divergent thinking. It does not necessarily have a positive correlation with academic achievement and intelligence. It does, however, show positive correlation with anxiety and negative correlations with sociability.

3.6 KEY TERMS

- **Creativity:** The ability to discover new solutions to problems or to produce new ideas, inventions or works of art.
- **Redefinition:** A factor which causes an ability to give up old interpretation of familiar objects in order to use them or their parts in some new ways.
- **Concrete intelligence:** The ability to deal with concrete objects, things or material as in skilled traders or as in working with appliances, apparatus and tools used in physical sciences or in practical tasks.
- **Social intelligence:** The ability to understand people in life and to make one's headway through them by dealing with them or handling them.

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3.7 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Mc Kenon defines creativity as, 'a process extended in time and characterized by originality and realization.'
2. According to Stein (1974), 'creativity is a process which results in novel work that is accepted as tenable to useful or satisfying a group of people at some point of time.'
3. The two characteristics of creativity are:
   - Creativity is universal and not confined to any individual groups, caste, age, location or culture. Every person is capable of demonstrating creativity to some degree.
   - Creativity is innate as well as acquired. It is a natural endowment and also influenced by the cultural background experiences nurturing etc.
4. Creativity tests are used in the identification of creative instinct in the same way as intelligence tests are used for the assessment of intelligence.
5. Guilford defines divergent thinking as a kind of mental operation in which we think in different directions, searching and seeking variety.
6. All inventions are the result of a man's ability to think differently.
7. Educational psychology is primarily concerned with the psychological principles, facts and categories, which are responsible for the medications or changes brought about in a new born baby, so that it is fashioned into a citizen of the particular society or community.
8. Thorndike thought of intelligence as the power of good responses from the point of view of truth or fact.
9. Binet's two outstanding contributions to the theory of psychological measurement were as follows:
   (i) Concept of general level of intelligence
   (ii) Mental age

3.8 QUESTIONS AND EXERCISES

Short-Answer Questions

1. What do you understand by creativity?
2. How can a creative child be recognized?
3. List the qualities of a creative teacher.
4. What is the formula for measuring I.Q.?

Long-Answer Questions

1. Write a brief article on the nature and development of creativity.
2. What do you mean by creative performance and how can you measure it?
3. Mention some important definitions of intelligence and critically analyse one of them.
4. Critically explain the history and development of intelligence tests in India.

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3.9 FURTHER READING

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UNIT 4 THEORIES OF LEARNING

NOTES

Structure

4.0 INTRODUCTION

Learning is a key process of human behaviour. Parents and teachers are greatly interested in their child's learning. A child's instincts, attitudes, appreciations, skills and abilities are primarily the product of learning. Each individual is born with some native endowments, which determine his/her response. These native tendencies are not enough in the struggle of existence. Any organism, at any stage of its evolution is not only present in an environment but is being reacted upon by that environment and in turn reacting to it. Such active and reactive behaviour involves changes and modifications of the organism as well as in some cases, changes in the environment. Thus, learning is a modification of behaviour through experience and training. Briefly speaking, learning is a change in behaviour-organization. It is the organism as a whole that learns. Learning reconstruction combines thinking, skill, information and appreciation in a single unitary process and it is characterized by flexibility since it must constantly adopt itself to the circumstances.

A child in a school learns a sense of personal worth and his whole personality undergoes transformation.

In this unit you will learn the different theories of learning.

4.1 UNIT OBJECTIVES

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After going through this unit, you will be able to:

- State the meaning of learning
- Describe the different theories of learning
- Explain the difference of cognitive, connectionist or behaviourist theories
- Differentiate different laws of learning

4.2 SIGNIFICANCE OF THE THEORIES OF LEARNING

Theories of learning attempt to explain the mechanism of behaviour involved in the learning process. Experts have formulated different theories of learning with the result that it is not possible to give one theory which meets the expectations of all. Before discussing the different theories of learning, the meaning of a theory needs to be explained. The most acceptable definition of a theory is that of Melvin H. Marx (1970). According to him, 'a theory is a provisional explanatory proposition or set of propositions, concerning some natural phenomena and consisting of symbolic representation of the following:

- The observed relationships among independent and dependent variables.
- The mechanisms or structures presumed to underlie such relationships.
- Inferred relationships and underlying mechanisms intended to account for observed data in the absence of any direct empirical manifestation of the relationships.

A theory provides detailed systematized information of an area of knowledge. It serves as a guideline to conduct further research in the area. It produces new facts or supplements the previous facts. It gives an organized explanation about a phenomenon. It provides practical wisdom. It provides effective guidelines.

Important characteristics of a theory are:

- Testability of its principles
- Predictability of the outcomes of the actions
- Comprehensiveness
- Brevity
- Simplicity

A learning theory is supposed to find answers of the following:

- Role of drill and practice in learning.
- Utility of rewards and punishments or other incentives/motives in learning.
- Place of insight and understanding in the process of learning.

- Role of transfer of learning in various situations.
- Limits of learning with regard to the capacity of an individual in various aspects, i.e., individual differences of age, intelligence and sex, etc.

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4.2.1 Categorization of Theories

Learning theories may broadly be divided into two categories:

1. **Stimulus Response (SR) Theories**
   - (i) *SR Theories without Reinforcement*
     - Pavlov's Classical Conditioning Theory of Learning
     - Watson's Learning Theory
     - Guthrie's Learning Theory
   - (ii) *SR Theories with Reinforcement*
     - EL Thorndike's Theory
     - Hull's Theory
     - Skinner's Theory
2. **Cognitive Field Theories**
   - Gestalt Theory of Learning or Kohler's Insight Theory of Learning
   - Lewin's Field Theory of Learning
   - Tolman's Sign Theory of Learning

4.3 PAVLOV'S CLASSICAL CONDITIONING THEORY OF LEARNING

Ivan P. Pavlov (1849–1936), a Russian psychologist, was the originator of the classical conditioning theory of learning. He won the Nobel Prize in 1904 for his research on the digestive process. He was interested in studying the process of gastric secretion in dogs. His findings brought about a revolutionary change in the field of learning.

Conditioning is the modification of the natural response. By conditioning, Pavlov modified the behaviour of the dog on which he experimented. According to him, the behaviour of learners can also be modified in such a way, as the response originally connected with a particular stimulus comes to be aroused by a different stimulus. The classical experiment conducted by Pavlov made clear the process of conditioning.

Pavlov's Experiment: In one of his experiments, Pavlov kept a dog hungry during night and then tied him on the experimental table which was fitted with certain mechanically controlled devices. The dog was made comfortable and distractions were excluded as far as possible. The observer (Pavlov) kept himself hidden from the dog's view but was able to view all the movements of it by means of a set of mirrors.

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Arrangement was made to give food to the dog through automatic devices. With this act of offering food to the dog, a bell was rung simultaneously. It was natural for the dog to secrete saliva at the sight of food. The saliva went into the tube and it was measured. The experiment went on for some days. One day, the bell was rung but no food was given. The dog secreted saliva even then. It was observed that the saliva secreted was of the same quantity even when no food was given and just the bell was rung for some days. The actual stimulus to bring forth the response, i.e., the secretion of saliva, was the sight of the food but it was conditioned in such a way that another stimulus, which ordinarily had nothing to do with secretion of saliva, began to stimulate it.

Food was the 'natural stimulus' as it motivated the dog to respond. Its response was secretion of saliva. Ringing of the bell was an 'artificial stimulus', also called 'conditioned stimulus'. The response of the dog when the bell was rung is called a 'conditioned response'. Conditioning is thus the modification of the natural response. The abbreviations used are: NS for Natural Stimulus, CS for Conditioned Stimulus, NR for Natural Response and CR for Conditioned Response.

Situation	***Natural Stimulus***	***Conditioned Stimulus***	***Response***
Before	Food	→	Saliva
Conditioning	NS	→	→ NR
Under	Food	+ Ringing of Bell	→ Saliva
Conditioning	NS	+CS	→ CR
After	—	Ringing of Bell	→ Saliva
Conditioning	—	CS	→ CR

In this experiment, the dog learnt to secrete saliva at the sound of the bell. This kind of learning was named as Learning by Conditioning.

The experiment was conducted in a windowless soundproof room in order to minimize the effects of extraneous stimuli on the subject.

An apparatus was used to measure the number of drops of the saliva secreted as well as the total amount in cubic centimetres.

4.3.1 Principles of Conditioning

For explaining his theory, Pavlov gave some principles of conditioning.

1. **Principle of Reinforcement*:*** The term reinforcement refers to the following of the conditioned stimulus by the unconditioned stimulus, i.e., food following the bell. Pavlov stated that it was only reinforcement that led to the conditioning. Without reinforcing the bell with meat, no conditioning could be developed—this was reinforcement. This principle is applicable to children also. Children's learning becomes effective when they are rewarded immediately after a good performance Thus, their behaviour is conditioned with reinforcement.

   Quite often, the unconditioned stimulus reduces a drive or tension. Thus, the term reinforcement has also come to mean reduction in drives or tensions.

2. **Principle of Sequence and Time Intervals:** There is an optimal time between the presentation of the conditioned stimuli and the unconditioned

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stimuli. If there is any variation, i.e., increase or decrease in the optimal time, then there is no conditioning and a bond cannot be formed

3. **Principle of Stimulus Generalization:** According to this principle, if we are conditioned to one thing, i.e., the bell, then we would be conditioned, more or less, to all sorts of bells. In the earlier stages of learning by conditioning, the animal responded to a number of stimuli which accompanied the exact conditioned stimulus. The response was the greatest to the conditioned stimulus and went on decreasing to other stimuli which were less similar to the original one.
4. **Principle of Differentiation:** When two stimuli are sufficiently distinguishable, a living being can be conditioned to respond to one of them. This is done by regularly reinforcing one stimulus and non-reinforcing the other. The individual can be conditioned to react differently to the two stimuli, which at first make nearly the same response. This is how one learns to differentiate between different brands of tea or coffee. But in case, the organism is pressed too far, it causes experimental neurosis. In the laboratory, when the dog was made to discriminate between two very thin ellipses it started howling at the experiments. It is clear that response to a particular stimulus can be achieved only through selective reward.
5. **Principle of Extinction:** If the sound of the bell was not followed by food, it implied that there was no reinforcement. A stage was reached when the dog stopped secreting saliva. This process is called as extinction. Pavlov noted in his experiments that when the spacing of test trials was increased, the response extinguished rapidly.
6. **Principle of Spontaneous Recovery:** The principle of spontaneous recovery explains that there is no complete extinction on account of the time interval but there is inhibition of CR. When the dog was brought out of the experimental set-up and again put in the set-up after a lapse of time, the dog responded to Conditioned Stimulus (CS) by gastric secretion. This process is called spontaneous recovery.
7. **Principle of Inhibition:** Inhibition may be defined as a process in which a stimulus inhibits a response that would otherwise occur. Pavlov mentioned two types of inhibition.
   - ***External Inhibition:*** Even when the dog was conditioned, it did not react to Conditioned Response (CR) in the presence of some stranger. Often we come across cases when pupil-teachers fail to deliver a well-prepared lesson in the presence of their supervisors.
   - ***Internal Inhibition:*** Pavlov observed that complete extinction of CR was obtained by not providing food to the dog. But when it was given after a period of 24 hours, there was spontaneous recovery of CR when the dog is tested again. Thus, the extinction did not permanently weaken the CR. It was argued by Pavlov that spontaneous recovery proved that CR in extinction did not represent dying of the reflex or any real weakening

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of the learnt SR connections. It was blocked by some internal inhibitory process. For example, physical health of an organism or pre-occupation with some other activity, could block the response.

8. **Principle of Higher Order Conditioning:** When conditioning is done to a new stimulus on the basis of a previous conditioned stimulus, it is designated as higher order conditioning. By this process, conditioning can be done by associating one stimulus with another. The process of conditioning becomes difficult if the process is carried too far.
9. **Principle of Secondary Reinforcement:** Conditioned Response (CR) is established to some stimulus other than the primary one, e.g., food elicited salivation. By repeated presentation it was found that sight of food led to salivation or a part response. It is called secondary reinforcement. Secondary reinforcement plays an important role in later learning, especially in the case of children, when the reward may be no more than a kind word or some other gesture or some token reward.
10. **Principle of Age and Conditioning:** The process of conditioning is valuable at all ages but especially in early childhood.

Contribution of Pavlov's Theory of Conditioning to Learning and its Classroom Implications

Pavlov's work on the laws of conditioning is considered as a landmark contribution to educational psychology. No learning theorist can ignore the technical and theoretical discoveries of Pavlov. Pavlov's work influenced the thought process of behaviourist psychologists, especially those of Watson, Guthrie, Hull and Skinner. Pavlov explained learning in terms of physiological changes by adopting an objective method of study. Conditioning was accepted as theoretical framework and practical technique for solving a variety of applied problems. Most of the terminology used in learning was developed by Pavlov.

The principles of classical conditioning can be used in various areas of teaching-learning in the classroom also.

A child learns through conditioning. A child who fears a particular object or subject can be made to love it through conditioning, thereby dispelling fear and hatred for the same. A teacher with his defective methods of teaching or improper behaviour, may be disliked by a particular student or a group of students. He may develop the habit of rebuking children while returning the checked assignment or listening to their answers. Gradually, the students develop hatred for the subject as well as for the teacher. On the other hand, a friendly and sympathetic teacher will have a positive impact on the students through the process of conditioning. The students develop positive attitude both for the subject as well as the teacher.

The use of audio-visual aids in the teaching-learning process involves the conditioning theory. For instance, the teacher shows the picture of a cow, along with the written word 'cow'. The teacher speaks out the word 'cow' and asks the student to say 'cow', everytime the picture is presented. After some time, the picture of cow is not presented. Only the written word cow is shown. But the child responds to

it by saying cow. He associates the written word cow with the picture of the cow and the sound of the word.

Principles of classical conditioning are help in developing good habits in children—habits of cleanliness, punctuality, respect for others, etc. Bad habits, too, can be eliminated through conditioning. As most of the learning is acquired in social environment, principles of classical conditioning can be used to remove bad habits like fear and anxiety in children.

Classical conditioning can be used for developing favourable attitude towards subjects, teachers and above all, the school. The concept of reinforcement in classical conditions points out the need for immediate rewards.

Pavlov's theory of conditioning is criticized on two grounds. (*i*) All learning is not conditioning and on the other hand, it is an active process. (*ii*) Learning needs intelligence and understanding but conditioning ignores it by and large.

Check Your Progress

1. Who was Evan P.Pavlov? State one of his achievements.
2. On what grounds is Pavlov's theory of conditioning criticised?
3. What is the principle of spontaneous recovery?

4.4 THORNDIKE'S THEORY OF LEARNING: CONNECTIONISM OR THEORY OF TRIAL AND ERROR

E. L. Thorndike (1874–1949) was the chief exponent of the theory of connectionism or trial and error. The basis of learning, accepted by Thorndike, was an association between the sense impressions and impulses to action. This association came to be known as a 'bond' or a 'connection'. Since it is these bonds or connections which become strengthened or weakened in the making and breaking of habits, Thorndike's system is sometimes called a 'bond' psychology or simply 'connectionism.' As it believed in stimulus and response type of learning, it was also called SR Psychology of Learning. Thorndike called it learning by selecting and connecting. It is also known as trial and error theory as learning takes place through random repetitions.

Thorndike propounded his theory on the basis of experiments conducted on cats, chickens, dogs, fish, monkeys and rats. He placed them under different learning situations and studied them carefully. With the help of these experiments, he tried to evolve certain laws and evolved his theory of connectionism or trial and error. It is interesting to know the type of experiments he carried out with these animals. One such experiment is mentioned below.

He put a hungry cat in a puzzle box. There was only one exit door which could be opened by correctly manipulating a latch. A fish was placed outside the

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box. The smell of the fish worked as a strong 'motive' for the hungry cat to come out of the box. Consequently, the cat made every possible effort to come out. Thorndike observed, the cat tries to squeeze through every opening; it claws and bites at the bars or wires, it thrusts its paws through any opening and claws at everything it could reach." In this way, it made a number of random movements. In one of such movements, by 'chance', the latch was manipulated, the cat came out and got its 'reward'. For another trial, the process was repeated. The cat was kept hungry and placed in the same puzzle box. The fish and its smell again worked as 'motive' for getting out of the box. It again made random movements and frantic efforts. But this time, it took less time in coming out. On subsequent trials, incorrect responses—biting, clawing and dashing gradually diminished and the cat took less time on every succeeding trial. In due course, it was in a position to manipulate the latch as soon as it was put in the box. In this way, gradually, the cat learnt the art of opening the door.

An analysis of the trial and learning indicated the following characteristics:

- Where there is drive or motive, there is learning. In the experiment, the cat was hungry, so its motive was to get food by learning to come out of the cage.
- An organism makes a number of varied types of responses. The cat made these responses—clawing, scratching, walking around, pawing, pulling, etc.
- When some responses lead to the goal, they are known as satisfying responses. The response of pulling the strings, etc., by the cat was satisfying. Some do not lead to the goal and they are known as annoying responses. The responses of clawing, pawing, scratching, and walking were annoying for the cat.
- Satisfying responses are better learnt as they lead to the attainment of the goal.
- Annoying responses tend to be eliminated gradually as they do not lead to the goal.

The experiment summed up the following stages in the process of learning:

- **Drive**: In the present experiment, drive was hunger and was intensified with the sight of the food.
- **Goal**: The goal was to get the food by getting out of the box.
- **Block**: The cat was confined in the box with a closed door, which was the main blockage.
- **Random Movements:** The cat, persistently made random movements, by trying to get out of the box.
- **Chance Success:** As a result of this striving and random movement, the cat, by chance, succeeded in opening the door.
- **Selection of Proper Movement:** Gradually, the cat selected the proper way of manipulating the latch out of its random movements.

- **Fixation:** At last, the cat learnt the proper way of opening the door by eliminating all the incorrect responses and fixing the only right responses. Now it was able to open the door without any error or in other words, it learnt the way of opening the door.

Thorndike named the learning of his experimental cat as 'Trial and Error Learning'. He maintained that learning is nothing but the stamping in of the correct responses and stamping out of the incorrect responses through trial and error. In trying for the correct solution, the cat made so many vain attempts. It committed errors and errors before getting success. On subsequent trials, it tried to avoid the erroneous ways and repeat the correct way of manipulating the latch. Thorndike called it, 'Learning by selecting and connecting' as it provided an opportunity for the selection of the proper responses and corrected or associated them with adequate stimuli. In this context, Thorndike wrote, 'Learning is connecting. The mind is man's connection system.' Learning is, thus, caused by the formation of connection in the nervous system between stimuli and response.

The following summary description of the behaviour of 12 cats ranging from 3 to 19 months of age in the puzzle box is quoted from Thorndike's book entitled, *Animal Intelligence* (1901). 'When put into the box the cat would show evident signs of discomfort and an impulse to escape from confinement. It tries to squeeze through any opening; it claws and bites at the bars or wire; it thrusts its paws out through any opening and claws at everything it reaches; it continues its efforts when it strikes anything loose and shaky; it may claw at things within the box. It does not pay very much attention to the food outside, but seems simply to strive instinctively to escape from confinement. The vigour with which it struggles is extra-ordinary. For eight or 10 minutes it will claw and bite and squeeze incessantly. The cat that is clawing all over the box in her impulsive struggle to open the door, will probably chance upon the string or loop or button. And gradually all the other non-successful impulses will be stamped out by the resulting pleasure, until, after many trials, the cat will, when put in the box, immediately claw the button or loop in a definite way.'

4.4.1 Laws Propounded by Thorndike

On the basis of his experiments, Thorndike propounded the following laws of learning:

1. Law of Readiness

The law stated, 'When any conduction unit is ready to conduct, for it to do so is satisfying. When any conduction unit is not in readiness to conduct, for it to conduct is annoying. When any conduction unit is in readiness to conduct, for it not to do so is annoying.'

The law is indicative of learner's state to participate in the learning process. According to Thorndike, readiness is preparation for action. Readiness does not come automatically with maturation. It is a law of preparatory adjustment, not a law about growth. Thorndike termed the neurons and synapses involved in establishment of a specific bond or connection, a conduction unit. According to this law, for a conduction unit ready to conduct, to do, is satisfying and for it not to do so is annoying.

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Educational Implications: Teachers should prepare the minds of students to be ready to accept knowledge, skills and aptitudes. For this, he should provide opportunities of experiences in which students can spontaneously participate. In other words, he should arouse their capacity to link the experiences with their everyday life. 'Simple to complex' is an important maxim. Aptitude tests may be given to students to find out their readiness to learn.

2. Law of Effect

The law stated, 'Of several responses made to the same situation, those which are accompanied or closely followed by satisfaction to the animal will, other things being equal, be more firmly connected with the situation, so that, when it recurs, they will be more likely to recur; those which are accompanied or closely followed by discomfort to the animal, will, other things being equal, have 'their' connections with that situation weakened, so that, when it recurs, they will be less likely to occur. The greater the satisfaction or discomfort, the greater is the strengthening or weakening of the bond.'

Thorndike explained the meaning of *satisfaction* and *discomfort* as: 'By a satisfying state of affairs is meant one which the animal does nothing to avoid, often doing such things as attain and preserve it. By a discomforting or annoying state of affairs is meant one which the animal commonly avoids and abandons.'

Educational Implications: A pleasing environment should be created in the classroom. The teacher should be sympathetic but firm and should enjoy his work. Experiences provided to the students should be satisfying and meaningful. They should be organized in the order of increasing difficulty. Material should be provided in a number of interesting ways including the use of audio-visual aids.

In simple words, the law of effect means that learning takes place properly when it results in satisfaction and the learner derives pleasure out of it. In the situation when the child meets a failure or is dissatisfied, the progress in learning is blocked. All the pleasant experiences have a lasting influence and are remembered for a long time, while the unpleasant ones are soon forgotten. Therefore, the satisfaction or dissatisfaction, pleasure or displeasure obtained as a result of some learning ensures the degree of effectiveness of that learning.

3. Law of Exercise or Repetition

It stated, 'Any response to a situation will, other things being equal, be more strongly connected with the situation in proportion to the number of times it has been connected with that situation and to the average vigour and duration of the connection.'

According to this law, the more a stimulus-induced response is repeated, the longer it will be retained. The law states, other things being equal, exercise strengthens the bond between situation and response. Conversely, a bond is weakened through failure to exercise it. Thus, the law has two subparts, (i) law of use (ii) law of disuse.

- *Law of Use:* 'When a modifiable connection is made between a situation and response, that connection's strength is, other things being equal, increased.'

- *Law of Disuse:* 'When a modifiable connection is not made between a situation and response, during a length of time that connection's strength is decreased.'

Educational Implications: More and more opportunities should be provided to the students to use and repeat the experiences in the classroom. Drill strengthens the bonds of SR. Review of the lesson helps to maintain connections.

NOTES

Subordinate Laws

Apart from the three laws explained above, Thorndike gave the following subordinate laws:

- **Multiple Response:** Confronted with a new situation, the learner responds in a variety of ways before arriving at the correct response.
- **Attitude:** The learner performs the task well if he has his attitude set in the task.
- **Prepotency of Elements:** The learner reacts to the learning situation in a selective manner. He uses his insight, selects the prepotent elements in a situation and bases his responses upon those elements.
- **Analogy:** The organism responds to a new situation on the basis of the responses made by him in a similar situation in the past. He makes responses by comparison or analogy.
- **Associative Shifting**: According to it, we can get from the learner any response of which he is capable, and response associated with any situation to which he is sensitive.
- **Principle of Polarity:** It states that connections act more easily in the direction in which they were first formed than in opposite directions.

Thorndike's Five Aids to Improve Learning

The five aids given by Thorndike to improve learning are:

- Interest in the work
- Interest in improvement
- Significance of the work
- Problem-attitude
- Attentiveness

Change in Thorndike's Stand

As a result of his further research, Thorndike modified his laws in the early 1930s. His growing interest in educational psychology eventually led him to carry out research in the field of human learning.

The law of exercise was disproved by Thorndike in an experiment in which exercise was made the independent variable while other factors were held constant. He experimented on a college student who was asked to draw a three-inch line blindfolded. Mere repetition did not bring any change or improvement. Some subjects

were given more than a thousand trials. However, on an average, there was no improvement from the first to the final trial. Practice without knowledge of results failed to produce any result.

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As regards the law of exercise, Thorndike began to realize that rewards and punishment were not equal and opposite in effect. While reward strengthened the connection considerably, punishment did not weaken the connection to the same degree. The intensity and speed of reward in casting influence upon learning was greater than that of punishment. It also brought healthy and desirable improvement in the personality of the child. In this way, he began to give more importance to rewards and praise in place of punishment and blame.

Educational Implications of Thorndike's Theory of Learning and Laws

Thorndike's theory of trial and error and laws of learning have great educational significance. Thorndike's findings made the learning purposeful and goal-directed. There is no doubt that many discoveries and inventions in various fields of knowledge are the results of trial and error. But at the same time it must be remembered that in the case of human beings, trial and error is not always devoid of thinking and understanding. Thus, trial and error, coupled with insight can make the process of learning more effective. Some of the important educational implications of Thorndike's theory are:

- Readiness is preparation for action and is very essential for learning. If a child is ready to learn, he learns more quickly, effectively and with greater satisfaction than if he is not ready to learn. Thorndike was of the view that a child should not be made to learn till he is ready to learn and any opportunity of providing learning experiences to the child should not be missed if the child is, already prepared to learn. The right movements concerning the learning situation and the learner's state of mind should be very well recognized and maximum use of this knowledge should be made by the teacher. He should also make an attempt to motivate his students by arousing their attention, interest and curiosity.
- Thorndike's law of effect emphasized the role of rewards and punishment in the process of learning. Getting a reward as a result of some learning, motivates and encourages a child to proceed on the same path with more intensity and enthusiasm, while punishment of any sort discourages him and creates disinterest towards that learning.
- The main task of a teacher in the teaching-learning process is to see what generalizations, principles and theories, etc., should be remembered by the students. Consequently he must try to strengthen the bonds or connections between the stimuli and the responses of those things which are to be remembered. This could be done through drill, repetition and reward. .
- Other implications of Thorndike's theory and laws are:
    - Mere repetition is of no use. Repetition becomes useful only when the response is rewarded. In that case, repetition strengthens the connections.

- Understanding grows out of previous experience. The best way to develop understanding is to develop a body of connections appropriate to that understanding
- Transfer in learning takes place because of identical elements in the two situations.
- Rewards have more strengthening effect than the corresponding weakening effect of punishment.
- Forgetting takes place because of the law of disuse.
- The child should be encouraged to do his work independently.

Evaluation of Thorndike's Theory of Learning and Laws

In the words of J. P. Chaplin and T.S. Krawie (I960), 'Thorndike's pioneer efforts rank among the greatest in the history of psychology.... whatever the ultimate status of Thorndike's basic laws and principles, there is general agreement among psychologists that his theory of learning heralded the rise of modem learning to the position of pre-eminence in modem psychology.'

R. A. Roback (1962) was of the view, 'Thorndike is known in psychology for his *theory of effect*, according to which the satisfaction gained by an act tends to stamp it in, so that it will re-occur.'

W. F. Hill (1972) pointed out the significance of the work of Thorndike as 'Thorndike was no less a pioneer of objective psychology than Watson, indeed his original contributions were quite likely more important than Watson's. However, our concern here is that he incorporated within his objective psychology of learning, the law of effect and thus became the first real reinforcement theorist.'

CHECK YOUR PROGRESS

4. What are the two sub parts of Law of Exercise or Repetition?
5. What are the five aids given by Thorndike to improve learning?

4.5 HULL'S NEED REDUCTION THEORY OF LEARNING

Clark L. Hull (1884–1952), professor of psychology at Yale University, related learning to the needs of an individual or a living being. He held that association between SR is not enough for learning. According to him, some kind of reward or other reinforcement was necessary to establish the stimulus as signal. Hull emphasized the importance of satisfaction of the needs of children. These needs, according to him, could be reduced or satisfied through some reinforcement. Hull's theory, therefore, is known as *need reduction* or reinforcement theory of learning. It stressed that needs create behaviour and the particular behaviour that reduces need is learnt

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by the living being. According to Hull, men and animals are always confronted with such situations in which there is a need: (*i*) to reinforce SR bonds which have already been formed, (*ii*) to form entirely new SR bonds. A Conditioned Response occurs when a child feels a need. For instance, when he is hungry or thirsty, there is a response and the need or drive is minimized or satisfied. In a simple way ,it can be stated in these words, "Whenever a response (R) follows quickly upon a stimulus (S) and this conjunction of S and R is closely associated in time with the diminution of a need, there will be increased tendency of that SR to recur on later occasions."

Hull conducted experiments to frame his theory of learning. In a puzzle box, he placed a rat in one apartment. In the box there was another apartment which was divided by a wall. The way to this apartment was through a hole at the top of the dividing wall. An electric current was switched on in the compartment where the rat was. The current was also directed into the dividing wall. To the stimulus of the electric current, the rat responded in a number of ways. It started cutting bars of the box and began to jump in a haphazard manner. In the end, it jumped into the other apartment through the hole. This was repeated till the rat learnt to jump immediately to the other apartment through the hole. This showed that learning took place on account of the law of effect.

In the next experiment, two seconds before the electric current was switched on, a bell was rung. The rat quickly learnt to jump on hearing the bell. It started jumping even before switching of the electric current and only on hearing the bell. This type of learning occurs due to conditioning. It, therefore, followed that according to Hull's theory, law of effect and law of conditioning were combined.

Important Definitions Concerning Hull's Theory

Need: Need implies a state of the organism in which a deviation of the organism which is necessary for survival from the optimum of biological conditions, takes place. When a need arises, the organism acts with a view to reduce the need. Hence, sometimes Hull's theory of learning is called need reduction theory.

Drive: Drive is a general condition or a common denominator for all primary motivation on account of food, water, sex or any other reason. It is a state of tension resulting from needs.

Reinforcement: According to Hull, reinforcement is as 'whenever a reaction (R) takes place in temporal contiguity with an afferent receptor impulse (S) resulting from the impact upon, a receptor or stimulus (S) and this conjunction is followed closely by the diminution in a need, in the tendency of that stimulus on subsequent occasion to evoke that reaction.'

Postulates: Hull stated his theory in the form of sixteen postulates or general rules. Some of the postulates are given here:

- Postulate of hereditary responses. Hereditary matters in learning. These are unlearned stimulus responses.
- Postulate of primary and secondary enforcement.
- Postulate of habit formation.

- Postulate of reaction potential: It is the strength of the tendency to respond.
- Postulate of stimulus intensity: The greater the intensity of the stimulus, the greater is the reaction potential for a level of habit strength.
- Postulate of intensive motivation: The greater the magnitude of the incentive used in reinforcement, the greater is the reaction potential.
- Postulate of stimulus generalization: This postulate means that there are two or more like stimuli, which can evoke exactly the same response from the organism as was evoked by the original stimulus.

Educational Implications of Hull's Theory of Learning

Hull's theory pointed out that the curriculum to be followed should be based on the needs of students and that individual differences of students should be taken care of.

According to it, a reasonable anxiety should be created in students as students with mild anxiety are easier to teach. The drive in them creates restlessness and in order to release tension, a series of actions would be needed. Too much or too little of anxiety is very harmful for learning. In the course of action, the students encounter several stimuli. They make a continuous series of responses. When these stimuli occur with a response, there is a chance for an association and the association takes place only if it is followed by reward or punishment. Rewards and punishment both reduce tension of the students.

Hull's theory made drive a major factor in learning. Therefore, all learning should be as stimulating as possible. Students must be motivated as much as possible.

Hull's theory pointed out the importance of adequate drill and practice in learning.

It also emphasized the gradual development of 'artificial incentives'. In all learning situations, especially in the case of younger children, artificial incentives work wonders.

CHECK YOUR PROGRESS

6. State the theory of reinforcement as stated by Hull.
7. State any four postulates of Hull's Theory.

4.6 SKINNER'S THEORY OF OPERANT CONDITIONING

Prof. B. F. Skinner started his research work on behaviour while he was a graduate in the Department of Psychology at Harvard University. In 1931, he wrote his thesis entitled, *The Concept of the Reflex in the Description of the Behaviour.* Thereafter, in the middle of forties, Skinner conducted a good deal of research at the Minnesota

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and Indiana Universities, on the theory of operant conditioning. Skinner was a practical psychologist who conducted several experiments on rats and pigeons. He popularized 'teaching machines' in learning in 1954. His important publications are: *The Behaviour of Organism* (1938); *Science and Human Behaviour* (1953); *Verbal Behaviour* (1957); *Cumulative Record* (1959); *Beyond Freedom and Dignity* (1971) and *About Behaviourism* (1974).

Meaning of Operant Conditioning

Skinner called his theory as operant conditioning, as it is based on certain '*operations or actions'* which an organism has to carry out. The term 'operant' stresses that behaviour is carried out in the environment to generate its own consequences. An operant is a set of acts which conditions an organism in doing something. In the process of operant conditioning, operant responses are modified or changed by reinforcement. Reinforcement is a special kind or aspect of conditioning within which the tendency for a stimulus to evoke a response on subsequent occasions is increased by reduction of a need.

Most SR theorists have assumed the existence of a stimulus as a prerequisite for evoking a response. In the absence of any external stimulus, they have assumed some internal stimuli for evoking the response. Skinner was against this 'No stimulus—no response' theory and believed that most of the responses could not be attributed to the known stimuli. He defined two kinds of responses—the one elicited by the known stimuli, which he called as respondent or reflexive behaviour, and the other emitted by the unknown stimuli, which he called as operant behaviour.

Respondent behaviour is learnt according to Pavlovian model of conditioning. Since it is concerned with the stimuli, it is known as S-type conditioning. Skinner attached greater importance to operant behaviour which is primarily concerned with response rather than stimuli, it is known as R-type conditioning. Out of many responses which an organism is capable of giving, the problem with the experimenter is to evoke only the appropriate responses and fix them properly. Thus Skinner changed the usual SR formula into an RS formula.

Operations Involved in Operant Conditioning

Several operations are involved in the process of operant conditioning. Some of the important operations briefly described are as follows:

- Shaping (generalization, chaining and habit competition)
- Extinction
- Spontaneous recovery
- Concept of reinforcement

1. Shaping

Shaping is the most important mechanism used in operant conditioning. It refers to the judicious use of selective reinforcement to bring certain desirable changes in the behaviour of the organism. The basic process in shaping is successive approximation to the desired behaviour. The experimenter shapes or moulds the behaviour of the organism just as clay is moulded by a potter in a definite form of a pot.

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Principles involved in shaping: There are three important psychological principles which are involved in the process of successful shaping of behaviour. They are as follows:

- Generalization
- Habit competition
- Each segment in the chain must be linked to the other

2. Extinction

It is permitting a behaviour to die out by not reinforcing it. This is known as external approach to motivation.

3. Spontaneous Recovery

Extinction of a response may take place due to non-reinforcement or interference by incompatible responses but there can be a spontaneous recovery of the responses.

4. Reinforcement

A reinforcer is the stimulus whose presentation or removal increases the probability of a response. Skinner thought of two kinds of reinforcements—positive and negative. A positive reinforcement is any stimulus the presentation of which strengthens the probability of a response. A negative reinforcement is any stimulus the withdrawal of which weakens the probability of response. Any electric shock, a loud voice are negative reinforcements while food, water, etc., are positive reinforcements.

Skinner did not attribute motivation to internal processes within a living being. He stressed that the reinforcement of conditions was a common way for motivation. He pointed out that just as food was reinforcement to a parrot or pigeon, correct knowledge was to a learner in school. According to him, reward strengthens the behaviour which preceded it but punishment does not permanently reduce a tendency to respond. Extinction—permitting a behaviour to die out by not reinforcing it—and not punishment, according to him, was the appropriate process for breaking habits. This was, in Skinner's view, the external approach to motivation.

Schedules for Reinforcement

As a result of the external approach, Skinner worked out the following effective schedules of reinforcement:

- *Fixed Internal Reinforcement:* According to him, when reinforcement is given after a fixed interval of time, it should be called fixed internal reinforcement.
- *Fixed Ratio Reinforcement:* When reinforcement is given after a fixed number of responses, it is called fixed ratio reinforcement.
- *Variable-Interval Ratio Reinforcement:* When reinforcement is given on varying intervals of time or after a varying number of responses, it is called variable reinforcement.

Skinner was of the view that learning of a response takes place quickly if every correct response is reinforced, but is forgotten easily when the reinforcement

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is stopped. If reinforcement is given after varying number of correct responses or at varying interval of time, the response is remarkably resistant to extinction.

Two Types of Operant Reinforcements: There are two types of operant reinforcements—stimulus discrimination and response discrimination. Stimulus discrimination occurs when a given response is made to one member of a pair of stimuli and not to the other member of the pair. Differentiation of a response occurs when the response form is adjusted or attested approximately to the situation.

Typical Problems in Learning Explained by Skinner's Theory

- **Capacity:** Differences in capacity have been attributed to the empirical constants which are formed in Skinner's laws, because the value of these constants varies from species to species.
- **Practice:** Skinner accepted something like a law of exercise for 'Type-S' conditioning and for 'Type-R' conditioning he favours repeated reinforcement. He emphasized intermittent reinforcement as protection against extinction.
- **Motivation:** Reward increases the operant strength, while punishment has no corresponding weakening influence. Drive level also affects the role of responding.
- **Understanding:** Rapid learning, which has been identified with 'insight' by Keller and Schoenfeld, depends upon (a) similarity of the problem to one solved earlier, and (b) simplicity of the problem. Problem solving is the process of manipulating variables to correct response. It does not involve originality.
- **Transfer:** Generalization, which Skinner called induction, is the basis of transfer.
- **Forgetting:** There is no special theory proposed by Skinner for forgetting. Extinction of a response may take place due to non-reinforcement or interference by incompatible responses, but there can be spontaneous recovery of the response also, which means that extinction is not forgetting. True forgetting is a slow process of decay with time.

Skinner's Experiments

The early experimental work by Skinner was carried out with rats with pressing levers for food packets in a box, constructed by him. Figure 18.1 depicts the initial form of the box constructed by Skinner to experiment with rats, and Figure 18.4 shows the modified box as adapted for pigeons. The experimental base of the analysis was gradually extended to other animals, to humans and to situations and behaviours differing increasingly from the original base, i.e., to teaching machines Entire Programmed Learning is based on Skinner's learning theory.

Skinner constructed a box and equipped it with a lever and a food tray. The lever could be pressed. Skinner placed a hungry rat in the box and the rat would wander over the bar from time to time and push the bar down. The moment it happened, a food pellet would fall into the tray. The rat learnt this task of pressing the lever more frequently in order to get the food pellet and this *reinforced the*

behaviour. Skinner modified the procedure; food pellets would be supplied under certain conditions—when the lever was pushed down and a tone was sounded but not under other conditions. The rat pushed the lever when tone was sounded.

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- Skinner used pigeons also as subjects where the operant investigation was pecking at a spot that acted as a key to trigger the reinforcement. He also conducted experiments on human beings where the operant was problem-solving. For pigeons, food was the reinforcement just as it was for the rat in the box. For human subjects, it could be getting the right answer or a verbal expression of approval.
- The first few reinforcements were relatively ineffective but later, the rate of response was extremely rapid.

Educational Implications of Skinner's Learning Theory

- Learning objectives should be defined very specifically in terms of behaviour.
- Objectives should be arranged in order from simple to complex
- For developing motivation in students for classroom work or activity, reinforcements like praise, blame, grades, etc., should be used.
- Proper use of positive and negative gestures also serves as reinforcements. .
- Reinforcement should be used periodically so that the possibility of extinction of the desired behaviour is resisted.
- In the classroom, the principle of immediate reinforcement is very important. Praise for a job done well given immediately can be a stronger motivator than a grade given much later.
- Skinner's principles of learning focus attention on the individual's pace of learning. Various teaching mechanisms and learning programme systems have been devised on the basis of the theory of learning, founded by Skinner.

Limitations of Operant Conditioning

- It is doubtful if live results derived from controlled experimental studies on animals, would yield the same results on human beings in social learning situations.
- It is argued that Skinner had ignored the structural and hereditary factors which are very important in the development of psychological process of language.
- The operant reinforcement system did not adequately take into account the elements of creativity, curiosity and spontaneity in human beings.
- Skinner argued that all human behaviour is acquired during the lifetime of an individual. Thus, the importance of genetic inheritance was not given due consideration.
- Skinner s theory of learning dehumanized the learning process on account of its emphasis on the mechanization of the mental process.

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- Operant theory of learning did not deal with the depth of mind and, thus, is artificial in nature.

Table 4.1 *Comparison Between Classical and Operant Conditioning*

Classical Conditioning	*Operant Conditioning*
1. It was formulated by a Russian psychologist, Pavlov.	1. It was formulated by an American psychologist, Skinner.
2. Pavlov conducted experiments on dogs.	2. Conducted experiments on rats and pigeons.
3. It is called Pavlovian or type-1 learning (respondent).	3. It is called Skinnerian or type-2 learning (operant)
4. The occurrence of conditioned response is forced reflectively by unconditioned stimulus	4. Response is more spontaneous and voluntary in operant conditioning.
5. The unconditioned stimulus occurs irrespective of the subject's behaviour.	5. The reward is contingent upon the occurrence of response.
6. Classical conditioning is preparatory or anticipatory response. It is also called signal learning.	6. Operant conditioning serves mainly to stress or guide the learner who already has certain responses available.
7. The law of contiguity is the basis of association between Stimulus Response (SR).	7. The law of effect is the basis of association between Stimulus Response (SR).
8. Automatic nervous system in the organism is the controlling authority	8. Central nervous system in the organism is the controlling authority.
9. There is pairing of unconditioned stimulus and conditioned stimulus.	9. Pairing is of a response and the reinforcing stimulus which follows. No pairing of unconditioned stimulus and conditioned stimulus.
10. Bondage between specific unconditioned stimulus and Conditioned Stimulus is established.	10. Tendency to respond in a specific manner is developed.
11. Reinforcement takes the first place as food is presented first to elicit the response.	11. Reinforcement comes after the response is made by the organism.
12. Conditioned stimulus and unconditioned stimulus can be placed in different temporal sequences. Close contiguity is followed.	12. Close contiguity is followed and response stimulus chain is formed.
13. In classical conditioning, focus is on the single stimulus response bondage.	13. Operant conditioning is concerned with the sequences of responses. A chain of responses is formed leading to the desired goal.
14. Regardless of the occurrence of conditioned response, we present the unconditioned stimulus.	14. Stimulus is presented only if the organism makes the desired response.
15. Classical conditioning presents different pictures of behaviour and learning in which an arbitrary stimulus is associated with a specific elicit able response.	15. The operant conditioning deals with the differentiation and discrimination of a sequence out of a mass behaviour emitted in response to a complex stimulus field.
	16. Operant conditioning lays stress on motivation and reward.
16. Classical conditioning lays stress on time control.	
17. Stimulus substitution is the essence in learning.	17. Response-modification is the essence in learning.
18. Initially, the classically conditioned reflexes may have zero strength.	18. The operant conditioning cannot have zero strength as it has to occur once at least before it can be reinforced.
19. Respondent behaviour is internal.	19. Operational behaviour is external. The organism operates on the environment.

CHECK YOUR PROGRESS

8. State any three limitations of operant conditioning.
9. What are the important operations involved in operant conditioning?

4.7 GESTALT (OR KOHLER'S) THEORY OF LEARNING BY INSIGHT

NOTES

Gestalt theory of learning, also named as *Learning by Insight,* is the contribution of German psychologists who were studying the nature of perception. Max Wertheimer (1880–1943) was the founder of Gestalt psychology. He did a lot of research work at the University of Frankfurt and the University of Berlin. Thereafter, he worked at the New School of Social Research in New York. Wolfgang Kohler and Kurt Koffka were the other German psychologists associated with Wertheimer. Gestalt theory of learning (Learning by Wholes) or Learning by Insight stated that perceptual phenomena are only experienced as *wholes* or gestalts.

Learning, according to Gestalt Theory, is not by random steps, neither by trial and error, nor by conditioning but by insight, introspection and understanding.

Gestaltians placed far more emphasis on the intrinsic organizing capacity in the brain of an individual and emphasized the dynamic interaction of the elements in the entire perceptual field. Gestalt theory of learning essentially consisted of problem-solving by understanding the relative position of the elements in the entire perspective or situation.

'*Gestalt'* is a German word for which there is no equivalent word in English. The term was carried over into English psychological literature. The nearest English translation of *gestalt* is 'configuration' or more simply 'an organized whole in contrast to a collection of parts'. Gestalt psychologists considered the process of learning as an organized whole. The basic idea behind this theory was that a thing cannot be understood just by the study of its constituent parts only, but by the study of it as a totality. Gestalt school made a strong attack on Thorndike's Theory of 'trial and error' and asserted that learning was not stamping of correct responses through trial and errors. Neither was behaviourists approach acceptable to gestaltists as they wanted to study behaviour as a whole and learning in its totality.

Gestalt psychology was a revolt against SR approach to learning. It pointed out two weaknesses in the theory of conditioning:

- Conditioning reduced complex human behaviour to an accumulation of simple conditioned responses.
- SR-theorists attributed learning to reduction of basic organic drives.

Gestalt psychology was primarily concerned with the nature of perception. According to it, an individual perceived wholes and not parts. Learning was viewed as purposive, explorative, imaginative and creative enterprise in which the total situation was taken into account by the learner. Kohler and Koffka conducted many experiments on Chimpanzees and brought out a book, '*Mentality of Apes'* in 1925 (result of the experiments conducted during 1913–17.) These experiments showed that learning was not the result of trial and error but of insight and the ability to see relationships between various factors involved in a situation.

A very detailed and systematic treatment of learning from Gestalt viewpoint was found in Koffka's *Principles of Gestalt Psychology* (1935).

As mentioned earlier, Kohler and Koffka were the chief exponents of this theory. They stressed the totality of the process of learning. They took the process of learning as a synthetic activity which brought forth complete solutions of problems.

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Experiment I

In one of his experiments, Kohler shut the chimpanzee, Sultan by name, in a big cage. A banana was placed outside, at a considerable distance from the cage. Inside the cage, there were two sticks—one of them a long one and the other a bit shorter. The shorter stick could be screwed into the long one. The long stick could not reach the banana but if the other one was screwed into it, the banana could be touched. Sultan tried to get the banana. He first tried with the longer stick but it did not reach the fruit. The other was still smaller. He sat down and began to play with both the sticks. But he was still brooding over the matter. Suddenly, an idea flashed him. He thrust the smaller stick into the hole of the longer one and thus managed to get the banana with the help of the combined sticks.

Experiment 2

In this experiment, the chimpanzee was shut in a room with unscalable walls. A banana was hanging from the ceiling. The animal was hungry. He jumped at the fruit but it was too high. He left his efforts and sat down. There was a box lying in the corner of the room. The animal began to play with the box. He then suddenly got up and pushed the box to the centre of the room below where the banana was hanging, jumped from it and got the fruit.

Principles of Learning

Koffka suggested that the laws of perception were equally applicable to learning. According to him, learning situation was a problem situation and the learner had to see the problem as a whole and find its solution by insight. The law of organization of perception as applicable to learning was the law of *pragnanz* and four laws of organization subordinate to it—the laws of similarity, proximity, closure and good continuation.

The Law of Pragnanz: The German word *pragnanz* means 'compact but significant'. The law suggested the direction of events. According to it, psychological organization tended to move in one general direction, always towards the state of *pragnanz,* towards good *gestalt*. A good gestalt had the properties of regularity, simplicity, stability, etc.

So, this law spoke of the movement of our psychological organization towards the direction of stability, i.e., we accept only those experiences which do not disturb our psychological organization (equilibrium). How good the *pragnanz* is, is examined by the following subordinate laws:

(i) Law of Similarity: This law said, 'other things being equal, the stimuli that are more similar to one another will have greater tendency to be grouped.' Thus, learning similar things is easier than learning dissimilar things, according to this law.

(ii) Law of Proximity: According to this law, 'Perceptual groups are favoured according to the nearness of the parts.' This means that we perceive all closely situated or located things as groups.

(iii) Law of Closure: This law stated that 'Closed areas are more stable than unclosed ones and therefore, more readily form figures in perception.' It is similar to the Thorndike's law of effect. Unless the work is finished, the individual does not feel satisfied as he is under tension which is over only when the work is completed.

(iv) Law of Good Continuation: This law stated, 'Organization in perception which appears to go in a particular direction appears to be going infinitely in the same direction.' So there is a tendency of factors to give direction, movement and continuation to perceptual organization. Koffka believed in the trace theory of memory. The function of learning, according to him, was to strengthen those traces and create new ones. The essential features of the trace theory are:

- Trace is the result of past experience, so that it represents past in the present.
- The present process can select, reactivate or communicate with the trace.
- There is a resulting new process of recall or recognition.

Factors Influencing Insight

Insight involves the following:

- The learner perceives the situation as a whole.
- The learner tries to understand the relationships between various factors involved in a situation.
- As a result of the understanding of the relationship, the learner is helped in the sudden grasping of the solution of the problem.

On the whole, insight depends on the following factors:

- *Experience:* Past experiences assist in the insight of the problems.
- *Intelligence:* Basic intelligence of the learner is an important factor in insight learning.
- *Learning Situation:* As a common observation, insight occurs when there is ample scope for observation in a learning situation.
- *Initial Efforts:* The initial efforts in the form of trial and error open the way of insight learning.
- *Reception and Generalization:* Learning gained in one situation, helps the learner to react insightfully in other identical situations.

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Educational Implications of the Theory of Insight

The Gestalt theory highlighted the following points:

- **From Whole to Parts:** According to the theory, the whole is greater than the parts. Therefore, the teachers should present the picture of a topic or subtopic as a whole. It is especially more important in the case of small children. While teaching the topic '*parts of a flower'*, the flower should be presented first, and the parts should be taken up later. Similarly, the poem may be taken up as a whole.
- **Problem-Solving Approach:** The theory rejected memorization and rote learning. It stressed that the learners must be given opportunities to use their thinking power and power of observation. Students should be provided training and encouraged to become pioneers. Questions of 'What and When' should be replaced by *'Why* and *How'* and be the key-note of the teaching-learning process. Spoon-feeding, according to the theory, does not result in constructive and creative thinking. Progressive and scientific methods like Heuristic, analytical and problem-solving should be made use of.
- **Integrated Approach:** The contents of a subject should not be treated as mere collection of isolated facts. They could be closely integrated into the whole. . In the same way, all subjects and activities of the curriculum should reflect unity and cohesion.
- **Motivational Aspect:** A child's curiosity and interest must be aroused. He should be fully familiarized with the specific aim and purpose of every task that is being undertaken.

Limitations of the Theory

It was argued that every type of learning is not the product of insight. Quite a number of our day-to-day experiences are the results of chance contiguous associations and not of insight.

In insight learning, one cannot altogether eliminate *learning by trial.* Some measures of learning by trial and error come into play in insight learning also.

All children are not capable of independent thinking. Hence, slow learners need to be taught with other methods as well. Moreover, mechanical application of rules is also needed in several cases.

Check Your Progress

10. State some of the essential features of trace theory.
11. State two weaknesses of the theory of conditioning.

4.8 LEWIN'S FIELD THEORY OF LEARNING

NOTES

Kurt Lewin (1890–1947), unlike Pavlov, Skinner and Gestaltian psychologists, conducted experiments on the study of behaviour of children. He utilized an elaborate experimental set-up with a view to control a child's total environment during the course of the investigation for getting detailed information. Lewin emphasized the study of behaviour as a function of the total physical and social situation. Lewin held that psychological laws should not be formulated solely on the basis of statistical averages. Rather, the individual case was equally important, according to him. Even if all general psychological laws were known, there was still a need to understand the specific individual and 'total situation' in which he existed, before making any prediction about his behaviour. Thus Lewin favoured an '*idiographic* psychology' in which the focus was on the *individual*, as opposed to '*nomothetic* psychology', where the emphasis was on s*tatistical average*. Lewin described his viewpoint in the following formula:

$$B = f(PE)$$

where B represents behaviour, f is a function, P is the person, and E is the total environmental situation.

Lewin explained an individual's behaviour on the basis of his life-space. An individual's life-space, according to him, depends on his psychological force. It includes the person; his drives, tensions, thoughts and his environment, which consists of perceived objects and events. Lewin represented his theory through a diagram in which an individual is in the centre. He moves through his life-space which consists of the totality of facts that determine his behaviour at a given time. A life-space contains the individual himself, the goals he is seeking (positive valence) or avoiding (negative valence), the barriers that restrict the individual's movements and the path he must follow to reach his goal. Desire creates tensions in the individual and tensions come to a balancing state and the person acts. After the goal has been achieved, the organism (individual) returns to a state of repose until a new desire activates him.

In Lewin's theory, threat, goal and barrier are the main factors. An individual who has to achieve some goal has to cross a barrier. The barrier may be psychological or physical. Because of the changes in the barrier in the life-space of an individual, continuous reconstruction takes place.

Lewin's theory is called field theory, because to a psychologist, *field* means total psychological world in which a person lives at a certain time. It includes matters and events of past, present and future, concrete and abstract, actual and imaginary—all interpreted as simultaneous aspects of a situation. Lewin stated that each person exists within a field of forces, called his *life-space,* to which the individual is responding or reacting.

Lewin's theory regarded learning as a relativistic process by which a learner develops new insight or changes old ones. According to the theory, learning is not a mechanistic process of connecting stimuli and responses within a biological organism. Field psychology explains the development of insight as a change in cognitive structure of life-space. Lewin's theory may be explained as under.

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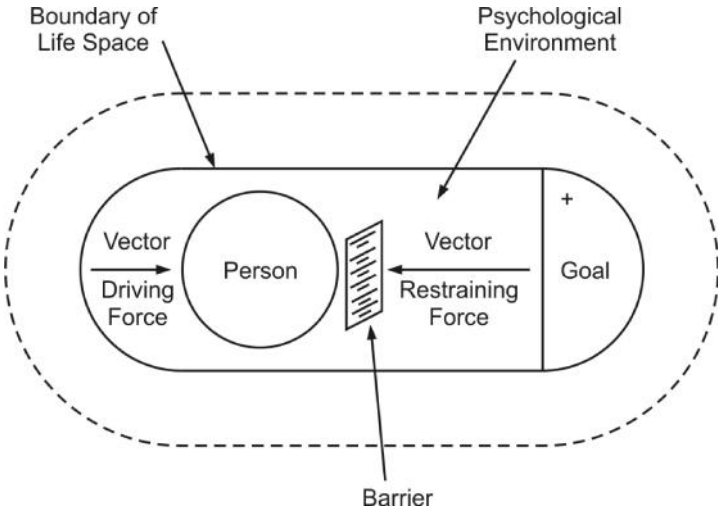

Fig. 4.1 *Lewin's Theory of Learning*

Suppose a person P is moving towards a goal of getting social recognition. But to achieve the goal, he has to apologize, which in turn acts as the barrier coming in his way. The barrier may be physical or psychological forces, preventing him from reaching the goal, as explained in the Figure 4.1. These forces organize themselves into a pattern which determines his future behaviour.

Lewin classified learning into the following categories:

- Learning is a change in cognitive structure.
- Learning is a change in motivation, i.e., in valences and values.
- Learning is acquisition of skills.
- Learning is a change in group belonging.
- Learning of all types involves change in perception.
- Changes in cognitive structure are caused by the forces in the psychological field—needs, aspirations and valences. The level of aspiration depends upon the potentialities of an individual and on the influences of the group to which he belongs. Too higher or lower level of aspiration discourages learning.

Main Concepts of Lewin's Field Theory

Lewin's theory rests on concepts derived from *topology*—a branch of higher mathematics that deals with transformation in space; from *vector analysis*—or the mathematics of directed lines; and from the sciences of chemistry and physics with concepts as v*alence, equilibrium and field force*. Lewin's most important publication was *Principles of Topological Psychology* (1936).

The main concepts used in Lewin's field theory are as follows:

- **Topology:** It is also called topological. Two basic concepts which topological space denotes are: (i) connectedness, and (ii) part-whole relationships. Topological concepts are used to represent the structure of life-space in such a way as to define the range of possible perceptions

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and actions. This is accomplished by showing the arrangements of the functional parts of life-space. The parts are shown as various regions and their boundaries. When an individual structures his life-space, he divides it into regions.

- **Vector:** The term vector represents a force which influences a movement towards a goal or away from it. If there is only one vector (force), there is a movement in the direction of the vector. However, if there are two or more vectors acting simultaneously in different directions, the movement is in the direction of the resultant force.
- **Life-Space:** It is also called the psychological field. The psychological field is the space in which the person moves psychologically. It contains the whole of one's psychological reality—one's self and what one thinks of or what one gains from his physical and social environment.
- **The Person in Life-Space:** The person is often represented as a point moving about in his life-space, affected by pulls and pushes on him, circumventing barriers in his locomotion in his own life-space.
- **Valence:** When a person is attracted by an object, that object is said to have a positive valence. When a person is repelled by an object, it is said to have a negative valence. The person tends to move towards a region in life-space that has positive valence but tends to move away from a region in life-space that has negative valence. As life-space may contain regions with several valences active at a time, which in turn gives rise to conflicts, especially when the opposing forces are approximately in balance. Lewin specified three chief kinds of conflicts:
  - o *Two Positive Valence:* When a child has to choose between going to picnic and playing with his friends.
  - o *A Simultaneous Positive and Negative Valence:* When a child is offered a reward for the school task which he does not wish to perform.
  - o *Two Negative Valence:* When a child is threatened with punishment for not doing a task which he does not wish to perform.
- **Distance and Direction:** When there is a close correspondence between life-space and physical space, physical distances and directions may be used for experimental purposes as approximations of distances and directions in life space.
- **Behaviour:** Lewin regarded behaviour as a function of present life space. He insisted that behaviour depends on the present and not on the past or future.
- **Barrier:** It is a dynamic part of an environment which resists action or movement through it and stands in the way of a person's reaching his goal.
- **Goal:** Goal is a region of valence-region of life-space to which a person is psychologically attracted.

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- **Tension:** It is very closely to and is descriptive of psychological needs. Release of tension may be achieved either through reaching a goal or through reconstructing a life-space.
- **Cognitive Structure:** It is an environment including a person as known by the person. It is synonymous with insight or understanding.

Classroom and Educational Implications of Field Theory

The classroom implications of the field theory include the significance of seeing the whole situation at the beginning of a lesson or an activity. The teacher should preview the activities involved and the problem to be encountered. Moreover, from the point of view of a field theorist, the teacher should keep in mind that the student, the teacher himself, other teachers, the school and the peer group—are all parts of the total situation.

The need for seeing the whole and details of the situation is necessary. The teacher must assist the students to perceive the goal and the barrier. The goal must be presented in an easier and simplified manner. Sometimes, partial insight of a situation may provide partial relief from tension.

Following are the major educational implications of this theory:

1. **Reward and Punishment:** According to Lewin, a learner because of attraction of rewards may resort to shortcut methods. For example, to get distinction in the examination (record), a student may resort to cheating (shortcut method). It is, therefore, necessary to put some barriers over rewards in order to avoid access to such shortcut methods. In the case of punishment, however, one tends to leave the field because of the unpleasantness of the task, unless some strong barriers are there to keep him in the field. Reward activities often become interesting and are liked, while the activities controlled by the threat of punishment tend to be disliked.
2. **Success and Failure:** Psychological analysis of success from the point of view of a learner shows the following possibilities:
   - To reach a goal, constitutes success.
   - To get within the region of the goal, may be a success in itself.
   - To make some progress in the direction of the goal, also constitutes a successful experience.
   - To select a socially approved goal is also an experience of success.

   Psychological success or failure depends upon the self-involvement of an individual and his level of aspiration. Success in an easy task might not be a successful experience, since it does not involve the ego of the person. Similarly, failure in a very difficult task might not be a failure.
3. **Motivation:** The repetition of an activity brings changes both in the cognitive structure and in the need-tension systems. As a result of this goal, attractiveness changes. Lewin called goal attractiveness valence

and valence change. The valence may change in any of the following ways:

- Attractive goals may lose attention if the activity related to them is repeated to the points of satiation.
- Choice of goals is influenced by previous experiences of success and failure.

4. **Memory:** Lewin stated the following regarding memory:
   - Tasks which have no sense in completion are not remembered.
   - Unfinished tasks are remembered better than finished tasks because of psychological tension.
   - Tasks which lead to the satisfaction of many needs are remembered better than tasks which lead to the satisfaction of one need.

CHECK YOUR PROGRESS

12. What are the chief conflicts as stated by Lewin?
13. State the categories under which Lewin classified learning.

4.9 TOLMAN'S SIGN THEORY OF LEARNING

Edward C. Tolman (1886–1959), like other behaviourists rejected the idea of introspection as a method of studying human behaviour. On the contrary, he believed the objective method of collecting data. He was of the view that one does not only respond to the stimulus but acts on beliefs and expresses attitudes. Thus, according to him, behaviour could be modified by experience and training.

Tolman's theory combined the advantages of stimulus-response theories and cognitive field theories.

Tolman's theory of learning is also known by several names such as 'sign significance theory', 'expectancy theory', 'purposive behaviourism' or 'sign theory'. The main features of this theory are as follows:

1. It accepts behaviourism as the basis of any learning process. Main characteristics of behaviour are:
   - Behaviour is goal-directed, i.e., it is purposive.
   - Behaviour makes use of environmental factors as means for getting to the goal.
   - Behaviour consists of the formation of cognitive maps
   - The individual has a selective preference for the 'principle of least effort', for arriving at the goal.
   - Human behaviour is docile.

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2. According to Tolman, the behaviour depends upon:
   (a) The need system
   (b) The belief value matrix
   (c) The behaviour space
3. This theory takes into consideration that learning is based upon some signs or clues leading to the goal. The individual learns not the movement patterns, but the sign-significant relations.

Tolman published his major work *Purposive Behaviour in Animals and Men* in 1932. He recorded the results of his experiments and revised his theory in 1949. According to the findings of his experiments, "the learner does not reach the goal in a fixed sequence of movements but changes his behaviour according to the variation in conditions."

Educational Implications

Tolman highlighted the following learning problems:

- *Capacity:* According to Tolman, the learning of a task depends upon the capacity of the learner.
- *Practice:* Tolman believed that practice or exercise cannot help the learner in the initial selection of the right response. Mere frequency without belongingness does not establish a connection.
- *Motivation:* Tolman was of the view that motivation does not help in learning something new. It simply encourages the performance as such.
- *Understanding:* Tolman believed in learning by creative inference, inventive ideation and so on. Insightful learning should be emphasized.
- *Transfer:* Transfer of training, according to him, depends upon applicability of the essential relationship perceived by the learner in one situation to some other situation.
- *Forgetting:* Repression and ratio-active inhibition results in forgetfulness. Tolman attributed forgetfulness to the resistance of cathexis (relationship between a drive and an object) also.

Laws of Learning

Tolman stated the following laws of learning:

- **Law of Capacity:** This relates to traits, characteristics and aptitudes of the learner which determine the type of tasks and situations which can be mastered successfully.
- **Law of Stimulus:** It deals with conditions inherent in the material itself such as belongingness of its parts and how successfully it leads to insightful solution.
- **Law of Manner:** It is concerned with the manner of presentation of material, such as frequency of presentation, distribution of practice and use of rewards.

Agne's Hierarchical Learning

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R.M. Gagne (1970) classified learning into eight categories:

(i) Signal learning, (ii) Stimulus-Response (S-R) learning, (iii) Chain learning, (iv) Verbal associate learning, (v) Discrimination, (vi) Learning of concepts, (vii) Learning of principles and (viii) Problem-solving.

1. **Signal learning:** It is usually termed as classical conditioning which was developed by a Russian physiologist, Pavlov. In classical conditioning, unconditioned stimulus (food) and conditioned stimulus (sound of the bell) were paired together and presented to a dog a number of times with the result that when conditioned stimulus, i.e., CS (the sound of the bell) was presented alone, it elicited saliva from the mouth of the dog. This modification of behaviour which caused salivation to the sound of the bell, was called conditioning. (More details on this are given while discussing the theory of classical conditioning).
2. **Stimulus-Response (S-R) learning:** Thorndike initiated the study of instrumental conditioning with puzzle box experiments on cats. B F Skinner conducted a series of experiments on animals and prepared ground for the application of those principles in human learning.
3. **Chain learning:** Chain learning consists of motor and verbal chaining. *Verbal chaining* is connecting together, in a sequence, two or more previously learnt stimulus responses (S's - R's), in which the first member or element of the sequence seems firmly tied with the second. Some examples are: a boy and a girl, daddy and mummy, horse and buggy, etc., among others. *Motor chaining* may be illustrated with the stimulus response connections in the process of unlocking a door: (a) Key in hand, (b) Facing the lock, (c) Checking the side of the key to be inserted, (d) Inserting the key into the lock until the end of the lock is reached, and finally, (e) Pushing the door to open it. However, it must be remembered that for establishing a chain, one must be capable of performing the individual links.
4. **Verbal associate learning:** Verbal associate learning can be explained by the following example: A child is shown an object, say a doll. The next time he sees this particular object, he will be able to say that it is a 'doll'. Thus, two chains are involved here:
   - Observing response (Ss-R) connection that connects the appearance of the object and distinguishes it from other objects.
   - Ss-R connection that stimulates the child himself to say 'doll'.

   S ì **R** **S** ì **R**

   Object Observing Doll Doll
5. **Discrimination:** When a behaviour shows a specificity of response to one given stimulus to the exclusion of others, we may say that discrimination has taken place. From the very beginning, an infant learns to discriminate

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between a feeding bottle and a simple bottle, between walking and talking, etc. Gradually, the child learns to discriminate more objects and ideas. Discrimination involves higher mental processes. In discrimination, the emphasis is not on the stimulus side but on the response side and in differentiation.

6. **Concept learning:** In concept learning, we deal with a set of objects as the stimuli. We form concepts by finding properties which a set of objects have/share in common. Thereafter, we learn generalizations within groups and gradually learn discrimination between them. First, we learn about a dog, then various breeds of dogs and then cats, etc.
7. **Learning of principles:** Learning of principles depends on learning of concept formation and other forms of learning. Principles denote regular relationship among two or more concepts.
8. **Problem-solving:** Problem-solving comes at the higher stage in the hierarchy of learning process. In fact, all the earlier steps lead to problem-solving.

CHECK YOUR PROGRESS

14. Tolman's Theory of learning is also known by several other names. State them.
15. State any four educational implications of learning.

4.10 FACTORS INFLUENCING LEARNING

There are essentially four interrelated factors which affect learning. These are as follows:

- Psyche of the student
- School atmosphere
- Home atmosphere
- Socio-economic factor

1. Psyche of the Student

The student is the subject who has to learn. It is the student's state of being which is most important to study. This state is affected by the student's will to learn, his or her ability or disability, if any, which assists or prevents learning, memory or power of retention, attention and capacity to recapitulate. These are traits of the child which affect learning. The barriers of language caused by numerous movements and migrations in today's volatile environment can have a significant adverse effect on learning if there are frequent changes in language or medium of instruction.

2. School Atmosphere

The school includes the following three important contributors to the learning process.

- Overall school environment
- Classroom environment
- The teacher

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A. Overall School Environment

Meaning of school ethos: School ethos implies moral nature or environment of the school, its guiding principles, its distinguishing character and its sentiment.

The concept of an ideal ethos for a school has been beautifully summed up by S. Balakrishna Joshi, an eminent headmaster of a well-managed school as, 'A school is not a mere brick and mortar structure housing a miscellany of pupils and teachers; a school is not a market place where a heterogeneous crowd gathers with diverse objects; a school is not a rigorous reformatory where juvenile suspects are kept under vigilant watch. A school is a spiritual organism with a distinctive personality of its own; a school is a vibrant community centre, radiating life and energy all round; a school is a wonderful edifice, resting on the foundation of goodwill—goodwill of the public, goodwill of the parents; goodwill of the pupils. In a word, a well conducted school is a happy home, a sacred shrine, a social centre, a state in miniature and bewitching Vrindavan, all beautifully blended into a synthetic structure.'

It is not without reason that the Education Commission 1964–66 observed: 'The destiny of India is now being shaped in its classrooms. On the quality and number of persons coming out of schools and colleges will depend our success in the great adventure of national reconstruction.'

Important factors in the appropriate school ethos for the many-sided development and learning of children

- ***Training in the art of living together:*** "We do not visualize the school as merely a place of formal learning, whose main concern is to communicate a certain prescribed quantum of knowledge but rather as a living and organic community which is primarily interested in training its pupils in what we have called the gracious "art of living", observed the Secondary Education Commission.
- ***Development of a child's entire personality:*** We would like the school to see if it can provide a richly varied pattern of activities to cater to the development of its children's entire personality. It has to formulate a scheme of hobbies, occupations and projects that will appeal to, and draw out, the powers of children of varying temperaments and aptitudes.
- ***Provision of a stimulating environment:*** The primary concern of the school should be to provide for its pupils a rich, pleasant and stimulating environment which will evoke their manifold interests and make life a matter of joyful experience.

NOTES

- ***Transformation into activity school:*** The school must be transformed into an 'activity school' because activity has an irresistible appeal for every normal child and is his natural path to the goal of knowledge and culture.

We do not visualize that these schools will have dull, routine ridden formal lessons in the class *plus* a number of independent unrelated extra-curricular activities which have no intrinsic relationship with them either in contents or methods. The entire programme of the school will be visualized as a unity and inspired by a psychologically congenial and stimulating approach, the so-called 'work' being characterized by the feeling of joy and self-expression usually associated with play and hobbies, and these having something of the meaningfulness and purpose which are normally considered a special feature of academic work. Thus, by planning a coherent programme of these different activities, rich in stimuli, the school will not be frittering away either the time or the energy of the pupils but will be heightening their intellectual powers also side by side while training them in other fine qualities.

- ***Opportunities for self-discipline:*** Discipline in the school will not be a matter of arbitrary rules and regulations enforced through the authority of the teachers helped by the lure of rewards or the fear of punishment. The students will be given full freedom to organize functions, to conduct many of the school activities through their own committees and even to deal with certain types of disciplinary cases. In this way, discipline will be maintained through the influence of the social group and it will gradually lead to the development of self-discipline.

  No school can develop into an educative community, capable of releasing the students' creative capacities, if the teachers maintain a stiff forbidding attitude towards their pupils and try to maintain their authority through various kinds of punishments whilst the pupils, on their part, stand in awe of them and are not prepared to share their problems and difficulties with them.

- ***School as a centre of community service:*** **Another** thing which will distinguish this school from most of the traditional schools ***is*** that it will be organized as a community.

- ***Providing work experience and socially useful work:*** We expect the school to devote special attention to craft and other productive work and thus redress the balance between theoretical and practical studies which have been upset for many, many years.

Every well-established and reasonably well-financed school will have workshops and craftrooms where students will learn to handle tools and to fashion different kinds of material into form.

- ***Comprehensive curriculum:*** The school curriculum should fulfil the psychological and social needs of the students.

- ***Guidance and counselling services:*** These should be adequate.

- ***Human relations:*** Students should be made acquainted with the principles of developing good, harmonious relations.
- ***Dynamic teacher's personality*** (see the next point).

NOTES

B. Class Environment

Classroom climate implies classroom environment in which change of behaviour or learning takes place through interaction in the group which consists of students of various shades and the teacher who is the leader of the group. The mental health of the group is an important factor in the process of learning. As a leader, the teacher is expected to create a democratic environment. His democratic behaviour in the classroom can steer constructive and inspirational individuals as well as group activities in the right direction. See Table 14.1.

General Suggestions for Creating Democratic Climate: Apart from the above mentioned factors for creating a democratic classroom climate, following suggestions should prove very useful:

- It would be desirable for a teacher to throw some light on the qualities of leadership so that students choose their leaders wisely and the teacher is able to influence the class through its leaders. However, it must be stressed that a teacher must remain neutral in the selection of leaders.
- The behaviour of the leader of the group is imitated by the members of the group.
- Suggestion plays a big role in influencing the group behaviour. The suggestions put forward by the leader of the group are readily accepted.
- The recent studies have made it clear that for bringing about changes in the individual, we must bring about changes in the characteristics of the group. The teachers, therefore, should adopt appropriate group methods in the class and through these influence the attitudes of the members of the group. Group training is better than individual training.

C. The Teacher

Teacher's Personality

It has been rightly observed. 'While books can teach, only personality can educate.' A good personality includes:

- Impressive Appearance
- Modulated Voice
- High Character
- Effective Power of Communication

Personality of the child in the desired dimension cannot be developed if the teacher who is the model to be followed lacks personality. 'Example is better than the precept' is an old saying, and it is absolutely true for the teaching profession. No amount of sermons from the teacher can make appreciable headway. A teacher teaches not only by 'what he says' but very largely by 'what he is'. Children are

NOTES

imitative and suggestive by nature. They imitate the dress, voice, habits and manners of their teachers. On several occasions, the likes and dislikes of teachers become the likes and dislikes of their students. Children who are in the plastic period of their lives are easily influenced by their teachers. 'Man, know thyself' is the advice given by sage Yajnavalkya in India and the philosopher Socrates of Greece. The teachers must undergo a spiritual inner training. They should try to find out their own shortcomings and remove them.

Rybum observed, 'Self-analysis on the part of a teacher is a necessary equipment' Montessori stressed that every teacher worth his salt must destroy the sins of pride, anger, sloth, sensuality and envy. He should be partly a doctor, partly a scientist and completely religious. He must acquire a moral alertness, patience, love and humility. Writing about the role of the teachers, Lauri observed, 'If a teacher has not an ideal aim, he had better to take to shop-keeping at once, he will there doubtless find an ideal within his capacity.'

Teachers' Practices

Dynamic Methods of Teaching: The Secondary Education Commission(1952–53) has very rightly observed, 'Every teacher and educationist of experience knows that even the best curriculum and the most perfect syllabus remains dead unless quickened into life by the right methods of teaching and the right kind of teachers.'

A wise teacher can make his classroom teaching–learning easier and effective if he can direct group dynamics into constructive paths.

Through group discussion and activity methods, the teacher would give the individual student a chance to participate actively and to contribute to group work in the class.

Some specific group techniques which could be used for the improvement of the group are:

- Buzz session, in which a small group of five or six students participate, is organized for purposes of stimulating discussion.
- Role playing, in which problems of handling a situation are dramatized for the benefit of the group.
- Brainstorming, in which a group is organized for stimulating discussion.
- Catharsis, in which a planned group expression of problems of concern to the group is provided.
- Recreational experiences, in which opportunities are provided for participation in dramatics, picnics, parties, etc., to improve morale.

Effective interpersonal communication: Good teaching is interpersonal communication. Teaching is a two-way communication. As the name indicates, interpersonal communication is the presence of the facility to seek reactions, information, etc. One way communication, i.e., telling or lecturing by the teacher, denies the facility to the learners to seek clarification, confirmation, etc. The learners do not get the opportunity to develop interpersonal relationships. Interpersonal communication has a built-in system of feedback. It ensures that further information

and clarification are provided wherever possible. The receiver or the learner gets an opportunity to understand the message or the content of the communication.

Healthy interpersonal communication is the sound basis of sound instruction or teaching.

NOTES

Ego-involvement: The personality of the child should be given due recognition. Emerson has observed, "The secret of education lies in respecting the pupil."

Constructive and creative discipline: The teacher should have a sympathetic but firm attitude towards his charges.

Learning combined with creative Humour and Appropriate Laughter: An experienced teacher once observed. "I consider a day's teaching–learning wasted, if we do not have a hearty laugh."

Teacher as a guide: Sri Aurobindo writes in the regard, "The first principle of true teaching is that nothing can be taught. The teacher is not an instructor or a taskmaster, he is a helper and a guide. His business is to suggest and not to impose. He does not impart knowledge to the pupil: he shows him how to acquire knowledge for himself."

3. Home Environment

The environment at home is the next important factor which affects learning. Stressed or disturbed atmosphere, family discords family feuds, and similar tension-inducing situations at the home have a serious negative impact on the learning process as they cause anxiety, divert attention, dilute focus and disrupt learning. The education level of parents, the time and energy they devote towards the child and the assistance they provide has a direct effect on the learning process. The Home, and the neighbourhood where the child spends the after-school hours, can have both a positive and the negative affect on learning. A healthy atmosphere around the home, the general health pattern within the home, sickness and disease—all such things can affect concentration and, ultimately, learning.

4. Socio-Economic Factor

This is another factor which comes into play in the modern world which impacts learning. Students come from various backgrounds. Some are poor while others come from affluent households. Students from affluent backgrounds will most likely have more educational support and resources to help them through school and college. Often, these neighbourhoods have more tutoring support, after-school activities, and bookshops than middle class or poor neighbourhoods. The availability of new technology affects faster access to knowledge and resources and thus has an impact on learning. Therefore, economic status and environment makes a lot of difference to the overall learning process.

CHECK YOUR PROGRESS

16. State any four factors which affect learning.
17. What are the features of a good personality?

4.11 MOTIVATION AND LEARNING

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Students in the classroom learning, need constant motivation from the teachers so that optimum use of their talents may be made for their development. The needs are the basis of motivation. Therefore, techniques that the teachers employ to arouse and maintain motivation will be successful only insofar as they make them perceive that progress is being made towards need-satisfaction. Since individual children differ in regard to their specific needs according to their personality patterns and socio-economic background, the teachers will have to vary their motivational techniques and employ them judiciously. In other words, every individual pupil should be led towards goal that he is aware of and will want to attain. Secondly, goals should be within each pupil's reach, and should seem attainable to him. Thirdly, he should be able to judge whether or not he is attaining his goals and how he is falling short. Fourthly, a teacher should not rigidly and strictly adhere to one technique of motivation but he should make use of all techniques judiciously and scientifically.

1. **Attractive physical and environmental conditions:** First of all the teacher should attend to the physical conditions of the classroom. There should be no distracting factors in and around the classroom. Noise, strong light and some undesirable scenes often distract the attention and do away with the interest. Abnormal temperature is also a disturbing element. Monotony creates boredom.

   The rooms should be ventilated and tastefully decorated. There must be flowery plants in the school compound. Cleanliness should be stressed adequately.

2. **Sublimation of innate impulses***:* Most of the behaviour of small children is directed by their innate impulses. Curiosity, construction, self-assertion, submission, pugnacity and hoarding are some of their most powerful drives which form the basis of all kinds of their activities. Small children are very curious by nature. They like to do many things. Every new and strange things attract them. An efficient teacher will stimulate the impulse of curiosity. He will always start the lesson by exhibiting some very new and strange aspect of the same. Similarly, children like to construct things. The teacher should encourage the children to learn by constructing and creating things.

3. **Stimulus variation and the teacher:** It has been generally observed that children are not able to attend to one thing for a very long period. The effectiveness of the teaching–learning process in such a situation depends to a great extent on the stimulus variations used by the teacher behaviour. Some of the common teacher behaviours in the classroom which fall under variation are:

   - Teacher movement
   - Teacher gestures
   - Changes in speech pattern
   - Changes in sensory focus
   - Changes in posture

NOTES

5. **Reinforcement (Praise and Blame):** 'Praise, like gold and diamonds, owes its value to scarcity,' writes Robinson Johnson. It implies that this technique should be employed with great care. These may be classified as:
   (i) **Positive verbal reinforcement:** Following a pupil's answer, the teacher verbally indicates pleasure at the pupil's response by the use of words like 'Good', 'Fair', 'Excellent', 'Correct', etc.
   (ii) **Positive non-verbal reinforcement:** This includes
      - Teacher's nods and smiles
      - Teacher's friendly movements towards pupils
      - Teacher's friendly look
      - Teacher writing student's response on the blackboard

   (iii) **Negative non-verbal:** This comprises gestures and facial expressions, such as those depicting impatience, annoyance, contempt, pity, sometimes by sneering, frowning, etc.
   (iv) **Negative verbal:** This includes comments like 'No', 'Wrong', 'No good', 'Poor', 'Of course not', etc.
4. **Extrinsic learning rewards and punishment:** These are also termed as reinforces, and the process of giving rewards and punishment is known as reinforcement. Rewards, whether material or symbolic and psychological, enhance and satisfy child's safety, belonging and esteem needs, and as such are capable of acting as incentives. Material rewards seem to work better for poor children and symbolic rewards seem to work better for children from rich homes. Thus a reward in order to act as an incentive must be perceived by the child as of some value. As extrinsic motivator, rewards may, however, become an end in themselves, and the child may not develop any intrinsic impulsion to identify himself with the learning activity. Therefore the students should be helped to perceive that successful performance is more important than any extrinsic incentive like prizes, marks and certificates. Intrinsic learning takes place when the individual is motivated without rewards, etc.
5. **Pleasure and pain:** According to the oldest theory of behaviour, pleasant experiences which give satisfaction are sought after and painful experiences are avoided by an individual. This theory has direct implication in classroom teaching-learning. The teacher must provide pleasant and satisfying experiences to the students so that they are motivated for further learning.
6. **Attainable goal:** There should be a goal to be reached in every lesson. Only then the students can endeavour to continue their efforts to a particular direction. The goal must be made clear to students.
7. **Experience of success:** Experience of success motivates a child to continue an activity. The teacher should, therefore, make school work, both curricular and co-curricular, sufficiently varied so that each pupil has a chance to experience success at his own level. He must ensure frequent and regular

NOTES

experience of success or reinforcement throughout all phases of learning, but particularly during the earlier and more difficult phases.

8. **Competition and cooperation:** Competition is a spur to activity. But competition on individual basis is likely to be unequal and therefore threatening to some students. Competition between groups makes it possible to spread the share of success or failure.

   Cooperation too provides motivation since it provides social situation to learners when they find satisfaction of their acceptance and belonging needs.

9. **Novelty:** The striving toward self-actualization makes pupils search for the new and the different. Field trips, excursions, dramatics, sports, literary activities, etc., satisfy the pupil's needs for self-actualization by providing them opportunities. But their safety needs require that they should know beforehand when and how the new experiences will be provided.

10. **Individual differences of the children:** Children have different interests and capabilities. All the children cannot be motivated alike for all the lessons at all time. It is the duty of the teacher to discover individual interests and capabilities of the children in his charge to motivate them accordingly.

11. **Teaching skills:** Teaching skills of the teacher greatly influence motivation. It is not easy to give an exact number of teaching skills involved in motivating students in the class. Commonly identified skills in the teaching-learning process may be listed as under:

    - Skill in introducing the topic
    - Skill in putting questions
    - Skill in dealing with pupil's answers
    - Skill in stimulus variations
    - Skill in the use of blackboard or the chalkboard
    - Skill in handling teaching aids and other equipment
    - Skill in non-verbal cues
    - Skill in reinforcement
    - Skill in the use of illustrations and examples
    - Skill in the exposition of sub-matter
    - Skill in explanation
    - Skill in encouraging group discussion
    - Skill in planned repetition
    - Skill in drawing out conclusions from students
    - Skill in teacher liveliness
    - Skill in the closure of the lesson
    - Skill in using appropriate methods of teaching

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12. **Teacher's own motivation and interest in teaching:** The teacher must be interested in what he is teaching and in the children whom he is teaching. If he is not interested in the work himself, he can never motivate the class. It may be said that a teacher who has been teaching the same subjects to the same classes for years tends to lose interest. But this is not the fact. The subject matter may be the same but the children are not the same. Even the subject matter is changing and developing. Moreover, with experience the teacher will discover new approaches and methods of teaching even the same subject matter.

Theories of Motivation

As already mentioned, twenty-four theories of motivation have been propounded by experts. These theories provide divergent explanations of motivation. An overview of some of the popular theories is given here. It is also observed that these theories supplement each other and point towards the same truth.

- Pawn Theory
- Instinct Theory
- Need Theory
- Stimulation Theory
- Behaviour (or Learning) Theory
- Social Theory
- Depth Theory.
- Physiological Theory
- Theory of Achievement Motivation

1. Pawn Theory of Motivation

This is based on the transcendental approach to the problems of life. According to this theory, we are a *pawn*, a puppet, an instrument in the hands of God. This theory passes on the responsibility to some *mysterious power* which is something intangible and which motivates human beings to action.

2. Instinct Theory of Motivation

McDougall is the originator of this theory. According to him, 'The human mind has certain innate or inherited tendencies which are the essential springs or motive powers of all thought and action, whether individual or collective and are the bases from which the character and will of individuals and of nations are gradually developed under the guidance of the intellectual faculties.' McDougall put forward a list of 14 instincts and attached 14 emotions with them. This theory became very popular in Britain. Nunn, Burt, Ross, Hughes and Valentine, etc., accepted this theory. However, American psychologists did not find any weight in it.

NOTES

3. Need Theory

A. Maslow (1908–1970) was the main advocate of this theory. We have already discussed hierarchy of needs as stated by him. There are two sets of needs: (*i*) Primary or biological, and (*ii*) Secondary or psychological. The more intense the need, the more is the motivation.

4. Stimulation Theory

According to this theory all inner and outer stimuli that bear upon a person at one time constitute his psychological field and determine his behaviour jointly through interaction.

5. Behaviour or Learning Theory

This is more elaborate than the need theory. Hull and his associates are the suppoiters of this theory. The theory has three main tenets:

- All motivated behaviour is based on needs and desires;
- All learning involves reward in the sense that only those responses that reduce need or drive are stamped in; and
- Needs may be biological or psychological, primary or secondary.

Tolman, Hebb and Mowrer do not share this view. They argue that alllearning is not like that. Learning can be 'cognitive type' also. It is not only the 'need reduction' but also 'avoidance of plain' that goads one to learn.

6. Social Theory

According to this theory, causes of the social behaviour are to be found in the social environment. There are two streams of this theory:

- ***Cultural Pattern:*** According to this view, an individual is cast in the mould of the culture to which he belongs. The different cultures would, therefore, produce different types of personalities.
- ***The Field Theory:*** According to this theory, behaviour is caused by the interaction between a person and his environment.

7. Depth Theory

Freud is the main protagonist of this theory. The spring of action is unconscious which is dark, ruthless, very powerful and illogical. Special exploratory techniques are needed to dig out the unconscious. Unconscious motives influence our conscious thought and conduct.

8. Physiological Theory

This theory holds that the secrets of mind are locked within the cells of the nervous system.

9. Theory of Achievement Motivation

C McClelland David (1953) and Atkinson W John (1958) came to the conclusion that in every individual there is a need for achievement. A person who has a high

NOTES

need for achievement considers problems and obstacles as challenges to be met. According to this theory, human beings differ from one another in the strength of achievement motive. It is this difference in the strength of motivation to achieve that is important in understanding the development. The need for achievement develops in early childhood. It depends upon the discipline of the home. Parents' expectation and guidance to the child develop need for high achievement in life.

The teacher can play an important role in the development of motivation by taking the following steps:

Step 1. The teacher should emphasize the importance of achievement motive in life by means of narrating the exploits of great personalities and their achievements. Students may be motivated to follow the footsteps of great persons.**STEP 1.** The teacher should emphasize the importance of achievement motive in life by means of narrating the exploits of great personalities and their achievements. Students may be motivated to follow the footsteps of great persons.

Step 2. The teacher's encouraging and friendly attitude and his enthusiasm in work will create the necessary environment for achievement motive in children.

Step 3. The teacher will guide the students in developing realistic achievement motives.

Step 4. Attempts should be made to convince the students that new motives will improve their self-image and is an improvement upon the prevailingones.

Step 5. The teacher should develop habits of self-study among students.

Step 6. The teacher should encourage the students to evaluate their own achievement from time to time.

Step 7. The teacher should develop Conducive social environment in the class so that even,' student should think that he is wanted and has a role to play.

Rewards and Punishments in Motivating Children

No Misfit Children—Punishment by Natural Consequences. "There are misfit schools, misfit tests and studies, misfit dogmas and traditions of pedants and pedantry. There are misfit homes, misfit occupations and diversions. In fact, there are all kinds and conditions of misfit clothing for children, but in the nature of things, there can be no misfit children," writes Frederick Burk. Educationists representing such a school of thought protest against all sorts of well-established systems of rewards and punishments. Their watchword is "Freedom to the child," because they think that by nature, a child is innocent and noble and adult restrictions and discipline simply spoil the intellect of the child and stand in the way of his progress and happiness.

Many great educationists like Rousseau protest against all sorts of well-established systems of rewards and punishments and have waged a bitter war against the theory of original sin and its repression. Their watchword is *'Freedom to the child'* because they think that by nature a child is innocent and noble and adult restrictions and discipline simply spoil the intellect of the child and stand in the way of his progress and happiness. They believe in the discipline of natural consequences' and are convinced that natural punishments are the best and leave no room for

NOTES

punishments in the life of the school. Rousseau says, "Children should never receive punishment as such—it should always come as the natural consequence of their fault.' Sir T. Percy Nunn writes, 'The conviction that punishment and the fear of punishment are the natural foundation of school government, is gradually being recognized as merely a barbarous superstition.' A. S. Neill, in his book, *'The Free Child'* writes, 'My contention is that unfree education ignores almost entirely the emotions of life, and because these emotions are dynamic, their lack of opportunity for expression must and does result in cheapness, ugliness and hatefulness. Only the head is educated, but if the emotions are free, intellect will look after itself.'

Herbert Spencer would like the child to suffer the unavoidable consequences of his conduct.

Punishments are Indispensable: Bagley puts it, 'The child is immature and helpless and he must not be given a long rope with which he may hang himself.'

Bray justifies punishments with these words, 'Punishment is the lesser evil applied to avoid the greater one that lives in the future.' It is always seen that evil if not checked in time brings havoc ultimately. 'Nip the evil in the bud' is an old saying.

P. C. Wren, though admits that punishment is an evil thing to be avoided, yet says that it is a necessary evil like the surgeon's knife.

According to H. Thring, school punishment is not vengeance. Its object is training, first of all the training to the wrong-doer; next the training to other boys by his example. Both he and other are to be deterred from committing the offence again.

The naturalists dub all rewards as bribery. They think these rewards have a demoralizing effect on the child because they tempt the child to work not for duty's sake but for the sake of prize.

Rewards sometimes lead to unhealthy jealousies among students. Moreover, they affect only a few students and leave group on the whole untouched. They encourage unnecessary competition and affect emotional development adversely.

The protagonists of the system of rewards on the other hand argue that the rewards provide incentive to the students to work hard. They contend that society as a whole is governed by a system of rewards and punishments.

Psychologically also the system of rewards and punishments can be justified if we take into account the Law of Effect as enunciated by Thorndike.

Rewards provide incentive for healthy emulation among individuals and group of individuals.

When the work of the students is given appreciation in the presence of others, they feel encouraged and reinforcement is provided. This helps in infusing great confidence in them.

It gives happiness to the parents when their children get prizes. They encourage their children to put in all the more labour.

Rewards may be given for:

- Regular and punctual attendance
- Good conduct
- Progress in studies
- Proficiency in games
- Service rendered for a noble cause

CHECK YOUR PROGRESS

18. What is depth theory?
19. What are the three tenets of learning theory?

4.12 TRANSFER OF LEARNING AND ITS THEORIES

The idea of transfer of learning is basic to education. Education is considered to be a preparation for life. Whatever students learn in educational institutions is useful only when they can apply the same in the everyday life. This application or *carry over* learning from one act to another is called transfer of learning. Transfer of learning thus implies the application of knowledge in various subjects and fields. It is assumed that whatever knowledge, skills, attitudes and information are either taught in schools, or given training in, would be useful only when children use it to solve problems of life after completing their formal education. Arithmetic is taught on the assumption that it would be useful in handling day-to-day life problems. Civics is taught on the assumption that its knowledge would be helpful in facing social problems successfully.

Children are required to do additions and subtractions of fractions in algebra. The teacher points out to them that the principle is the same as that in arithmetic. This implies that transfer of learning of arithmetic takes place in the learning of algebra.

There are many educators who believe that subjects like mathematics, English language and science, etc., are superior to other subjects like economics, history, arts, crafts and home science as they are more helpful in sharpening the intellect of the students. The intellect so sharpened, they think, can be profitably employed in the performance of any other activity which may or may not be directly related to the subjects studied. But this is going too far.

Traditionally, children had been given long poems to memorize, long mathematical tables to learn by rote and a huge store of material to be committed to memory. It was believed that such learning was meant for disciplining the mind.

NOTES

Definitions of Transfer of Learning

In order to understand the term transfer of learning, we may consider the following definitions:

- **According to M J Peterson** (1957), 'Transfer is generalization, for it is the extension of idea to a new field.'
- **L D Crow and A C Crow** (1963) viewed, 'The carry-over habits of thinking, feeling or working of knowledge or of skills from one learning area to another usually is referred to as the transfer of training.'
- **B L Bigge** (1964) said, 'Transfer of learning occurs when a person's learning in one situation influences his learning and performance in other situations.'
- **H C Ellis** (1965) defined, 'Transfer of learning means that experience or performance on one task influences the performance on some subsequent task.'
- **According to K Lovell** (1970), 'Transfer of learning is the effect which some particular course of training has on learning or execution of a second performance. Such an effect may be of a helpful nature or it may hinder.'
- **Guthrie and Powers** (1973) observed, 'Transfer may be defined as a process of extending and applying behaviour.'

A comprehensive definition of transfer of learning can be 'application or carry-over of knowledge, skills, attitudes, habits, values or other responses from the situation in which they were initially acquired for some other situation for which they were not specifically learnt."

Brief History of the Concept

The idea of transfer of learning is as old as the Vedic system and the Greek system of education. Memorization and chanting of Vedic hymns in Sanskrit was considered essential for training the mind. In Greece, Plato believed that geometry was essential for training the mind. Latin, Greek and Sanskrit were considered to be the subjects to train the various faculties of the mind. In due course, mathematics was also placed in this country.

William Jones (1890) was the first to challenge this view. He found that practice in memorizing Milton's *Paradise Lost* did not produce any improvement in memorizing French poetry. The findings evoked a lot of research in the field of transfer of learning and more than 300 studies were conducted on this subject. Types of material used in transfer of learning may be categorized under the following heads:

- School subjects
- Memory materials
- Perceptual materials
- Reasoning materials
- Sensory-motor materials
- Ideals-related materials

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Importance of the Transfer of Learning

There is no doubt that almost all educational and training programmes are built on the premise that learners have the ability to transfer what they have learnt in one situation to another. This relationship has a great significance for any educational practice as it lends importance and faith to the usefulness of formal education. Learning becomes functional only when it enables students feel confident that they would use their experiences and skills obtained in the school in their day-to-day life.

The very existence of our educational institutions is based on the assumption that the knowledge, skills and attitudes developed by them in their students will be transferred to life situations.

The following issues arise in connection with the study of transfer of learning:

- What are the areas in which transfer of training takes place?
- What is the degree of transfer of training from one area to another?
- How best can transfer of learning take place?
- Is transfer of training possible in reasoning?

Areas of Transfer of Learning

Scope of transfer of learning is very wide. Some of the areas in which it is important are:

- Transfer from knowledge to knowledge
- Transfer from knowledge to skill
- Transfer from knowledge to behaviour
- Transfer from attitude to attitude
- Transfer from attitude to behaviour

Types of Transfer of Learning

Some of the important types of transfer of learning are:

1. **Lateral transfer:** It is the most common form of transfer which takes place. Suppose a child has been taught addition and subtraction and he understands that 15 – 8 = 7 in the context of beads or blocks used in the classroom by the teacher. It is hoped that this understanding of addition and subtraction would transfer to other situations too. For example, the same child removes 8 apples from a basket containing 15 apples at home and understands that there would be 7 left. This is an example of lateral transfer as in this case, the child has made use of the understanding and skill learnt in his school in learning situations outside the school.
2. **Sequential transfer:** The contents of the subjects of school curriculum are divided into sequent units. One idea leads to another and both ideas have some relationship to the third idea to be taught.
3. **Horizontal transfer:** Lateral and sequential transfers are called horizontal for the learner is within the same behavioural category while making the transfer.

NOTES

4. **Vertical transfer:** Vertical transfer of learning implies facilitating the higher behavioural level in vertical manner by the lower level of learning.
5. **Bilateral transfer:** This type of transfer takes place when training imparted to one lateral automatically transfers to another. Training in the use of pen by the right hand transfers training to the left.

Positive, Negative and Zero Transfer

A positive transfer takes place when the learning of a particular task facilitates the subsequent-learning of another task. But on the other hand, if learning of a particular task interferes with the learning of a subsequent task, it is called a negative transfer. If, however, learning of a particular task makes no difference whatsoever to the learning of a subsequent task, it is said to be zero transfer or no transfer of learning.

Once a child has learnt to misspell a word, it is difficult to correct it, especially if the child has been writing it for a long time. Similarly, if a child has developed faulty handwriting, it is more difficult to improve it than to teach him to write well from the beginning. These are examples of negative transfer.

Theories of Transfer of Learning

Important theories of transfer of learning are as under:

- Theory of Mental Discipline
- Theory of Identical Elements or Components
- Theory of Generalization of Experience
- Theory of Ideals
- Gestalt or Relationship Theory

1. Theory of Mental Discipline

General transfer of training through mental discipline is the oldest theory but hardly accepted by modern psychologists. The principal feature of the theory of mental discipline is that the mind or its faculties such as memory, reason, will and perseverance are the muscles of the mind, and like muscles of body, they are strengthened through exercise and later on function automatically in all situations and areas in which they are involved. It was thought that the rigorous study of geometry could train the faculty of reasoning and it was so trained in a person that he could reason well in the realms of mathematics, social studies, philosophy and business. This theory was first challenged by William James. Experiments by James and Sleight showed that one could hardly improve memory for all situations in which it was called for by rigorously exercising it in any one specific situation.

Thorndike did a lot of research work on this problem and came to the following conclusion, 'The notions of mental machinery which being improved for one sort of data held the improvement equally for all sorts, of magic powers which, being trained by exercise of one sort to a high efficiency, held that efficiency whatever they might be exercised upon, and of the mind as a reservoir for potential energy which could be fired by any one activity and drawn on for any other—have now disappeared from expert writing on psychology.' This sets limitations to formal disciplines.

A G Wesman (1945) concluded on the basis of his studies that there was no clear-cut superiority of any subject as regards the amount of transfer.

2. Theory of Identical Elements or Components

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Thorndike and Woodworth were the main founders of this theory. On the basis of their experiments carried out in 1901, they concluded that transfer of learning occured from one situation to another on account of the presence of identical twins. The theory implied that learning was facilitated in the new situation to the extent that identical elements which occurred in an earlier situation were present in the new situation. The similarity of elements could be either in the subject-matter or in procedure or in attitudes.

Peter Sandiford (1941) stated, 'This theory of identical elements is, a perfectly reasonable one. Out of the millions of specific reactions, each with its specific connection in the nervous system, some of them are bound to be common to several situations. The greater the number of these common elements, the greater will be the transfer effect.'

According to this theory, addition is supposed to improve multiplication on account of lots of additive processes required in multiplication tables.

Learning of one language helps in the learning of the other, as the methods of learning used in two languages have common elements of vocabulary.

In a simple way, it may be stated that the transfer of learning is in terms of 'identity of content, identity of procedure and identity of ideals'.

3. Theory of Generalization of Experience

CH Judd (1908) came to the conclusion on the basis of his experiments conducted on transfer of learning that transfer took place to the extent to which a learner was able to generalize his experiences. Judd laid emphasis on the intelligence of the learner which enabled him to understand and apply knowledge of principles or generalizations from one situation to another.

The theory states, 'The development of special skills, the mastery of specific facts, the achieving of particular habits or attitudes in one situation have little transfer unless the skills, facts, habits are systematized and related to other situations in which they can be utilized.' Thus, if we are trying to build good habits of study and work, it should be done in such a way that these are applicable in all subjects and not merely to one subject.

4. Theory of Ideals

W C Bagley, who gave an explanation of transfer in terms of ideals, asserted that generalizations were more likely to transfer, if they were regarded as of some value as desirable. According to him, generalization is not the whole story but it must be given an emotional sanction or be elevated to a plane of an ideal worth living for. Thus, the teacher should consciously seek maximum transfer of values by emphasizing ideals of neatness, of love, of learning, tolerance for difference of opinion and so on.

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5. Gestalt (or Relationship) Theory

According to Gestalt psychologists, transfer of learning means that generalizations, concepts or insights which are developed in one learning situation are employed as a whole in other situations in which they are applicable. However, the transfer of generalizations or insights does not occur automatically. For transfer to occur, the pupil must perceive the relationships between the two situations, must understand that the generalizations gained through past experience are appropriate in the new situations and must have the desire to use the generalizations and to benefit by the perceived commonality.

Educational Implications of Theories of Transfer of Learning

Inclusion in the Curriculum: In the curriculum, utility aspect should be kept in view. In selecting and planning the curriculum, the selection and arrangement of material in subjects should be such as they are closely associated with the daily needs of the learners. This implies that spellings or those words should be taught first which are used in everyday life of the learners. Similarly, the kinds of readings they would use in their life should be given priority. Curriculum content should be related directly to vocational interests and ways of life. Mathematical symbols and formulas should be expressed in familiar terms to the students.

Superiority of one subject over the other in terms of transfer has little relevance. The degree of transfer depends upon the applicability of the outcomes of learning. As Thorndike pointed out, 'The differences are so small and the unreliabilities are relatively so large, that the influence of the subject studied seems unimportant. Indeed one subject was about as good as another."

Principles of Transfer (or Conditions that Facilitate Transfer) of Learning

- Transfer of learning takes place when there is some similarity between two tasks.
- It is not necessary that there should be similarity between two tasks but the learner must realize that similarity.
- Transfer of learning is more likely to occur if the learner is keen to use his old learning in the new situation.
- Transfer of learning depends on the ability of the learner. The more intelligent a learner is, it is more likely that transfer will take place. The impact of transfer of learning on the part of the learner also depends on the intelligence of the teacher.
- The better the first task has been learnt, it is more likely that the learning will be transferred to the new situation.
- Understanding of the underlying principles, i.e., arriving at generalizations, adds transfer of learning.
- When children discover principles for themselves, there is greater possibility of transfer than when they are told the principles.

- The more experiences children have, of applying a principle in different situations, the easier it will be for them to apply it in a new situation.

Role of the Teacher in Transfer of Learning

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- Subject matter of all subjects should be taught and learnt in close contact with its applications.
- Adequate experiences and practice should be provided with the original task for its transfer to other situations in learning.
- Important features of a task should be identified so that differences and similarities with other tasks should be comprehended and proper relationships established.
- Implications of concepts and rules in actual life should be thoroughly discussed to make its applications practicable.
- Students should be guided to discover common essential features and relationships of situations which appear to be different superficially.
- Students should be encouraged to develop proper generalizations.
- Students may be motivated to see the significance of identical elements and components of ideas, skills, attitudes and objects.
- Emphasis should be on the development of desirable flexible behaviour and not merely apply the ideas or skills mechanically.
- While teaching abstract concepts, a number of illustrations and practical examples should be given.
- Relationships should be emphasized and the learners guided to perceive them within a subject, between the subjects and out of school life. Project method is very useful in cutting across several subjects.
- Discussions and debates should be arranged to develop students' power of understanding relationships.
- Field trips to important places of commercial, educational, economic, historical, cultural and scientific, etc., help in developing proper understanding of situations in life in the context of curriculum content.
- Logical thinking should be kept in constant focus. Students may constantly be asked the *why* and *how* of generalizations.
- Goals, outputs and objects of a particular activity should be made very clear to the students.

Check Your Progress

20. State three principles of transfer of learning.
21. Why are lateral or sequential transfers called horizontal?

4.13 SUMMARY

NOTES

- Theories of learning attempt to explain the mechanism of behaviour involved in the learning process.
- A theory provides detailed systematized information of an area of knowledge. It serves as a guideline to conduct further research in the area. It produces new facts or supplements the previous facts.
- Learning theories may broadly be divided into two categories: Stimulus Response (SR) Theories and Cognitive Field Theories.
- Ivan P. Pavlov (1849–1936), a Russian psychologist, was the originator of the classical conditioning theory of learning.
- Conditioning is the modification of the natural response. By conditioning, Pavlov modified the behaviour of the dog on which he experimented.
- According to Pavlov, the behaviour of learners can also be modified in such a way, as the response originally connected with a particular stimulus comes to be aroused by a different stimulus.
- Pavlov's work on the laws of conditioning is considered as a landmark contribution to educational psychology.
- Pavlov explained learning in terms of physiological changes by adopting an objective method of study.
- E. L. Thorndike was the chief exponent of the theory of connectionism or trial and error. The basis of learning, accepted by Thorndike, was an association between the sense impressions and impulses to action.
- Thorndike propounded his theory on the basis of experiments conducted on cats, chickens, dogs, fish, monkeys and rats. He placed them under different learning situations and studied them carefully.
- Thorndike named the learning of his experimental cat as 'Trial and Error Learning'. He maintained that learning is nothing but the stamping in of the correct responses and stamping out of the incorrect responses through trial and error.
- Thorndike's five aids to improve learning are:
  - Interest in the work
  - Interest in improvement
  - Significance of the work
  - Problem-attitude
  - Attentiveness
- Clark L. Hull related learning to the needs of an individual or a living being. He held that association between SR is not enough for learning.

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- According to Hull, some kind of reward or other reinforcement was necessary to establish the stimulus as signal. Hull emphasized the importance of satisfaction of the needs of children.
- Skinner called his theory as operant conditioning, as it is based on certain '*operations or actions'* which an organism has to carry out.
- The term 'operant' stresses that behaviour is carried out in the environment to generate its own consequences. An operant is a set of acts which conditions an organism in doing something.
- Gestalt theory of learning, also named as *Learning by Insight*, is the contribution of German psychologists who were studying the nature of perception. Max Wertheimer (1880–1943) was the founder of Gestalt psychology.
- Learning, according to Gestalt Theory, is not by random steps, neither by trial and error, nor by conditioning but by insight, introspection and understanding.
- Gestalt psychology was primarily concerned with the nature of perception. According to it, an individual perceived wholes and not parts. Learning was viewed as purposive, explorative, imaginative and creative enterprise in which the total situation was taken into account by the learner.
- Kurt Lewin (1890–1947), unlike Pavlov, Skinner and Gestaltian psychologists, conducted experiments on the study of behaviour of children. He utilized an elaborate experimental set-up with a view to control a child's total environment during the course of the investigation for getting detailed information.
- Lewin emphasized the study of behaviour as a function of the total physical and social situation. Lewin held that psychological laws should not be formulated solely on the basis of statistical averages.
- According to Lewin, a learner because of attraction of rewards may resort to shortcut methods.
- Edward C. Tolman (1886–1959), like other behaviourists rejected the idea of introspection as a method of studying human behaviour. On the contrary, he believed the objective method of collecting data.
- There are essentially four interrelated factors which affect learning. These are as follows:
  - Psyche of the student
  - School atmosphere
  - Home atmosphere
  - Socio-economic factor
- Students in the classroom learning, need constant motivation from the teachers so that optimum use of their talents may be made for their development. The needs are the basis of motivation.
- Twenty-four theories of motivation have been propounded by experts. These theories provide divergent explanations of motivation.

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- The idea of transfer of learning is basic to education. Education is considered to be a preparation for life. Whatever students learn in educational institutions is useful only when they can apply the same in the everyday life.
- Scope of transfer of learning is very wide. Some of the areas in which it is important are:
  - o Transfer from knowledge to knowledge
  - o Transfer from knowledge to skill
  - o Transfer from knowledge to behaviour
  - o Transfer from attitude to attitude
  - o Transfer from attitude to behaviour

4.14 KEY TERMS

- **Pawn theory:** This theory is based on the transcendental approach to the problems of life. It assumes that human beings are pawns in the hands of God.
- **Topological concepts**: Topological concepts are used to represent the structure of life-space in such a way as to define the range of possible perceptions and actions. This is accomplished by showing the arrangements of the functional parts of life-space.

4.15 ANSWERS TO 'CHECK YOUR PROGRESS'

1. Ivan P. Pavlov (1849–1936), a Russian psychologist, was the originator of the classical conditioning theory of learning. He won the Nobel Prize in 1904 for his research on the digestive process.
2. Pavlov's theory of conditioning is criticized on two grounds. (i) All learning is not conditioning and on the other hand, it is an active process. (ii) Learning needs intelligence and understanding but conditioning ignores it by and large.
3. The principle of spontaneous recovery explains that there is no complete extinction on account of the time interval but there is inhibition of CR.
4. The two sub-parts of the Law of Exercise or Repetition are:
   - **Law of Use**: 'When a modifiable connection is made between a situation and response, that connection's strength is, other things being equal, increased.'
   - **Law of Disuse**: 'When a modifiable connection is not made between a situation and response, during a length of time that connection's strength is decreased.'
5. The five aids given by Thorndike to improve learning are:
   - Interest in the work

- Interest in improvement
- Significance of the work
- Problem-attitude
- Attentiveness

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6. According to Hull, reinforcement is 'whenever a reaction (R) takes place in temporal contiguity with an afferent receptor impulse (S) resulting from the impact upon, a receptor or stimulus (S) and this conjunction is followed closely by the diminution in a need, in the tendency of that stimulus on subsequent occasion to evoke that reaction.'
7. Four postulates of Hull's Theory are:
   - Postulate of hereditary responses. Hereditary matters in learning. These are unlearned stimulus responses.
   - Postulate of primary and secondary enforcement.
   - Postulate of habit formation.
   - Postulate of reaction potential: It is the strength of the tendency to respond.
8. Three limitations of operant conditioning are:
   - It is doubtful if live results derived from controlled experimental studies on animals, would yield the same results on human beings in social learning situations.
   - It is argued that Skinner had ignored the structural and hereditary factors which are very important in the development of psychological process of language.
   - The operant reinforcement system did not adequately take into account the elements of creativity, curiosity and spontaneity in human beings.
9. The important operations involved in operant conditioning are:
   - Shaping (generalization, chaining and habit competition)
   - Extinction
   - Spontaneous recovery
   - Concept of reinforcement
10. The essential features of trace theory are:
    - Trace is the result of past experience, so that it represents past in the present.
    - The present process can select, reactivate or communicate with the trace.
    - There is a resulting new process of recall or recognition.
11. Two weaknesses of the theory of conditioning are:
    - Conditioning reduced complex human behaviour to an accumulation of simple conditioned responses.
    - SR-theorists attributed learning to reduction of basic organic drives.

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12. The chief conflicts as stated by Lewin include:
    - **Two Positive Valence**: When a child has to choose between going to picnic and playing with his friends.
    - **A Simultaneous Positive and Negative Valence**: When a child is offered a reward for the school task which he does not wish to perform.
    - **Two Negative Valence**: When a child is threatened with punishment for not doing a task which he does not wish to perform.
13. Lewin classified learning into the following categories:
    - Learning is a change in cognitive structure.
    - Learning is a change in motivation, i.e., in valences and values.
    - Learning is acquisition of skills.
    - Learning is a change in group belonging.
    - Learning of all types involves change in perception
14. Tolman's theory of learning is also known by several names such as 'sign significance theory', 'expectancy theory', 'purposive behaviourism' or 'sign theory'.
15. Four educational implications of learning are:
    - Capacity: According to Tolman, the learning of a task depends upon the capacity of the learner.
    - Practice: Tolman believed that practice or exercise cannot help the learner in the initial selection of the right response. Mere frequency without belongingness does not establish a connection.
    - Motivation: Tolman was of the view that motivation does not help in learning something new. It simply encourages the performance as such.
    - Understanding: Tolman believed in learning by creative inference, inventive ideation and so on. Insightful learning should be emphasized.
16. Four factors which affect learning are:
    - Psyche of the student
    - School atmosphere
    - Home atmosphere
    - Socio-economic factor
17. A good personality includes:
    - Impressive Appearance
    - Modulated Voice
    - High Character
    - Effective Power of Communication
18. Freud is the main protagonist of depth theory. The spring of action is unconscious which is dark, ruthless, very powerful and illogical. Special

exploratory techniques are needed to dig out the unconscious. Unconscious motives influence our conscious thought and conduct.

19. The behaviour or learning theory has three main tenets:
    - All motivated behaviour is based on needs and desires;
    - All learning involves reward in the sense that only those responses that reduce need or drive are stamped in; and
    - Needs may be biological or psychological, primary or secondary
20. Three principles of transfer learning are:
    - Transfer of learning takes place when there is some similarity between two tasks.
    - It is not necessary that there should be similarity between two tasks but the learner must realize that similarity.
    - Transfer of learning is more likely to occur if the learner is keen to use his old learning in the new situation.
21. Lateral and sequential transfers are called horizontal for the learner is within the same behavioural category while making the transfer.

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4.16 QUESTIONS AND EXERCISES

Short-Answer Questions

1. Give a few characteristics of trial and error theory of learning.
2. Give three important laws of learning as given by Thorndike.
3. What are the important types of 'transfer of learning?'
4. State the concept of zero transfer.
5. List a few conditions that facilitate transfer of learning.
6. What is the role of teacher in transfer of learning?
7. State the types of materials used in transfer of learning.
8. What is the contribution of Skinner's theory of learning to teaching?
9. What is Hull's 'need reduction or reinforcement theory of learning'?
10. State the educational implications of Hull's theory of learning.

Long-Answer Questions

1. Explain Pavlov's classical conditioning theory of learning by giving his famous experiment on dog?
2. Explain five important principles of conditioning as given by Pavlov.
3. Explain Thorndike's theory of learning. State its educational implications.
4. List any four theories of learning. Explain in about 1,000 words, their educational implications.

5. What is Lewin's theory of learning? What are its main concepts?
6. What are the educational implications of Tolman's sign theory of learning?
7. Give a few typical problems in learning as explained by Skinner's theory.

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8. Explain Tolman's theory of learning and its educational implications.
9. What are the main points in Lewin's field theory of learning? Describe its educational implications.
10. Briefly discuss the factors that affect learning.

4.17 FURTHER READING

Mangal, S. K. 2007. *Essential of Educational Psychology.* New Delhi: Prentice Hall of India.

Bhatia, B. D., Raghunath Safaya. 1992. *Educational Psychology and Guidance*. Delhi: Dhanpat Rai and Sons.

Kuppyswamy, B. 1991. *Advanced Educational Psychology*. New Delhi: Sterling Publishers.

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UNIT 5 PSYCHOLOGY AND EDUCATION OF EXCEPTIONAL CHILDREN

NOTES

Structure

5.0 INTRODUCTION

One generally observes that children display dissimilarities from one another in factors such as physical attributes, for example, some are shorter, some are stronger and in aspects of learning abilities (for example, some learn quickly and are able to recollect and apply what they have learned in new situations; others need to practice again and again and have difficulty in maintaining and simplifying new knowledge and skills). At times, differences among most children are comparatively small, allowing these children to benefit from the general education programme. The physical attributes and learning abilities of some children, however—those known as **exceptional children**—differ from the standard to such a level that they require an individualized programme of special education and related services to completely take advantage of education. Exceptional children refers to those children who face difficulties in learning as well as those whose performance is so above the mark that revisions in curriculum and instruction are essential to facilitate them achieve their potential.

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The term 'personality' is applied to recognize the most evident attribute of an individual, or draw attention to an individual's social expertise. Personalities generally interest psychologists for (i) explaining the reason for people with matching heredities, experiences and motivation to display different reactions, when in similar circumstances (ii) explaining the reason for people with different heredities, past experiences and motivation to display alike reactions in the same circumstances.

This unit provides a discussion on education of exceptional children and about personality and its theories, mental health and hygiene.

5.1 UNIT OBJECTIVES

After going through this unit, you will be able to:

- Discuss the psychology and education of exceptional children
- Explain the meaning of personality and its theories
- Describe the different types of personality with classifications
- Analyse the concept of personality
- Differentiate between the meaning of mental health and mental hygiene

5.2 MEANING OF EXCEPTIONAL CHILDREN

An exceptional child may be defined as the one who differs so much from his peer average in respect of physical, mental or social characteristics that he is unable to develop his fullest potential under normal conditions in an ordinary class and for whom some special environment or organization has to be created either within or without the normal school. Exceptional children deviate significantly from the normal ones. The deviation may fall on either end far above the average or far below the average in one or more aspects of achievement.

In the words of Crow and Crow, 'The term *typical* or *exceptional* is applied to a trait or a person possessing the trait, if the extent of deviation from normal possession of that trait is so great that because of it the individual warrants and receives special attention from his fellows and his behaviour responses and activities are thereby affected.'

Samuel A. Kirk, in his book, *Educating Exceptional Children,* gave the following definition, 'An exceptional child is he who deviates from the normal or average child in mental, physical and social characteristics to such an extent that he requires a modification of school practices or special educational services or supplementary instruction in order to develop to his maximum capacity.'

According to W. M. Cruickshank, an expert on special education and mental disabilities, 'An exceptional child is he who deviates physically, intellectually, emotionally and socially so marked from normal growth and development that he cannot be benefited from a regular classroom programme and needs special treatment in school.'

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Characteristics of Exceptional Children

Some of the characteristics of exceptional children are as follows:

- Exceptional children deviate markedly from normal children.
- Deviation may be physical, intellectual, emotional or social.
- Exceptional children need a special environment.
- Special environment may be provided in the normal school or in a special school.

Classification of Exceptional Children

Exceptional children can be classified as follows:Classification of Exceptional Children

1. Mentally Exceptional
   - Gifted
   - Backward or mentally retarded
2. Emotionally Exceptional
   - Delinquents
3. Physically Handicapped
   - Blind and near blind
   - Crippled
   - Deaf and dumb
   - With defective speech.
4. Socially Handicapped
5. Neurotic
6. Multi-handicapped

Importance and Need to Educate Exceptional Children (Special Education)

Constitutional Directive on compulsory education includes education for all children till the age of 14 years. Therefore, exceptional children must also receive education. The Declaration of the Rights of the Child, adopted by the United Nations in 1959, stated, 'The child who is physically, mentally or socially handicapped shall be given the special treatment, education and care required for his particular condition.'

India's National Policy for Children (1974) specifically observed, 'Children who are socially handicapped, who have become delinquent or have been forced to take to begging or are otherwise in distress, shall be provided facilities for education, training and rehabilitation and will be helped to become useful citizens.' It further stated, 'Special programmes shall be formulated to spot, encourage and assist gifted children, particularly those belonging to the weaker sections of society.'

The National Policy on Education, 1986 and as amended in 1992 also envisages special provision for the handicapped.

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Apart from constitutional obligations, education of the exceptional children should receive special attention on account of the following reasons:

- Exceptional children do not get proper motivation in regular classroom work as they need different treatment.
- Exceptional children may develop behavioural problems if their specific needs are not properly attended to.
- Principle of equality demands that all children must be provided with equal opportunities to develop their potentialities to the maximum level.
- Education of the exceptional children will enable them to be self-supporting economically.
- Special education will guide these children to become useful members of the society.
- Several categories of children i.e., the deaf, the dumb and the blind need special curriculum, methods of teaching and instructional materials which can be provided only in special schools.

5.2.1 Gifted Children

Kirk, in his book *Educating Exceptional Children,* stated that in ancient Greece, over 2000 years ago, Plato stressed the need for proper and special education of the intellectually superior children.

On account of the significant contribution of the gifted in various fields, interest in their special education and training has grown considerably all over the world during the last one hundred years. Gifted children are the wealth of any civilization or society.

A gifted child is both an asset and a responsibility. He is an asset of incalculable value to society. His potentialities for good are difficult to overestimate. Our socio-economic structure, both at the national and international level, demands that leadership should be of the highest quality with keen intelligence. Following are the important reasons for growing interest in the gifted children:

- Values of democracy can only be realized in the fullest sense when we recognize the full range of ability within our total population.
- There is a limited pool of ability and special talent in every country. This must be identified and developed to save it from loss.
- The gifted individuals have played an important role in the preservation and advancement of civilization.
- Many gifted children languish in educational institutions simply because they are not aware of their 'gifts' and the school programmes do not provide them enough motivation and challenge.
- We need leaders for our business, education, research and government. These leaders are provided by this class of gifted children.

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Meaning and Definition of the Term Gifted

Some of the important definitions are mentioned to explain the meaning of the word 'gifted child'.

According to Robert J. Havighurst, a professor, physicist, educator, and aging expert, 'The talented or gifted is one who shows consistently remarkable performance in any worthwhile line of endeavour.'

In the words of Leta S. Hollingworth, 'By a gifted child we mean one who is far more educable than the general children. The greater educability may lie along the lines of one of the arts, as in music or drawing, it may lie in the sphere of mechanical aptitude, or it may consist in surpassing power to achieve literacy and abstract knowledge.'

Prem Pasricha observed, 'The gifted child is the one who exhibits superiority in general intelligence or the one who is in possession of special abilities of high order in the fields which are not necessarily associated with high intelligence quotient.'

Intelligence Quotient (IQ) and the Gifted

Lewis Terman, in 1916, set the lower limit for the gifted person at 110 on the Revised Stanford Binet Simon Intelligence Scale. In 1937, only children having IQ of at least 120 (1.25 sigmas above mean) were judged to be very superior. Some years later, children with IQ 125 or above in the major classes of Cleveland, Ohio, were classed as superior. Goddard used 120 as the lower limit in forming classes for gifted children including both those with special artistic and mechanical talents and those who excelled in creative thinking and abstract reasoning.

Gifted children may be classified into three categories:

- Superior, having IQ between 100 and 120
- Very superior, having IQ between 120 and 140
- Near-genius, having IQ 140 or more.

Scope of Giftedness: Not Confined to IQ

Giftedness is not only confined to intellectual domain but it also pervades different areas. Thus, Guilford envisaged as many as 120 different abilities as an individual may be gifted in one or more abilities in different areas.

The 57th Yearbook of the National Society for the Study of Education in the US explained the nature of giftedness as, 'A talented or gifted child is one who shows consistently remarkable performance in any worthwhile line endeavour. Thus, we shall include not only the intellectually gifted but also those who show promise in music, the graphic arts, creative writing, dramatic, mechanical skills and social leadership.'

Ralph W. Tyler, discarded the IQ standard and defined the gifted child as one who is exceptional in the amount of production, the rate of his production, the quality of his production or a combination of these; a child who may do much more school work than the average student does, he works faster and performs with much higher quality.

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Kirk referred giftedness as any of the following special aptitudes and talents:

- Academically talented
- Artistically talented
- Linguistically talented
- Mechanically talented
- Musically talented
- Physically talented
- Socially talented

Sumption and Lucking envisaged the gifted as, 'Those who possess a superior central nervous system characterized by the potential to perform tasks requiring a comparatively high degree of intellectual abstraction or creative imagination or both.'

Louis A. Fleigher and Charles E. Bish observed, 'The term gifted encompasses those children who possess a superior intellectual potentiality and functional ability to achieve academically in the top 15 to 20 per cent of the school population; and/or talent of a high order in such special areas as mathematics, science, expressive arts, creative writing, music and social leadership, and a unique creative ability to deal with their environment.'

W. J. Getzels explained giftedness as, 'Although the question may be largely a semantic one, there is no doubt that many desirable qualities exist beyond those with an exclusively intellectual form. Are there not some social qualities, say moral character or psychological adjustment which also might lead us to call an individual gifted, and may perhaps be reflected in superior school performance, to say nothing excellence in other areas such as public service? Surely the study of such qualities might be an adjunct to any general and systematic examination of giftedness.'

Luois Leon Thurstone, a US pioneer in the fields of psychometrics and psychophysics, observed that a person of high intelligence may not be creative. According to him, 'To be extremely intelligent is not the same as to be gifted in creative work. This may be taken as a hypothesis. It is a common observation in the universities that those students who have high intelligence, judged by available criteria, are not necessarily the only ones who produce the most original ideas. All of us probably know a few men who are creative and highly intelligent, but this combination is not the rule.'

L. X. Magnifico divided the gifted into two groups as follows:

- A child whose ability, as indicated by an intelligence test, is within the range of the upper 2 or 3 per cent of the population
- A child having outstanding ability in a given field, for example, music or art

Eight-fold Criterion for Defining Gifted Children

In emphasizing special talents, Paul Witty enumerated the following criteria for defining very young gifted children:

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- A large vocabulary, accurately used
- The use of phrases and sentences at an early age, as also the ability to tell or reproduce a story
- Interest in books and later enjoyment of atlases, dictionaries and encyclopaedias
- Interest in calendars and clocks
- Ability to concentrate longer than most children
- Early discovery of cause and effect relationship
- Early development of mental faculties; gifted children often learn to read before they enter school
- Proficiency in drawing, music or other art forms

Behaviour Pattern of Gifted Children

The behaviour patterns of gifted children are as follows:

- **Physical characteristics:** They are physically sound and better than normal children. Their faces are usually bright. They possess vigour and vitality.
- **Intelligence:** Their intelligence is high. Their 'g' factor of intelligence is very strong. Some have a very strong group factor or 's' factor.
- **Varied interests:** Their interests are more varied than those of normal children. A gifted child of eight may read novels, write long essays, take interest in subjects such as history, geography, astronomy, grammar, physics and music.
- **Inquisitive nature:** They are extremely inquisitive and quick in understanding.
- **Superiority in academic work:** They are characterized by general superiority in academic work. Even in the elementary school, they do their best work on tests of reading and language. 45 per cent of Terman's group of gifted children, whom he studied, learned to read before entering school. Regarding one child, Terman said 'As early as 21 months, she read and apprehended simple sentences, by 26 months her reading vocabulary was more than 700 words.'
- **Well adjusted:** As regards character and personality traits, they are well-adjusted. Terman stated, 'Even in leadership and social adaptability, traits in which gifted children are thought to be especially deficient, most studies show gifted children to be somewhat superior to children of the general school population.'

Positive and Negative Characteristics of the Gifted Adolescents

James M. Dunlop has categorized positive and negative characteristics of gifted children:

Positive Characteristics

The positive characteristics are as under:

- Learn easily and rapidly

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- Retain what they learn without much drill
- Have a rich vocabulary marked by originality
- Show interest in ideas and words
- Show much curiosity in questioning
- Enjoy reading
- Reason things out
- Possess greater ability to generalize
- Know and appreciate things of which normal children are unaware
- Take interest in the nature of man and universe at an early stage
- Seek older companions
- Possess a good sense of humour
- Have a desire to excel

Negative Characteristics

The negative characteristics are as under:

- Restless, disturbing and inattentive
- Careless in handwriting
- Indifferent to class work
- Critically outspoken

Extent or Incidence of the Gifted Population

Hollingworth, on the basis of a study, concluded that there is one gifted child in a population of one million. However, studies conducted by J. J. Gullagher did not tally with the estimates of Hollingworth. Usually, it is said that about 2 to 3 per cent of the population may be placed in the category of the gifted.

On account of several factors, it is not easy to estimate the number of gifted children in a particular school population. The difficulty is on account of the fact that there is no single criterion which can be used as the yardstick for assessing giftedness.

Identification of the Giftedness

Usually four types of techniques are used to identify giftedness. Gallagher pointed out the following limitations of various techniques in this regard:

Table 5.1 *Limitations of Various Techniques to Identify Giftedness*

	Method	***Limitations***
1.	Intelligence tests (Individual)	Best but expensive and time consuming.
2.	Group intelligence tests	Generally good for screening. May not identify those with reading difficulties and emotional problem.
3.	Achievement test batteries	Will not identify under achieving gifted children.
4.	Observation by teachers	Not suitable for children with emotional problems, and children and others with hostile attitudes towards school.

Gallagher concluded that what gifted children have in common is the ability to absorb concepts, to organize them more effectively and to apply them more appropriately.

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Adjustment Problems of Gifted Children

A gifted child may become a problem for the parents and the teacher if he is not handled properly. The following problems arise:

- He revolts against the parents and teachers when they do not recognize him, and sometimes creates mischief in order to catch their attention or to show his superiority.
- There is lack of stimulation for him in the subjects of his interests when he does not get opportunities to progress according to his own pace.
- Because of lack of opportunities and lack of recognition, he sometimes develops inferiority complex.
- Too much of recognition or applauses by the parents or teachers, leads to the development of a feeling of pride and arrogance in the child.
- When the gifted child is not properly guided, he utilizes his superior intelligence in mischief, indiscipline, gang-formation and revolts against his elders. He, in turn, becomes a nuisance.

Education of the Gifted

Efforts to identify gifted children were started in the US by WT Harris in St. Louis Public School in 1867. By 1920, three public schools in Cleveland, Rochester and Los Angeles in the US were offering enriched programmes to gifted children. Later, all educators, parents and administrators recognized the importance of providing special education to gifted children.

Methods of educating the gifted

The methods of educating the gifted children are as follows:

1. **Acceleration:** Acceleration offers opportunity for a gifted pupil to move at a pace appropriate to his ability and maturity and to complete an educational programme in less than the ordinary amount of time. It involves advancing the gifted child rapidly from one grade to another in school so that he enters college earlier than others.
2. **Ability grouping or homogeneous grouping or segregation:** The gifted pupils may be placed in special groups for all or part of the school day. The purpose of ability grouping is usually to provide for enrichment of children's experiences in both depth and breadth, and to permit the children to stimulate one another.

   According to this scheme, students with more or less similar background are grouped together in the same section. It is a common practice in some of the schools to group students into various sections, that is, A, B, C and others according to intellectual, physical and social interests of the students. This

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creates healthy competition and is very useful in a large school where classes can be divided into different sections.

3. **Enrichment Programmes:** Enrichment consists in giving the gifted child the opportunity to go deeper or to range more widely than the average child in his intellectual, social and artistic experience.

   Such a programme may be characterized by (i) emphasis upon the creative or the experimental work (ii) emphasis on the skill of investigation and learning (iii) independent work, stressing initiative and originality (iv) high standard of accomplishment (v) cooperative planning and activity that provide opportunity for leadership training and experiences in social adjustment (vi) individual attention given by teacher to student (vii) First-hand experiences (viii) flexibility of organization and procedure (ix) extensive reading and (x) concern with community responsibility.

   The gifted students should be encouraged to study a variety of books and reference material. On the co-curricular side, provisions for a sufficient variety of activities should exist in a school so that the students may develop various social and moral qualities of a high order.

4. **Triple Track Plan:** Track Plan which introduces elasticity in the classification of the students is very popular in American schools. According to this scheme, the authorities prescribe a uniform syllabus for all. Average children cover it within the normal period, the dull in a large period and the gifted in a shorter period in comparison to average children.

5. **Rapid Promotion or Double Promotion:** By this we mean more than one promotion during the course of the year. If a child shows an extraordinary achievement in one class, he may be given a double promotion. The aim of this promotion is to place the gifted student in a setting suiting him the most. However, at occasions such promotions prove to be very detrimental to the child. The child may be a gifted one in comparison with the students of his previous class but may not show the same progress in the next class with the students of different mental and physical make-up and this would result in his mental slowdown in the new setting. Age, social maturity and health—all these factors should be given due weightage.

6. **Special Schools:** In some of the developed countries, separate schools are provided for such students. This system has been criticized on the ground that quite a large number of such students are deprived of the practice in leadership which they would get in association with average children.

   Brown was of the opinion that keeping these children as an integral part of the school was the most important factor in affecting their future performance.

7. **Summer Schools:** These schools are planned during summer vacations. These schools have been successfully tried in the US. Academically talented students are selected from different parts of the country on the basis of psychological tests, interview and previous school records and are brought together for a special educational programme. The programme is intended to

be very challenging and is planned under the expert guidance of a band of talented teachers. The students are provided with the best available books which they may consult for writing their project reports and for holding discussions in the class. Usually, three areas—science including mathematics, social studies and literature are covered.

After the programme is over, the students return to their regular schools. Students can attend summer schools as long as they do not complete their final school leaving examination.

Advantages of the Scheme of Summer Schools

The benefits of summer schools are as follows:

- The scheme provides students with challenging situations.
- The students realize, perhaps for the first time, that there are other children equally intelligent, or even more intelligent than them.
- The scheme sets the pattern for an enriched programme for the talented.
- The scheme is psychologically and scientifically sound, as it provides a suitable basis for developing a curriculum for the talented children.
- The scheme provides first-hand experiences to students of living together for a number of weeks with a wide variety of talented children.
- The scheme provides first-hand experiences to teachers for handling the problems of the academically talented children.
- It is easy to have an all-India scheme for the purpose without much difficulty either of an administrative or of a technical nature.
- The scheme fits in the context of our democratic educational set-up.
- The scheme will help in creating the necessary climate in the country for making adequate provisions for the education of the academically talented.
- It would be possible to make the best use of the potential human resources.
- The scheme will help in providing the necessary basis for organizing systematic and scientific research on the academically talented.
- The scheme will also help in spotting out a large number of talented teachers.

8. **Scholarship Programmes:** The large programme of scholarships at all stages will ensure that all gifted students, or at least the top five to fifteen per cent of the relevant age group, will receive the highest education possible.
9. **Special Visits:** Well-planned visits may be arranged to laboratories, museums, and other places.
10. **Contact with Talented People:** Talented students may be brought into contact with persons engaged in the types of work for which the students show special ability or interest. These persons may be able to provide occasional opportunities for the students to work in their special fields.
11. **Hostels:** Hostels or 'day centres' should be made available for those students whose home environment is not conducive to proper study.

NOTES

Roles of those Involved with Educating the Gifted

(i) Role of the counsellor: The role of the counsellor in the promotion of a talent can be very important. The counsellor with his detailed knowledge of each talented student is in a unique position to formulate a programme for his enrichment and suggest the necessary modifications required in the existing curricular and extracurricular programme. Where special counsellors are not available, this task falls on the teachers.

It is, therefore, necessary to train teachers for this responsibility through in-service seminars and special courses. It should be impressed on them that the classroom atmosphere and the attitudes of teachers are of considerable importance. In a social and educational set-up like that of India, where the relationship between the teacher and the taught is still largely authoritarian, the general tendency is to suppress any urges and interests that deviate from the class norm. The first requirement for the promotion of talent, therefore, is for the teachers create an atmosphere of free expression in the classroom and to provide opportunities for creative work.

In planning for the development of the talented student, it should be remembered that it is not only his intellectual competence of special ability that needs to be developed. The development of the emotional and social aspects of his personality, and of socially desirable attitudes, is equally important.

(ii) Role of every educational institution: The Education Commission 1964–66 observed, 'Every educational institution should be assisted to develop a programme for identifying the brighter children attending it and for providing them with special enrichment programmes to suit their needs and to help in their growth. These programmes, the nature of which would vary from stage to stage and from one type of institution to another, would have to be carefully designed and teachers would have to be trained, in putting them across. In all these programmes, "talent" should not be understood in the traditional sense only, but should cover a wide range of mathematical, verbal, artistic and experimental skills. Scholarships and encouragement should be available, on a basis of equality, to all talent at all stages of education.'

(iii) Role of the education departments: The responsibility for the development of this comprehensive programme should be squarely placed on the education departments which should work in collaboration with the universities. The secondary stage is the most crucial for discovery and development of talent, and unfortunately, it is precisely at this stage that the scholarship programme is now weak. Its development will, therefore, have to be accorded high priority.

We may sum up the discussion with the observations of the Education Commission. 'A dearth of competent and trained manpower is now felt in nearly every branch of national life, and is probably one of the biggest bottlenecks in progress. Poor as we are financially, the poverty of trained intellect is still greater. We might do well to remember Whitehead's warning: "In the modern world the rule is absolute—any race which does not value trained intelligence is doomed.'"

5.2.2 Backward Children

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Problem and Its Importance

Educational administrators, teachers, parents and social workers face problems with those children who lag behind other children in their school work. They do not benefit and are not able to manage and deal with classroom instructions. In a highly technological age, where talents are very much needed, dissipation of human resources is a great problem.

In India which has the lever of a skilled manpower resource, the gravity of the problem of backward children cannot be ignored any more. Both as a social and as well as an economic problem, care, education and training of the backward children has gained significant importance in recent years.

Definition of backwardness

Some of the popular definitions of backwardness are as follows:

Burton Hall (1947) gave the following definition, 'Backwardness in general, is applied to cases where their educational attainment falls below the level of their natural abilities.'

According to F J Schonell, 'Backward pupil is one who compared with other pupils of the same chronological age, shows marked educational deficiency.'

C Burt (1950) defined a backward child as, 'one who in mid-school career is unable to do the work for the class next below that which is normal for his age.'

Types of backwardness

Backwardness in children can be of two types. A child who is dull, that is, of low intelligence and who is lagging behind in class is considered backward. On the other hand, a child who does not fare well in class, even though his level of intelligence is normal or even above normal, is also considered to be backward, only because his educational achievements are not satisfactory. In many cases, the teachers are not able to distinguish one from the other, and label both these types of children under the category of 'dull children.' Under such circumstances, even the child with normal intelligence is unable to exert himself as he is made to believe that he is dull. Enormous amounts of wastage occur due to his misconception.

Backwardness and retardation

No attempt to define 'backwardness' is, however, complete without some reference to Schonell's use of the terms 'Backwardness' and 'Retardation', since his methods are still widely used for the selection of cases for remedial education.

In categorizing backwardness, Schonell introduced the mental age concept, and 'Subject' or Educational Age (EA), as determined by standardized tests. In Schonell's view, backwardness is measured in terms of the difference between the Educational Age and Chronological Age (CA), so that in this context, he is following the same pattern as Burt. Schonell, however, goes on to introduce the concept of 'Retardation'.

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Table 5.2 Cases Illustrating Schonell's Definition of Backwardness and Retardation

Case	*IQ*	*CA*	*MA*	*EA*	*Classification*	*Comments*
A	100	10	10	10	Neither Backward nor Retarded	Satisfactory
B	100	10	10	8	Backward and Retarded	Both remedial
C	80	10	8	8	Backward only	Non-remediable
D	80	10	8	6	Backward and Retarded	Only retardation is remedial
E	120	10	12	10	Retarded only	Remedial
F	70	10	7	8	Backward only	Non-remediable
G	120	10	12	8	Backward and Retarded	Both remedial

(a) Backwardness refers to Educational Age (EA) relative to Chronological Age (CA).

(b) Retardation refers to Educational Age relative to Mental Age.

Retardation is measured in terms of the extent to which the Educational Age falls below the Mental Age. This approach is based on the hypothesis that a child cannot be expected to perform at a level above that of his innate ability as expressed in terms of Mental Age. In applying Schonell's approach, we find that a number of contingencies can arise. These are best illustrated by means of Table 5.1.

5.2.3 Slow Learner

Prof. T N Birkett defined, 'A slow-learning child is one whose capacity for learning the kind of material which is taught in the ordinary school is limited by some deficit in intellectual capacity. Limited intelligence, however, may be defined as the chief characteristic of the 'Slow Learner."'

Classification of Backward / Slow Learners

(i) Children whose capacity to undertake education or training is limited because of low intelligence, cover a fairly wide IQ range from approximately 40 to 80 or 90. However, students whose IQ ranges between 50/55 to 85/90 are capable of benefiting from the kind of education which is offered within the normal school system. These may be subdivided into two groups.

- The Educable Mentally Retarded (IQ range 50 to 70).
- The Dull Normals (IQ range 70 to 85).

(ii) Students whose IQ range is between 35/40 to 50 are usually found as Trainable Mentally Retarded. Provision for education of such children may be made outside the normal school system.

Backwardness in Indian context

Backwardness in Indian context cannot be limited to clear-cut definition in general terms. Several complementary definitions become necessary. In Indian context a backward child is one:

- Who is two years above the average age of class, where this is the result of stagnation and not of late enrolment or interrupted schooling, and is experiencing difficulty in working up to the norms of the group in school subjects.

- Who is grossly under-functioning in one or more subject areas, although his age approximates to the class average.
- Whose average total achievement score is less than minus one standard deviation.

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Need for Education of Backward Children or Slow Learners

We cannot ignore the care and education of the backward children who are found in varying degrees in every school. Such children behave like other children with the exception that they take longer time and effort to learn. Slow learners are sometimes referred to as 'backward children.' Schonell called a backward pupil as 'one who compared with other pupils of the same chronological age shows marked educational deficiency.' With proper guidance, backward children can become useful members of the society.

Chief Characteristics of Backward or Slow-learning Children

Sullivan summarized the characteristics of backward and slow-learning children as follows:

- Short attention and concentration span
- Short reaction time.
- Limited ability to evaluate material for relevancy
- Limited power of self-direction
- Limited ability to work with abstractions and to generalize
- Slowness to form association between words and phrases
- Failure to recognize familiar elements in new information
- Habits of learning very slowly and forgetting very quickly
- Very local point of view
- Inability to set-up and realize standard of workmanship
- Lack of originality and creativeness
- Inability to analyse, to do problem-solving, or think critically
- Lack of power to use the higher mental processes

Causes of Backwardness

There is no denying the fact that backwardness of a child is due to a number of factors which operate simultaneously. Each child has to be studied individually in order to find the reasons for his backwardness. The causes may be grouped on the basis of their origin.

- **Home conditions:** Lack of accommodation, over crowdedness, uneducated parents, emotional and moral conditions of home affect the attainment level of the child in school.
- **General health:** Poor physical and general health, malnutrition, diseases and other factors contribute towards backwardness of a child.

NOTES

- **Intellectual defects:** (a) General—Intellectual deficiency or inborn dullness is the most common and important cause of backwardness (b) Special—Apart from general intelligence, there may be other special intellectual disabilities like perceptual and associative disabilities.
- **Physical conditions:** As physical and mental growth are closely related, physical defects often lead to backwardness.
- **School conditions:** Inefficient teaching, ill-organized school organization, unsympathetic behaviour of the teachers, lack of individual and group counselling, absence of the child from the school are the important factors which are responsible for backwardness of a child.
- **Sensory defects:** Weak eyesight, poor hearing, lack of control of hands also hamper the work of the classroom more directly than physical defects. Sensory defects prove to be a great barrier to the acquisition of knowledge, thereby causing backwardness.
- **Social:** A number of surveys were conducted in various countries by eminent psychologists to find out the backwardness in relation to the social environment of the child. A survey conducted by Burt during 1925–35, covering the entire area of London, reported that backwardness and poverty go hand in hand.
- **Temperamental defects:** Emotional instability, excitability, depression, apathy, lack of industry and lack of honesty are some of the numerous temperamental disorders which can be equally responsible for backwardness.

Problems of a Backward Child

A backward child suffers from the following problems:

- A backward child lags behind his classmates. He, therefore, becomes bitter and hostile towards himself and others.
- A backward child is filled with anxiety.
- A backward child lacks the motivation to learn.
- Repeated failures deprive him of his confidence.
- A backward child may become a problematic child.

Identification of Backwardness

In this regard, it may be borne in mind that backwardness may be specific, affecting only one subject or part of a subject area, or general appearing over a range of school subjects. In carrying out the procedures, we should endeavour to be as objectives and scientific in our appraisal as circumstances permit and remain alive to the dangers of intuitive assessment.

- **Assessment:** As a general rule, it is advisable that more than one assessment of mental ability should be made using different tests, at least one of which is of the individual type.
- **Attainment tests:** The normal method of getting this information is through the administration of standardized tests of achievement in the various subject

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areas. Such tests usually yield scores in terms of Subject Ages which can be compared to be child's Chronological Age level and thus provide an index of backwardness where this exists.

- **Teacher's observation:** Teachers are the best judges for identifying backward children on the basis of their observation in and outside the class.
- **Personality inventory and case history*:*** For supplementing information gathered from other sources, tools of personal inventory and case history may also be used.

Guiding Principles for the Education of the Backward and Slow Learners

The following principles are very conducive to the education of the backward children. In the first instance, maximum information should be gathered about such children and their interests should be discovered.

- **Patience:** Patience is the key word in the education of the backward children.
- **Free expression:** Sufficient time should be given to the backward children so that they are able to express themselves.
- **Diagnostic tests:** Diagnostic tests should be used while working with backward children.
- **Proper equipment:** Backward children should be provided with schoolbooks, stationery, calculators, computers and other tools at the proper time.
- **Drill work*:*** Sufficient drill work needs to be done by the backward children.
- **Short assignments:** Assignments given to the backward students should be broken up into short and simple units.
- **Summaries and recapitulation:** Summaries and recapitulation work should be carried out frequently.
- **Audio-visual aids:** Such aids facilitate the learning of the backward students.
- **Praise:** Slow learners should be praised and encouraged occasionally when they do their assignments in a satisfactory manner.
- **Opportunities for creative work:** Creative work is very helpful for motivating backward children.
- **Curricular work according to individual differences:** Students should be allowed to select various courses and activities in accordance with the three A's—age, ability and aptitude.
- **Educational and vocational guidance:** A comprehensive programme of educational and vocational guidance should be planned for the backward children.
- **Equality of opportunity in recreational programmes:** The whole programme of recreational activities, athletics, music, art and dramatics should be open to all on an equal basis. Mones summarized the advantages which the slow-learners get 'when these people are accepted in secondary schools, the schools, clubs, the bands, the patrols, the clean-up squads, the down and

NOTES

ground squads, the cafeteria patrols, athletics teams are all possible instrumentalities of their education. If they can find educational outcome in the way of developing traits, attitudes, purposes, and satisfactions that will give them a sense of integrated personality.'

- **Remedial teaching:** Remedial teachers who meet such students twice a week may be appointed.
- **Special classes:** Special classes for slow-learning children should be organized. However, partial segregation is preferable to total segregation.
- **Partial segregation:** It has been stated, 'The children should be included in the total school set-up, regularly participating in assembly programmes, organized play, and other activities enjoyed by all children.' The problems should be clearly explained. Professor Udai Shankar emphasised the need of segregation in these words, 'if they are kept with normals, they will be pushed back and the backward will become more backward with children of their own level. But they will be less conscious of their drawbacks and they will feel more secure in a group of their own type where there will be more encouragement and appreciation and less competition.'
- **Regular medical check-up and follow-up:** Such arrangements must exist in every institution.
- **Cooperation of all agencies:** All agencies in the child welfare work should fully cooperate with one another.

5.2.4 Juvenile Delinquency

Every society prescribes a set of norms which it expects that all its members should follow. Those who deviate from these norms and behave in anti-social manner are called delinquents. Children and adolescents who are minor in age and who deviate are known as juvenile delinquents. Juvenile delinquents commit offences like assaulting, cheating, gambling, murder and stealing. They also indulge in sexual offences. Most of these delinquents are school drop-outs.

The following definitions provide valuable insight to the concept of juvenile delinquency.

C Burt observed 'A child is to be regarded as technically delinquent when his anti-social tendencies appear so grave that he becomes or ought to become the subject of official action.'

According to Hadfield, 'Delinquency may be defined as an anti-social behaviour. It is primarily a term of social application: it is a failure in social adaptation.'

Herbert Quay viewed, 'The delinquent then would be a person whose misbehaviour is relatively a serious legal offence, which is inappropriate to this level of development, is not committed as a result of extremely low intellect ... and is alien to the culture in which he has been reared.'

Johnson and Szurck said, 'Delinquency as holes in super ego.'

According to Howrer, 'Delinquency is moral deficiency.'

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A Cloward Richard observed, 'The delinquent act is a behaviour that violates norms of the society, and when officially known, it evokes a judgement by agents of criminal justice that such norms have been violated.'

Travis Hirchi said, 'Delinquency is defined by acts, the deletion of which is thought to result in punishment of the person committing them by agents of the larger society.'

Valentine observed, 'Broadly speaking, the term delinquency refers to the breaking of some law.'

From the above, it can be concluded that delinquency has the following features:

- It is a deviation from the accepted standards of the culture of a society or the laws of the land.
- The deviation is detected.
- The deviation results in punishment by the judges.

Characteristics of Delinquents

Sheldon Glueck (a Polish-American criminologist) and his wife Eleanor Glueck in their studies of delinquency found the following general characteristics:

- Attitudinal: A delinquent is defiant, hostile, non-submissive to authority, resentful, suspicious and unconventional.
- Physical: A delinquent is mesomorphic in constitution, muscular and bold.
- Psychological: A delinquent is less methodical in approach.
- Social: He usually lacks moral standard.
- Temperamental*:* A delinquent is aggressive, destructive, energetic, extraverted, impulsive and restless.

Types of Delinquent Acts

- Acquisitive tendency resulting in stealing and so on
- Forgery leading to forged signatures of the parents on cheques.
- Aggressive tendencies which include (i) damaging school property (ii) bullying and mockery (iii) torturing (iv) committing suicide.
- Sex delinquency includes: (i) corruption by talks, (ii) exhibitionism (iii) homosexuality (iv) heterosexuality (v) making sexual suggestions (vi) masturbation (vii) obscene drawings and pictures (viii) prostitution and (ix) abducting and raping.

Causes of Delinquency

Delinquency is the result of a number of causes. Broadly speaking, these may be categorized under the following heads:

- Hereditary, biological and physiological
- Home environment

- School environment
- Social environment

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1. Hereditary, Biological and Physiological

- **Criminal Type:** In the last quarter of the 19th century, Italian criminologist, Lombroso, put forward the hypothesis of a criminal type. He held that the majority of crimes are committed by 'born criminals.' Lombroso held that a number of physical and mental peculiarities are found in born criminals; for instance, they are mentally 'deficient in sensibility to pain, have unnatural emotions and a defective moral sense, and possess peculiar physical features like "an excessive development of jaws, high cheek bones and asymmetrical or misshapen ears."' According to him, normal persons would not possess all these mental and physical marks together; only the born criminal will have a significant number and a peculiar combination of these. Later, Lombroso added that to bring about a full development of criminality, environmental influence is necessary. Goring and others tested what Lombroso had said and declared that the criminal hypothesis was unsound.
- **Innate imbecility and delinquency:** Thedyot stressed that delinquency was the result of 'innate imbecility.' According to him, criminals gave evidence of deficiency in powers of moral discrimination, though they often possessed normal and even subnormal or superior intelligence. But Healy's tests declared that such cases were not of defective moral feelings or defective powers of moral discrimination, rather they were mentally defective. Healy, however, held that innate mental defect was an important factor of delinquency. The Stanford-Binet intelligence tests supported the view of Healy by finding a considerable percentage of mental defectiveness among delinquents, the range varying from 15 to 30 per cent.
- **Delinquents and mentally defective children:** According to Goddard, 30 to 50 per cent of the delinquents are mentally defective. But these tests have been criticized on the ground that they were of the Binet-Simon variety, which were not sufficiently standardized then. According to Cyril Burt, 7 per cent of delinquents are defective as compared with 1 per cent of non-delinquents. Murchison did not find any important difference between the delinquents and the non-delinquents so far as intelligence was concerned. According to Slawson, in the measure of verbal intelligence, the delinquents were inferior to the non-delinquents on the average but in non-verbal tests there were no significant differences, rather the delinquents, on the average were superior to the non-delinquents. Slawson said that the social status was an important factor leading to delinquency. He also emphasized the fact that low social status was also responsible for low intelligence.
- **Delinquency and innate emotional instability:** According to Dr Parsons, the major cause of delinquency is innate mental abnormality. But his assumptions were proved wrong by Cyril Burt and others. Burt said that delinquency is caused by innate emotional instability. According to him,

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temperamentally defective persons are marked by emotional maladjustments. Delinquents are emotionally unstable from their birth onwards, though intellectually they are normal. According to his views, the proportion of emotionally unstable and temperamentally defective persons is three to six times greater among the delinquents than among the non-delinquents. Woodworth's device of Psycho-neurotic Questionnaire indicated that instability score of an individual is directly associated with delinquency. But the problem whether emotional instability is innate or acquired is still an open question.

2. Home Environment

- Broken homes and marital adjustment problems
- Disability of parents
- Defective discipline
- Lack of affection
- Partiality of parents
- Lack of recreation
- Crowded families
- Lack of moral code
- Extreme poverty and also extreme wealth
- Servant's company
- Sudden accidents or deaths

3. School Environment

- **Unhealthy physical environment of the school:** Unhealthy surroundings, noisy places, absence of playground, insufficient accommodation and overcrowded classrooms dampen the spirit of the child.
- **Defective organization of the school:** Bad timetable, long hours of study, lack of co-curricular activities, stress of examinations, lack of guidance and lack of special facilities for retarded and backward children create conditions of dislike and even hatred for the school.
- **Unsuitable curriculum and uninspiring methods of instruction:** These inappropriate curricula and inept teaching methods destroy all interest in the studies, in the mind of the child. No wonder that he plays a truant, or remains away from the school.
- **Wrong attitude of the teacher***:* This becomes an important source of most of the crimes committed by adolescents. Slurs, taunts, cutting remarks, racial or social prejudices, severe punishments, lack of sympathy, rudeness and injustice create revolting and revengeful spirit in a child. Hartshorne and May, American psychologists made a study of some children who have been honest earlier but turned thieves in the school under rude teachers.
- **Unhealthy relationship among pupils in the school:** Lack of organization, coordination and discipline create jealousy, rivalry, formation of gangs, caste

prejudices among pupils. In such cases, the energies of adolescents are spent on fighting, picketing, strikes, destructive actions and crimes.

4. Social Environment

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- Inequalities
- Class conflict
- Natural calamities
- Corruption at various levels

Remedial Measures

It may be stressed that a delinquent act is the outcome of a tendency of satisfying a thwarted or checked motive. So the best way of preventing such acts is to satisfy the needs of children in respect of their social, economic and hygienic conditions. Our attention should be directed to the betterment of their environment. Ethical training should be given from the very beginning. Adaptability, altruism and harmony should be emphasized regularly. Social influence is the best way to give the child direct teaching in practical morality. Morality cannot be taught, it is caught. So, emphasis should be laid to present examples of good moral behaviour rather than precepts. Parents should also be educated to appreciate the value of these principles.

Role of Parents

- Understanding their children's emotions, urges and mental traits
- Providing children with necessary requirements and facilities
- Creating healthy emotional, physical and social environment
- Developing proper discipline at home
- Setting good examples
- Contacting school from time to time

Responsibility of the Society

- Strengthening cultural and religious institutions, youth-serving agencies, educative agencies like libraries, recreative agencies like public tournaments and clubs.
- Helping the youth-serving organizations like Bharat Scouts and Guides and others.
- Eliminating evil influences from the society like gambling, drinking, robbery, pick-pocketing, prostitution, begging, slums, unemployment and poverty.
- Opening and strengthening reformative agencies like juvenile courts, police service, orphanages, mental hospitals, guidance clinics, Bal Niketan children's homes, district jails. Juvenile police should be instituted to patrol areas infested with delinquents.

Role of the School and Teachers

1. Preventive Measures taken by teachers
   - Reforming techniques of teaching
   - Sympathetic attitude
   - Organizing creative and constructive activities
   - Constructive discipline
   - Guidance and counselling
2. Diagnosis
   - Medical examination of the delinquent, stating physical disabilities, if any.
   - Administering mental tests, discovering IQ, character traits and personality traits.
   - Administering achievement tests and finding the scholastic level, educational attainment and failure.
   - Preparing case history, collecting data about the family and community life, about the school life of the child.
   - Examinations by the psychiatrist, who will interview the child, engage him into playful activities; administer the Children's Appreciation Test (CAT) or the Thematic Appreciation Test (TAT) tests. The psychiatrist will take him into confidence and elicit from him his problems and their sources.
   - Interpretation of the data. This will be done in a special meeting of the psychologist, psychiatrist and the social worker (who gets data about the family and community).

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Remedial Measures

- The classroom and school environment should be purged of all the deficiencies and should be made stimulating.
- The teacher's attitude must be sympathetic. He should understand and be aware of the difficulties and help the delinquent to overcome those difficulties. He should develop wholesome human relationship.
- Guided group activities must be encourage like group play, group games, scouting, social service, group therapy and so on. These will strengthen their ego and super ego.
- Special classes must be started for the low achievers.
- Crafts or skills are useful in engaging the less developed mind to proper action.
- The teachers should take the help of clinical services in understanding the specific problems.
- The parents should be educated and they should be appraised of the activities of the child. The parent's attitude must be changed and the father should be

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made to understand the nature and the cause of the boy's trouble to avoid further dangers.

- The change in the environment also helps in certain cases. Children can be removed from bad homes and put in foster homes, from bad school and admitted into reputed schools.
- The impulses and emotions of children must be sublimated. Instead of advising them, they should be engaged in activities.
- Punishments, corporal or otherwise, should not be taken recourse to, as these only create reaction and revolt in the mind of delinquents.
- Proper supervision should be done regarding the gangs and their activities in the school and community. Gang-formation leads to unsocial behaviour. On the other hand, self-government should be started in the schools so that their energies are redirected to proper course.
- Moral and religious teaching in the schools can go a long way in strengthening the super ego of the children. Noble sentiments should be developed.

CHECK YOUR PROGRESS

1. List the characteristics of exceptional children.
2. What are the positive characteristics of gifted adolescents?
3. What are two kinds of backwardness?
4. What are the characteristics of delinquents?

5.3 PERSONALITY AND ITS THEORIES

No topic in the field of psychology is more fascinating than personality. Tremendous research has been done on the topic but no conclusions have been drawn as regards the nature of personality. If you ask a person the meaning of the term personality, the individual will be unable to give a clear answer to this simple question in definite terms because the human personality is so complex a phenomenon that it can be interpreted in many ways.

Psychologists who have analysed the problem of personality and the variables influencing its development have defined the term 'personality' in various ways.

Meaning of Personality

The meaning and definition of any term is arbitrary. This also holds true in case of the word personality. To arrive at its meaning, we have to trace the historical root of the word. The term personality has been derived from the Latin word *Persona* that was associated with Greek theatre in ancient times. *Persona* meant a mask, which the Greek actors commonly used to wear when they worked on the stage. In our own country, actors in Ram Lila and Krishna Lila use masks when they enact the role of a particular character from the epics.

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The mask, worn by the actors, was called a persona. According to the concept of mask, personality was thought to be the effect and influence that the individual wearing a mask left on the audience. Even today, for a layman, personality means the effect that an individual leaves on other people. Precisely, we can say that the mask or persona of the actor implied a cover for the real person behind it. It was developed on the basis of Plato's idealistic philosophy who believed that personality is a mere facade for some substance.

Some Definitions

1. **Personality as a stimulus:** Some psychologists define personality in term of its social stimulus value. How an individual affects other persons with whom he comes in contact, whether he is impressive or repulsive, whether he has a dominating or a submissive personality. Personality, from this point of view, becomes identical to reputation and impression, mostly in terms of physical appearance, clothing, conversation and etiquette. Generally, we use this concept of personality in selecting applicants for various jobs and courses. The interviewers take into consideration the total picture of an individual's organized behaviour.
2. **Summative approach:** The second approach of defining personality emphasizes the importance of sum total of different processes and activities of the individuals as, for example, innate dispositions, habits, impulses and emotions. This approach was criticized by Gestalt psychologists who objected to the idea of aggregation or sum total of parts without introducing the concept of organization and integration of parts into a total whole.
3. **Integrative approach:** The definitions of this category lay emphasis on the integrative aspects of personality and its definite pattern of organization. Warren's dictionary defines personality as, 'personality is the integrative organization of all the cognitive, affective and physical characteristics of an individual as it manifests itself in focal distinction from others.' G.W. Hartman defined it as, 'personality is integrated organization of all the pervasive characteristics of an individual as it manifests itself in focal distinctiveness to other.'
4. **Totality view:** This approach to define personality puts more emphasis on integration than the first category of definitions given above. It forgets the part. According to this view, the general characterization or pattern of an individual's total behaviour is his personality. A man's personality is the total picture of his organized behaviour, especially, as it can be characterized by his fellowmen in a consistent way. Mark Sherman in his book *Personality: Inquiry and Application* (1979) has defined personality as, 'the characteristic pattern of behaviour, cognitions and emotions which may be experienced by the individual and/or manifest to others.'
5. **Personality as adjustment:** An individual, since his birth, attempts to adjust to his environment. The behaviour of an individual can be defined as an adjustment to his environment. Every individual develops his own unique way

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of adjustment in the society. According to this approach, personality is an individual's characteristic pattern of behaviour. An individual, through his continuous reactions, attempts to adjust himself in his environment. We can say that the sum of the individual's movements as he adapts himself to the environment is his personality.

We have described the various approaches to define the term personality. We now examine the important definitions of personality.

Fredenburgh, in his book, *The Psychology of Personality and Adjustment,* tried to summarize the various definitions in a single definition that runs as, 'Personality is a stable system of complex characteristics by which the life pattern of the individual may be identified.'

Allport (1961) who devoted most of his time for research on personality defines, 'Personality is the dynamic organization within the individual of those psychophysical systems that determine his unique adjustment to his environment.' The definition given by Allport is very comprehensive and includes all aspects of an individual's personality. Some terms used in the definition need explanation. A dynamic personality is one that is undergoing constant changes but is still organized. It constitutes two types of systems, i.e., psycho (mental) and physical and these two systems interact with internal and external environment. The word 'determine' emphasizes that it is the psychophysical system that activates the organism for action. The unique adjustment of the individual to his environment means that each individual employs different methods of adjustment resulting in unique adjustment.

Guilford (1959) defines personality as 'an individual's personality, then, is his unique pattern of traits. A trait is any distinguishable, relatively enduring way in which one individual differs from another.'

Thus, we see that different approaches have been taken to define personality but there is no agreement on a single definition of personality. Though there is diversity of views but even then all psychologists agree on certain common basic characteristics. One basic fact is that personality is unique. No two individuals, even identical twins, have the same personality. The second basic fact regarding personality is that it is the product of its own functioning. What we do today depends on our accumulated experiences of the past. The experiences are accumulated daily and shape our personality by a continuous interaction with the external environment. The third common characteristic of most definitions is that they stress on the need to understand the meaning of individual differences. Personality is what makes an individual unique. It is only through the study of personality that the relevant differences among individuals can be made clear.

5.3.1 Theories of Personality

Psychologists have developed several theories of personality to study its structure and growth. Some of these are as follows:

- Type theory
- Trait theory

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- Psychoanalytic theory
- Phenomenological theories
- Learning theory of personality
- Social Behaviour theory
- Rotter's Expectancy–Reinforcement model

1. Type Theory

It has been the nature of people, from ancient times, to name and classify objects of the environment and human beings into different categories called types. The old system of typology still continues and in modern times. Greek physicians were the first in 5 BC, who classified people four broad categories on the basis of emotional and temperamental characteristics. One of Aristotle's pupils theorized that human body consists of four fluids. The personality of an individual is typed by the dominance of one of them in the body. The four types of fluids are as follows:

If we study our own scriptures we find in that ancient India there existed an advanced system of Ayurveda, in which our ancient physicians broadly categorized all human beings on the basis of three elements in the body. The predominance of one of the three decided the category of the person. It appears that this system of Hippocrates and Indian physicians were, more or less, similar. The three elements, which the Indian physicians theorized are *pitt* (bile), *bat* (wind) and *kuf* (mucus).

A number of typologies have been attempted for constitutional, temperamental and behavioural types of persons by philosophers and psychologists in the ancient and current literature.

Constitutional type

Ernest Kretschmer, a German psychiatrist, classified human beings on the basis of physical constitution. He attempted to establish relationship between personality characteristics and body built.

Somato type

William H. Sheldon, an American surgeon, divided all human beings into three broad categories of physical dimensions and their corresponding temperamental characteristics. He believed that physical structure of the body is the determinant of personality characteristics.

Spranger's type

E. Spranger, German philosopher, divided human beings, on the basis of interest, in the following categories:

- *Theoretical:* Persons who are theoretical in nature neglect social and political participation
- *Economic:* Persons who are interested in money-hoarding
- *Aesthetic:* Persons who are lovers of beauty and are busy in sensuous gratification

- *Social:* Persons who are interested in social activities
- *Political:* Dominating and desirous of power
- *Religious:* Persons who devote themselves to religious activities and mysticism

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Jung's Typology

Jung, a Swiss psychiatrist, attempted to classify human beings on two behavioural dimensions: extrovert and introvert. His typology is widely known and is most influential among professional workers. The major characteristics of two types are as follows:

1. **Introvert:** Defined as a person who tends to withdraw into himself, especially, when facing emotional conflicts and stress in the environment. An introvert individual is shy, avoids people and enjoys being alone. Scientists and philosophers may be termed as introverts.
2. **Extrovert:** In contrast to the introvert type, an extrovert person's orientation is towards the external world. He deals with people intelligently in social situations. He is conventional, outgoing, social, friendly and free from worries. Social workers, politicians, business executives may be typed as extroverts. These two broad categories have been further classified on the basis of rational and irrational processes.

Jung's system of classification of human beings is eight-fold and not two-fold as is popularly known. A person, according to Jung, may be extrovert for one function, for example, feeling and the same person may be introvert in intuition. All persons can be divided into eight types, based on the dominance of one of the above factors. Modern writers have introduced ambivert, another type in between two extreme poles of extroversion and introversion. Ambivert refers to those persons who can be classified as neither extroverts nor introverts.

Freud's Typology

Freud, on the basis of his theory of psycho-sexual development, identified three types of personality. The type depends on the fixation of sexual energy at a particular stage of sex development. The three types are as follows:

1. *Oral-erotic type:* According to Freud, sex in infancy is located within a month of birth. There is a membrane in the mouth which, when irritated gives pleasure to the infant. Sexual gratification at this stage involves activities related to mouth. Oral-erotic type of personality shows excessive degree of pleasures associated with oral activity. Sucking, biting or putting anything in the mouth gratifies sex in infancy. Fixation at the oral stage results in two types of personality in later life.
   (i) Oral passive type: This type of person is dependent, optimistic and immature in his/her thinking and other activities like a child. He/she expects help from other people.
   (ii) Oral sadistic type: This type of person is pessimistic. He/she is suspicious and aggressive. He/she is often bitter in his/her dealings with others.

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2. *The anal type:* The second stage of sex development is anal, when the child obtains gratifications through anal activities. These activities generally relate to the expulsion of fecal material through the anus or the retention of these materials in response to the social demands of toilet training. Some traits of personality develop due to fixation of sex energy at this stages include obstinacy, miserliness, orderliness, etc., in later life.
3. *The phallic type:* The third stage of psycho-sexual development is phallic. This type of person shows self-love and exhibitionism. He tries to draw the attention of others. These characteristics are found in early adolescence.

Evaluation of the Type Approach

Classification of human beings into types has been generally criticized by psychologists on the basis that typologies tend to place emphasis upon one or another phase of development. They deal with extreme rather than mediocrity of human nature. It is very difficult to categorize individuals under one of the types as proposed by some typologists. Two or three types are wholly inadequate to describe human varieties of behaviour into a few limited categories. The second criticism of typology is that types are discontinuous and non-scalable. There is multiplicity of type theories, which are very difficult to apply in practice.

Criticism does not mean that typology is useless. Typology has its historical value in the sense that it was the first attempt to typify people, which generated a great deal of research. The second important contribution of typology is that it attempts to assess the personality of an individual as a whole. It does not study personality in fragments of traits. The type approach is very useful for psychologists who attempt to comprehend the personality of an individual as a whole.

The third advantage of typology is that types are useful and valuable from the point of view of experiments in physical science, where attention to certain process in a relatively pure form is uncontaminated by accidental and confusing factors. Lastly, we can say that they serve one very important function as reference points or guides for the examination of dimensions of personality by different psychologists.

2. Trait Theory

Typology and trait approaches are interrelated to each other in the sense that typology includes a wide variety of traits in classifying human beings in broad types while in trait approach we label or call a person by a specific mode of behaviour, which he shows in a variety of circumstances.

In modern psychology, the type approach is not so widely used as the trait approach to understand the development of personality. In our daily life, we label traits as honest aggressive, fearful, dependent, lazy, dull, etc. In the simplest sense, by trait we mean a mode of behaviour manifested in number of life situations consistently. It is any distinguishable, relatively enduring way in which one individual varies from other. Trait may be defined, 'as a property within the individual that accounts for his unique but relatively stable reactions to the environment.'

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Walter Mischel, in his book, *Introduction to Personality*, states, 'trait is a continuous dimension on which individual differences may be arranged quantitatively in terms of the amount of the characteristics, the individual has.'

Let us now explain the process of development of trait. Trait in daily life, first, is used simply as an adjective, for instance, 'Ram behaves in a lazy way in several situations'. The description is generalized from individual behaviour to the individual (Ram), we say that he (Ram) is lazy. Laziness becomes a trait of Ram's personality, a characteristic mode of his behaviour.

Development of Friendliness

Some properties of traits

- **Scalability**: Traits are scalable. They can be measured and scaled quantitatively.
- **Inference from behaviour:** Personality traits are not directly observable but are manifested in a number of activities and verbal expression. We infer a trait from the behaviour of the individual.
- **Flexibility:** Traits are not static in nature. Traits are flexible in childhood. They become stable with the maturity of the person with age but some variability is always present.
- **Universality:** There are certain traits, which are universal in nature like height and weight.
- **Functional unity:** The trait must have functional utility. It means that there must be different indications, which may vary or are manifested consistently in the behaviour of the individual.
- **Traits are higher order habits:** Guthrie conceived that a trait is a higher order habit, which recurs in behaviour frequently.
- **Traits are mental sets:** Some psychologists define traits as a mental set. It is a readiness to respond to any variety of situations in a consistent way. Cason stated that there is a generalized tendency in some people to be annoyed easily.
- **Traits are frame of reference:** The personality of an individual is an organized whole of beliefs, emotions, etc., about the environment. In this reference, traits are organized frames of references.
- **Traits are learned:** Traits are learned during interaction with the environmental stimuli. They are biologically determined as neuroticism and other traits, which depend on the disposition and intellectual potentialities of the individual.

G.W. Allport's Classification

G.W. Allport is one of the most outstanding trait psychologists. His conception and research on trait approach to personality has had an immense influence on psychologists. He has conceived that traits have a real and vital existence. He

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defined a trait, 'as a generalized and focalized neuropsychic system with the capacity to render many stimuli functionally equivalent and to imitate and guide consistent forms of adaptive and expressive behaviour.'

The definition given by Allport is a comprehensive one. It emphasizes that traits are not linked with a small number of stimuli but are general and enduring in nature. He classified all human traits into three broad categories as follows:

- **Cardinal traits:** Traits that appear the most in the behaviour of an organism are called cardinal. It may be illustrated with the example of achievement in life. Some people are so devoted to achievement that this trait pervades their entire life.
- **Central traits:** Central traits are less pervasive than cardinal traits but are generalized dispositions.
- **Secondary dispositions:** Secondary dispositions are specific and narrow traits. They are also known as attitudes.

According to Allport, traits differ in intensity and magnitude in general population from individual to individual. No two individuals are alike in their behaviour. People operate in their unique way in the environment. Each individual in unique in his adjustment.

R.B. Cattell's Classification

Raymond B. Cattell is another ardent propounder of trait theory of personality. The basic structural element for him is the trait. He stated that a trait is the structure of personality inferred from behaviour in different situations. He classified traits into four categories:

- **Common traits:** There are certain traits, which are widely distributed in general population or among all groups. They are known as common traits. Generally, aggression and cooperation can considered common traits.
- **Unique traits:** These traits are possessed by particular persons like temperamental traits, emotional reactions, etc.
- **Surface traits:** Traits that can be easily recognized by overt manifestation of behaviour are called surface traits, such as, curiosity, integrity, honesty, tactfulness and dependability.
- **Source traits:** Source traits are the underlying structure of sources that determine behaviour. Dominance and emotionality are source traits. Cattell, through the factor analytic approach, determined the contribution of hereditary and learning factors in the development of traits in the individual. He emphasized on the importance of interaction between hereditary and environmental influences in personality development.

H.J. Eysench's Classification

H.J. Eysenck, a British psychologist, devoted much of his research studies to explore the trait dimensions. He conducted extensive research on trait dimensions by applying quantitative techniques of factor analysis.

NOTES

He conducted research on ten thousand soldiers and by statistical analysis isolated two dimensions in personality:

(i) Introversion and extroversion

(ii) Neuroticism

Later on, he isolated another personality dimension as psychoticism. According to Eysenck, psychoticism is an independent dimension of personality. It is quite different from the introversion-extroversion, dimension.

Eysenck has found three fundamental dimensions of personality.

(i) Introversion vs extroversion

(ii) Normality vs neuroticism

(iii) Psychoticism

The first two dimensions given above may be taken as the part of normal personality. Their relationship is presented as follows:

Eysenck developed personality inventory to test the traits of personality. His findings have generated research activities by several psychologists. His most important contribution is that he tried to prove that personality is genetically caused. He traced neuroticism to the autonomic nervous system and introversion-extroversion to central nervous system. He emphasized the importance of heredity in the development of traits of personality as against the concept of American psychologists who are biased in favour of environment.

Common Features of Trait Theories

Though trait theories disagree with the specific content and structure of the traits needed to describe personality, there is still agreement on the general concept of traits:

- **Consistency of traits:** All theories agree that traits are consistent in an individual's behaviour. They are not temporary dispositions but enduring characteristics of the individual.
- **Trait dimensions:** There is agreement as regards the various dimensions of traits as source traits and surface traits, common and unique, broad and narrow. Traits vary in breadth and generality.
- **Traits are dispositions:** Traits fluctuate or change in a person's position with respect to a disposition. All psychologists are committed in their search of broad and stable traits.

Criticism of Trait Theory

The trait theory of personality has often been criticized by many psychologists in recent years. The main points of criticism are as follows:

- There is no agreement among psychologists concerning the use of the terms.
- There is a view that a trait is a behavioural disposition, which is consistent and does not vary from situation to situation. In daily observation, we find that

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if a man possesses friendliness as a trait, he does not behave in a friendly manner in all the situations of life. Trait is not a permanent or a static characteristic of the individual because personality does undergo change.

- Another difficulty is the quantification of human traits as there is no zero reference and equality of units in trait measurement. There is no suitable measuring tool of trait dimensions. Generally, traits are measured with the help of paper-pencil tests, which can be manipulated by the subject by giving fake information.
- 'Halo effect' operates when a person rates an individual very high on a specific trait. He may rate the same person on other traits equally high.
- The behaviour of an individual cannot be predicted on the basis of scores on trait inventory. Traits are the only point of references. An examination of the personality traits of an individual enables us to make only probability statements about what the individual may do.
- The last criticism against trait theory is that it is still unclear whether a trait is viewed as an inner process that causes difference among individuals or is it the situation that brings into play certain organizational tendencies, which create the behaviour.

2. Psychoanalytic Theory

We will now discuss different theories of personality that emphasize on the dynamics of human behaviour. We will outline the views of classical psycho-analysis and examine the views of neo-Freudians who deviate from Freud but claim to be psycho-analysts.

(i) Freud's theory

Basic Concepts

Sigmund Freud was the first psychologist who placed great importance on instincts as the determinant of human behaviour. He proposed two instincts: (i) Eros, (love and the self-preservation), (ii) Thanatos, (death instinct, as the ultimate cause of all human activity).

Psychic Structure

Psychic energy, according to Freud, comes from libido. It denotes sexual energy. When Freud revised his theory, which included two groups of instincts, sexual libido was regarded as the primary driving force of personality. The dynamics of personality is seen as largely governed by the need to gratify the libido.

Id: Implies inborn and its main function is the discharge of psychic energy, which when pent up produces tension through the personality system. Identity operates on animal level. It cannot differentiate between good and bad and operates on the principle of pleasure. The primary process of thinking and explaining id behaviour, resulting from pent up tensions is described by Freud as frustration. The primary process attempts to discharge tensions by bringing into consciousness, memories associated with the source of frustration.

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The ego: The id knows only the subjective reality of the mind. The second concept of Freud is the ego, which distinguishes between subjective reality and things in the external environment. It operates on the principle of reality. The ego is called the executive of personality. It obeys the reality principle and operates by means of secondary process. The pleasure principle is only concerned with whether an experience is painful or pleasant; the principle of reality is concerned with whether it is true or false. The ego formulates a plan for the satisfaction of the need and executes it, keeping into consideration the reality principle. It often integrates the conflicting demands of id, the super ego and the external world.

The ego is an organized portion of the id, which has been modified by the contact of external reality and experience. It comes into existence to forward the aims of the id. It brings a compromise between the instinctual urges of the id and demands and forces of the external environment. Freud remarked about the function of ego. The poor ego has to serve three harsh masters and has to do its best to reconcile the demands of all three.

Explaining the relationship between ego and the id, Freud once said, 'Imagine that the relationship between the ego and the id is similar to the relationship between a horse (id) and its rider (ego). While the rider usually determines the direction of the horse, there are those times when it is the horse who leads the rider.'

The super ego: The third concept is the super ego. It is the agency that internalizes the parental influences and ideals of society through early childhood experiences. It represents the ideal rather than the real and strives for perfection. It works in accordance with the moral standards authorized by the agents of society.

Let us explain it with the help of an example: Suppose there is a beautiful toy in the room, a child sees it and runs towards it, this is the id level. The second stage occurs when the parents instruct the child, not to touch the toy. The child sees the toy but does not touch it out of fear of punishment in the presence of the parents. The third stage of development is when the toy is in the room and the parents are not there but the child does not touch the toy. This is the super ego. The super ego involves the internalization of parental control in the form of self-control.

We can say that id is biological and seeks pleasure; ego is a psychological test reality. The super ego represents the social-self and seeks perfection.

The super ego develops gradually by the process of reward and punishment meted out by the parents to the child in early childhood training. The parental reward and punishment is substituted by self-control. An individual with a well-developed super ego refrains from bad or evil temptations, such as stealing or telling a lie, etc., even in the absence of the punishing agent. The process of adoption of the moral and ethical standards of family and society is called the process of introjections.

Dynamics of Personality

According to Freud, the human organism is a complex energy system that derives its energy from the food it consumes. The energy created by biological factors may be transformed to psychic energy. The three parts of the psychic structure, i.e., id, ego and super ego are in constant conflict. The dynamics of personality involves a

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continuous interaction and clash between id impulses seeking release and inhibition imposed by the super ego. The individual is in quest for immediate gratification of impulses, seeks pleasure and avoids pain in order to reduce tension. The drive for immediate satisfaction of instinctual demands leads to early clash between the individual and environment. Conflicts develop when the parents or other members impose restriction or control on expression. There is a perpetual warfare between the pressure of the environment and the demands of the id and super ego. The ego, in order to adjust in the social environment, utilizes a number of mental mechanisms to it and the demands of the id and the super ego reduce the tensions of the individual.

Extensive Interpretative Materials

In addition to the unique features inherent in the test, the BPI Manual offers a wealth of information to facilitate interpretation of the results.

- Detailed individual scale considerations based on the professional opinions of experienced psychologists
- Discussion of the detection of invalid cases and of the role of faking and motivated distortion
- Correlations with other well-established measures of psychopathology (for example, the MMPI)
- Empirically derived profiles representing specific symptoms of psychopathology (for example, delusions and alcoholism)

Norms of the Inventory

Separate adult (N = 1419) and adolescent (N = 2210) norms are reported in the manual. Adult norms are based on a North American sample using comparisons with US census data.

Reliability of the Inventory

Internal consistency reliabilities for the BPI are routinely found to be acceptable. In one large psychiatric sample (N = 812), KR20 coefficients ranged between .66 and .86 (median = .76). A group of normal adults (N = 379) produced values ranging from .61 to .83 (median = .70), and a college sample (N = 52) gave coefficients ranging from .61 to .86 (median = .76). Test-retest reliabilities are similarly acceptable. Two studies (N = 123 and 168), each with retest intervals of one month, gave a combined range of .62 to .87 (median = .77). These values indicate appreciable and stable reliabilities for BPI scale scores.

Validity of the Inventory

The BPI scales have demonstrated sizable correlations with other self-report measures intended to assess the same dimensions of psychopathology. For example, in a study of 235 substance abusers, BPI-Hypochondriasis correlated .73 with MMPI-Hypochondriasis. Other convergences were .55 for BPI-Depression and MMPI-Depression, .62 for BPI-Thinking Disorder and MMPI-Schizophrenia, and .58 for BPI-Social Introversion and MMPI-Social Introversion. BPI validities involving other

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clinical batteries (e.g., the Millon Clinical Multiaxial Inventory) are similarly acceptable. Correlations between BPI scales and clinical ratings (by others) like dimensions provide further support. In a study of 112 psychiatric patients, such correlations ranged from .32 to .51 (mean = .40), which compares favourably to an average correlation of .12 between the scales and ratings on irrelevant dimensions. Overall, such independent research strongly supports the BPI's validity.

Mail in Scoring of the Inventory

The BPI Basic Report generated by the Mail-in scoring service contains an interpretive validity paragraph, a profile of scores on 11 clinical scales and 1 critical item scale. In addition, the report features scale descriptions for high and low scorers, a list of critical items endorsed, and a summary of raw responses. Materials required for mail-in scoring include the test manual, one reusable test booklet, one machine scored answer sheet and one coupon.

3. PF test Inventory

Cattell, R. B., Cattell, A. K., Cattell, H. E., Russell, and Karol (1994) explained that the 16 Personality Factor, 5th Edition (16PF) test is a well-known personality test used to measure normal personalities and has been extensively researched in a variety of different applications, settings, and is available in over 25 languages. The 16PF test is administered in the form of a questionnaire with three possible answers for each question and can be taken in a pen and paper format or electronically if desired. This test has 16 personality factors that take a bottom up approach to describe five large categories of personality, which are referred to as the Big Five (Cattell, Cattell, Cattell, Russel, & Karol, 1994).

The significant historical milestones associated with the development of the 16PF questionnaire, started in the 1930s with the development of a factor analysis method of studying human behaviour, led by Cattell and Spearman in which Cattell furthered into personality structure research. Cattell started out designing the 16PF in the 1940s with a belief in the concepts of a person having wide ranges of personalities including personality, ability, and motivations and that these human characteristics could be found in personality roles, states, verbal or nonverbal behaviours, abilities, interests, thoughts, and actions (Noller, Law, & Comrey, 1987). Cattell began the process of collecting and categorizing data using three sources of information, which were L-data (life record and life observation data), Q-data (questionnaire data and personal self-descriptive data), and T-data (objective measurement of behaviour often collected in laboratory settings, experimental situations, or projective tests) (Cattell, 1956). Cattell (1956) gathered information from this research to create the primary traits of his test, which were rated and described from a low range to a high range of occurrence.

The first publication of the 16PF test was in 1949 in the United States and then in 1952 in Great Britain. It has undergone four revisions dated in 1956, 1962 and 1968, with the Fifth Edition published in 1993 (Schuerger, 1994). Additionally, the test has been standardized in 2000 with a population of over 10,000 people. The

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latest version of the 16 primary traits are warmth (A), reasoning (B), emotional stability (C), dominance (E), liveliness (F) , rule-consciousness (G), social boldness (H), sensitivity (I), vigilance L), abstractedness (M), privacy (N), apprehension (O), openness to change (Q1), self-reliance (Q2), perfectionism (Q3), and tension (Q4). The traits are labeled with alphabetic designations (although some letters are missing due to updates) that represent traits derived from L-data and T-data and the last four traits are labeled Q1-4 as they were derived from questionnaire data (Schuerger, 1994). The 16PF test can be scaled upwards to create a five second order global traits, which are extraversion, anxiety tough-mindedness, independence, and self-control (Cattell, 1956). These global traits are very consistent with the 'Big Five', which are extraversion, neuroticism, conscientiousness, agreeableness, and openness to experience. This multilevel factor structure allows for the specificity of the personality to be reviewed, while having a larger overview of the person's global personality (Noller, Law, & Comrey, 1987).

Norms and Qualities of the Test

The 16 PF Questionnaire consists of 185 items across 16 scales and uses a 3 point Likert scale for a response system. Each item is scored a between 0, 1, or 2 as the questions are on a bipolar scale with one answer left as a question mark (?) for a desired response (Cattell, Cattell, Cattell, Russel, & Karol, 1994). The raw scores are then transformed to standard scores and then calculated in reference to the norm group. The questionnaire was standardized again in 2000 using a stratified sample of 10,261 individuals based upon the year 2000 census data in the United States to accurately reflect age, sex, and race. The 16PF 5th Edition has additionally been reassessed to have simpler and clearer language in the questions, increased the consistency in the response format, and decreased the amount of time associated with administrating and taking the test to approximately 40 minutes (Dancer & Woods, 2006).

Reliability of the Test

The internal consistency reliability was determined using Cronbach's alpha (n = 10,261) in which a 0 denotes zero internal consistency and a 1 denotes perfect internal consistency. The results for the primary scales were warmth = .69, reasoning = .75, emotional stability = .79, dominance = .68, liveliness = .73, rule-consciousness = .0.77 social boldness = .87, sensitivity = .79, vigilance = .73, abstractedness = .78, privacy = .77, apprehension = .80, openness to change = .68, self-reliance = .79, perfectionism = .74, and tension = .76. The overall mean for this reliability was .76 (n = 10,261) and, upon a two week test-retest interval, the mean was .80 (n = 204), and upon a two month test-retest interval, the mean was .70 (n = 159). The global scales (not calculated alone for internal consistency as they are a combination of the 16 primary factors) of extraversion, anxiety, tough-mindedness, independence, and self-control had a mean of 87 for the two week test-retest and a mean of .78 for the two month interval. All of this demonstrates high reliability, which is one of the reasons for the popularity of the 16PF

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Questionnaire

Validity of the test

The 16PF was constructed in a manner to ensure validity using factor analysis to ensure that the factors meant to be independent remained independent, an absence of significant correlation with other factors in the test, and equal loading for the factors when appropriate (Cattell, 1956). The validity of the 16PF test has been demonstrated in a variety of studies and is noted to have improved validity in the 5th edition versus the 4th.

CHECK YOUR PROGRESS

5. State the Greek meaning of the term 'persona'.
6. What is a dynamic personality?
7. What makes an individual unique?

5.4 MEASUREMENT OF PERSONALITY

One of the important inventory for personality measure is basic personality inventory by Douglas N. Jackson (1988, 1955, 1997). The Basic Personality Inventory (BPI) is an innovative, multi-phased personality assessment, intended for use with clinical and normal populations to identify sources of maladjustment and personal strengths. BPI can be used with both adolescents and adults and is completed in half the time of other measures. BPI measures twelve distinct psychological traits. Scale names were chosen to avoid potentially inaccurate diagnostic labels while emphasizing construct dimensions of psychopathology. BPI makes use of sophisticated procedures to minimize susceptibility to the social desirability response bias. It is sensitive to the tendency to describe oneself in favourable ('fake-good') and unfavourable ('fake-bad') terms. The easy reading level makes it suitable for a variety of populations.

5.4.1 Tools of Personality Assessment

Self-report inventories, also known as personality inventories are the self-rating questionnaires, where the individual describes his own feelings, environment, and reactions of others towards himself. In a nutshell, on the self-report inventories a person reports about himself in the light of the questions (or items) put therein. Hence, the method is known as a self-report inventory. Self-report inventories are further classified into the following five types:

- Inventories that attempt to measure social and certain other specified traits, such as self-confidence, dominance, ego-strength, extroversion, responsibility, etc. The Bernreuter Personality Inventory, the Eysenck Personality Questionnaire, the Differential Personality Scale are some of the examples of this category.

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- Inventories that attempt to evaluate adjustment of people to different aspects of the environment, such as school, home, health, etc. The Bell adjustment inventory is the best example.
- Inventories that attempt to evaluate pathological traits, such as hysteria, paranoia, hypomania, depression, schizophrenia, etc. the Minnesota Multiphasic Personality Inventory (MMPI) is the best example.
- Inventories that attempt to serene individuals into two or three groups. The Cornell Index is the best example of such an inventory. The Cornell index screens people into two groups-those having psychosomatic difficulties like asthma, peptic ulcers, migraine, convulsive disorders, etc., and those not having them that is, those who are normal.
- Inventions that attempt to measure attitudes, interests and values of persons. The Kuder inventories (vocational, occupational, and personal), the Strong Vocational Interest Blank, the Allport-Vernon Study of Values are some of the best examples of this category of self-report inventories.

It does not follow, however, that the above five classifications of inventors have nothing in common. In reality, the classification is based upon the purpose and the nature of the item content. All the above self-report inventories are based upon the same principle, which states that behaviours are nothing but the manifestation of trail and one can use the presence and absence of a trait as a means of assessing behaviour.

Observational Methods

Observational methods are distinct from self-report inventories. Observational methods provide either a structured or unstructured situation. A structured situation is a controlled situation whereas an unstructured situation is an uncontrolled situation. People whose personality traits are to be observed are put in either of these two situations and careful, impartial and accurate observations are emphasized. Observation becomes the basis for assessing personality traits. In some observational methods, however, a departure is made from the above set procedure. The difference in observations made by different observers reflects the subjectivity in the observations.

Some Representative Personality Inventories

We will now analyse some significant representative personality inventories developed in India and abroad.

1. Self-report Inventories Abroad

The first attempt to measure personality through a questionnaire was made by Francis Galton in 1880. He developed a questionnaire for studying mental imagery, that is, the inner world of perception and feeling. However, this did not prove to be a popular inventory. Thereafter, the first systematic effort to develop a personality inventory was made by Woodworth in 1918. This inventory is known as the Woodworth Personal Data Sheet and consists of 116 questions all relating to neurotic tendencies. The

purpose of the inventory was to screen out emotionally unfit men before they were sent overseas during the World War I. Since then, a number of self-report inventories have come into vogue.

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The Minnesota Multiphasic Personality Inventory is one of the most important self-report inventories, which was developed in the early 1940s by Starke R. Hathaway and J. C. McKinley (1943). The inventory is a very important means for detecting disabling psychological abnormalities. It is called 'multiphasic' because it was designed to detect several psychiatric problems. Originally, the inventory had 550 affirmative statements each to be answered from among the given three category options, i.e., 'True', 'False' and 'Can't say'. The inventory applies to people who are 16 years and above, but has also been successfully used on persons below 16. Over the years, it has been widely used to screen large groups of people for whom clinical interviews are not ordinarily feasible.

MMPI has undergone extensive revisions. The most recent version is called MMPI-2, which has been developed by Butcher, Dahlstrom, Graham, Tellegen & Kaemmer (1989). This version consists of several true-false items that are used to produce 14 different scales. Out of these 14 scales, ten are clinical scales that identify particular psychological problems, such as schizophrenia, paranoia, depression, hysteria, hypochondria, etc. In addition to these clinical scales, the MMPL-2 also contains four validity scales like the Question or Cannot say (?), Lie (L), Infrequency (F) and Correction (K). These four scales exemplify a test's need to guard against different kinds of response biases commonly shown by the respondents. New validity scales to be used in conjunction with ?, L.F and K have also been added. Two of these scales abbreviated as VRIN and TRIN are included for identifying persons who have answered test items in an adult form and adolescent form is designed as MMPI-A. (Butcher et al., 1992). The full length form of MMPI-2 has 704 items while the adolescent form has 654 items (Morris, 1996). Both forms include 550 items from the original MMPI to ensure that the clinical information obtained does not differ significantly from the original one.

MMPI's objective scoring made it popular both as a research tool and clinical tool. According to Graham (1990), it has been used in more than 10,000 studies. One survey has revealed that it is preferred by about 90 per cent of the clinical psychologists (Aiken, 1989)

The California Psychological Inventory is another important personality inventory, which is based in part upon the MMPI. The inventory consists of 462 items and is meant for normal persons above 13 years. Each item is to be answered as 'True' or 'False'. There are altogether 18 scales, of which three are validity scales designed to measure various kind of response sets. These three scales are called 'sense of well-being' designed to measure social undesirability tendency of 'faking-bad' tendency, 'good impression' designed to measure social desirability tendency or 'faking-good' and 'communality' designed to measure the greater number of popular responses. Other 15 scales measure personality traits like dominance, sociability, responsibility, self-control, socialization, self-acceptance, achievement-via-conformance, achievement-via-independence and femininity.

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The Minnesota Counselling Inventory is a personality inventory, which is based upon the MMPI. It has 335 items, each to be answered as 'True' or 'False'. The seven important areas of personality measured by this inventory are emotional stability, family relationships, social relationships, leadership, adjustment to reality, conformity and mood.

The Guilford-Zimmerman Temperament Survey is another personality inventory. The inventory is based upon factor analysis and measures ten personality traits. Guilford and Zimmerman (1956) computed intercorrelations of items from different inventories. As a by-product of these researches three inventories were developed: Inventory of Factors STDCR, Guilford-Martin Personnel Inventory, and Inventory of Factors GAMIN. Ultimately, these three inventories were combined into a new one called the Guilford-Zimmerman Temperament Survey. For measuring each trait, there are 30 affirmative statements each to be answered as 'Yes', '?' and 'No'. Thus, there are 300 items in all. The ten traits covered by the inventory include general activity, ascendance, restraint, sociability, objectively, friendliness, thoughtfulness, personal relations, masculinity and emotional stability. In this inventory, three verification keys have been given to detect carelessness and falsification, if any, by the examinees.

The Bell Adjustment Inventory is another important personality inventory. It intends to measure home adjustment (satisfaction or dissatisfaction with home life), social adjustment (extent of introversion, shyness and submissiveness), health adjustment (extent of illness), emotional adjustment, ease of disturbance and occupational adjustment (satisfaction or dissatisfaction with work, colleagues, and conditions of works). The inventory has been developed in two forms (student form and adult form). The student form has only the first four areas of adjustment mentioned above whereas the adult form besides having these four areas, has an additional area of occupational adjustment. Each item is to be answered as 'Yes', 'No' or '?'..The inventory has proved to be a very useful on for rough screening of students and adults who are in need of solving personal problems.

Besides the above cited inventories, there are other self-report inventories designed to measure personality traits. A few examples include Gordon Personal Profile, Eysenck Personality Questionnaire, Heston Personal Adjustment Inventory, Mooney Problem Checklist, SRA Junior Inventory, SRA (Science Research Associates) Youth Inventory, sixteen Personality Factor Questionnaire, STS (Scholastic Testing service) Youth Inventor, Gordon Personal Inventory, California Test of Personal Orientation Inventory and Maslow Security-Insecurity Scale.

2. Self-report Inventories in India

In India, several self-report personality inventories have been constructed. Some of the international tests have also been adapted to suit Indian conditions. B.K. Sohoni (1953) developed a test of temperament and character for high school children. The reliability of the test ranged from 0.44 to 0.54 and the validity coefficient ranged from 0.23 to 0.45. Singh (1967) constructed an adjustment inventory for college students. It measured adjustment in five areas, i.e., home, health, society, emotion and education and had a total of 102 'Yes-No' items. The internal consistency

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reliability ranged from 0.92 to 0.94. The validity coefficient of the inventory against Asthana's adjustment inventory was 0.62. M.D. Bengalee (1964) developed a Multiphasic Personality Inventory, which was named the Youth Adjustment Analyser (YAA). The prupose of the inventory was to screen out maladjusted students from the college going population. It covered five areas of personal and social adjustment, namely, unhealthy parent attitudes, general home adjustment, aggressive behaviour, neuroticism and interests. For measuring the first two personality traits, two independent scales were developed, i.e., the Parent Attitude Scale for measuring unhealthy parental attitude and the General Home Adjustment Scale for measuring general home adjustment. The Parent Attitude Scale has five subscales, namely, dominance, acceptance, submission, rejection and total parent attitudes. The General Home Adjustment Scale consists of 38 items. The Parent Attitude Scale consists of 35 items. Items of the former are available in English, Marathi and Hindi languages. Prasad (1974) developed an inventory for measuring adjustment, social adjustment, emotional adjustment and self-acceptance. The inventory has 279 items and norms for different sections of the population are provided. A.K. Singh and L.N.K. Sinha 1979 have developed a personality test known as the Differential Personality Scale, which measures nine personality traits, namely, decisiveness, responsibility, emotional stability, masculinity, friendliness, heterosexuality, ego-strength, curiosity and dominance. This scale has been revised by Singh and Singh (2002) and has been renamed as Differential Personality Inventory, which apart from the above nine dimensions also includes the dimension of self-concept. The inventory has a total of 150 items in Hindi and is meant for college students. However, it can be administered in upper classes at school as well. The test-retest reliability coefficient for the various dimensions of the scale ranged from 0.73 to 0.86 and the internal consistency coefficients ranged from 0.70 to 0.89. The validity coefficients of the different dimensions ranged from 0.55 to 0.84. The intercorelations of all the nine dimensions were low and statistically not significant.

There have been some adaptations of foreign-made tests to suit Indian conditions. Mohsin and Hussain (1981) adapted the Bell Adjustment Inventory (students' from) in Hindi. The Hindi adaptation of the inventory consists of 135 items and in its present modified form published in 1987, it has only 124 items. The test-retest reliability coefficients of the four areas of the adjustment of the inventory ranged from 0.700 to 0.926and the split-half reliability coefficient ranged from 0.738 to 0.932. The validity coefficients of the four areas of adjustment ranged from 0.272 to 0.785 against the Neuroticism Scale of the Hindi adaptation of Eysenk's Personality Inventory and from -0.088 to 0.255 against the extroversion scale of the same inventory, Bell's adjustment inventory has also been adapted in Hindi by Saxena (1959) for the age range of 11 -20 years. Singh and Jamuar (1971) adapted the Maslow Security-Insecurity Inventory in Hindi. There are 70 items in the adopted inventory. The test-retest reliability coefficient was 0.79 and the split-half reliability coefficient was 0.86. Percentile norms were developed separately for male and female students of BA Part-I. Singh (1972) adapted the Maudsley Personality Inventory in Hindi. The test-retest reliability coefficient for the E scale (extroversion) was 0.77 and Guilford-Zimmerman Temperament Survey and several other criteria.

The validity coefficients were satisfactory and statistically significant.

CHECK YOUR PROGRESS

8. What is a self-report inventory?
9. What is the Woodworth Personal Data Sheet?
10. How does the Minnesota Counselling Inventory function?

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5.5 MENTAL HYGIENE

When discussing mental hygiene, it should be kept in mind that it has an important place in educational practices. With a working knowledge of the meaning and principles of mental hygiene, teachers have several opportunities to develop social attitudes and social skills among students. Thus, enabling them to develop better personal and social adjustment. Some psychologists consider mental hygiene and mental health as synonymous.

The following definitions are very helpful in understanding the meaning of mental hygiene.

- In the words of Klein, D. B., 'Mental hygiene, as its name suggests, is concerned with the realization and maintenance of the mind's health and efficiency.'
- Wallace-Wallin has defined mental hygiene as 'the application of a body of hygienic information and techniques for the purpose of observation and improvement of mental health of individuals and of the community, for the prevention and care of minor and major mental diseases and defects and of mental, educational and social maladjustments.'
- Drever, James considers **mental hygiene** as 'investigation of the laws of mental health and the taking or advocacy of measures for its preservation.'
- Hadfield considers mental hygiene as 'concerned with the maintenance of mental health and the prevention of mental disorder.'
- American Psychiatric Association observes, 'Mental hygiene consists of measures to reduce the incidence of mental illness through prevention and early treatment and to promote mental health.'
- Crow and Crow conceive mental hygiene 'as a science that deals with human welfare and pervades all fields of human relationship.'
- *The Dictionary of Education* by Carter W. Good defines mental hygiene as 'Establishment of environmental conditions, emotional attitudes and habits of thinking that will resist an honest of personality and habits of thinking that will resist an onset of personality maladjustments. It is the study of principles and practices in the promotion of mental health and prevention of mental disorders.'

- According to Boring, E.G., the aim of mental hygiene is to 'aid people to achieve more satisfying ad more productive lives through the prevention of anxieties and maladjustment.'

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The movement of mental hygiene began in the first decade of 20th century with the publication of *A Mind That Found Itself* (1908) authored by Clifford Beers. His book revolutionized the concept of mental health. Beers, a graduate with so much of unnecessary strain and stress that he attempted to commit suicide. He however was saved and treated of his mental illness. After recovery, he described his experiences and treatment the received, in his book which created awareness in the general public for mental hygiene as a movement.

5.5.1 Principles of Mental Hygiene/Mental Health: Classification

1. Principles of Seeking Adjustment with Oneself

Following principles fall in this category:

- Principle of knowing the self
- Principle of accepting one's self
- Principle of balancing one's development
- Principle of self-drive and shaping
- Principle of self-control

2. Principle Seeking Adjustment with Environment

- Principle of understanding others
- Principle of accepting and understanding others
- Principle of socializing oneself
- Principle of satisfying needs adequately
- Principle of training emotions
- Principle of adjusting with the world of work
- Principle of developing positive attitude towards life
- Principle of bearing the stresses and strains of life
- Principle of good physical health
- Principle of faith in Good

3. Principles of Mental Hygiene/Mental Health

- Principle of prevention of mental disorders through an understanding of the relationship that exists between wholesome personality development and life experiences: This implies:
  - Listing various causes of maladjustment-personal as well as social.
  - Furnishing the knowledge of drives, needs, motives, conflicts of motives, frustration and tension, etc.

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- Suggesting was and means of achieving emotional and social adjustment, and
- Suggesting the solution for the inner conflicts and frustrations and thus relieving from the tensions, anxieties and emotional disturbances.

- Principles of preservation of the mental health of the individual and of the group. This means:
  - *Developing total potentialities of an individual.*
  - Attaining emotional maturity and stability.
  - Achieving personal and social security as well as adequacy.
  - Helping an individual in acquiring sound body and normal mental health.
- Principle of cure of mental health. This is related to:
  - Suggesting various forms of therapy for treatment and curing specific mental illness and disorders.
  - Suggesting means for the rehabilitation and readjustment of the mentally ill persons.

CHECK YOUR PROGRESS

11. How does D. B. Klein define mental hygiene?
12. What is the aim of mental hygiene, according to Boring?
13. Which are the three categories of symptoms of a mentally ill child?

5.6 MENTAL HEALTH

In the words of N.E. Cutts and N. Mosel, 'Mental health has various strains of the environment we meet in life and mental hygiene as the means we take to assure the adjustment.'

Role of Parents (home) in Promoting Mental Health of their Children

- Providing proper affection and love to children
- Providing conducive environment in the home
- Developing proper attitudes to life
- Criticizing the children when absolutely essential
- Discarding the tendency to compare their children with other children
- Accepting the limitation of their children
- Avoiding over protection to their children
- Becoming democratic in their behaviour with children

NOTES

- Setting proper examples of cooperation between husband and wife and with other members
- Meeting the legitimate needs of children
- Building confidence in children
- Providing guidance where necessary
- Avoiding frequent change of address
- Encouraging sibling cooperation
- Paying equal attention to sibling

Mental Health Hazards in School

We may briefly mention the following factors, which adversely affect the mental health of a child.

- Lack of friendliness on the part of teachers.
- Undue stress on scholastic and other competitions.
- Defective system of evaluation-element of subjectivity and unreliability/loss of confidence in the teacher's marking.
- Fear of failure resulting in tension.
- Excess of homework.
- Heavy curriculum and failure of the child to cooper with it.

Symptoms of a Mentally Ill Child

The symptoms can be divided into the following three categories:

- **Physical symptoms:** Drumming with fingers, facial twitching, nail biting, restlessness, rocketing feet, scratching head, stammering, and vomiting.
- **Behavioural deviation:** Aggression, bullying hyperactivity, lying, negativism, poor school achievement and sexual disturbances.
- **Emotional symptoms:** Persistent anxiety, intense conflicts and tension, fear, hatred, inferiority complex, extreme timidity, temper, tantrum and excessive worry.

Role of School in Promoting Mental Health of the Children

The school has a great responsibility in the promotion of mental health of children. It must provide a suitable emotional, intellectual and physical environment in which a child can develop the 'feeling of security' and the 'feeling of belongingness'. He should feel that his personality is given its due recognition.

The following measures can be very helpful in securing mental health of the students:

- ***Relationship between mental health and physical health:*** Mental health is related to the physical health of an individual. 'A sound mind in a sound body' is a popular saying, which truly reflects the vital connection between the mind and the body. Apart from a well-organized programme of games

NOTES

and sports in a school, there should be a regular programme of yogic exercises. Yogic exercises help to maintain a sort of psycho-physical balance. They tone up the endocrine glands, nervous system and the muscular system. When yogic exercises are combined with *pranayam*, individuals experience good physical and mental health.

- ***Emotional stability of the teacher:*** A teacher's personality has a great bearing on the personality development of the students. A UNESCO publication entitled *The Education and Training of Teachers* states that 'While books can teach, only personality can educate'. Various researches show clearly that the emotional stability of teachers affects that of pupils. Unhappy, frustrated, dissatisfied teachers cannot help their pupils become happy and well-adjusted young people. Teachers should be mentally alert and strive to develop alertness and stability in students. They should undergo self-introspection, find out the limitations and shortcomings in their behaviour and temperament and try to remove them so that the students do not face adverse influence of prejudices affecting their emotional behaviour. They should, as far as possible, have high ideals.
- ***Love for children:*** A teacher must have abundance love for children. One who does not like children should not stay in the teaching profession.
- ***Missionary zeal:*** E.A. Pires opines that a great teacher has the zeal of a missionary. There is a certain aptness in the analogy between a missionary and a teacher, for every true missionary is first and last a teacher.

  S. Balakrishan Joshi feels, 'Without a band of devoted teachers who are inspired by a holy zeal, an institution with the paraphernalia of modern convenience will be like a beautiful corpse without spark of life, a carcass without soul.' According to the same author teaching is a divinely ordained mission.
- ***Meditation and Moral Education:*** Mediation need not be done in an elaborate manner accompanied by several rituals. Meditation is merely observance of silence for a few minutes either in the morning assembly or in a regular period. Meditation is likely to provide peace of mind and calmness, if practiced regularly.
- ***According respect for the individuality of the child:*** A child should not be treated like cattle. He/she has his/her own individuality. He/she thinks and feels. His/her sense of respect should not be undermined merely because he/she is a child.
- ***Establishing close pupil-teacher contacts:*** The teacher is expected to observe the child carefully in and outside the class and also know the child's home environment. This will enable the teacher to understand the child in a better way.
- ***Regular medical examination:*** There should be a regular medical check up of the students and follow up action taken to safeguard the health of students. Cases requiring special treatment should be sent to child guidance clinics.

NOTES

- ***Patience:*** A teacher has to deal with a large number of students having different levels of understanding. He/she may have to repeat the lessons many a time for the sake of the less intelligent. A teacher should not be irritated in doing so. Some students, by nature, pick up lessons very slowly and a teacher should possess the required patience to make them understand gradually. Good habits are not formed overnight. It requires time and patience to inculcate virtues in students.
- ***Consistent behaviour:*** Inconsistent behaviour of the teacher can disturb the mental attitude of the child. A teacher should not be moody and whimsical.
- ***Democratic attitude:*** A teacher cannot afford to be an autocrat. Present day education lays much stress on the inculcation of democratic ideas in students. A teacher who is to guide the way of democracy to students must develop a democratic attitude. His/her role is that of a friend, philosopher and guide and not of a policeman.
- ***Honest:*** Less commands should be given to students and when given, they must be stuck to, otherwise they loose their effectiveness and are likely to create conflict.
- ***Just and impartial:*** The teacher not show undue favour to any student. All students should be treated equally. Undue favour to some students will lead to frustration among others.
- ***Provision of educational, vocational and personal guidance*:** It is not essential that a psychologist must be appointed in every school. Trained teachers may be provided opportunities to undergo short-term courses, in guidance. For difficult cases, area counselors may provide necessary guidance.
- ***Balanced curriculum:*** The curriculum should be in accordance with 3 A's, i.e., age, ability and aptitude of the students. A right curriculum does not suit all categories of students.
- ***Imparting sex education:*** It is now being increasingly realized that there should be a well-drawn up programme of sex education in schools so that the students develop positive attitudes towards sex.
- ***Motivating intellectual environment of the school*:** Sound methods of teaching-learning suited to the individual needs of the students should be adopted. Activity methods, for example, Play-way, Project Method, Dalton method, etc., should be encouraged. Special attention should be paid to weak students.
- ***Provision of co-curricular activities:*** Properly planned co-curricular activities are very helpful in providing suitable opportunities to students to sublimate their instincts.

NOTES

- ***Balanced approach to freedom and self-discipline:*** A child who breathes in an environment of freedom develops courage and initiative. Unregulated punishment results in mental retardation. According to Hobbes, 'A fool cannot be mended by flogging and he who flogs is the greatest fool'. A.S. Neill has observed, 'We could abolish caning by an act of the Parliament, but no act of Parliament can abolish the fear of teacher or a system.' Discipline should be inculcated through actions and a constructive approach.
- ***Correct level of aspiration:*** Students should not be made to engage in the blind race of excelling. This disturbs their mental equilibrium. For winning, they may resort to unethical ways, which may lead to conflict and have negative consequences in the future.

Common Characteristics of Mentally Healthy People

The common characteristics of psychologically healthy individuals given by several psychologists are as follows:

- Adaptable and resilient
- Calm
- Cheerful
- Conscious control of life
- Emotionally balanced
- Definite philosophy of life
- Enthusiastic and reasonable
- Independent in thinking
- Insight into one's own conduct
- Instincts and habits will regulated
- Free from prejudice
- Good tempered
- Normal sex-consciousness
- Realistic imagination
- Satisfied with the work or occupation
- Socially adaptable

CHECK YOUR PROGRESS

14. What are the basic characteristics of mentally healthy people?
15. What are the factors which adversely affect the mental health of a child?
16. What is the role of the school in promoting mental health of the children?

5.7 SEX EDUCATION

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There is no doubt that ignorance about sex and sex related problems is one of the main causes of unhappiness and maladjustment in life. Moreover, research shows that a large number of anti-social acts are committed by the adolescents as proper and timely information on sex not being made available to them. Therefore, there is an urgent need of imparting sex education to the youngsters and adolescents.

There is still a good deal of prejudice against giving sex education to boys and girls. The parents often believe that such information will spoil their morals. It is necessary to remove such misconceptions from the minds of the parents and to convince them that this subject will inculcate in the minds of the youngsters a healthy attitude towards the opposite sex, based on a sense of social responsibility and equality.

Youngsters who are kept ignorant of their own body changes are naturally unable to adjust themselves physically and psychologically at the time of onset of changes of adolescence, and develop an unrestrained behaviour. This ignorance may lead to family disharmony and marital conflict.

Sex education should not be considered secretive: Talking about sex is usually considered taboo, sinful or not worthy of mention in a conservative society. There is general inhibition in talking about sex. However, it is increasingly being realized now that without sex education people cannot live a happy and well-adjusted life, because many marital, emotional and mental problems occur as a result of the misdirection and misconceptions about sex. Alva Myrdal observed, "In general, more wholesome attitudes towards sex, questions will not be created until they are discussed openly and as a matter of fact phenomenon." Children ask questions about sex as the subject fascinates them. It is the answer and the way it is given that plays an important part in forming their future attitudes towards it. Frank and honest response can help them develop a healthy outlook.

Scope of Sex Education

Sex education includes in its scope not only physical and biological aspects of the growth of an individual including reproduction, but also, matters pertaining to ethics, morality and development of a responsible, wholesome and correct attitude towards the other sex.

Prof. Uday Shanker was of the opinion, "Education without sex education is ridiculous as the 'how' of population control cannot be answered without sex education. Sex education is no imposition, it concerns a vital matter in which children are interested. Interest in sex is instinctive and starts from early infancy. In pre-adolescent boys and girls, the sex drives intensifies. Enlightenment on sex is to be given intelligently and pleasantly but gradually and methodically. There need not be any class on the subject like history or geography, nor can there be any general rules as to the time and place or manner of imparting sex education. Through the teaching of general science, biology, physiology or hygiene, a good deal of physiological

knowledge about sexual differences, animal and human reproduction, involving all the process of mating, fertilization, pregnancy or birth can be imparted."

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Role of Parents in Sex Education

To make this education effective, it must commence from the earliest stages of a child's life. It is the family where foundation is laid of a child's personality and where, by stages, his outlook on life and character are moulded.

Parents have, thus, to play a central role in the scheme at all stages. It is in fact, a part of family life education that goes on from infancy to maturity.

Sex education is therefore essentially a preventive measure to help children become emotionally stable and develop character. This knowledge should be given to make them aware of the pitfalls of early life and should create in their minds sound moral values and proper attitudes.

Role of the Teachers

During the school stages, the teachers must play a very important role in giving requisite knowledge to the students and guide them to acquire a sense of regard and helpfulness towards the other sex. The instruction should be given according to the age of the student and his state of physical, mental and psychological development. Such information should be integrated with other subjects such as civics, nature study, biology and physiology. Sex education should thus permeate the entire school curriculum. It should never be taught as a separate subject, but incidentally in the context of other subjects and in response to children's questions.

It is possible that some teachers may themselves not be quite familiar with the subject. The education authorities should organize in-service training course for teachers in such cases.

It would be beneficial if the parents are kept informed of this as a character building activity. Parents and teachers meet regularly to sort out their mutual problems to determine a common course of action to avoid conflicts in the advice to young people.

General guidelines to teachers in imparting sex education: The teachers should try to establish a warm, friendly, open-minded classroom environment, free of embarrassment and self-consciousness in which students feel free to ask questions which trouble them and can expect to get honest, sensible answers.

Matters relating to sex should be discussed by the teachers in a direct, unemotional and unembarrassed manner and should be talked in an objective, matter-of-fact way as in dealing with any other subject. Normal aspects of sex should be emphasized to build up healthy attitudes which will enable a student to make wise choices.

Teachers should discuss problems with students and let them draw their own conclusions and give appropriate facts because knowledge satisfies curiosity.

Students should be encouraged to participate in planning the lessons.

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A questions box in which students may put questions anonymously (if they feel free in opening up in the class) should be put up and films and other visual aids should be shown to clarify concepts.

Adequate and carefully selected books on this subject should be kept on an open shelf in the school library.

Adolescence and Sex Education: An Outline of Areas to be covered

A publication entitled ***Sex Education: How and Why,*** written by Dr W Mathur for the Association for Social Health in India (1976) gave the following broad outlines of the topics to be taken up by the teachers and others with a view to guide the adolescents.

Table 5.3 *Adolescents: 14-18 Years Age Group*

Objectives	Content	Approach
1. To help the adolescent grow into a responsible and knowledgeable adult.	Knowledge of the phenomenon of ovulation, nidation, foetal development and birth of a baby. Marriage and reproduction and the need of assistance at birth.	Talks with the aid of audiovisual tools. Emphasis on leading highly moral and ethical life in the interest of family happiness, and community peace.
2. To make him understand venereal diseases	Different venereal diseases, their mode of infection and their damaging effect on patients.	Causes of these diseases, their symptoms and the condition of patients should be illustrated by means of films, film strips and pictures.
3. To make him aware of promiscuity and prostitution.	Dangers of promiscuous sexual relations. Causes very adverse influence on family life; it is a great social evil. Prostitutes are one the reasons of the spread of venereal diseases.	Full and frank discussion. All extra-marital sexual relationships must be avoided in the interest of personal health and family harmony.
4. To make him aware of homosexuality	It is an unethical and unnatural practice and is a punishable offence under law.	Awareness about venereal diseases should be created. Adolescents should be encouraged to spend their spare time, in nation building activities, sports and cultural programmes.

CHECK YOUR PROGRESS

17. What is the role of parents in imparting sex education?
18. What are the general guidelines followed by teachers in imparting sex education?

5.8 SUMMARY

- An exceptional child may be defined as the one who differs so much from his peer average in respect of physical, mental or social characteristics that he is unable to develop his fullest potential under normal conditions in an ordinary class.

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- Constitutional Directive on compulsory education includes education for all children till the age of 14 years. Therefore, exceptional children must also receive education.
- Kirk, in his book *Educating Exceptional Children*, stated that in ancient Greece, over 2000 years ago, Plato stressed the need for proper and special education of the intellectually superior children.
- Hollingworth, on the basis of a study, concluded that there is one gifted child in a population of one million. However, studies conducted by J. J. Gullagher did not tally with the estimates of Hollingworth.
- Educational administrators, teachers, parents and social workers face problems with those children who lag behind other children in their school work. They do not benefit and are not able to manage and deal with classroom instructions.
- Backwardness in children can be of two types. A child who is dull, that is, of low intelligence and who is lagging behind in class is considered backward. On the other hand, a child who does not fare well in class, even though his level of intelligence is normal or even above normal, is also considered to be backward, only because his educational achievements are not satisfactory.
- There is no denying the fact that backwardness of a child is due to a number of factors which operate simultaneously. Each child has to be studied individually in order to find the reasons for his backwardness.
- Every society prescribes a set of norms which it expects that all its members should follow. Those who deviate from these norms and behave in anti-social manner are called delinquents. Children and adolescents who are minor in age and who deviate are known as juvenile delinquents.
- The mask, worn by the actors, was called a persona. According to the concept of mask, personality was thought to be the effect and influence that the individual wearing a mask left on the audience.
- Ernest Kretschmer, a German psychiatrist, classified human beings on the basis of physical constitution. He attempted to establish relationship between personality characteristics and body built.
- Jung, a Swiss psychiatrist, attempted to classify human beings on two behavioural dimensions: extrovert and introvert.
- Typology and trait approaches are interrelated to each other in the sense that typology includes a wide variety of traits in classifying human beings in broad types while in trait approach we label or call a person by a specific mode of behaviour, which he shows in a variety of circumstances.
- G.W. Allport is one of the most outstanding trait psychologists. His conception and research on trait approach to personality has had an immense influence on psychologists. He has conceived that traits have a real and vital existence.
- Psychic energy, according to Freud, comes from libido. It denotes sexual energy. When Freud revised his theory, which included two groups of instincts, sexual libido was regarded as the primary driving force of personality. The

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dynamics of personality is seen as largely governed by the need to gratify the libido.

- According to Freud, the human organism is a complex energy system that derives its energy from the food it consumes. The energy created by biological factors may be transformed to psychic energy. The three parts of the psychic structure, i.e., id, ego and super ego are in constant conflict.
- The BPI scales have demonstrated sizable correlations with other self-report measures intended to assess the same dimensions of psychopathology.
- Self-report inventories, also known as personality inventories are the self-rating questionnaires, where the individual describes his own feelings, environment, and reactions of others towards himself.
- Observational methods are distinct from self-report inventories. Observational methods provide either a structured or unstructured situation.
- The movement of mental hygiene began in the first decade of 20th century with the publication of *A Mind That Found Itself* (1908) authored by Clifford Beers.
- In the words of N.E. Cutts and N. Mosel, 'Mental health has various strains of the environment we meet in life and mental hygiene as the means we take to assure the adjustment.'
- The school has a great responsibility in the promotion of mental health of children. It must provide a suitable emotional, intellectual and physical environment in which a child can develop the 'feeling of security' and the 'feeling of belongingness'.
- There is no doubt that ignorance about sex and sex related problems is one of the main causes of unhappiness and maladjustment in life.
- Talking about sex is usually considered taboo, sinful or not worthy of mention in a conservative society. There is general inhibition in talking about sex.
- Sex education includes in its scope not only physical and biological aspects of the growth of an individual including reproduction, but also, matters pertaining to ethics, morality and development of a responsible, wholesome and correct attitude towards the other sex.

5.9 KEY TERMS

- **Exceptional child:** An exceptional child may be defined as the one who differs so much from his peer average in respect of physical, mental or social characteristics that he is unable to develop his fullest potential under normal conditions in an ordinary class.
- **Delinquent:** Children and adolescents who are minor in age and commit criminal offenses are known as delinquents.

- **Super ego:** It is the agency that internalizes the parental influences and ideals of society through early childhood experiences. It represents the ideal rather than the real and strives for perfection.
- **Mental health:** It is defined as a state of well-being in which every individual realizes his potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his community.

5.10 ANSWERS TO 'CHECK YOUR PROGRESS'

1. The characteristics of exceptional children are as follows:
   i. Exceptional children deviate markedly from normal children.
   ii. Deviation may be physical, intellectual, emotional or social.
   iii. Exceptional children need a special environment.
   iv. Special environment may be provided in the normal school or in a special school.
2. The positive characteristics of gifted adolescents are as follows:
   i. Learn easily and rapidly
   ii. Retain what they learn without much drill
   iii. Have a rich vocabulary marked by originality
   iv. Show interest in ideas and words
   v. Show much curiosity in questioning
   vi. Enjoy reading
   vii. Reason things out
   viii. Possess greater ability to generalize
3. Backwardness in children can be of two types. A child who is dull, that is, of low intelligence and who is lagging behind in class is considered backward. On the other hand, a child who does not fare well in class, even though his level of intelligence is normal or even above normal, is also considered to be backward, only because his educational achievements are not satisfactory.
4. The characteristics of delinquents are as follows:
   i. Attitudinal: A delinquent is defiant, hostile, non-submissive to authority, resentful, suspicious and unconventional.
   ii. Physical: A delinquent is mesomorphic in constitution, muscular and bold.
   iii. Psychological: A delinquent is less methodical in approach.
   iv. Social: He usually lacks moral standard.
   v. Temperamental*:* A delinquent is aggressive, destructive, energetic, extraverted, impulsive and restless.

NOTES

5. *Persona* meant a mask, which the Greek actors commonly used to wear on their faces when they performed on the stage.
6. A dynamic personality is one that is undergoing constant changes but is still organized.
7. Personality is what makes individual unique: it is only through the study of personality that the relevant differences among individuals can be made clear.
8. Self-report inventories, also known as personality inventories are the self-rating questionnaires, where the individual describes his own feelings, environment, and reactions of others towards himself.
9. The Woodworth Personal Data Sheet is a personality inventory developed by Woodworth in 1918. It consists of 116 questions all relating to neurotic tendencies. The purpose of the inventory was to screen out emotionally unfit men before they were sent overseas during the World War I.
10. The Minnesota Counselling Inventory is a personality inventory, which is based upon the MMPI. It has 335 items, each to be answered as 'True' or 'False'. The seven important areas of personality measured by this inventory are emotional stability, family relationships, social relationships, leadership, adjustment to reality, conformity and mood.
11. In the words of Klein, D. B., 'Mental hygiene, as its name suggests, is concerned with the realization and maintenance of the mind's health and efficiency.'
12. According to E.G. Boring, the aim of mental hygiene is to 'aid people to achieve more satisfying ad more productive lives through the prevention of anxieties and maladjustment.'
13. The symptoms of a mentally ill child can be divided into the following three categories: physical symptoms, behavioural deviation and emotional symptoms.
14. The basic characteristics of mentally healthy people are as follows:
    i. Adaptable and resilient
    ii. Calm
    iii. Cheerful
    iv. Conscious control of life
    v. Emotionally balanced
    vi. Definite philosophy of life
    vii. Enthusiastic and reasonable
15. The factors which adversely affect the mental health of a child are as follows:
    i. Lack of friendliness on the part of teachers.
    ii. Undue stress on scholastic and other competitions.
    iii. Defective system of evaluation-element of subjectivity and unreliability/ loss of confidence in the teacher's marking.

iv. Fear of failure resulting in tension.

v. Excess of homework.

16. The school has a great responsibility in the promotion of mental health of children. It must provide a suitable emotional, intellectual and physical environment in which a child can develop the 'feeling of security' and the 'feeling of belongingness'. He should feel that his personality is given its due recognition.
17. To make sex education effective, it must commence from the earliest stages of a child's life. It is the family where foundation is laid of a child's personality and where, by stages, his outlook on life and character are moulded. Parents have, thus, to play a central role in the scheme at all stages. It is in fact, a part of family life education that goes on from infancy to maturity.
18. The following are the general guidelines to be followed by teachers in imparting sex education:

    i. The teachers should try to establish a warm, friendly, open-minded classroom environment, free of embarrassment and self-consciousness in which students feel free to ask questions which trouble them and can expect to get honest, sensible answers.

    ii. Matters relating to sex should be discussed by the teachers in a direct, unemotional and unembarrassed manner and should be talked in an objective, matter-of-fact way as in dealing with any other subject.

    iii. Teachers should discuss problems with students and let them draw their own conclusions and give appropriate facts because knowledge satisfies curiosity.

5.11 QUESTIONS AND EXERCISES

Short-Answer Questions

1. What is the importance and need to educate exceptional children?
2. What is the behaviour patter of gifted children?
3. How are backward/slow learner children classified?
4. What is personality?
5. How does personality develop?
6. State the various theories of personality.
7. Define mental health.
8. Define a proper level of aspiration.
9. How is personality measured?
10. Mention the types of Self-report inventories.
11. Write a short note on the scope of sex education.

NOTES

Long-Answer Questions

1. Explain the methods for educating the gifted children.
2. Discuss the guiding principles for educating the backward and slow learners.
3. Discuss the causes of delinquency.
4. Analyse the meaning of personality and determine its form.
5. What elements constitute personality? Describe these elements.
6. Explain the utility of personality study in education.
7. Describe some significant representative personality inventories developed in India and abroad.
8. Discuss the problems related to mental hygiene.
9. Analyse the importance of imparting sex education.

5.12 FURTHER READING

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