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Fundamentals of Psychology *for Graduate Nurses*

(Revised INC Syllabus Based Textbook)

P Prakash

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Chapter 2

Biology of Behavior

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INTRODUCTION

- Biology of behavior is a study of behavioral functions of body in relation with nervous system (Fig. 2.1).

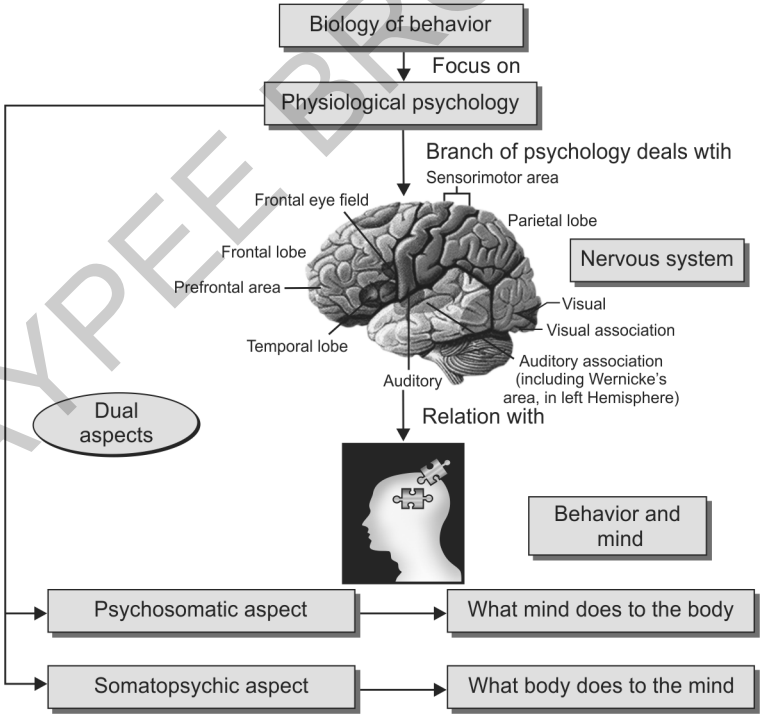

Fig. 2.1 Basic concept—biology of behavior

- It mainly focus on physiological psychology, i.e. to watch the relation exist between the nervous system and behavior.
- Physiological behavior has dual aspects—Psychosomatic (Fig. 2.4) and Somatopsychic (Fig. 2.5).

BODY-MIND RELATIONSHIP: MODULATION PROCESS IN HEALTH AND ILLNESS

- Mind is a part of body and body is a part of mind
- Without mind, body cannot exist and without body, mind cannot exists
- Malfunction in mind can affect body and malfunction in body can affect the mind
- If the mind is healthy then bodily functions will be healthy (Fig. 2.2)
- So, mind and body is inter-related.
- Mind and body will influence each other.

LEARNING ENHANCEMENT CO-OPERATION develops a mental processing model (Fig. 2.3) has been divided into 4 main aspects:

1. Reception
2. Perception
3. Memory and
4. Thinking

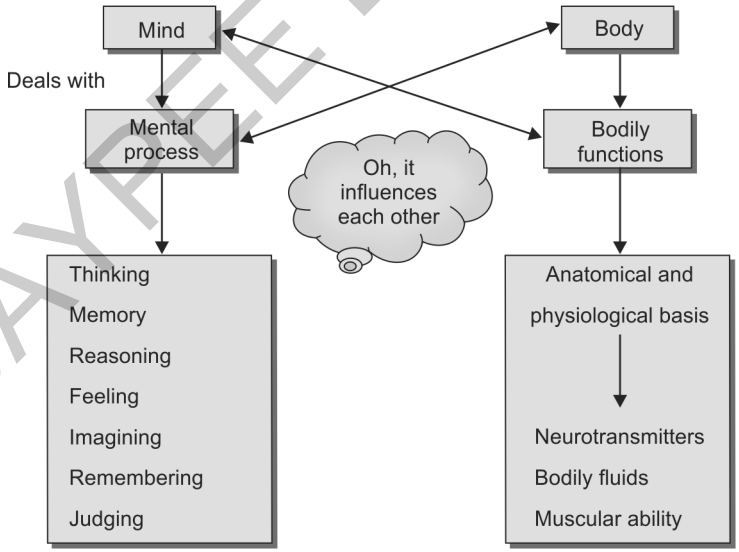

Fig. 2.2 Mind-body relationship

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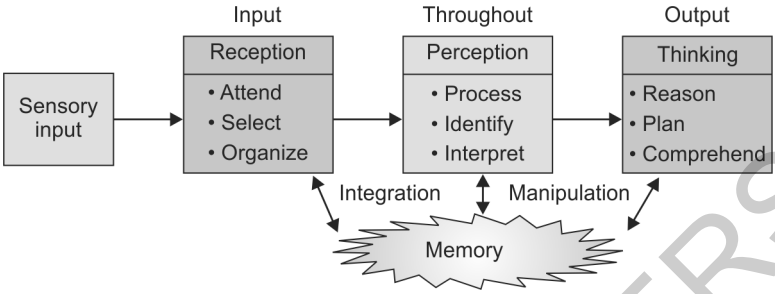

Fig. 2.3 Learning enhancement mental processing model

Reception

- Reception is a first step in the sequence of learning and involves the processing of sensory inputs.
- Inputs may be:
  - Visual
  - Auditory
  - Kinesthetic
  - Mediated by other senses.

Perception

- The second stage of the learning sequence, information selected in the reception stage is further processed to identify and interpret it.
- The skills required to perform these functions are:
  - Visual
  - Auditory processing skills and
  - Memory skills.

Memory

- Memory is important in all phases of information processing
- Remembrance, short-term memory and long-term memory is quite important for learning.

Thinking

- Thinking is the last stage of the learning sequence in which mental processes is conscious.
- Thinking will generate the ideas from memory and generate solutions to any problem.

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The anatomy of vertebral column, spinal nerves and its functions is shown in Figure 2.6.

GENETICS AND BEHAVIOR: HEREDITY AND ENVIRONMENT

Hereditary

Definition

- Capability of transmission genetically from a parent to offspring (Fig. 2.7).
- Passing from a generation to other by means of genes will influence behavior (Fig. 2.8).

TWINS

Twins are defined as two offspring produced from a same pregnancy.

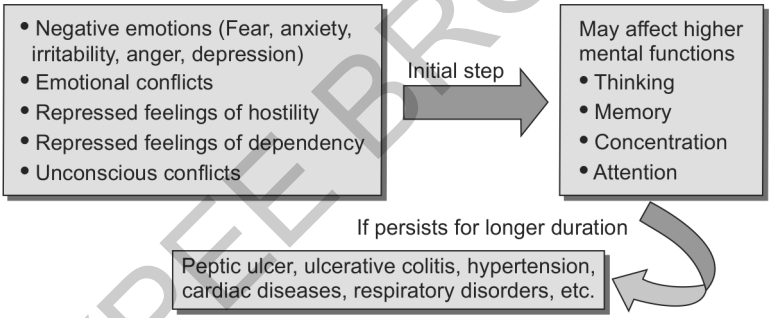

Fig. 2.4 Psychosomatic aspect

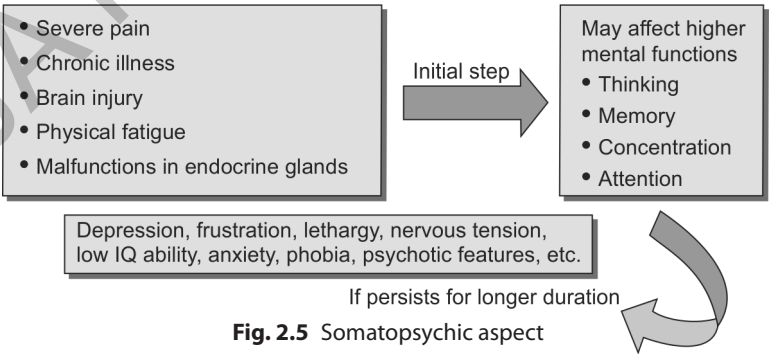

Fig. 2.5 Somatopsychic aspect

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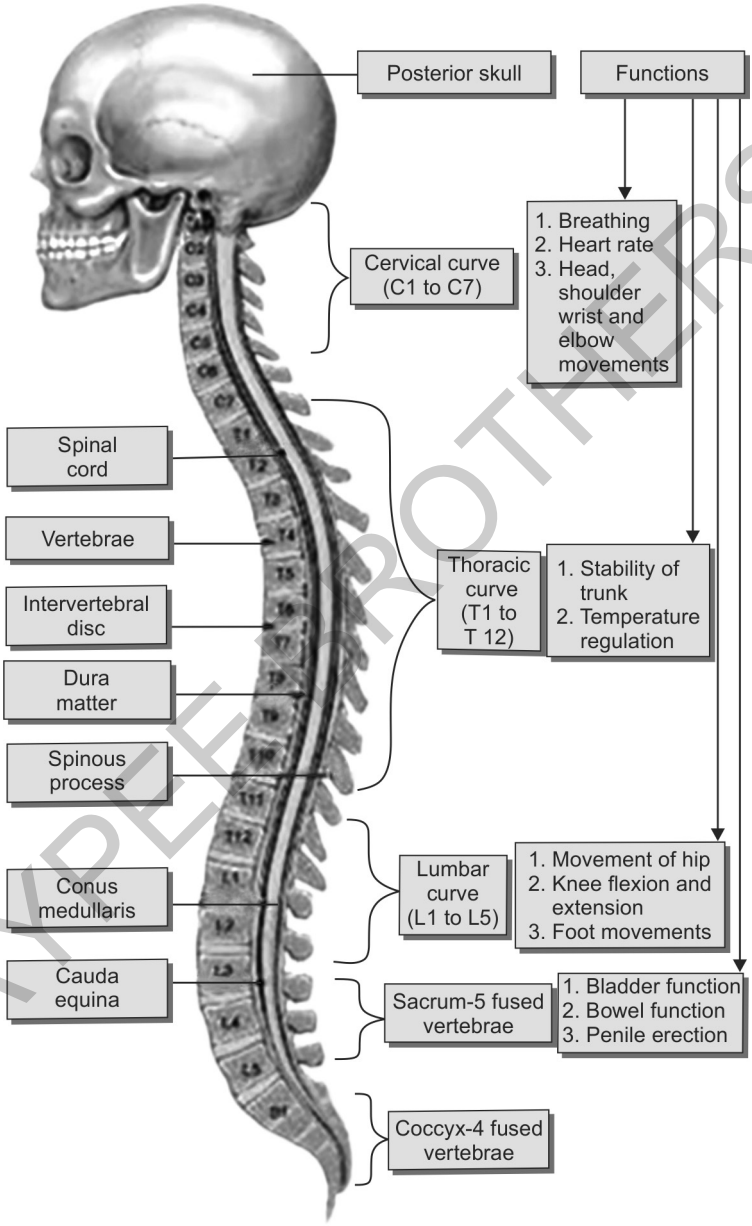

Fig. 2.6 Anatomy of vertebral column, spinal nerves and its functions

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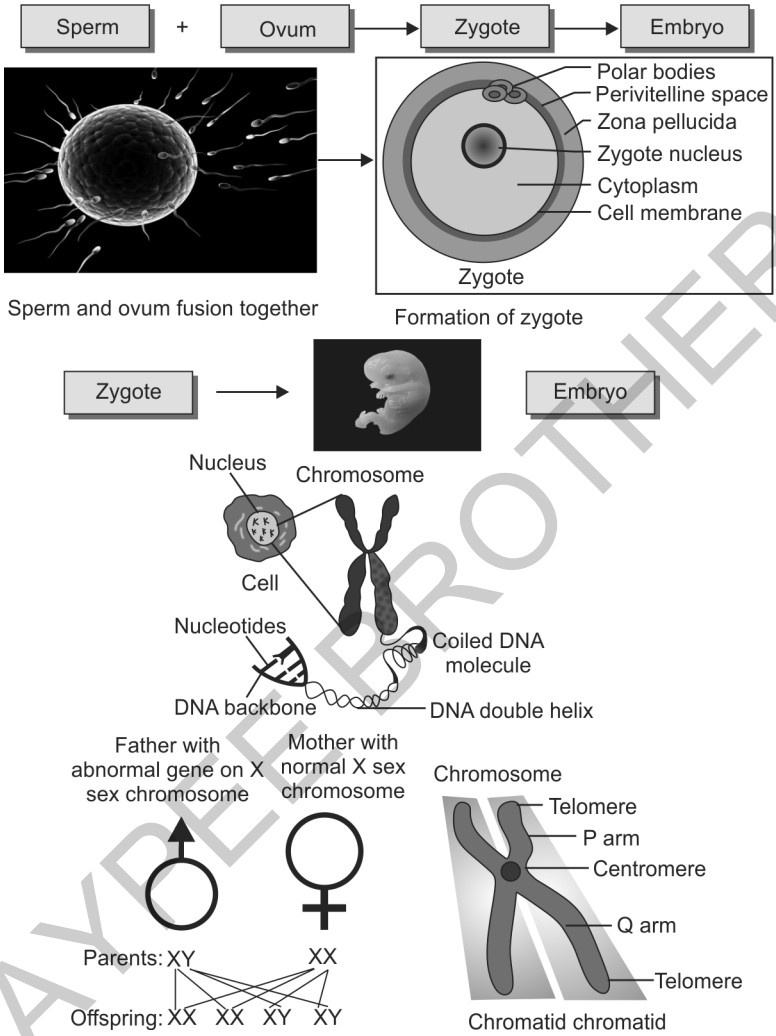

Fig. 2.7 Mechanism of hereditary

Twins are Classified as

- Monozygotic (or) Identical twins
- Dizygotic (or) fraternal (or) dissimilar(or) non-identical (or) biovular twins.

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Identical twins form when a single fertilized egg (ovum) splits into two.

Fraternal twins developed from two sperm and two separate fertilized egg (Fig. 2.9).

Factors Influencing the Twin Pregnancies

- *Advancing in age:* Women above 30 years of age has higher levels of estrogen will stimulate the ovaries to produce more than one egg at a time.

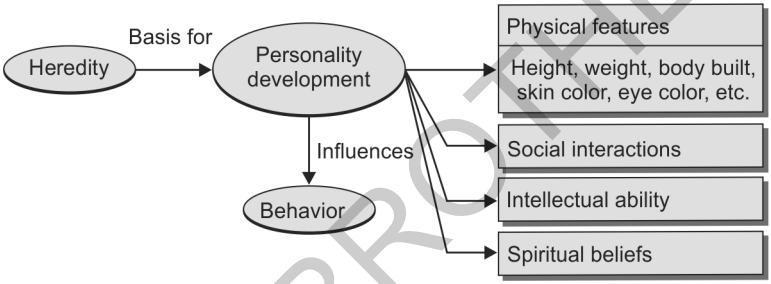

Fig. 2.8 Mechanism of heredity influences the behavior

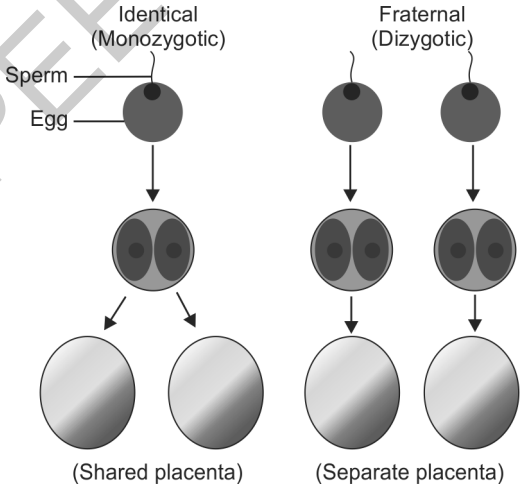

Fig. 2.9 Identical and fraternal twins

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- *Race:* Black African has high-risk and Asian women has low risk
- *Number of previous pregnancies:* More the number of previous pregnancies has a chance for more number of twins
- *Hereditary:* Chance of twin pregnancies from ancestors
- *Assisted reproductive techniques:* Several eggs are produced in a single ovulation with assisted reproductive drugs or techniques.

Complications of Twin Pregnancies

- Vanishing twin syndrome (or) miscarriage (or) abortion
- Parasitic twins (undeveloped form of twins)
- Low birth weight
- Twin to Twin transfusion syndrome (Blood of one fetus was completely diverted to other while one fetus is healthy and other become anemic)
- Conjoint twins (abnormal fusion process and so born as united).

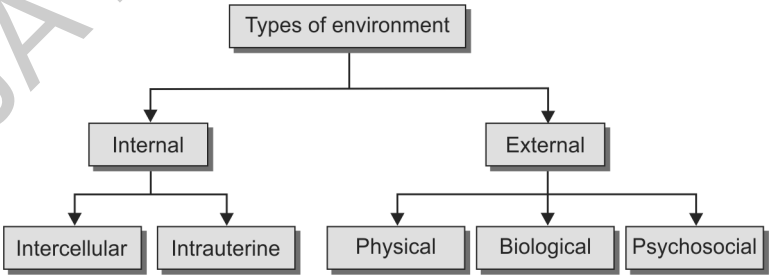
ENVIRONMENT

The term environment means surroundings. The various types of environment is shown in Flow chart 2.1.

Intercellular Environment

- It denotes the surrounding within the cell.
- Genes, endocrine glands and hormones influence the behavior
- Most of congenital deformities are due to hormonal imbalance and chromosomal defects.

Flow chart 2.1 Types of environment



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Intrauterine Environment

- It denotes the surroundings within the uterus or womb
- Fetus was surrounded by amniotic fluid and it was attached to mother with umbilical cord
- The nourishment of fetus will depend on the mother's nourishment
- Physiological and psychological state of mother plays a vital role in healthy growth/development of fetus.

Physical Environment

The growth of the child was highly depends on physical surroundings such as:

- Air
- Water
- Housing
- Heat
- Soil
- Climate
- Noise
- Radiation
- Ventilation

} Nonliving component

Biological Environment

The growth of the child was more depends on biological surroundings such as:

- Plants
- Animals
- Insects
- Germs
- Bacteria
- Viruses
- Protozoa

} Living component

The new born baby was more prone to get infections due to low development of immune system.

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Psychosocial Environment

It includes

- Cultural values
- Customs
- Habits
- Beliefs
- Attitudes
- Morals
- Religion
- Education
- Occupation
- Motives

Parents, teachers, family members, friends, classmates, mass media and recreation

Influences each other

Example: If the father having lot of confidence in his child and if it verbalized to child, then automatically that confidence level of father will develop the child's self-confidence level. This example denotes how psychological factor in environment will influence the behavior of the child.

Structure and Functions of Brain (Fig. 2.10)

Cerebrum

- Cerebrum or cortex occupies larger portion of brain
- Mainly responsible for higher level function such as thought and action

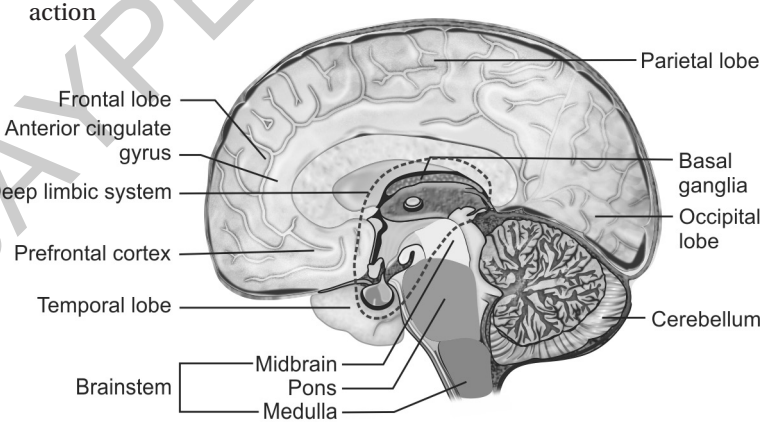

Fig. 2.10 Structure of brain

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- It has major lobes such as frontal, temporal, occipital and parietal
- These lobes was explained in Table 2.11 in this chapter
- Deep furrow divides the cerebrum into right and left hemisphere
- Corpus callosum is a bundle of axon which connects the right and left hemisphere.

Cerebellum

- It is a little brain which has two hemisphere and has a highly folded surface/cortex
- Cerebellum plays vital role in movement, co-ordination and balance.

Limbic System

- It is also called as emotional brain
- This system consists of
  - Thalamus
  - Hypothalamus
  - Amygdala and
  - Hippocampus
- Thalamus is present between the cerebral cortex and midbrain. Thalamus plays vital role in maintenance of consciousness, alertness and sleep
- Hypothalamus is located below the thalamus and above brainstem. It plays vital role in regulation of body temperature, hunger, thirst, sleep and circadian rhythms
- Amygdala plays primary role in processing of memory, decision making skills and emotions
- Hippocampus plays primary role in memory, olfaction and sleep.

Brainstem

- Under the limbic system, brainstem is present
- It has function to control the vital functions of the body such as breathing, heart rate and blood pressure
- Brainstem made of
  - Midbrain
  - Pons
  - Medulla
- Midbrain or mesencephalon involved in the function of vision, hearing, eye movement and body movements

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Fundamentals of Psychology *for Graduate Nurses*

Salient Features

- This comprehensive textbook focuses on key points highlighting the basic Psychology for Nurses as per the revised Indian Nursing Council (INC) syllabus
- Paves right way for easy understanding among nursing students by the diagrammatic presentation
- Includes frequently asked questions (FAQs) in every chapter and question bank comprises of previous university examination questions in which the short answer questions have been solved for easy revision
- Glossary helps to understand the basic terms in psychology
- Promotes students to think optimistic towards life by impressive psychological quotes of this textbook
- Competency will be developed with the integration of knowledge, attitude and skills. The level of competency said to be an ultimate goal of this textbook as such, it was designed with in-depth analysis of subject with appropriate illustration
- The necessary information in the textbook will boost up the confidence of students to appear in University examinations
- It is student-friendly psychology textbook with a specific vital message for nurses.



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