

DEVELOPMENTAL PSYCHOLOGY

MEANING OF DEVELOPMENTAL CHANGES

The term *development* means a progressive series of changes that occur as a result of maturation and experience. As Van den Daele has pointed out, "development implies qualitative change" (114). This means that development does not consist merely of adding inches to one's height or of improving one's ability. Instead, it is a complex process of integrating many structures and functions.

Two essentially antagonistic processes in development take place simultaneously throughout life — *growth*, or evolution, and *atrophy*, or involution. Both begin at conception and end at death. In the early years growth predominates, even though atrophic changes occur as early as embryonic life. In the latter part of life, atrophy predominates, though growth does not stop; hair continues to grow, and cells continue to be replaced. With aging, some parts of the body and mind change more than others.

The human being is never static. From conception to death, change is constantly taking place in physical and psychological capacities. As Piaget has explained, structures are "far from being static and given from the start." Instead, a maturing organism undergoes continued and progressive changes in response to experiential conditions, and these result in a complex network of interaction (87).

Even though development is continuous, as

STAGES IN THE LIFE SPAN

- *Prenatal period*: conception to birth
- *Infancy*: birth to the end of the second week
- *Babyhood*: end of the second week to end of the second year
- *Early childhood*: two to six years
- *Late childhood*: six to ten or twelve years
- *Puberty or preadolescence*: ten or twelve to thirteen or fourteen years
- *Adolescence*: thirteen or fourteen to eighteen years
- *Early adulthood*: eighteen to forty years
- *Middle age*: forty to sixty years
- *Old age or senescence*: sixty years to death

HOW LIFE BEGINS

New life begins with the union of a male sex cell and a female sex cell. These sex cells are developed in the reproductive organs, the *gonads*. The male sex cells, the *spermatozoa* (singular: *spermatozoon*), are produced in the male gonads, the *testes*, while the female sex cells, the *ova* (singular: *ovum*), are produced in the female gonads, the *ovaries*.

Male and female sex cells are *similar* in that they contain *chromosomes*. There are twenty-three chromosomes in each mature sex cell, and each chromosome contains *genes*, the true carriers of heredity. A gene is a minute particle which is found in combination with other genes in a stringlike formation within the chromosome. It has been estimated that there are approximately 3,000 genes in each chromosome. These are passed on from parent to offspring (10,53,66).

Male and female sex cells also *differ* in two important ways. First, in the mature ovum there are twenty-three matched chromosomes while in the mature spermatozoon there are twenty-two matched chromosomes and one unmatched chromosome which may be either an X or a Y chromosome. The function of X and Y chromosomes will be discussed later in relation to sex determination.

The second way in which male and female sex cells differ is in the number of preparatory stages of development they pass through before they are ready to produce a new human being. While all sex cells, male or female, must go through preliminary stages of development, male cells go through two preliminary stages—maturation and fertilization—while female cells go through three preliminary stages—maturation, ovulation, and fertilization.

KINDS OF BIRTH

Natural, or Spontaneous, Birth

In a natural birth, the position of the fetus and its size in relation to the mother's reproductive organs allow it to emerge in the normal, head-first position.

Breech Birth

In a breech birth, the buttocks appear first, followed by the legs and finally the head.

Transverse Birth

In a transverse presentation, the fetus is positioned crosswise in the mother's uterus. Instruments must be used for delivery unless the position can be changed before the birth process begins.

Instrument Birth

When the fetus is too large to emerge spontaneously or when its position makes normal birth impossible, instruments must be used to aid in delivery.

Caesarean Section

If x-rays taken during the latter part of pregnancy indicate that complications may result if the infant emerges through the birth canal, the baby is brought into the world through a slit made surgically in the mother's abdominal wall.

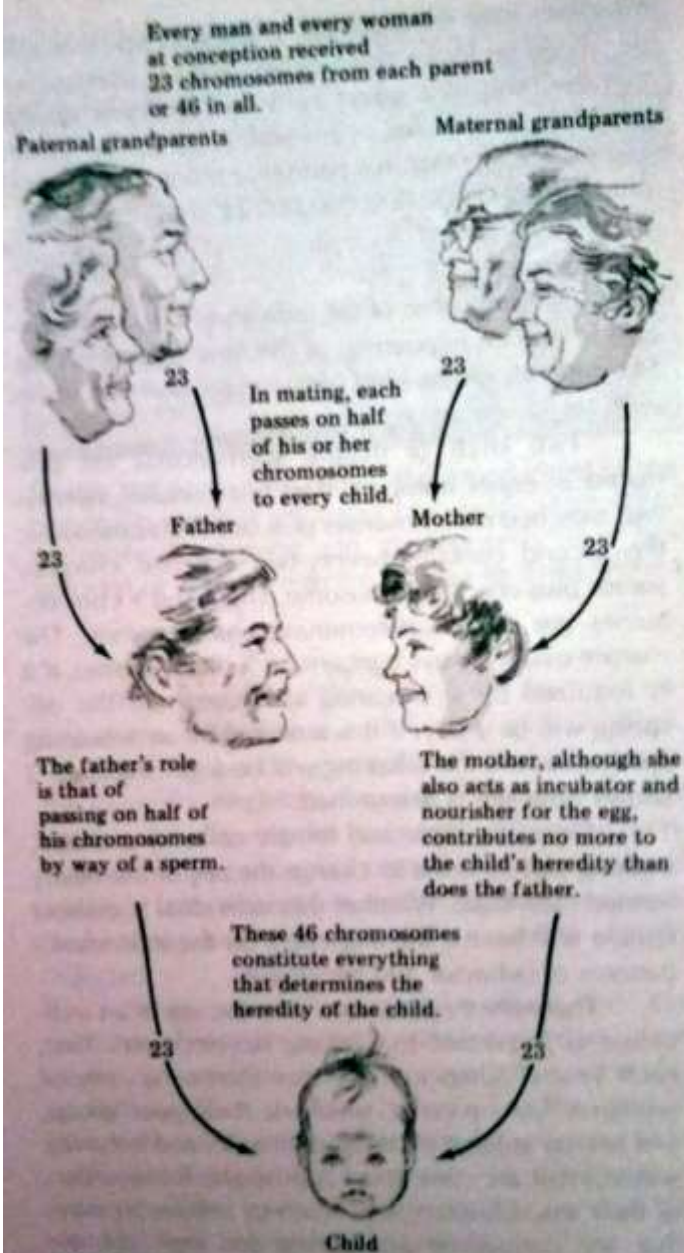


FIGURE 2-1 The hereditary process. (Adapted from A. Scheinfeld. *The new you and heredity*. Philadelphia: Lippincott, 1961. Used by permission.)*

TIMETABLE OF PRENATAL DEVELOPMENT

Period of the Zygote (fertilization to end of second week)

- The size of the zygote—that of a pinhead—remains unchanged because it has no outside source of nourishment; it is kept alive by yolk in the ovum.
- As the zygote passes down the Fallopian tube to the uterus, it divides many times and separates into an outer and an inner layer.
- The outer layer later develops into the placenta, the umbilical cord, and the amniotic sac, and the inner layer develops into a new human being.
- About ten days after fertilization, the zygote becomes implanted in the uterine wall.

Period of the Embryo (end of the second week to end of the second lunar month)

- The embryo develops into a miniature human being.
- Major development occurs, in the head region first and in the extremities last. See Figure 2-5.
- All the essential features of the body, both external and internal, are established.
- The embryo begins to turn in the uterus, and there is spontaneous movement of the limbs.
- The placenta, the umbilical cord, and the amniotic sac develop; these protect and nourish the embryo.
- At the end of the second prenatal month, the embryo weighs, on the average, $1\frac{1}{4}$ ounces and measures in length $1\frac{1}{2}$ inches.

Period of the Fetus (end of the second lunar month to birth)

- Changes occur in the actual or relative size of the parts already formed and in their functioning. No new features appear at this time.
- By the end of the third lunar month, some internal organs are well enough developed to begin to function. Fetal heartbeat can be detected by about the fifteenth week.
- By the end of the fifth lunar month, the different internal organs have assumed positions nearly like the ones they will have in the adult body.
- Nerve cells, present from the third week, increase rapidly in number during the second, third, and fourth lunar months. Whether or not this rapid increase will continue will depend upon conditions within the mother's body such as malnutrition, which adversely affects nerve-cell development—especially during the latter months of the prenatal period.
- Fetal movements usually appear first between eighteen and twenty-two weeks and then increase rapidly up to the end of the ninth lunar month when they slow down because of crowding in the amniotic sac and pressure on the fetal brain as the fetus takes a head-down position in the pelvic region in preparation for birth. These fetal movements are of different kinds—rolling and kicking and short or quick.
- By the end of the seventh lunar month, the fetus is well enough developed to survive, should it be born prematurely.
- By the end of the eighth lunar month the fetal body is completely formed, though smaller than that of a normal, full-term infant.

HAVIGHURST'S DEVELOPMENTAL TASKS DURING THE LIFE SPAN

Babyhood and Early Childhood

- Learning to take solid foods
- Learning to walk
- Learning to talk
- Learning to control the elimination of body wastes
- Learning sex differences and sexual modesty
- Getting ready to read
- Learning to distinguish right and wrong and beginning to develop a conscience

Late Childhood

- Learning physical skills necessary for ordinary games
- Building a wholesome attitude toward oneself as a growing organism
- Learning to get along with age-mates
- Beginning to develop appropriate masculine or feminine social roles
- Developing fundamental skills in reading, writing, and calculating
- Developing concepts necessary for everyday living
- Developing a conscience, a sense of morality, and a scale of values
- Developing attitudes toward social groups and institutions
- Achieving personal independence

Adolescence

- Achieving new and more mature relations with age-mates of both sexes
- Achieving a masculine or feminine social role
- Accepting one's physique and using one's body effectively
- Desiring, accepting, and achieving socially responsible behavior
- Achieving emotional independence from parents and other adults

- Preparing for an economic career
- Preparing for marriage and family life
- Acquiring a set of values and an ethical system as a guide to behavior—developing an ideology

Early Adulthood

- Getting started in an occupation
- Selecting a mate
- Learning to live with a marriage partner
- Starting a family
- Rearing children
- Managing a home
- Taking on civic responsibility
- Finding a congenial social group

Middle Age

- Achieving adult civic and social responsibility
- Assisting teenage children to become responsible and happy adults
- Developing adult leisure-time activities
- Relating oneself to one's spouse as a person
- Accepting and adjusting to the physiological changes of middle age
- Reaching and maintaining satisfactory performance in one's occupational career
- Adjusting to aging parents

Old Age

- Adjusting to decreasing physical strength and health
- Adjusting to retirement and reduced income
- Adjusting to death of spouse
- Establishing an explicit affiliation with members of one's age group
- Establishing satisfactory physical living arrangements
- Adapting to social roles in a flexible way