Developmental Psychology

CC12 Unit 1(For Semester V course)

1. Definition
2. What is life span approach
3. Principles
4. A brief history
5. Age and period
6. Biopsychosocial perspective
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Definitions

Development is not an empirical term (Reese & overton,1970) although on occasion it is used as though it were (Kaplan ,1983)

Developmental psychology is theoretical data collection exercise because this perspective makes no judgments as to what is better or preferable

Lifespan developmental psychology is a discipline concerned with description, modification(optimization), explanation of within individual change and stability from birth or possibly from conception to death and/ or between individual differences and similarities and within individual change (Baltes, Reese & Lippsitt,1980)

Development is better thought of as a process than as a state. Kaplan (1983) defines development as movement in the direction of perfection, although he acknowledged that what we mean by perfection is neither transparent nor easy to articulate.

What is Life span Approach

Beginning with Sigmund Freud (1856-1939) and Jean Piaget (1896-1980) the early focus of developmental psychology was **child development or maturation of children**. Later researchers who study human development expanded their focus to include **study of physical , motor, cognitive, intellectual, emotional , personality, social and moral change that occur throughout all stages of the life span.**

Lifespan Psychology is a metatheoretical framework that was first proposed by Baltes ,(1997) **encompassing growth , stability and decline from conception to the end of life.**

Lifespan psychology alone cannot explicate the architecture of human development**. Biology, Demography, Neuroscience as well as economics, educational science and philosophy are also needed** – just to mention a few.

Gains and losses co-exist in human development.

Lifespan psychology posits the dialectics of **gains and losses** (Riegel,1976) Which means any gain at any age , entails a loss and vise versa (Baltes, 1987)

Some highly debated issues in lifespan development psychology :**a) continuity versus discontinuity b) Nature vs nurture c)Active versus passive d)stability versus change**

Development and aging are used synonymously to define selective age-related change in adaptive capacity. **Adaptive capacity encompasses psychological functions (self-regulations, working memory) as well as structures (such as personality traits and knowledge systems).**

Principles

Development is lifelong. Lifespan theorists believe that development is life-long, and change is apparent across the lifespan.

Development is multidirectional. Humans change in many directions. We may show gains in some areas of development, while showing losses in other areas

Development is multidimensional. We change across three general domains/dimensions; physical, cognitive, and psychosocial.

Development is multidisciplinary. Human development is such a vast topic of study that it requires the theories, research methods, and knowledge base of many academic disciplines.
Development is characterized by plasticity. Plasticity is all about our ability to change and that many of our characteristics are malleable
Development is multicontextual : Baltes (1987) identified three specific contextual influences- **Normative age-graded influences, Normative history-graded influences, Non-normative life influences.**

History

In its earliest days, developmental psychology was closely linked with mainstream psychology. Indeed, two of the founding fathers of the American Psychological Association (APA) , G. Stanley Hall and M. M. Baldwin, were renowned developmentalists. Then, for a long while, many developmentalists operated outside the central concerns of the mainstream of psychology.

On 100th anniversary of the founding of the APA provided a unique opportunity for developmentalists to take stock of the progress of the field..

Darwin, Hall, Baldwin, Binet, Dewey, Freud, Spitz, Piaget, Watson, Gesell, McGraw, Vygotsky, Stem, Werner, Bayley, Bowlby, Ainsworth, Sears, Bandura, and E. J. Gibson are prominent developmental scientists provide a series of reflections on the future of the field.

Dimensions	Turn of the Century	1950s and 1960s	Present (1990s)
General Theoretical Dimensions			
Nature of explanatory models	Predominantly organismic	Predominantly mechanistic	Predominantly organismic; some mechanistic
Principal explanatory processes	Evolutionary principles	Social, environmental; learning principles	Affective, biological, cognitive, social; interactional processes
Aims of theory	Explanation and description	Prediction and control	Explanation and description
Scope of theory	Broad	Very broad	Limited
Universal versus culture-bound nature of explanations	Universal	Universal	Culture bound; universal
Status of secular influences on development	Limited	Limited	Extensive
Relationship to other disciplines	Extensive	Limited links	Many links
Applied versus nonapplied orientation	Both	Nonapplied	Both
Developmental Dimensions			
Developmental as continuous versus discontinuous	Discontinuous	Both	Predominantly continuous; some discontinuity
Focal period of development	Childhood	Early Childhood	Life span
Role of critical periods	Accepted	Accepted	Limited
Direction of influence	Unidirectional	Unidirectional	Bidirectional
Unit of analysis group	Individual, dyad	Individual	Individual, dyad, triad
Methodological Dimensions			
Nature of designs: cross sectional versus longitudinal	Both	Cross sectional	Both
Experimental versus nonexperimental	Both	Experimental	Both
Setting: Laboratory versus field	Multiple settings	Laboratory	Multiple settings
Data collection strategy (self-report; observations)	Multiple strategies	Nonsequential observations	Multiple strategies
Level of analysis	Molar	Molecular	Molar and molecular
Selection of samples	Samples of convenience	Convenience sample, random assignment to experimental conditions	National surveys; multicultural samples

What is age and period in developmental psychology

AGE

- **Biological age** : How quickly the body is aging
- **Psychological age**: Psychologically adaptive capacity compared to others of our chronological age
- **Social age**: Based on the social norms of our culture and the expectations our culture has for people of our age group

PERIOD

- **Critical period**: A period during which a particular leaning occurs

- **Imprinting:** A biological predisposition for a behaviour that is triggered by or linked to a specific environmental stimulus
- **Sensitive period**: A time of heightened ability to learn

Period (Age)	*Freud's Stages*	*Erikson's Task or Crisis*
Infancy (0–1)	Oral	Trust vs. mistrust
Toddlerhood and early childhood (1–3)	Anal	Autonomy vs. shame
Early childhood (3–6)	Phallic	Initiative vs. guilt
Middle childhood (7–11)	Latency	Industry vs. inferiority
Adolescence (12–19)	Genital	Identity vs. confusion
Early adulthood (20–45)		Intimacy vs. isolation
Middle adulthood (45–65)		Generativity vs. stagnation
Late adulthood (65+)		Integrity vs. despair

Stages of life (Freud, Erikson)

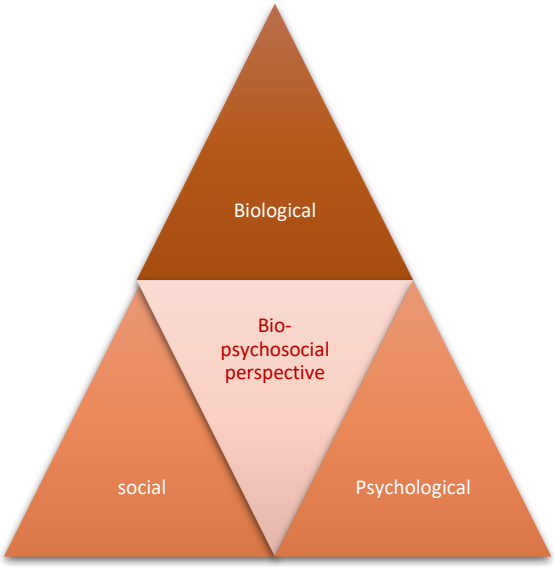
Stage	*Age*	*Characteristics of Stage*
Sensorimotor	0–2	The child learns by doing: looking, touching, sucking. The child also has a primitive understanding of cause-and-effect relationships. Object permanence appears around 9 months.
Preoperational	2–7	The child uses language and symbols, including letters and numbers. Egocentrism is also evident. Conservation marks the end of the preoperational stage and the beginning of concrete operations.
Concrete Operations	7–11	The child demonstrates conservation, reversibility, serial ordering, and a mature understanding of cause-and-effect relationships. Thinking at this stage is still concrete.
Formal Operations	12+	The individual demonstrates abstract thinking, including logic, deductive reasoning, comparison, and classification.

Stages of Cognitive development : Piaget

Age Period	Description
Prenatal	*Starts at conception, continues through implantation in the uterine wall by the embryo, and ends at birth.*
Infancy and Toddlerhood	*Starts at birth and continues to two years of age*
Early Childhood	*Starts at two years of age until six years of age*
Middle and Late Childhood	*Starts at six years of age and continues until the onset of puberty*
Adolescence	*Starts at the onset of puberty until 18*
Emerging Adulthood	*Starts at 18 until 25*
Early Adulthood	*Starts at 25 until 40-45*
Middle Adulthood	*Starts at 40-45 until 65*
Late Adulthood	*Starts at 65 onward*

Reference : Lally, M & Valentine,S (2019)Lifespan Development : a Psychological perspective (2nd ed)

Biopsychosocial Perspective



The interaction of biological, psychological, and social aspects of developmental psychology forms the essence of the holistic **biopsychosocial perspective.**

The biopsychosocial perspective attributes complex phenomena or events to multiple causes.

In contrast to the biopsychosocial perspective is the **reductionistic perspective,** which reduces complex phenomenon or events to a single cause.

Growth, Maturation and learning : Interrelationship

Crow & Crow (1962) **Growth refers to structural and physiological changes and development is concerned with growth as well as those changes in behavior which results from environmental stimulation .**Growth proceeds from top to bottom following **Cephalocaudal** principle.

Proximodistal development occurs from the centre or core of the body in an outward direction. Head region starts growth first followed by which other organs starts developing. Child gains control of the head first and then the arms, legs. Growth and development is sequential**. Growth is measurable and observable(quantitative) .Growth may or may not bring development.**

Maturation is unfolding of individuals inherent traits. **Phylogenetic functions(common to the human race)** such as creeping, sitting, walking- Learning in the form of training is of little advantage here, though controlling the environment to reduce opportunities for practice may retard development. Maturation provides raw materials for learning and determines more general patterns and sequence of behaviour. Maturation sets limits beyond which development can not progress even with most favorable learning methods and strongest motivation from learner's part. **Developmental readiness** is required.

Learning is development comes from experience and effort from individuals parts.**Ontogenetic functions (specific to the individual)** such as writing, driving , swimming – learning I the form of training. variation in learning occurs due to individual difference in personality , attitude interest etc.

Developmental directions: cephalocaudal and Proximodistal

Developmental Direction

The concept of **developmental direction**, namely that change is cumulative and directional, was first formulated by Gesell (1954) as a means of explaining increased coordination and motor control as a function of the maturing nervous system. Through observations, Gesell noted that an orderly, predictable sequence of physical development proceeds from the head to the feet (cephalocaudal) and from the center of the body to its periphery (proximodistal).

The concept of developmental direction has encountered recent criticism and should not be viewed as operational at all levels of development or in all individuals. It may be that the observation of tendencies toward distinct developmental directions is not exclusively a function of the maturing nervous system, as originally hypothesized by Gesell, but is due, in part, to the demands of the specific task and the experiences of the child. For example, the task demands of independent walking are considerably greater than

those for crawling or creeping. There is less margin for error in independent walking than there is in creeping and, in turn, crawling. In other words, it is mechanically easier to crawl than it is to creep, and easier to crawl than it is to walk. Therefore, the apparent cephalocaudal progression in development may be due not only to maturation of the nervous system, but also to the performance demands of the task. Care, therefore, should be taken when interpreting the concept of developmental direction, particularly during the period of infancy.

CONCEPT 4.1

Neuromotor maturation may be used to account for, in part, both the sequence and rate of motor development throughout the life cycle.

The *cephalocaudal* aspect of developmental direction refers specifically to the gradual progression of increased control over the musculature, moving from the head to the feet. It may be witnessed in the prenatal stages of fetal development as well as in later postnatal development. In the developing fetus, for example, the head forms first, and the arms form prior to the legs. From a cephalocaudal standpoint, the newborn infant first gains control of her head, then her shoulders and trunk. At the point the infant has control over his hips and core, she will be able to sit independently, and ultimately once she has some control over her lower limbs and feet, she will be able to walk. Young children are often clumsy and exhibit poor motor control over their lower extremities. This may be due to incomplete cephalocaudal development and to the complexity of the task demands of independent walking.

The second aspect of developmental direction, known as *proximodistal* development, refers specifically to the child's progression in control of the musculature from the center of the body to its most distant parts. As with cephalocaudal development, the proximodistal concept applies to both growth processes and the acquisition of movement skills. For example, with regard to growth, the trunk and shoulder girdle grow prior to arms and legs, which grow prior to the fingers and toes. Another example of the proximodistal law of developmental direction includes the sequences in learning how to catch, where children first catch the ball in the midline, and it is not until later they can catch more distal to their body. In skill acquisition, the young child is able to control the muscles of the trunk and shoulder girdle prior to the muscles of the wrist, hand, and fingers. This principle of

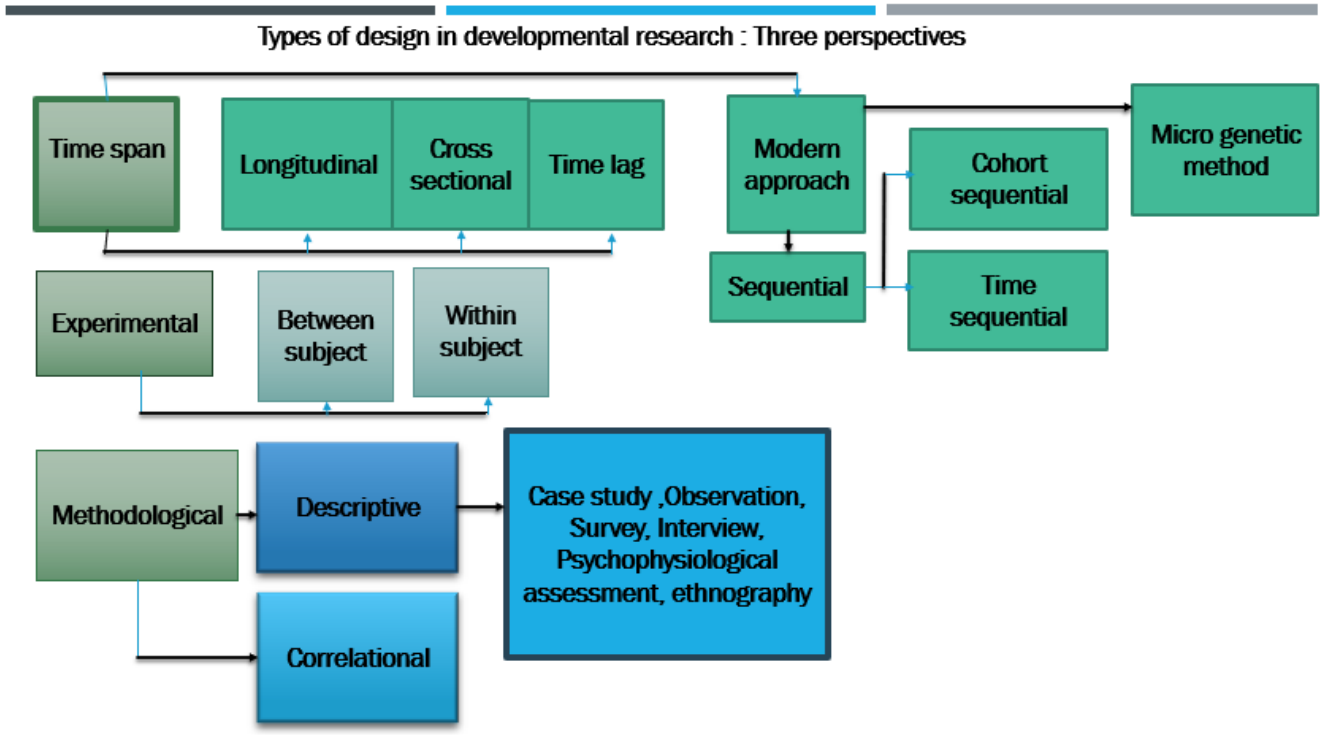
development is frequently used in the primary grades when children are taught the less refined elements of manuscript writing before they learn the more complex and refined movements of cursive writing.

The cephalocaudal and proximodistal process is operational throughout life and has a tendency to reverse itself as one ages. Actions of the lower body and extremities are the first to regress. For example, many older adults shift to a more primitive walking pattern with a short stride and step height (cephalocaudal) and struggle with fine motor manipulation (proximodistal) like picking up pennies. Certainly, however, older individuals can forestall and reduce such regression by staying active throughout life. (See Chapter 19 for more details on older adults).

Research Design

Research design is a strategy or blueprint for deciding how to collect and analyze information. Research design dictates which methods are used and how. Developmental research designs are techniques used particularly in life span development research. To describe development and change , age is important because age, cohort , gender and social class impact development.

Types of research design



Cross sectional design and longitudinal design

The majority of developmental studies use cross-sectional designs because they are less time-consuming and less expensive than other developmental designs. **Cross-sectional research** designs are used to examine behavior in participants of different ages who are tested at the same point in time. **Longitudinal research** involves beginning with a group of people who may be of the same age and

background (cohort) and measuring them repeatedly over a long period of time. One of the benefits of this type of research is that people can be followed through time and be compared with themselves when they were younger; therefore changes with age over time are measured.

THE CROSS-SECTIONAL METHOD AND ITS LIMITATIONS

1. Advantages and Limitations

Growth and development have traditionally been studied by the cross-sectional method, by which the average values of a variable are calculated for groups of subjects distributed according to age. Growth is inferred from the progressive increase of the average values for height or weight in groups of growing children; that is, the regression of measurements on age is viewed as an index of growth rate. Such analysis neither provides a direct measurement of age changes nor specifies the magnitude or rates of change in individual subjects. Its primary advantage is that the presence of age trends in a group of subjects can be detected fairly quickly. Caution is necessary in its interpretation, however, since differences between age groups include birth-cohort[1] as well as age effects (see below, "Strategies of Analytical Design").

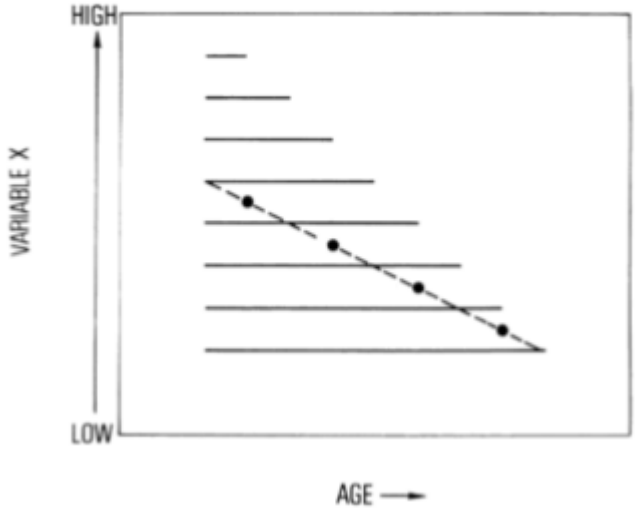
Students of child development recognized this limitation of cross-sectional analyses in the early part of this century and initiated longitudinal studies, in which measurements of height and weight were repeated at short intervals to generate growth curves for individual subjects (Dearborn et al., 1938). Although important findings have emerged, the longitudinal method has been used in only a few studies of adults (see Chapter II), because of the difficulties of recruiting and retaining subjects for repeated measurements over long periods of time, as well as of finding the necessary long-term financial support.

2. Effects of Differential Mortality

As a study population ages it becomes more and more selected, since death occurs more frequently among old than among young subjects. By age 70, the population available for study represents only about 50% of the original birth cohort. Averages derived from measurements in young adults are thus based on observations of subjects some of whom will not live to age 70, while data from older subjects obviously represent an "élite" population that has survived.

Age differences in a measured variable do not necessarily reflect changes in individuals or even the average changes in specific age groups, since deaths do not occur randomly throughout the population but are more likely among individuals whose characteristics increase their susceptibility. The selective nature of the process is implied by the term "differential mortality." This effect increases with age.

The influence of differential mortality on inferences about age changes made on the basis of cross-sectional measurements of age differences can be visualized from the theoretical curve in Figure 1. Consider the hypothetical variable X whose level varies among individuals but does not change with aging in any individual. Each of the horizontal lines in the figure represents a single individual as he ages. Suppose further,



3. Birth-Cohort Effects

Another limitation of cross-sectional studies is that young and old groups of subjects may differ in characteristics other than age that may also affect the measurements. Subjects born in a specified span of calendar years represent a birth cohort. An example of birth-cohort effects may be found in tests that are influenced by the level of education of the subjects. Most of today's young adults have completed high school, while a much smaller proportion of adults educated in the early years of this century reached that level of education. In any test in which level of education influences performance, young subjects will thus out-perform the old—but the difference may be due to education rather than to age.

Socioeconomic conditions early in life may also have affected older subjects differently from younger ones. For example, subjects who were 70 years old in 1980 were exposed to the effects of the economic depression of the 1930s when they were in their 20s, whereas subjects born after 1940 have not been subjected to such an event. Similarly, epidemics, wars, and other disruptions that occur at different points of the life cycle of different birth cohorts may influence test results in ways that the cross-sectional method cannot differentiate from true age changes (Birren and Renner, 1977).

4. Disease Effects

Since the occurrence of many diseases increases with advancing age, one of the primary problems in attributing differences between groups of subjects to aging is the necessity of excluding subjects suffering from diseases that influence the variable under study. This is an extremely difficult problem for which there is no certain remedy.

Many investigators, especially those concerned with behavioral and social research, have simply ignored the problem. Others have set criteria of health status, ranging from superficial to comprehensive, for inclusion in the study. These are commonly limited to the identification of a few specific disease states such as coronary artery disease or diabetes, or to arbitrary standards of normality in physical findings or laboratory tests such as blood pressure, blood glucose, or hemoglobin concentration. In many studies health status was determined by self-evaluation of the subjects; if a subject said he was in good health he was regarded as healthy. In only a few instances was a detailed physical examination carried out by physicians to screen subjects for the presence of specific diseases.

THE LONGITUDINAL METHOD

Some of the limitations of cross-sectional studies of aging can be minimized or overcome by a longitudinal design, in which the same subjects are measured repeatedly. The ideal longitudinal study of aging would provide observations on individuals over their entire life spans. Since this design is impractical, most longitudinal studies have been limited to specific periods of the life cycle. The phases of growth and development, for example, have received much more attention than adult aging. Among the many critical questions about how adults age that can be answered only from serial observations are the following:

Does the average curve of age differences based on cross-sectional data represent the average progression of aging in individual subjects?

How rapidly does an individual change with respect to a specific variable or test? That is, what is the rate of change? What is the diversity among individuals?

Is there a general aging factor, or does each organ system show a different pattern of aging? How are age changes in different variables related in individual subjects?

Do critical events in the life cycle of an individual affect aging? An answer to this question requires serial measurements in the subject before and after the event, which may take such forms as a heart attack or other severe illness, exposure to toxic substances or radiation, loss of job, retirement, loss of spouse, loss of mobility, or loss of independent living.

Can patterns or levels of performance at a given age be used as predictors of performance at a later age, or of longevity?

Can aging be distinguished from disease?

Does age influence the progression of such disease states as diabetes, arteriosclerosis, and hypertension?

Can a causal ordering be determined from serial observations when two variables are known to co-vary?

ADVANTAGES OF THE LONGITUDINAL METHOD

1. Age Regressions for Individual Subjects

The primary advantage of the longitudinal method is that it makes it possible to estimate age changes in an individual over a specified period, so that a "rate of aging" may be determined for any specified variable. The study must be so designed that enough observations are made in an individual to permit calculation of the standard error of estimate of the calculated regression on age. It is usually assumed that the regression of the variable on age is linear. Although the assumption of linearity may or may not be true, it is seldom possible to collect enough observations to reject it. A statistical analysis *(Schlesselman, 1973a,b)*[2] has been made of the experimental strategies (duration of the study, frequency of observations, number of observations) essential to achieve a specified reliability of estimate of the individual regression slopes for a specific variable. For one variable, equally satisfactory slopes might be computed by carrying out three tests in 14 years, ten tests in ten years, or 30 tests in six years. For another it might not be possible to compute individual slopes with satisfactory accuracy unless monthly examinations were carried out for 30 years. Two characteristics of the variable that necessitate different planning strategies are the mean rate of change with time (the mean regression on age for the population) and the degree of variance in the individual slopes. A third factor is the investigator's determination of the degree of accuracy required in the estimate of the age regression for an individual subject. The investigator may thus choose among many strategies for the design of a longitudinal study.

2. Predicting Outcomes

Events or processes experienced at various times may affect a person's health or functioning in later life, as well as survival. The longitudinal study design is valuable, sometimes essential, to identify events of significance and to quantify their long-term effects. In one sense, a true prospective longitudinal study with repeated periodic evaluations is not required to answer such questions: Information concerning past events may be obtained by history, and outcomes may be sought at a chosen point. The value of such an analysis, however, may be limited by the inaccuracies inherent in historical recall of distant events. The longitudinal approach, with reasonably frequent evaluations, decreases memory error, may provide objective evidence for the presence of an event, and permits more accurate identification of the time when both the event and its effects occur.

OPERATIONAL CHALLENGES IN LONGITUDINAL STUDIES

Although the longitudinal design is essential to the determination of age changes in individuals, it cannot resolve all the difficulties inherent in cross-sectional studies. Furthermore, longitudinal studies have a number of limitations of their own. What seems to be a simple, straightforward question—"How does aging, or the passage of time, affect performance in individual subjects?"—turns out to be a demon in disguise. Many pitfalls in design, subject selection, data collection, and data analysis may undermine or negate the assumption that changes in serially collected measurements are due to aging. These problems include the following:

1. Recruitment and Screening of Subjects

A primary concern in the selection of subjects for a longitudinal study is their commitment to continued participation in the study and their geographic stability over long periods. This requirement limits the sampling procedures that can be used and must be taken into consideration in the generalization of conclusions drawn from any longitudinal study.

2. Attrition

Subject losses must be expected as a longitudinal study progresses. Younger subjects are more likely than old ones to move away from the area of the study or to lose interest and motivation. As the subjects become older, death and disability become major factors (Wilson and Webber, 1976). On the other hand, useful research data may emerge from comparison of measurements in subjects who have survived with those in subjects who have died. This may result in development of new methods of predicting the likelihood of death.

Drop-outs due to loss of contact or to subjects' refusal to continue participation pose a problem in the interpretation of results, particularly when it is evident that those who have left the study differed systematically from those who have remained.

The degree to which findings from longitudinal studies are distorted by attrition, whatever its source, depends on the aspect of aging that is being investigated (see Chapter III). Since some variables are influenced more than others by attrition, each variable in each study must be examined for the drop-out effect.

Sequential research design

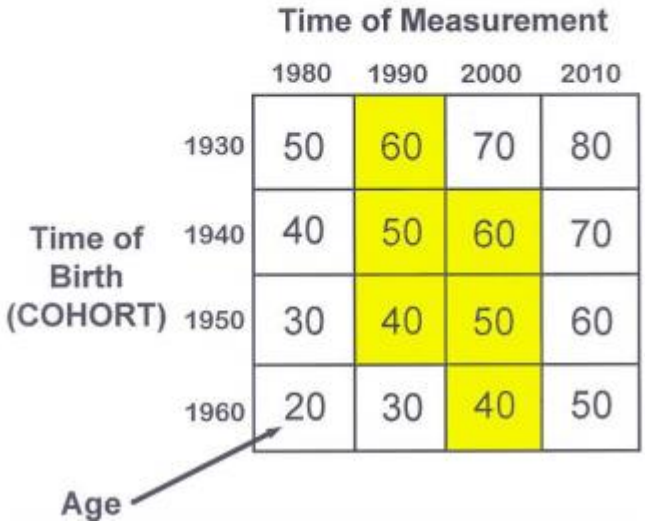
Sequential research designs include elements of both longitudinal and cross-sectional research designs. Similar to longitudinal designs, sequential research features participants who are followed over time; similar to cross-sectional designs, sequential research includes participants of different ages. This research design is also distinct from those that have been discussed previously in that individuals of different ages are enrolled into a study at various points in time to examine age-related changes, development within the same individuals as they age, and to account for the possibility of cohort and/or time of measurement effects. In 1965, K. Warner Schaie[1] (a leading theorist and researcher on intelligence and aging), described particular sequential designs: cross-sequential, cohort sequential, and time-sequential. The differences between them depended on which variables were focused on for analyses of the data (data could be viewed in terms of multiple cross-sectional designs or multiple longitudinal designs or multiple cohort designs). Ideally, by comparing results from the different types of analyses, the effects of age, cohort, and time in history could be separated out.

The Cohort-Sequential Design

A disadvantage of the cross-sectional and longitudinal designs is their relative inability to determine whether factors other than age are influencing the observed changes in behavior. The cohort-sequential design, described by Schaie (1965), combines the two developmental designs and lets you *evaluate* the degree of contribution made by factors such as generation effects. However, the cohort-sequential design does not *eliminate* generation effects. It simply lets you detect them and consider them in interpreting your data.

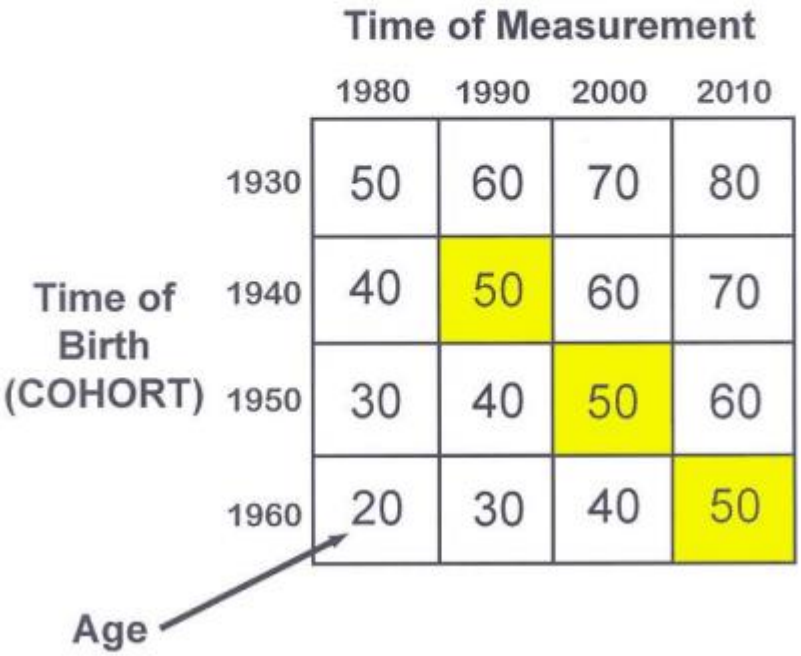
Time-Sequential Design

Consist of two or more replications of a cross-sectional design separated by time of measurement; segregates Age and Time factors but confounds both with Cohort



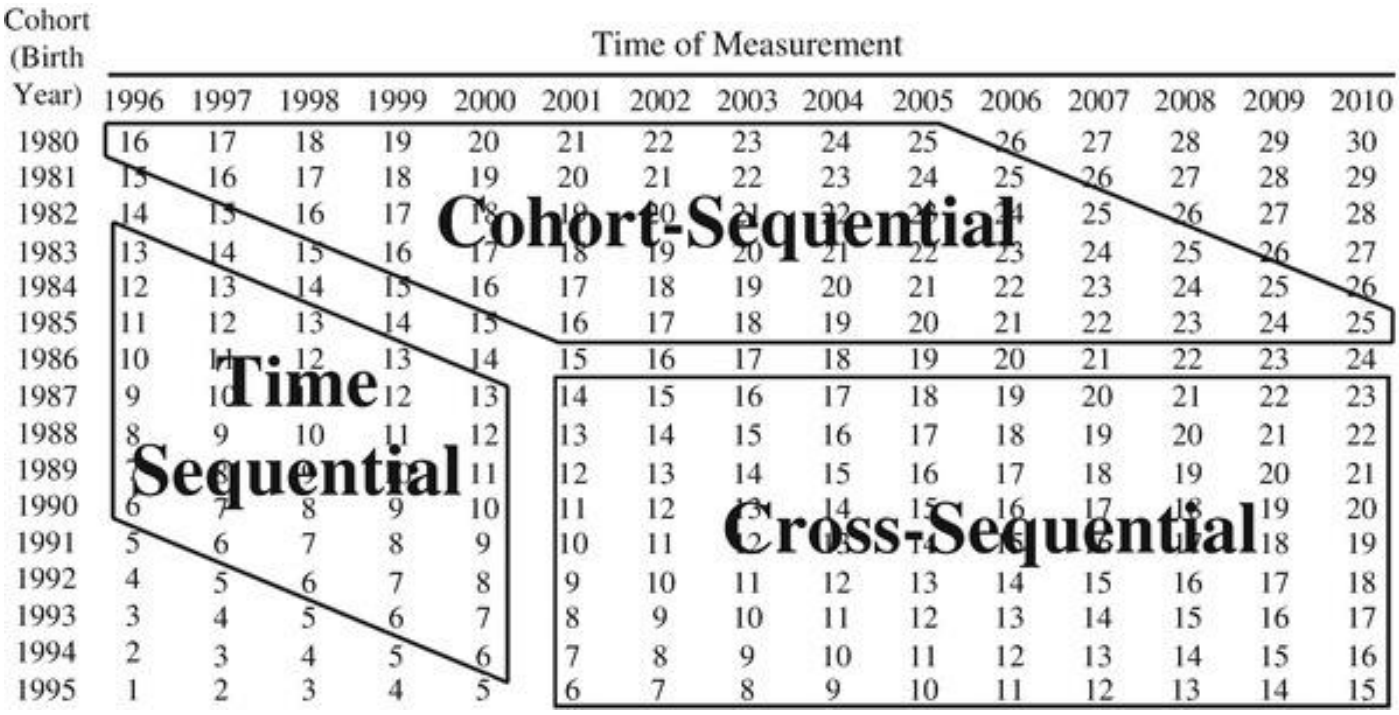
Time-Lag Design

Holds Age constant and samples at widely separated Times of measurement; segregates the effects of birth cohort and time of measurement (at the expense of Age)



Research Design	Advantages	Disadvantages
Cross-Sectional	• Examines changes between participants of different ages at the same point in time • Provides information on age differences	• Cannot examine change over time • Limited to one time in history • Cohort differences confounded with age differences
Longitudinal	• Examines changes within individuals over time • Provides a developmental analysis	• Expensive • Takes a long time • Participant attrition • Possibility of practice effects • Limited to one cohort • Time in history effects confounded with age changes
Sequential	• Examines changes within individuals over time • Examines changes between participants of different ages at the same point in time • Can be used to examine cohort effects • Can be used to examine time in history effects	• May be expensive • May take a long time • Possibility of practice effects • Some participant attrition

Difference between cohort sequential and time sequential deign shown here.(Data collection procedure)



Microgenetic Designs

Microgenetic designs aim to capture changes as they occur and attempt to understand mechanisms involved in any observed changes. They often focus on a key transition point or dramatic shift in the behavior of interest. Researchers usually begin observations before this transition point, and make observations until shortly after the transition has stabilized.

Advantages of Microgenetic Methods

One advantage of a microgenetic method is that it may lead to insights about the processes that lead to change. A second advantage is that it allows researchers to examine in detail transitions that occur infrequently.

Disadvantages of Microgenetic Methods

Microgenetic studies are susceptible to repeated testing since participants are observed frequently in a short period of time. Furthermore, because the large numbers of observations, many studies that use a microgenetic design often have a small number of participants and this can influence the representativeness of the sample. Furthermore, small sample sizes can make it difficult to use certain statistical techniques that are common in psychology.

Based on experimental conditions

All research involves comparison IV is manipulable researcher must assign participants to conditions that embody the desired levels of the factor. . If the independent variable is a nonmanipulable subject characteristic such as age, then the researcher must select participants who already possess different levels of the characteristic. The statistical tests appropriate for within-subject comparisons are somewhat different from those appropriate for between-subject comparisons. within-subject tests are often more powerful than between-subject tests—that is, more likely to reveal a significant difference if a difference does in fact exist. This greater power stems from the reduction in unwanted variance afforded by the within subject design.

Within subject design

This approach is referred to as repeated measures because participants are repeatedly measured across each condition. The advantage to this approach is that it can be used with smaller sample sizes with little or no error variance concerning individual differences between conditions (i.e., the same participants exist in each condition). Some disadvantages to this approach are the threats to internal validity, which are primarily maturation and history, and the biggest issue is sequencing effects (i.e., order and carryover effects). More specifically, performance in one treatment condition affects the performance in a second treatment condition. If possible, it is recommended to randomize the order of the treatments (also known as counterbalancing) to control for sequencing effects.

Between Subject design

Comparison of effect of two or more groups on single / multiple variables. It allows random assignments to different conditions. Comparison of different treatments.With a minimum of two groups, the participants in each group will only be exposed to one condition (one level of the independent variable), with no crossover between conditions.

Limitations of experimental designs in developmental research

Limitations of the Experimental Design in Developmental Psychology It is difficult to use an experimental approach in developmental psychology, for several reasons. The first, as indicated earlier, is the inability to assign participants to the variable of interest. Developmental psychologists cannot manipulate many of the variables they study—such as age, gender, abusive family background, or ethnicity. These variables come with the individual along with many other variables that can confuse us when interpreting their effects on the dependent variable. Second, many of the questions we ask involve the effects of stressful or dangerous experiences, such as tobacco or alcohol use, medical procedures, or the withholding of treatments thought to be beneficial. Manipulations of these variables would be unethical, if not impossible. Third, some argue that how people behave or perform in an experimental lab setting is not how they actually behave in a “real-world” setting. Fourth, planning, designing, conducting, and evaluating a true experimental design is very time-consuming and costly, as you can imagine from reflecting on the actual small-group lab experiment.

Descriptive Research

Case Study: Sometimes the data in a descriptive research project are based on only a small set of individuals, often only one person or a single small group. These research designs are known as **case studies** *which are descriptive records of one or a small group of individuals' experiences and behavior*. Sometimes case studies involve ordinary individuals. Developmental psychologist Jean Piaget observed his own children. More frequently, case studies are conducted on individuals who have unusual or abnormal experiences. The assumption is that by carefully studying these individuals, we can learn something about human nature. Case studies have a distinct disadvantage in that, although it allows us to get an idea of what is currently happening, it is usually limited to static pictures. Although descriptions of particular experiences may be interesting, they are not always transferable to other individuals in similar situations. They are also time consuming and expensive as many professionals are involved in gathering the information.

Observations: Another type of descriptive research is known as observation. When using **naturalistic observation**, *psychologists observe and record behavior that occurs in everyday settings*. For instance, a developmental psychologist might watch children on a playground and describe what they say to each other. However, naturalistic observations do not allow the researcher to have any control over the environment.

Laboratory observation, unlike the naturalistic observation, is *conducted in a setting created by the researcher*. This permits the researcher to control more aspects of the situation. One example of laboratory observation involves a systematic procedure known as the strange situation test, which you will learn about in chapter three. Concerns regarding laboratory observations are that the participants are aware that they are being watched, and there is no guarantee that the behavior demonstrated in the laboratory will generalize to the real world.

Figure 1.12
How many surveys have you taken?

Source

Survey: In other cases, the data from descriptive research projects come in the form of a **survey**, *which is a measure administered through either a verbal or written questionnaire to get a picture of the beliefs or behaviors of a sample of people of interest. The people chosen to participate in the research,* known as the **sample**, are selected to be representative of *all the people that the researcher wishes to know about* called the **population**. A **representative sample** *would include the same percentages of males, females, age groups, ethnic groups, and socio-economic groups as the larger population.*

Surveys gather information from many individuals in a short period of time, which is the greatest benefit for surveys. Additionally, surveys are inexpensive to administer. However, surveys typically yield surface information on a wide variety of factors but may not allow for in-depth understanding of human behavior. *Another problem is that respondents may lie because they want to present themselves in the most favorable light, known as* **social desirability**. They also may be embarrassed to answer truthfully or are worried that their results will not be kept confidential. Additionally, questions can be perceived differently than intended.

Interviews: Rather than surveying participants, they can be **interviewed** *which means they are directly questioned by a researcher.* Interviewing participants on their behaviors or beliefs can solve the problem of misinterpreting the questions posed on surveys. The examiner can explain the questions and further probe responses for greater clarity and understanding. Although this can yield more accurate results, interviews take longer and are more expensive to administer than surveys. Participants can also demonstrate social desirability, which will affect the accuracy of the responses.

Psychophysiological Assessment: *Researchers may also record psychophysiological data, such as measures of heart rate, hormone levels, or brain activity to help explain development.* These measures may be recorded by themselves or in combination with behavioral data to better understand the bidirectional relations between biology and behavior. Special equipment has been developed to allow researchers to record the brain activity of very young and very small research subjects. One manner of understanding associations between brain development and behavioral advances is through the recording of event-related potentials (ERPs). ERPs are recorded by fitting a research participant with a stretchy cap that contains many small sensors or electrodes. These electrodes record tiny electrical currents on the scalp of the participant in response to the presentation of stimuli, such as a picture or a sound.

Figure 1.13

Source

The use of ERPs has provided important insight as to how infants and children understand the world around them. Webb, Dawson, Bernier, and Panagiotides (2006) examined face and object processing in children with autism spectrum disorders, those with developmental delays, and those who were typically developing. The children wore electrode caps and had their brain activity recorded as they watched still photographs of faces of their mother or of a stranger, and objects, including those that were familiar or unfamiliar to them. The researchers examined differences in face and object processing by group by observing a component of the brainwaves. Findings suggest that children with autism are in some way processing faces differently than typically developing children and those with more general developmental delays.

Secondary/Content Analysis *involves analyzing information that has already been collected or examining documents or media to uncover attitudes, practices or preferences.* There are a number of data sets available to those who wish to conduct this type of research. For example, the U. S. Census Data is available and widely used to look at trends and changes taking place in the United States. The researcher conducting secondary analysis does not have to recruit subjects, but does need to know the quality of the information collected in the original study.

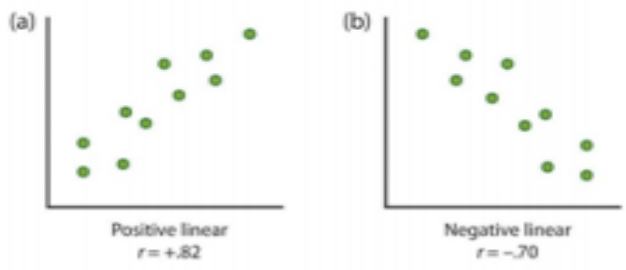
Correlational Research

In contrast to descriptive research, which is designed primarily to provide static pictures, correlational research involves the measurement of two or more relevant variables and an assessment of the relationship between or among those variables. For instance, the variables of height and weight are systematically related (correlated) because taller people generally weigh more than shorter people.

The **Pearson Correlation Coefficient**, *symbolized by the letter r, is the most common statistical measure of the strength of linear relationships among variables*. The value of the correlation coefficient ranges from $r = -1.00$ to $r = +1.00$. The strength of the linear relationship is indexed by the distance of the correlation coefficient from zero (its absolute value). For instance, $r = -.54$ is a stronger relationship than $r = .30$, and $r = .72$ is a stronger relationship than $r = -.57$. The direction of the linear relationship is indicated by the sign of the correlation coefficient. Positive values of r (such as $r = .54$ or $r = .67$) indicate that the relationship is positive (i.e., the pattern of the dots on the scatter plot runs from the lower left to the upper right), whereas negative values of r (such as $r = -.30$ or $r = -.72$) indicate negative relationships (i.e., the dots run from the upper left to the lower right).

When the straight line indicates that individuals who have high values for one variable also tend to have high values for the other variable, as in part (a), the relationship is said to be a **positive correlation**. Examples of positive correlations include those between education and income, and between age and mathematical abilities in children. In each case people who score higher on one of the variables also tend to score higher on the other variable. **Negative correlations**, in contrast, as shown in part (b), *occur when high values for one variable tend to be associated with low values for the other variable*. Examples of negative correlations include those between the age of a child and the number of diapers the child uses, and between practice and errors made on a learning task. In these cases, people who score higher on one of the variables tend to score lower on the other variable.

Figure 1.14

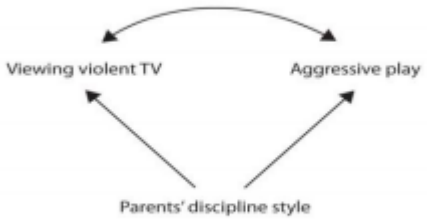


Some examples of relationships between two variables as shown in scatter plots. Source:

An important limitation of correlational research designs is that they cannot be used to draw conclusions about the causal relationships among the measured variables. Consider, for instance, a researcher who has hypothesized that viewing violent behavior will cause increased aggressive play in children. He has collected, from a sample of fourth-grade children, a measure of how much violent television each child views during the week, as well as a measure of how aggressively each child plays. The researcher discovers a positive correlation between the two measured variables. Although this positive correlation appears to support the hypothesis, it cannot be taken to indicate that viewing violent television causes aggressive behavior as there are other possible explanations. One alternative is that children who behaved aggressively at school want to watch violent television shows. Still another possible explanation for the observed correlation is that it has been produced by the presence of a third variable.

A **third variable** is *a variable that is not part of the research hypothesis but produces the observed correlation between them*. In our example a potential third variable is the discipline style of the children's parents. Parents who use a harsh and punitive discipline style may produce children who both like to watch violent television and who behave aggressively in comparison to children whose parents use less harsh discipline.

Figure 1.15



For this reason, we are left with the basic limitation of correlational research: **Correlation does not demonstrate causation**! It is important that when you read about correlational research projects, you keep in mind the possibility of third variables.

Strengths and limitations: Correlational research can be used when experimental research is not possible because the variables cannot be manipulated or it would be unethical to use an experiment. Correlational designs also have the advantage of allowing the researcher to study behavior as it occurs in everyday life. We can also use correlational designs to make predictions. For instance, we can predict from the scores on a battery of tests the success of job trainees during a training session. However, we cannot use such correlational information to determine whether one variable caused another variable. For that, researchers rely on an experiment.

Table 1.5 Characteristics of the Three Research Designs

Research Design	Goal	Advantages	Disadvantages
Descriptive	To create a snapshot of the current state of affairs	Provides a relatively complete picture of what is occurring at a given time. Allows the development of questions for further study.	Does not assess relationships among variables. May be unethical if participants do not know they are being observed.
Correlational	To assess the relationships between and among two or more variables	Allows testing of expected relationships between and among variables and the making of predictions. Can assess these relationships in everyday life events.	Cannot be used to draw inferences about the causal relationships between and among the variables.
Experimental	To assess the causal impact of one or more experimental manipulations on a dependent variable	Allows drawing of conclusions about the causal relationships among variables.	Cannot experimentally manipulate many important variables. May be expensive and time consuming.

ource: Stangor, C. (2011). *Research methods for the behavioral sciences* (4th ed.). Mountain View, CA: Cengage.

Additional Challenges to Consider in Developmental Designs

Research designs that are used to help developmental scientists understand change over time can be difficult to employ. There are three additional challenges in developmental designs: determining the cause of any observed changes, determining whether the measures used at different times or for different ages are equivalent, and determining the appropriate sample interval.

Determining the Underlying Cause of Change

An important goal of studying change overtime is to determine factors that play important roles in causing those changes. However, changes can be due to age, maturation, learning, specific experiences, and cohort effects. These effects do not always occur independently and can also interact.

Finding Equivalent Measures

From a perspective of creating a well-designed experiment, it would be ideal to use a single assessment to measure a behaviour of individuals of different ages. Yet practically, a particular assessment that works best for toddlers may not work so well for young teenagers. A solution to this problem would be to test measures across different ages to find those that provide a reasonable assessment across all different ages.

Determining the Appropriate Sampling Interval

This final issue that confronts researchers examining change over time challenges researchers to determine how frequently they should obtain samples over time. The risk of inadequate sampling is that patterns of change may be mischaracterized or missed altogether. Adolph and Robinson (2011) advocate for frequent sampling, though the appropriateness of their technique involving daily summaries depend on the particular behaviour of interest and the resources that you have available.

Ethics

Decisions about whether research is ethical are made using established ethical codes developed by scientific organizations, such as the American Psychological Association, and federal governments. In the United States, the Department of Health and Human Services provides the guidelines for ethical standards in research. The following are the American Psychological Association code of ethics when using humans in research (APA, 2016). • No Harm: The most direct ethical concern of the scientist is to prevent harm to the research participants. • Informed Consent: Researchers must obtain informed consent, which explains as much as possible about the true nature of the study, particularly everything that might be Table 1.6 Time Span Research Designs Advantages and Disadvantages Source 33 expected to influence willingness to participate. Participants can withdraw their consent to participate at any point. Infants and young children cannot verbally indicate their willingness to participate, much less understand the balance of potential risks and benefits. As such, researchers are oftentimes required to obtain written informed consent from the parent or legal guardian of the child participant. Further, this adult is almost always present as the study is conducted. Children are not asked to indicate whether they would like to be involved in a study until they are approximately seven years old. Because infants and young children also cannot easily indicate if they would like to discontinue their participation in a study, researchers must be sensitive to changes in the state of the participant, such as determining whether a child is too tired or upset to continue, as well as to what the parent desires. In some cases, parents might want to discontinue their involvement in the research. As in adult studies, researchers must always strive to protect the rights and wellbeing of the minor participants and their parents when conducting developmental research. • Confidentiality: Researchers must also protect the privacy of the research participants' responses by not using names or other information that could identify the participants. • Deception: Deception occurs whenever research participants are not completely and fully informed about the nature of the research project before participating in it. Deception may occur when the researcher tells the participants that a study is about one thing when in fact it is about something else, or when participants are not told about the hypothesis. • Debriefing: At the end of a study debriefing, which is a procedure designed to fully explain the purposes and procedures of the research and remove any harmful aftereffects of participation, must occur.