

CHAPTER 2

THEORY AND METHOD IN STUDYING AGING AND OLDER ADULTHOOD

CHAPTER SUMMARY

Chapter 2 is divided into five main sections. The first section describes three viewpoints, or metamodels, that guide developmental research – mechanistic, organismic, and contextual. Each viewpoint has its own way of looking at the role played by the organism and by the environment during development. Then the key propositions of the lifespan developmental perspective are listed, followed by a discussion of the proportion of developmental gains and losses over the life span.

The second section of the chapter on developmental research discusses the age variable, which is organismic, and the issue of age boundaries when an older age group is included in a research study. Three basic factors must be considered when conducting developmental research: age, cohort, and time of measurement. The latter two factors are discussed in detail and examples are given.

Three research designs are described. The cross-sectional design, the most commonly used and most efficient, confounds age and cohort. The longitudinal design follows individuals over time and confounds age and time of measurement. The time-lag design focuses on only one chronological age group and confounds cohort and time of measurement. Schaie's sequential research designs attempt to disentangle confounded factors and determine which ones are significant.

The third section of the chapter covers measurement issues. Reliability refers to the dependability of research instruments as well as the consistency of results obtained in research studies. Once reliability is established, the concern is with validity. Validity has to do with whether we are measuring what we think we are measuring. There are several kinds of validity (internal, external, ecological) and each is described. Other issues discussed are the meaning of heterotypic continuity and the importance of sampling for the validity of a research study.

The fourth section covers approaches to conducting aging research. With the experimental approach, studies have independent and dependent variables, study participants are randomly assigned to different levels of the manipulated independent variable, the outcome is measured by the dependent variable, and cause-and-effect statements can be made. Quasi-experimental studies appear to have the same form as experimental studies, but study participants are not randomly assigned to levels of an "independent" variable, so cause-and-effect statements cannot be made. An example is given for how each approach can be used to study activity level and memory in older adults. Experimental and quasi-experimental approaches can have single-factor or multi-factor designs. A third, descriptive, approach involves collecting data on variables of interest and measuring the relationship between them. This relationship is computed statistically using correlations, which range from -1.0 to 0 to +1.0.

The fifth section of the chapter discusses ethics in research on human aging and the history of what has led to the safeguards we have today. These include having study participants sign a consent form, maintaining their confidentiality, and insuring that a participation in a study will have benefits and no long-term negative effects.

SUGGESTED WEBSITES

National Center on Health Statistics Longitudinal Studies of Aging

www.cdc.gov/nchs/isoa.htm

This website is the home page that will direct you to information on Longitudinal Studies of Aging (LSOA), which is a collaborative project of the National Center for Health Statistics (NCHS) and the National Institute on Aging (NIA). It is a multi-cohort study of persons of age 70 and over and it measures changes in health, functional status, living arrangements, and health service utilization of Americans as they move into and through the oldest ages.

Seattle Longitudinal Study (SLS)

www.uwpsychiatry.org/sls/index.htm

This website describes an ongoing longitudinal study (SLS) initiated in 1956 by Dr. K. Warner Schaie in collaboration with the Group Health Cooperative of Puget Sound (GHC). Dr. Sherry L. Willis became principal co-investigator of the study in 1983. This research project investigates various aspects of psychological development during the adult years. Originally, in 1956, randomly selected participants ranged in age from their early 20s to late 60s. The study has continued to collect data in seven-year intervals since 1956: 1963, 1970, 1977, 1984, 1991, 1998, and 2005. At each interval, all persons who had previously participated in the study are invited to participate again. In addition, at each seven-year interval until 1998, a new group of people randomly selected from the Group Health membership were invited to join the study. Approximately 6,000 people have participated at some time in this study. Of the original participants, 26 people remain; they have been in the study for 50 years. Current participants range in age from 22 to 101 years.

Baltimore Longitudinal Study

www.grc.nia.nih.gov/branches/blsa/blsanew.htm

This is the home page of a website that describes the ongoing National Institute on Aging Baltimore Longitudinal Study. The National Institute on Aging (NIA) conducts research to learn about changes that take place as we age. One goal of NIA research is increase understanding of medical problems that are common in older adults. The NIA supports the Baltimore Longitudinal Study of Aging (BLSA), one of America's longest-running scientific studies of human aging,

begun in 1958. BLSA scientists are learning what happens as people age and how to determine the extent to which changes are due to aging and how much they are due to disease and other causes. More than 1,400 men and women are study volunteers, ranging in age from their 20s to their 90s.

Canadian Longitudinal Study on Aging (CLSA)

www.clsa-elcv.ca

This is the website for the CLSA, which is a national study in Canada on adult development and aging that focuses on physical, biological, psychosocial, health, and societal aspects of health and aging. It follows approximately 50,000 Canadians ranging in age from 45 to 85 over a period of 20 years.

MULTIPLE-CHOICE QUESTIONS

Select the best answer from the options provided.

1. A developmental scientist with a mechanistic metamodel _____.
 - a. emphasizes that development is multidirectional and adaptive
 - b. views development as a series of stages
 - c. focuses on quantitative differences between age groups *
 - d. emphasizes that the whole is greater than the sum of the parts

2. Which metamodel places the heaviest emphasis on the nurture (extrinsic, or environmental) side of the nature–nurture debate?
 - a. The ecological model
 - b. The organismic model
 - c. The contextual model
 - d. The mechanistic model *

3. Which metamodel views development as a progressive sequence of stages which are internally generated?
 - a. mechanistic
 - a. Organismic *
 - b. Contextual
 - c. Ecological

4. According to the organismic metamodel, _____.
 - a. behavior is the product of lawful associations between single

- environmental events
- b. it is best to isolate and study the simple aspects of development
 - c. development has no particular direction, goal, or end point
 - d. the developing organism acts upon rather than reacting to the environment *
5. Which metamodel views the organism and the environment as being in continuous interaction?
- a. Contextual *
 - b. Mechanistic
 - c. Organismic
 - d. Heterotypical
6. Which of the following is **NOT** an important aspect of the lifespan developmental perspective?
- a. Development is plastic.
 - b. Development is embedded in historical, social, and cultural contexts.
 - c. Development proceeds in only one direction. *
 - d. Development continues throughout life
7. Which statement is closest to the lifespan development perspective?
- a. There are gains and losses over the life span with a shift in proportion in older adulthood toward more gains than losses.
 - b. Up to the point of young adulthood there are only gains, after which there are losses in every aspect of functioning.
 - c. People make steady gains from young to older adulthood and there are never any losses.
 - d. There are gains and losses over the life span with a shift in older adulthood toward a greater proportion of losses than of gains. *
8. Age is a(n)_____ variable.
- a. independent
 - b. dependent
 - c. experimental
 - d. organismic *
9. In an extreme age groups design, _____.
- a. age is a continuous variable
 - b. age is an independent variable

- c. individuals in young adult and older adult age categories are included *
 - d. it is possible to determine whether there is a complex relationship between age and the variable that is being studied.
10. In studies with an extreme age groups design, _____.
- a. young adults are compared with adolescents.
 - b. young adults are compared with older adults. *
 - c. young-old adults are compared with old-old adults.
 - d. young, middle-aged, and older adults are compared.
11. Which developmental research design confounds (is unable to separate) age and cohort?
- a. Longitudinal
 - b. Cross-sectional *
 - c. Independent samples
 - d. Time-lag
12. The most commonly used developmental research design that attempts to study age-related differences is _____.
- a. time-lag
 - b. longitudinal
 - c. cross-sectional *
 - d. cohort-sequential
13. The longitudinal research design confounds (is unable to separate) _____.
- a. age and time of measurement *
 - b. age and cohort
 - c. cohort and time of measurement
 - d. age, cohort, and time of measurement
14. In which research design is attrition the most obvious issue to consider?
- a. Longitudinal *
 - b. Cross-sectional
 - c. Time-lag
 - d. Experimental
15. Which method of research is best for keeping track of age-related changes over

time in an individual person (intraindividual variability)?

- a. Cross-sectional
 - b. Longitudinal *
 - c. time-lag
 - d. Quasi-experimental
16. Professor Jones wants to conduct a study on a sample of 60-year-old adults who expect to retire from their jobs in five years. He will administer a questionnaire that asks them what they plan to do once they do retire. Then he will locate these same people every five years (until they are age 75) to find out whether they followed their original plans for retirement. Which research design is Professor Jones using for his study?
- a. Cross-sectional
 - b. time-lag
 - c. Experimental
 - d. Longitudinal *
17. Professor Adams is interested in comparing the attitude today's 70-year-old adults have toward using computers with the attitude that 70-year-old adults had 10 years ago. Assuming that she has computer attitude measures from a group of 70-year-old adults taken this year and computer attitude measures from a group of 70-year-old adults made 10 years ago, which type of research design does Professor Adams have?
- a. Sequential
 - b. Longitudinal
 - c. time-lag *
 - d. Cross-sectional
18. Which two factors are confounded (unable to be separated) when measures of computer attitudes made today on a sample of 70-year-olds today are compared with measures of computer attitudes made 10 years ago on a sample of 70-year-olds?
- a. Cohort and time of measurement *
 - b. Age and cohort
 - c. Age and time of measurement
 - d. Nothing is confounded in this study
19. Sequential designs are used in order to _____.
- a. complete research studies quickly and efficiently
 - b. disentangle the effects of age, cohort, and time of measurement *

- c. test people from only one age group
 - d. follow the same group of people over time
20. When a measurement instrument is reliable that means it is _____.
- a. valid
 - b. consistent *
 - c. heterotypic
 - d. flawed
21. Dr. Perkins places rats that always lived in a deprived environment into a new “enriched” environment with an exercise wheel and toys to stimulate the rats’ problem-solving capabilities. After two weeks in the enriched environment, the rats seem more alert than they were before. Dr. Perkins decides to try the same thing with a new sample of rats, which also seem more alert after spending two weeks in the new environment. This means that Dr. Perkins replicated his findings on the second sample of rats. However, when Dr. Perkins wants to know whether the rats became more alert because of the exercise wheel or because of the toys, he is concerned with the issue of _____.
- a. reliability
 - b. measuring gradients
 - c. internal validity *
 - d. ecological validity
22. The _____ of a study refers to whether there can be accurate identification and interpretation of the factor(s) responsible for an observation.
- a. test–retest reliability
 - b. interobserver reliability
 - c. external validity
 - d. internal validity *
23. _____ refers to whether a measure used to assess an underlying characteristic (for example, depression) has the same degree of internal validity for different age groups.
- a. Reliability
 - b. Heterotypic continuity *
 - c. Time-lag
 - d. Factorial purity
24. Being able to generalize the findings obtained from a sample of research

participants to the population from which this sample was drawn refers to the _____ of a research study.

- a. factorial purity
 - b. experimental control
 - c. internal validity
 - d. external validity *
25. Many traditional psychometric tests of intelligence measure abilities that children or young adults use in school. Some psychologists have argued psychometric tests are not appropriate for measuring the kinds of cognitive intellectual abilities older adults use in their everyday lives. These psychologists are worried about the _____ when these are used for older adults.
- a. ecological validity of psychometric tests *
 - b. reliability of psychometric tests
 - c. longitudinal gradient of psychometric tests
 - d. dropout during the administration of psychometric tests
26. The best way to compare a sample of young and older adults on how they perform on a memory test is to test a group of young adult undergraduates and a group of older adult nursing home residents.
- a. True
 - b. False *
27. Which type of study is best for identifying cause and effect?
- a. An experimental study *
 - b. A correlation study
 - c. A case study
 - d. A cross-sectional study
28. In which kind of research studies are participants randomly assigned to levels of an independent variable?
- a. Correlation studies
 - b. Quasi-experimental studies
 - c. Experimental studies *
 - d. Time-sequential studies
29. Professor Sanchez conducts a memory study in which young and older adults are randomly assigned to one of two different levels (or conditions) of an instruction variable. Those assigned to one instruction condition are just told to study a list of

words, which they will later be asked to recall. Those assigned to the other instruction condition are told to use visual imagery when they study a list of words which they will later be asked to recall. Professor Sanchez finds that, on average, the young and older adults given visual imagery instructions recall more words than do the young and older adults just told to study the words. In this study, what is the **independent variable**?

- a. Age group
 - b. Instruction condition *
 - c. Number of words recalled
 - d. Time of measurement
30. A group of young adults and a group of older adults are instructed to study a list of words and then are given a memory test. The researcher conducting the study finds that, on average, the memory test scores of the older group are lower than the memory test scores of the young group. This study is an example of a _____.
- a. true experimental approach
 - b. correlational approach
 - c. multi-factor approach
 - d. quasi-experimental approach *
31. A developmental researcher asks young and older adults to study a list of words. Half of the young and half of the older adults are told to use visual imagery when they study the list and the other half are given no imagery instructions. After they study the list, all participants are tested for how many words they can remember. This research has a _____.
- a. multifactor design *
 - b. completely experimental design
 - c. single-factor design
 - d. invalid design
32. A researcher measures the amount of time older adults spend each week engaging in mentally challenging activities and also the scores they earn on a test of intelligence. The researcher finds that the more time older adults spend engaging in mentally challenging activities, the higher their scores on the intelligence test. On the basis of this finding, which of the following conclusions would the researcher be justified in drawing?
- a. Engaging in mentally challenging activities causes intelligence test scores to increase.
 - b. Spending too little time engaging in mentally challenging activities causes intelligence test scores to decline.

- c. Amount of time spent engaging in mentally challenging activities and intelligence test scores are positively related (positively correlated). *
 - d. Amount of time spent engaging in mentally challenging activities and intelligence test scores are negatively related (negatively correlated).
33. Which correlation shows the strongest association between two variables?
- a. .55
 - b. .20
 - c. $-.75$ *
 - d. .01
34. As far as the ethics of conducting research, which guideline(s) is (are) important?
- a. Obtaining informed consent from study participants or their caretakers if they are unable to give it.
 - b. Safeguarding the privacy of the study participants.
 - c. Insuring that the benefits of the findings outweigh any temporary discomforts participants may experience.
 - d. All of the above *

SHORT ANSWER QUESTIONS

1. Compare the viewpoint of a behavioral scientist who approaches the study of behavior with mechanistic metamodel and the viewpoint of a scientist who approaches the study of behavior with an organismic metamodel.

A behavioral scientist with a mechanistic metamodel focuses on external, environmental, factors that influence behavior, breaks down complex behavior and studies each part separately, and uses quantitative measures to study development. A behavioral scientist with an organismic metamodel views development as a series of stages directed toward some goal or endpoint. Organisms act upon the environment and their behavior is qualitatively different at each stage. The focus is on patterns of behavior and the structures underlying such patterns rather than on individual aspects of behavior.

2. What does the lifespan developmental perspective propose about gains and losses over the life span?

Over the life span, developmental processes can show both gains and losses. However, the proportion of gains and losses changes. The proportion of gains is greater than that of losses in early life through young adulthood. In older adulthood the proportion of losses outstrips the proportion of gains, but gains can be used to compensate for losses.

3. What are the three factors that must be considered when researchers conduct developmental studies?

The three factors that must be considered are age, cohort, and time of measurement. Age is the number of time units that have elapsed since birth. Cohort refers to a generation born in a particular year or during a circumscribed time period such as five years. Cohort members have certain common experiences throughout development. Time of measurement is related to conditions which prevail at the time the research is conducted. These conditions could be related to the health, marital, job status, or other characteristics of the research participants. They could also be related to the test instruments available, the research personnel, or the general societal attitudes or philosophies at the time the study is conducted.

4. Describe the cross-sectional research design. Which factors are confounded in this design and why is this design the most commonly used in developmental research?

In a cross-sectional research design, participants of all ages are tested within the same period of time. For this reason, such studies are efficient, which is one reason this design is used most commonly. However, the factors of age and cohort are confounded. This means that if age-related differences are found, it is not clear whether they are due to the age of the study participants or to their cohort membership.

5. Describe the longitudinal research design and state which factors are confounded. What is the advantage of this design and what is the role of selective attrition?

With a longitudinal research design, the same individuals are followed over time so are tested or interviewed on two or more occasions. All study participants are from the same cohort, but the factors of age and time of measurement are confounded. The advantage to the longitudinal design is that it can determine whether there are any age-related changes within the same individuals (intraindividual change). However, there is attrition because not all research participants come back to be re-tested. The ones who do return for re-testing may be positively selected and thus could be less representative of the population of interest.

6. Define what is meant by the reliability and the validity of a test that is used to measure intelligence.

Reliability refers to the dependability or consistency of the test measurement, or whether people earn the same score on more than one occasion. Validity has to do with whether the test is measuring what it purports to measure. That is, is the test really measuring intelligence?

7. Define what is meant by the ecological validity of a test that is given to young and older adults. Give an example.

Ecological validity is one type of external validity. It has to do with whether scores on a particular test instrument are an accurate reflection of real-world functioning or behavior. For

example, does a test of intelligence really measure whether a person functions intelligently in the real world? A test of intelligence may reflect real-world functioning more accurately for young adult students than it does for older adults who are not students.

8. What are the defining characteristics of an experimental research study?

In a study that uses an experimental approach an independent variable is manipulated by the researcher and has two or more levels. Research participants are randomly assigned to the various levels of the independent variable and the outcome is measured using a dependent variable. In a true experiment, cause-and-effect statements can be made about the influence of the independent variable on the dependent variable.

9. What is the difference between a true experimental and a quasi-experimental research design?

In a true experimental design the investigator manipulates the independent variable and randomly assigns research participants to the various levels of the independent variable. A quasi-experimental design may appear to have the same form as a true experimental design but participants are not randomly assigned to the levels of the categorical factor. For example, people cannot be randomly assigned to age group, racial or ethnic group, or marital status categories. Unlike true experiments, quasi-experiments do not allow researchers to draw any cause-and-effect conclusions.

10. What is meant by a descriptive approach to research and what role does correlation play?

With the descriptive approach, variables are neither independent nor dependent. Rather, data is collected on the variables of interest and the relationship between them is studied. This relationship is often measured using correlations, which can range from +1.00 to -1.00. Both +1.00 and -1.00 indicate a perfect relationship between the variables, so knowing the value of one variable allows perfect prediction about the value of another variable. A correlation of 0 indicates no relationship, so knowing the value of one variable tells us nothing about the value of another variable.