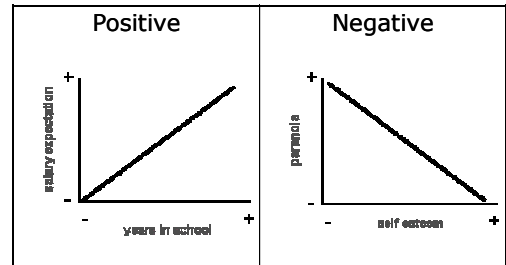


Relationships Between Variables

- Linear relationships
 - Positive linear relationship.
 - Both variables increase or decrease at the same rate in the same direction.
 - Represented as a straight line going up on a graph
 - Negative linear relationship
 - As one variable increases the other variable decreases at the same rate.
 - Represented as a straight line going down on a graph

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Linear Relationship Graphs



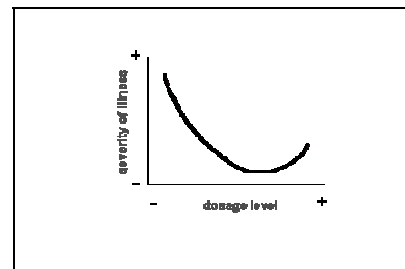
13

Relationships Between Variables

- Curvilinear relationship
 - As one variable increases the other variable both increases and decreases over time (nonmonotonic).
 - Represented as a curved line on a graph.
- No Relationship between variable changes
 - Represented by a flat, horizontal line on a graph.

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Curvilinear Relationship Graph



15

A researcher measured how much violent television children watched at home. These children were also observed for their aggressiveness on the playground. The researcher found that as the amount of violence watched on TV increased, the amount of playground aggressiveness increased. The type of relationship found was

- A. negative linear.
- B. positive linear.
- C. curvilinear.
- D. none of these

16

The finding that a person's shoe size is not associated with their family income suggests what type of relationship?

- A. negative linear.
- B. positive linear.
- C. curvilinear.
- D. none of these

17

Dr. Kramer found that the average number of miles driven decreases as the price of gasoline increases. This relationship can best be described as a _____ relationship.

- A. negative linear.
- B. positive linear.
- C. curvilinear.
- D. none of these

18

A researcher finds that the more a song is played on the radio, the greater the liking for the song. However, she also finds that if the song is played too much, people start to dislike the song. What type of relationship does this represent?

- A. negative linear.
- B. positive linear.
- C. curvilinear.
- D. none of these

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Experimental vs. Nonexperimental Methods

- Nonexperimental methods simply measure the variables of interest in an attempt to discover a relationship between them (if there is a correlation between them).
- Experimental methods **systematically change** some variables and measure the effects of these changes on other variables to assess the relationship between them.

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Nonexperimental Methods

- These methods are good for discovering if two or more variables covary.
 - Covariation or correlation is useful for prediction (if you know the value of one variable you can predict the value of correlated variable).
- Examples: High SAT scores are positively correlated with success in college, seat belt use is negatively correlated with severe injury in auto accidents.

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Nonexperimental Methods

- Causality **MUST NOT** be inferred from correlational methods
 - The problem of determining the direction of cause and effect.
 - Which change came first?
 - The third-variable problem
 - Did some other variable produce the changes in the two measured variables?

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Experimental Methods

- Experimental methods introduce techniques of control that allow inferences of causality.
 - Extraneous variables are held constant and/or their effects are randomized across experimental conditions.
 - This solves the third variable problem.
 - One variable is systematically changed (the independent variable) while changes in the other variable (dependent variable) are measured.
 - This solves the "cause/effect direction" problem.

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Students watched cartoons either alone or with others and then rated each cartoon on a "funny" scale. The independent variable was _____ and the dependent variable was _____.

- A. The cartoons, humor
- B. The funny rating, the watching condition
- C. The students, the funny rating
- D. The watching condition, the funny rating

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Teachers were told a child's parents were either college grads or high school dropouts. There were then asked to rate the child's academic potential. The independent variable was _____ and the dependent variable was _____.

- A. The children; parent's education
- B. The teachers; rating of education
- C. What teachers were told; teacher's rating of child's academic potential
- D. Academic potential of child; teachers beliefs

25

Dr. Sears observes that the more time a person spends in a department store, the more purchases they tend to make. The research method used in this study can best be described as

- A. experimental
- B. non-experimental
- C. operational
- D. independent

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Experimental Methods & Causality

- To infer causality we must consider the following
 - Temporal order (cause comes before effect)
 - There must be covariation between variables (as one variable changes there must be a corresponding change in the other variable)
 - Other explanations for the change must be eliminated

27

Which one of the following represents a critical difference between the nonexperimental and experimental methods?

- A. Nonexperimental methods involve operational definitions while experimental methods do not.
- B. Experimental methods involve operational definitions while nonexperimental methods do not.
- C. Nonexperimental methods involve the manipulation of variables while experimental methods do not.
- D. Experimental methods involve the manipulation of variables while nonexperimental methods do not.

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Determining which Research Method to Use

- Requirement for experimental control can make experiments less real.
 - Limits the questions asked and reduces the generalization of the findings.
 - Nonexperimental field studies are more realistic but extraneous variables are less controlled.
- Ethical and practical concerns limit what can be manipulated and controlled.

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Determining which Research Method to Use

- When description and prediction are all that is required nonexperimental methods are used.
- Participant variables must be measured in both experimental and nonexperimental research.
- Sometimes both experimental and nonexperimental methods are needed to answer the research question.

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A researcher manipulated how much violent television children watched and then observed their aggressiveness on the playground. The researcher used the _____ method.

- A. experimental
- B. non-experimental
- C. operational
- D. independent

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Validity in Research

- Validity refers to "truth" and accuracy.
 - If you have accurately and truthfully defined your variables (good operational definitions) your research has good *CONSTRUCT* validity.
 - If your experiment allows you to accurately determine that the independent variable changes produced the changes in the dependent variable your experiment has good *INTERNAL* validity.
 - If your experimental results generalize to other populations and settings your experiment has good *EXTERNAL* validity.

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Measurement Reliability

- Reliability is analogous to consistency.
 - If you measure something several times and get the same result each time, the measurement is considered *reliable*.
- Reliability is different from validity.
 - A *valid* measure truly measures what it purports to measure.
 - A *reliable* measure produces the same result each time the measurement is taken.
- Both validity and reliability are needed in research.

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