

Text Exercise Set 1

NAME:

1-1 Decide whether each of the variables listed can be treated as quantitative, qualitative-ordinal, qualitative-nominal, or qualitative-dichotomous.

- (a) a person's telephone area code
- (b) the number of hours of television a person watches on a given day
- (c) smoking habits measured by the brands of cigarettes that individuals smoke most often
- (d) smoking habits measured by classifying an individual as "nonsmoker," "light smoker," or "heavy smoker"
- (e) smoking habits measured by the number of cigarettes smoked per day
- (f) smoking habits measured by the amount of daily nicotine intake
- (g) the temperature at noon
- (h) study habits measured by the number of hours of study per week
- (i) study habits measured by the number of study sessions per week
- (j) study habits measured as poor, satisfactory, good, excellent

1-2 Decide whether each of the variables listed can be treated as quantitative, qualitative-ordinal, qualitative-nominal, or qualitative-dichotomous.

- (a) weight measured in pounds
- (b) a person's hair color
- (c) the number of television sets in a household
- (d) employment status measured as unemployed, employed part-time, employed full-time
- (e) number of cars owned
- (f) marital status measured as single, married, divorced, widowed
- (g) the number of miles traveled on a trip
- (h) different types of T-shirts measured as small, medium, large, and extra large
- (i) different types of T-shirts measured as red, green, blue, yellow, and white
- (j) speed measured in miles per hour

- 1-3** Three different ways of measuring the variable "Education" are listed; for each, decide whether the variable would most likely be treated as quantitative, qualitative-ordinal, qualitative-nominal, or qualitative-dichotomous.
- (a) the number of years a person has attended school
 - (b) the highest degree a person has attained: High School Diploma, Associate's Degree, Bachelor's Degree, Master's Degree, Ph.D.
 - (c) the major a person selected in college
- 1-4** Three different ways of measuring the variable "Political Inclination" are listed; for each, decide whether the variable would most likely be treated as quantitative, qualitative-ordinal, qualitative-nominal, or qualitative-dichotomous.
- (a) the political party to which a person belongs: Democratic, Republican, Independent, none, etc.
 - (b) classifying people as extremely liberal, liberal, moderate, conservative, extremely conservative
 - (c) assigning to people an integer from -10 to $+10$ with -10 representing extremely liberal and $+10$ representing extremely conservative
- 1-5** Decide whether each of the situations described addresses the issue of validity, the issue of unbiasedness/bias, or the issue of reliability/unreliability.
- (a) As a questionnaire used to calculate a job stress score was being developed, it was administered twice to a group of subjects in order to see how close together each subject's two scores would be.
 - (b) A job stress score is designed to be a numerical measure of the level of job related stress experienced by employees.
 - (c) The number of cigarettes smoked per day is used as a measure of addiction to nicotine, but not all brands of cigarettes contain the same amount of nicotine per cigarette.
 - (d) A stopwatch used to measure the length of time a horse races around a track is defective because it runs slow.
 - (e) Each of several students are found to have two vastly different scores on a certain test administered twice, two days in a row.
 - (f) A survey question concerning how strongly one is for or against the death penalty is criticized as being worded in a way which attempts to elicit a negative response.

1-6 Decide whether each of the situations described addresses the issue of validity, the issue of unbiasedness/bias, or the issue of reliability/unreliability.

- (a) Voters' reactions to a bill concerning a smoking ban in government buildings is measured by letters written to congressmen.
- (b) A thermometer always displays a reading which is three degrees higher than the actual temperature.
- (c) A method used to measure phosphoric acid content in soil was applied to the same soil type more than once to verify that the results are practically the same each time.
- (d) A test designed to measure intelligence is criticized, because it tends to underestimate intelligence for many individuals.
- (e) A test designed to measure intelligence is criticized, because it appears to measure knowledge of facts instead of intelligence.
- (f) A test designed to measure intelligence is criticized, because the results for one individual seem to be quite different at different times.

1-7 Identify those list items which are variables and those which are not.

- (a) the size of a shoe
- (b) a boy who wears a size 7 shoe
- (c) a sunny day
- (d) the inches of rain that fell last month

1-8 Identify those list items which are variables and those which are not.

- (a) all voters who belong to the Republican party
- (b) the political party to which a voter belongs
- (c) the number of pages in a book
- (d) all books with more than 100 pages

1-9 An instrument consisting of 15 questions is constructed to measure a person's typical stress level with a score ranging from 10 to 50, where a score of 10 indicates an unusually low level of stress, a score of 30 indicates a normal level of stress, and a score of 50 indicates an unusually high level of stress. Decide whether each of the following describes the issue of validity, the issue of unbiasedness/bias, or the issue of reliability/unreliability:

- (i) When the instrument to measure stress is repeatedly given to the same subject, the results are almost identical.
- (ii) Scores for individuals who appear to have a great deal of stress are often around 35 or 40, while scores for individuals who appear to have a normal level of stress are often around 15 or 20.
- (iii) The instrument is criticized as actually measuring a person's present stress level instead of a person's typical stress level.
- (iv) When the instrument to measure stress is repeatedly given to the same subject, the results sometimes show a high score, while other times showing a low score.

1-10 An instrument consisting of 30 items is constructed to measure the quality of a person's eating habits with a score ranging from 0 to 30, where a score of 0 indicates extremely poor eating habits, a score of 15 indicates satisfactory eating habits, and a score of 30 indicates excellent eating habits. Decide whether each of the following describes the issue of validity, the issue of unbiasedness/bias, or the issue of reliability/unreliability:

- (i) Scores for individuals who appear to have very poor eating habits are often around 10 or 15, while scores for individuals who appear to have only barely acceptable eating habits are often around 25 or 30.
- (ii) When the instrument to measure quality of eating habits is repeatedly given to the same subject, the results sometimes show a high score, while other times showing a low score.
- (iii) When the instrument to measure quality of eating habits is repeatedly given to the same subject, the results are almost identical.
- (iv) The instrument is criticized as actually measuring a person's amount of food intake instead of the quality of a person's eating habits.