Exercises

Chapter 1. Science

1. What is the nomothetic-deductive approach to research?

2. What is the idiographic approach to research?

3. What are the advantages and disadvantages of the nomothetic-deductive and idiographic approaches to research?

4. What is the difference between description and explanation? Why is explanation more difficult to do?

5. Compare and contrast causal explanation, rule-based explanation, and teleological explanation?

6. What are generative forces and what do they?

7. What is the difference between deduction and induction?

8. What is grounded theory and how is it related to the theory used in nomothetic-deductive research?

9. Parsimony and perspicuity are important characteristics of a good theory. What is the difference between the two and how are they different from utility?

10. Which approach is better — quantitative or qualitative? Justify your answer?

11. Compare and contrast laboratory and field research methods and discuss their strengths and weaknesses?

12. What does it mean to say that empirical research is "positive"?

Chapter 2.   Conceptualizing

1. What are "essential qualities"?

2. What role do essential qualities play in conceptual definitions?

3. Why do you need a conceptual definition when you already have a perfectly good operational definition?

4. What is the difference between a variable and a concept?

5. What is the relation between an hypothesis and a theory?

6. What is empirical research?

7. A professor is studying learning and academic performance and uses GPA as a measure of how much her students have learned. Discuss why (or why not) this is an adequate conceptual definition of learning.

8. What is "reification," and how can it cause problems with the development of conceptual definitions?

9. Why do researchers test hypotheses when they are really interested in theories?

10. What does it mean to say that something is "empirically verifiable"? Give an example.

Chapter 3. Operationalizing

1. Why do you need an operational definition when you already have a perfectly good conceptual definition?

2. Why can't you skip the conceptual definition and use only an operational definition to define your concept? i.e. why is it also necessary to have a conceptual definition?

3. What is the difference between conceptual and operational definitions?

4. A professor is studying learning and academic performance and uses GPA as a measure of how much her students have learned. Discuss why (or why not) this is an adequate operational definition of learning.

5. What role should essential qualities play in operational definitions?

6. What is the difference between a *numeral* and a *number?*

7. What is the difference between a *number* and an *ordinal?*

8. In what way is ratio scaling "stronger" than interval or ordinal scaling?

9. How do you tell which level of scaling is appropriate for a particular situation? (What aspects of the situation do you consider? Why do these aspects matter?)

10. Under what conditions would you have to use a lower level of scaling than the one that matches the phenomenon you want to measure? Give an example.

11. What can you do with interval or ratio scaling that you can't do with nominal or ordinal scaling?

12. Under what conditions does "0" not mean "none"? What are the consequences of this?

13. If you have a ratio-scaled variable and want to compare two values, what kind of comparisons can you make?

14. If you have an ordinal-scaled variable and want to compare two values, what kind of comparisons can you make?

15. If you have an interval-scaled variable and want to compare two values, what kind of comparisons can you make?

Chapter 4. Validity and reliability

1. What is the difference between the reliability and validity of a measurement?

2. What is construct validity and how do you test for it? Give an example.

3. What are the consequences of a lack of construct validity? Give an example to illustrate your answer.

4. What is it about construct validity that makes it more difficult to assess than the other types of validity?

5. What is the difference between construct validity and predictive validity? What would the consequences be if you confused the two and thought you had construct validity when you only had predictive validity?

6. What is the difference between random error and systematic error?

7. **What is the difference between the reliability of a measurement and its accuracy?**

8. Why does the multiple methods, multiple measures approach used to assess construct validity?

9. What is the difference between the accuracy and the validity of a measurement?

10. A professor is studying learning and academic performance and uses GPA as a measure of how much her students have learned. Discuss why (or why not) this is a valid measure how much her students have learned.

Chapter 5. Sampling

1. Distinguish between probability and non-probability sampling and discuss the advantages and disadvantages of each.

2. Discuss the main types of probability sampling methods and explain their strengths and weaknesses.

3. Explain how to select a sample with each of the probability sampling methods.

4. List all the *essential qualities* of a simple random sample. (***do not*** *include non-essential qualities!)*

5. List all the *essential qualities* of a probability sample. (***do not*** *include non-essential qualities!)*

6. Under what conditions would you use systematic sampling with a random start instead of simple random sampling?

7. What is stratified random sampling and under what conditions would you want to do it instead of simple random sampling?

8. Why are non-probability samples not likely to be representative of the populations from which they were drawn?

9. What factors affect the efficiency of a sampling method?

Chapter 6. Univariate descriptive statistics

1. Compute the mode, median, and mean for the following four sets of numbers:

1. 2, 7, 6, 5, 3, 8, 6, 4, 9, 7
2. 6, 2, 2, 5, 4, 2, 3, 4, 5, 6, 3
3. 2, 5, 8, 2, 8, 4, 2, 8, 1, 9, 9
4. 3, 5, 4, 8, 6, 9, 4, 43, 7, 2