

## Chapter 6

### Methods of Data Collection

(Note: For the **concept map** that goes with this lecture, [click here](#). Remember: concept maps help provide the big picture as well as show how the parts are interrelated.)

The purpose of Chapter 6 is to help you to learn how to collect data for a research project.

- The term method of data collection simply refers to how the researcher obtains the empirical data to be used to answer his or her research questions.
- Once data are collected they are analyzed and interpreted and turned into information and results or findings.
- All empirical research relies on one or more method of data collection.

It is important to consider and utilize the fundamental principle of mixed research during the planning of a research study.

- The principle states that researchers should mix methods (including methods of data collection as well as methods of research) in a way that is likely to provide complementary strengths and nonoverlapping weaknesses.
- We will provide you with additional tables (not in the chapter because of space limitations) for each method of data collection so that you can compare the strengths and weaknesses of each method of data collection and attempt to put together the match that will best serve your purpose and will follow the fundamental principle of mixed research.
- The focus in this chapter is on methods of data collection, not methods of research (which are covered in later chapters).

There are six major methods of data collection. We will briefly summarize each of these in this lecture:

- Tests (i.e., includes standardized tests that usually include information on reliability, validity, and norms as well as tests constructed by researchers for specific purposes, skills tests, etc).
- Questionnaires (i.e., self-report instruments).
- Interviews (i.e., situations where the researcher interviews the participants).
- Focus groups (i.e., a small group discussion with a group moderator present to keep the discussion focused).
- Observation (i.e., looking at what people actually do).
- Existing or Secondary data (i.e., using data that are originally collected and then archived or any other kind of “data” that was simply left behind at an earlier time for some other purpose).

## Tests

Tests are commonly used in research to measure personality, aptitude, achievement, and performance. The last chapter discussed standardized tests; therefore, we only have a brief discussion in this chapter. Note that tests can also be used to complement other measures (following the fundamental principle of mixed research).

In addition to the tests discussed in the last chapter, note that sometimes, a researcher must develop a new test to measure the specific knowledge, skills, behavior, or cognitive activity that is being studied. For example, a researcher might need to measure response time to a memory task using a mechanical apparatus or develop a test to measure a specific mental or cognitive activity (which obviously cannot be directly observed).

- An excellent source of tests (and other measures) (that we didn't get into the chapter in time) is called *The Directory of Unpublished Experimental Mental Measures* (2003) edited by Goldman and Mitchell, published by the American Psychological Association.
- We list the major sources of tests and test reviews in Table 5.7.
- We listed the major internet sources for finding tests in Table 5.8
- Remember that if a test has already been developed that purports to measure what you want to measure, then you should strongly consider using it rather.

The following table lists the strengths and weaknesses of tests. It, in conjunction with the tables for the other five major methods of data collection, will help you in applying the fundamental principle of mixed research:

### Strengths and Weaknesses of Tests

#### Strengths of tests (especially standardized tests)

- Can provide measures of many characteristics of people.
- Often standardized (i.e., the same stimulus is provided to all participants).
- Allows comparability of common measures across research populations.
- Strong psychometric properties (high measurement validity).
- Availability of reference group data.
- Many tests can be administered to groups which saves time.
- Can provide "hard," quantitative data.
- Tests are usually already developed.
- A wide range of tests is available (most content can be tapped).
- Response rate is high for group administered tests.
- Ease of data analysis because of quantitative nature of data.

#### Weaknesses of tests (especially standardized tests)

- Can be expensive if test must be purchased for each research participant.
- Reactive effects such as social desirability can occur.
- Test may not be appropriate for a local or unique population.
- Open-ended questions and probing not available.
- Tests are sometimes biased against certain groups of people.
- Nonresponse to selected items on the test.
- Some tests lack psychometric data.

## Questionnaires

A questionnaire is a self-report data collection instrument that is filled out by research participants. Questionnaires are usually paper-and-pencil instruments, but they can also be placed on the web for participants to go to and “fill out.” Questionnaires are sometimes called survey instruments, which is fine, but the actual questionnaire should not be called “the survey.” The word “survey” refers to the process of using a questionnaire or interview protocol to collect data. For example, you might do a survey of teacher attitudes about inclusion; the instrument of data collection should be called the questionnaire or the survey instrument.

- A questionnaire is composed of questions and/or statements.
- Because one way to learn to write questionnaires is to look at other questionnaires, here is an example of a typical questionnaire that has mostly quantitative items, [click here](#).
- For an example of a qualitative questionnaire, [click here](#).
- When developing a questionnaire make sure that you follow the 15 Principles of Questionnaire Construction.

I will briefly review the 15 principles now.

Principle 1: Make sure the questionnaire items match your research objectives.

Principle 2: Understand your research participants.

- Your participants (not you!) will be filling out the questionnaire.
- Consider the demographic and cultural characteristics of your potential participants so that you can make it understandable to them.

Principle 3: Use natural and familiar language.

- Familiar language is comforting; jargon is not.

Principle 4: Write items that are clear, precise, and relatively short.

- If your participants don't understand the items, your data will be invalid (i.e., your research study will have the garbage in, garbage out, GIGO, syndrome).
- Short items are more easily understood and less stressful than long items.

Principle 5: Do not use "leading" or "loaded" questions.

- Leading questions lead the participant to where you want him or her to be.
- Loaded questions include loaded words (i.e., words that create an emotional reaction or response by your participants).
- Always remember that you do not want the participant's response to be the result of how you worded the question. Always use neutral wording.

Principle 6: Avoid double-barreled questions.

- A double-barreled question combines two or more issues in a single question (e.g., here is a double barreled question: “Do you elicit information from parents

and other teachers?" It's double barreled because if someone answered it, you would not know whether they were referring to parents or teachers or both).

- Does the question include the word "and"? If yes, it might be a double-barreled question.
- Answers to double-barreled questions are ambiguous because two or more ideas are confounded.

Principle 7: Avoid double negatives.

- Does the answer provided by the participant require combining two negatives? (e.g., "I disagree that teachers should not be required to supervise their students during library time"). If yes, rewrite it.

Principle 8: Determine whether an open-ended or a closed ended question is needed.

- Open-ended questions provide qualitative data in the participants' own words. Here is an open ended question: How can your principal improve the morale at your school? \_\_\_\_\_
- Closed-ended questions provide quantitative data based on the researcher's response categories. Here is an example of a closed-ended question:

5. How difficult do you find learning about research methods to be?

- \_\_\_\_\_ Very difficult
- \_\_\_\_\_ Somewhat difficult
- \_\_\_\_\_ Not very difficult
- \_\_\_\_\_ Not at all difficult
- \_\_\_\_\_ Don't know

- Open-ended questions are common in exploratory research and closed-ended questions are common in confirmatory research.

Principle 9: Use mutually exclusive and exhaustive response categories for closed-ended questions.

- Mutually exclusive categories do not overlap (e.g., ages 0-10, 10-20, 20-30 are NOT mutually exclusive and should be rewritten as less than 10, 10-19, 20-29, 30-39, ...).
- Exhaustive categories include all possible responses (e.g., if you are doing a national survey of adult citizens (i.e., 18 or older) then the these categories (18-19, 20-29, 30-39, 40-49, 50-59, 60-69) are NOT exhaustive because there is no where to put someone who is 70 years old or older.

Principle 10: Consider the different types of response categories available for closed-ended questionnaire items.

- Rating scales are the most commonly used, including:
  - Numerical rating scales (where the endpoints are anchored; sometimes the center point or area is also labeled).



- Another name for a summated rating scale is a Likert Scale because the summated rating scale was pretty much invented by the famous social psychologist named Rensis Likert.
- Here is the Rosenberg Self-Esteem Scale, which is a summated rating scale:

■ **FIGURE 6.1** The Rosenberg Self-Esteem Scale

Circle one response for each of the following ten items.

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
1. I feel that I am a person of worth, at least on an equal basis with others.	1	2	3	4
2. I feel that I have a number of good qualities.	1	2	3	4
*3. All in all, I am inclined to feel that I am a failure.	1	2	3	4
4. I am able to do things as well as most other people.	1	2	3	4
*5. I feel I do not have much to be proud of.	1	2	3	4
6. I take a positive attitude toward myself.	1	2	3	4
7. On the whole, I am satisfied with myself.	1	2	3	4
*8. I wish I could have more respect for myself.	1	2	3	4
*9. I certainly feel useless at times.	1	2	3	4
*10. At times I think I am no good at all.	1	2	3	4

\*Items marked with an asterisk have reversed wording. The numbers on items with reversed wording should be reversed before summing the responses for the ten items. For example, on item 3, “strongly agree” becomes 4, “agree” becomes 3, “disagree” becomes 2, and “strongly disagree” becomes 1.

Source: Morris Rosenberg’s “Self-Esteem Scale” from pp. 325–327 of *Society and Adolescent Self-Image* © 1989 by Morris Rosenberg, Wesleyan University Press.

Principle 12: Consider using multiple methods when measuring abstract constructs.

- The idea here is that if you only use one method of measurement, then your measurement may be an artifact of that method of measurement.
- On the other hand, if you use two or more methods of measurement you will be able to see whether the answers depend on the method (i.e., are the answers corroborated across the methods of measurement or do you get different answers

for the different methods?). For example, you might measure student's self-esteem via the Rosenberg Scale just shown (which is used in a self-report form) as well as using teachers' ratings of the students' self-esteem; you might even want to observe the students in situations that should provide indications of high and low self-esteem.

Principle 13: Use caution if you reverse the wording in some of the items to prevent response sets. (A response set is the tendency of a participant to respond in a specific direction to items regardless of the item content.)

- Reversing the wording of some items can help ensure that participants don't just "speed through" the instrument, checking "yes" or "strongly agree" for all the items.
- On the other hand, you may want to avoid reverse wording if it creates a double negative.
- Also, recent research suggests that the use of reverse wording reduces the reliability and validity of scales. Therefore, you should generally use reverse wording sparingly, if at all.

Principle 14: Develop a questionnaire that is easy for the participant to use.

- The participant must not get confused or lost anywhere in the questionnaire.
- Make sure that the directions are clear and that any filter questions used are easy to follow.

Principle 15: Always pilot test your questionnaire.

- You will always find some problems that you have overlooked!
- The best pilot tests are with people similar to the ones to be included in your research study.
- After pilot testing your questionnaire, revise it and pilot test it again, until it works correctly.

The following table lists the strengths and weaknesses of questionnaires. It, in conjunction with the tables for the other five major methods of data collection, will help you in applying the fundamental principle of mixed research:

### **Strengths and Weaknesses of Questionnaires**

#### Strengths of questionnaires

- Good for measuring attitudes and eliciting other content from research participants.
- Inexpensive (especially mail questionnaires and group administered questionnaires).
- Can provide information about participants' internal meanings and ways of thinking.
- Can administer to probability samples.
- Quick turnaround.
- Can be administered to groups.
- Perceived anonymity by respondent may be high.
- Moderately high measurement validity (i.e., high reliability and validity) for well constructed and validated questionnaires.

- Closed-ended items can provide exact information needed by researcher.
- Open-ended items can provide detailed information in respondents' own words.
- Ease of data analysis for closed-ended items.
- Useful for exploration as well as confirmation.

#### Weaknesses of questionnaires

- Usually must be kept short.
- Reactive effects may occur (e.g., interviewees may try to show only what is socially desirable).
- Nonresponse to selective items.
- People filling out questionnaires may not recall important information and may lack self-awareness.
- Response rate may be low for mail and email questionnaires.
- Open-ended items may reflect differences in verbal ability, obscuring the issues of interest.
- Data analysis can be time consuming for open-ended items.
- Measures need validation.

### **Interviews**

In an interview, the interviewer asks the interviewee questions (in-person or over the telephone).

- Trust and rapport are important.
- Probing is available (unlike in paper-and-pencil questionnaires) and is used to reach clarity or gain additional information
- Here are some examples of standard probes:
  - Anything else?
  - Any other reason?
  - What do you mean?

Interviews may be quantitative or qualitative.

#### Quantitative interviews:

- Are standardized (i.e., the same information is provided to everyone).
- Use closed-ended questions.
- Exhibit 6.3 has an example of an interview protocol. Note that it looks very much like a questionnaire! The key difference between an interview protocol and a questionnaire is that the interview protocol is read by the interviewer who also records the answers (you have probably participated in telephone surveys before...you were interviewed).

#### Qualitative interviews

- They are based on open-ended questions.
- There are three types of qualitative interviews.

##### 1) Informal Conversational Interview.

- It is spontaneous.
- It is loosely structured (i.e., no interview protocol is used).

## 2) Interview Guide Approach.

- It is more structured than the informal conversational interview.
- It includes an interview protocol listing the open-ended questions.
- The questions can be asked in any order by the interviewer.
- Question wording can be changed by the interviewer if it is deemed appropriate.

## 3) Standardized Open-Ended Interview.

- Open-ended questions are written on an interview protocol, and they are asked in the exact order given on the protocol.
- The wording of the questions cannot be changed.

The following table lists the strengths and weaknesses of interviews. It, in conjunction with the tables for the other five major methods of data collection, will help you in applying the fundamental principle of mixed research:

### **Strengths and Weaknesses of Interviews**

#### Strengths of interviews

- Good for measuring attitudes and most other content of interest.
- Allows probing and posing of follow-up questions by the interviewer.
- Can provide in-depth information.
- Can provide information about participants' internal meanings and ways of thinking.
- Closed-ended interviews provide exact information needed by researcher.
- Telephone and e-mail interviews provide very quick turnaround.
- Moderately high measurement validity (i.e., high reliability and validity) for well constructed and tested interview protocols.
- Can use with probability samples.
- Relatively high response rates are often attainable.
- Useful for exploration as well as confirmation.

#### Weaknesses of interviews

- In-person interviews usually are expensive and time consuming.
- Reactive effects (e.g., interviewees may try to show only what is socially desirable).
- Investigator effects may occur (e.g., untrained interviewers may distort data because of personal biases and poor interviewing skills).
- Interviewees may not recall important information and may lack self-awareness.
- Perceived anonymity by respondents may be low.
- Data analysis can be time consuming for open-ended items.
- Measures need validation.

### **Focus Groups**

A focus group is a situation where a focus group moderator keeps a small and homogeneous group (of 6-12 people) focused on the discussion of a research topic or issue.

- Focus group sessions generally last between one and three hours and they are recorded using audio and/or videotapes.
- Focus groups are useful for exploring ideas and obtaining in-depth information about how people think about an issue.

The following table lists the strengths and weaknesses of focus groups. It, in conjunction with the tables for the other five major methods of data collection, will help you in applying the fundamental principle of mixed research:

### **Strengths and Weaknesses of Focus Groups**

#### Strengths of focus groups

- Useful for exploring ideas and concepts.
- Provides window into participants' internal thinking.
- Can obtain in-depth information.
- Can examine how participants react to each other.
- Allows probing.
- Most content can be tapped.
- Allows quick turnaround.

#### Weaknesses of focus groups

- Sometimes expensive.
- May be difficult to find a focus group moderator with good facilitative and rapport building skills.
- Reactive and investigator effects may occur if participants feel they are being watched or studied.
- May be dominated by one or two participants.
- Difficult to generalize results if small, unrepresentative samples of participants are used.
- May include large amount of extra or unnecessary information.
- Measurement validity may be low.
- Usually should not be the only data collection methods used in a study.
- Data analysis can be time consuming because of the open-ended nature of the data.

### **Observation**

In the method of data collection called observation, the researcher observes participants in natural and/or structured environments.

- It is important to collect observational data (in addition to attitudinal data) because what people say is not always what they do!

Observation can be carried out in two types of environments:

- Laboratory observation (which is done in a lab set up by the researcher).
- Naturalistic observation (which is done in real-world settings).

There are two important forms of observation: quantitative observation and qualitative observation.

1) Quantitative observation involves standardization procedures, and it produces quantitative data.

- The following can be standardized:
  - Who is observed.
  - What is observed.
  - When the observations are to take place.

- Where the observations are to take place.
- How the observations are to take place.
- Standardized instruments (e.g., checklists) are often used in quantitative observation.
- Sampling procedures are also often used in quantitative observation:
  - Time-interval sampling (i.e., observing during time intervals, e.g., during the first minute of each 10 minute interval).
  - Event sampling (i.e., observing after an event has taken place, e.g., observing after teacher asks a question).

2) Qualitative observation is exploratory and open-ended, and the researcher takes extensive field notes.

The qualitative observer may take on four different roles that make up a continuum:

- Complete participant (i.e., becoming a full member of the group and not informing the participants that you are studying them).
- Participant-as-Observers (i.e., spending extensive time "inside" and informing the participants that you are studying them).
- Observer-as-Participant (i.e., spending a limited amount of time "inside" and informing them that you are studying them).
- Complete Observer (i.e., observing from the "outside" and not informing that participants that you are studying them).

The following table lists the strengths and weaknesses of observational data. It, in conjunction with the tables for the other five major methods of data collection, will help you in applying the fundamental principle of mixed research:

### **Strengths and Weaknesses of Observational Data**

#### Strengths of observational data

- Allows one to directly see what people do without having to rely on what they say they do.
- Provides firsthand experience, especially if the observer participates in activities.
- Can provide relatively objective measurement of behavior (especially for standardized observations).
- Observer can determine what does not occur.
- Observer may see things that escape the awareness of people in the setting.
- Excellent way to discover what is occurring in a setting.
- Helps in understanding importance of contextual factors.
- Can be used with participants with weak verbal skills.
- May provide information on things people would otherwise be unwilling to talk about.
- Observer may move beyond selective perceptions of people in the setting.
- Good for description.
- Provides moderate degree of realism (when done outside of the laboratory).

#### Weaknesses of observational data

- Reasons for observed behavior may be unclear.
- Reactive effects may occur when respondents know they are being observed (e.g., people being observed may behave in atypical ways).

- Investigator effects (e.g., personal biases and selective perception of observers)
- Observer may “go native” (i.e., over-identifying with the group being studied).
- Sampling of observed people and settings may be limited.
- Cannot observe large or dispersed populations.
- Some settings and content of interest cannot be observed.
- Collection of unimportant material may be moderately high.
- More expensive to conduct than questionnaires and tests.
- Data analysis can be time consuming.

### **Secondary/Existing Data**

Secondary data (i.e., data originally used for a different purpose) are contrasted with primary data (i.e., original data collected for the new research study).

The most commonly used secondary data are documents, physical data, and archived research data.

1. **Documents.** There are two main kinds of documents.
  - Personal documents (i.e., things written or recorded for private purposes). Letters, diaries, family pictures.
  - Official documents (i.e., things written or recorded for public or private organizations). Newspapers, annual reports, yearbooks, minutes.
2. **Physical data** (are any material thing created or left by humans that might provide information about a phenomenon of interest to a researcher).
3. **Archived research data** (i.e., research data collected by other researchers for other purposes, and these data are save often in tape form or cd form so that others might later use the data). For the biggest repository of archived research data, [click here](#).

The following table lists the strengths and weaknesses of secondary/existing data. It, in conjunction with the tables for the other five major methods of data collection, will help you in applying the fundamental principle of mixed research:

### **Strengths and Weaknesses of Secondary Data**

Strengths of documents and physical data:

- Can provide insight into what people think and what they do.
- Unobtrusive, making reactive and investigator effects very unlikely.
- Can be collected for time periods occurring in the past (e.g., historical data).
- Provides useful background and historical data on people, groups, and organizations.
- Useful for corroboration.
- Grounded in local setting.
- Useful for exploration.

Strengths of archived research data:

- Archived research data are available on a wide variety of topics.
- Inexpensive.
- Often are reliable and valid (high measurement validity).
- Can study trends.

- Ease of data analysis.
- Often based on high quality or large probability samples.

Weaknesses of documents and physical data:

- May be incomplete.
- May be representative only of one perspective.
- Access to some types of content is limited.
- May not provide insight into participants' personal thinking for physical data.
- May not apply to general populations.

Weaknesses of archived research data:

- May not be available for the population of interest to you.
- May not be available for the research questions of interest to you.
- Data may be dated.
- Open-ended or qualitative data usually not available.
- Many of the most important findings have already been mined from the data.