5.2 Qualitative or Quantitative? Some Specific Considerations

LEARNING OBJECTIVES

1. Describe the role of causality in quantitative research as compared to qualitative research.
2. Identify, define, and describe each of the three main criteria for causality.
3. Describe the difference between and provide examples of independent and dependent variables.
4. Define units of analysis and units of observation, and describe the two common errors people make when they confuse the two.
5. Define hypothesis, be able to state a clear hypothesis, and discuss the respective roles of quantitative and qualitative research when it comes to hypotheses.

In Chapter 1 "Introduction", we discussed the importance of understanding the differences between qualitative and quantitative research methods. Because this distinction is relevant to how researchers design their projects, we'll revisit it here.

Causality

When designing a research project, how issues of causality are attended to will in part be determined by whether the researcher plans to collect qualitative or quantitative data. **Causality** refers to the idea that one event, behavior, or belief will result in the occurrence of another, subsequent event, behavior, or belief. In other words, it is about cause and effect.

In a qualitative study, it is likely that you will aim to acquire an idiographic understanding of the phenomenon that you are investigating. Using our example of students' addictions to electronic gadgets, a qualitative researcher might aim to understand the multitude of reasons that two roommates exhibit addictive tendencies when it comes to their various electronic devices. The researcher might spend time in the dorm room with them, watching how they use their devices, follow them to class and watch them there, observe them at the cafeteria, and perhaps even observe them during their free time. At the end of this very intensive, and probably exhausting, set of observations, the researcher should be able to identify some of the specific causes of each student's addiction. Perhaps one of the two roommates is majoring in media studies, and all her classes require her to have familiarity with and to regularly use a variety of electronic gadgets. Perhaps the other roommate has friends or family who live overseas, and she relies on a variety of electronic devices to communicate with them. Perhaps both students have a special interest in playing and listening to music, and their electronic gadgets help facilitate this hobby. Whatever the case, in a

qualitative study that seeks idiographic understanding, a researcher would be looking to understand the plethora of reasons (or causes) that account for the behavior he or she is investigating.

In a quantitative study, on the other hand, a researcher is more likely to aim for a nomothetic understanding of the phenomenon that he or she is investigating. In this case, the researcher may be unable to identify the specific idiosyncrasies of individual people's particular addictions. However, by analyzing data from a much larger and more representative group of students, the researcher will be able to identify the most likely, and more general, factors that account for students' addictions to electronic gadgets. The researcher might choose to collect survey data from a wide swath of college students from around the country. He might find that students who report addictive tendencies when it comes to their gadgets also tend to be people who can identity which of Steven Seagal's movies he directed, are more likely to be men, and tend to engage in rude or disrespectful behaviors more often than nonaddicted students. It is possible, then, that these associations can be said to have some causal relationship to electronic gadget addiction. However, items that seem to be related are not necessarily causal. To be considered causally related in a nomothetic study, such as the survey research in this example, there are a few criteria that must be met.

The main criteria for causality have to do with plausibility, temporality, and spuriousness. Plausibility means that in order to make the claim that one event, behavior, or belief causes another, the claim has to make sense. For example, if we attend a series of lectures during which a student's incessant midclass texting or web surfing gets in the way of our ability to focus on the lecture, we might begin to wonder whether people who have a propensity to be rude are more likely to have a propensity to be addicted to their electronic gadgets (and therefore use them during class). However, the fact that there might be a relationship between general rudeness and gadget addiction does not mean that a student's rudeness could *cause* him to be addicted to his gadgets. In other words, just because there might be some **correlation** between two variables does not mean that a causal relationship between the two is really plausible.

The criterion of **temporality** means that whatever cause you identify must precede its effect in time. As noted earlier, a survey researcher examining the causes of students' electronic gadget addictions might find that more men than women exhibit addictive tendencies when it comes to their electronic gadgets. Thus the researcher has found a correlation between gender and addiction. So does this mean that a person's gadget addiction determines his or her gender? Probably not, not only because this doesn't make any sense but also because a person's gender identity is most typically formed long before he or she is likely to own any electronic gadgets. Thus gender precedes electronic gadget ownership (and subsequent addiction) in time.

Finally, a **spurious relationship** is one in which an association between two variables appears to be causal but can in fact be explained by some third variable. In the example of a survey assessing students' addictions to electronic gadgets, the researcher might have found that those who can identify which of Steven Seagal's films the

actor himself directed also exhibit addiction to their electronic gadgets.In case you're curious, a visit to the Internet Movie Database will tell you that Seagal directed just one of his films, 1994's *On Deadly Ground*: http://www.imdb.com/name/nm0000219. This relationship is exemplified in Figure 5.5.

So does knowledge about Seagal's directorial prowess cause gadget addiction? Probably not. A more likely explanation is that being a man makes a person both more likely to know about Seagal's films and more likely to be addicted to electronic gadgets. In other words, there is a third variable that explains the relationship between Seagal movie knowledge and electronic gadget addiction. This relationship is exemplified in Figure 5.6.

Let's consider a few additional, real-world examples of spuriousness. Did you know, for example, that high rates of ice cream sales have been shown to cause drowning? Of course that's not really true, but there is a positive relationship between the two. In this case, the third variable that causes both high ice cream sales and increased deaths by drowning is time of year, as the summer season sees increases in both (Babbie, 2010).Babbie, E. (2010). *The practice of social research* (12th ed.). Belmont, CA: Wadsworth. Here's another good one: it is true that as the salaries of Presbyterian ministers in Massachusetts rise, so, too, does the price of rum in Havana, Cuba. Well, duh, you might be saying to yourself. Everyone knows how much ministers in Massachusetts love their rum, right? Not so fast. Both salaries and rum prices have increased, true, but so has the price of just about everything else (Huff & Geis, 1993).Huff, D., & Geis, I. (1993). *How to lie with statistics*. New York, NY: Norton. Finally, research shows that the more firefighters present at a fire, the more damage is done at the scene. What this statement leaves out, of course, is that as the size of a fire increases so, too, does the amount of damage caused as does the number of firefighters called on to help (Frankfort-Nachmias & Leon-Guerro, 2011).Frankfort-Nachmias, C., & Leon-Guerro, A. (2011). *Social statistics for a diverse society* (6th ed.). Thousand Oaks, CA: Pine Forge Press. In each of these examples, it is the presence of a third variable that explains the apparent relationship between the two original variables.

In sum, the following criteria must be met in order for a correlation to be considered causal:

1. The relationship must be plausible.
2. The cause must precede the effect in time.
3. The relationship must be nonspurious.

What we've been talking about here is relationships between variables. When one variable causes another, we have what researchers call independent and dependent variables. In the example where gender was found to be causally linked to electronic gadget addiction, gender would be the independent variable and electronic gadget addiction would be the dependent variable. An **independent variable** is one that causes another. A **dependent variable** is one that is caused by another. Dependent variables depend on independent variables.

Relationship strength is another important factor to take into consideration when attempting to make causal claims if your research approach is nomothetic. I'm not talking strength of your friendships or marriage (though of course that sort of strength *might* affect your likelihood to keep your friends or stay married). In this context, relationship strength refers to statistical significance. The more statistically significant a relationship between two variables is shown to be, the greater confidence we can have in the strength of that relationship. We'll discuss statistical significance in greater detail in Chapter 7 "Sampling". For now, keep in mind that for a relationship to be considered causal, it cannot exist simply because of the chance selection of participants in a study.

Some research methods, such as those used in qualitative and idiographic research, are not conducive to making predictions about when events or behaviors will occur. In these cases, what we are instead able to do is gain some understanding of the circumstances under which those causal relationships occur: to understand the *how* of causality. Qualitative research sometimes relies on quantitative work to point toward a relationship that may be interesting to investigate further. For example, if a quantitative researcher learns that men are statistically more likely than women to become addicted to their electronic gadgets, a qualitative researcher may decide to conduct some in-depth interviews and observations of men and women to learn more about how the different contexts and circumstances of men's and women's lives might shape their respective chances of becoming addicted. In other words, the qualitative researcher works to understand the contexts in which various causes and effects occur.

Units of Analysis and Units of Observation

Another point to consider when designing a research project, and which might differ slightly in qualitative and quantitative studies, has to do with **units of analysis** and **units of observation**. These two items concern what you, the researcher, actually observe in the course of your data collection and what you hope to be able to say about those observations. A unit of analysis is the entity that you wish to be able to say something about at the end of your study, probably what you'd consider to be the main focus of your study. A unit of observation is the item (or items) that you actually observe, measure, or collect in the course of trying to learn something about your unit of analysis. In a given study, the unit of observation might be the same as the unit of analysis, but that is not always the case. Further, units of analysis are not required to be the same as units of observation. What is required, however, is for researchers to be clear about how they define their units of analysis and observation, both to themselves and to their audiences.

More specifically, your unit of analysis will be determined by your research question. Your unit of observation, on the other hand, is determined largely by the method of data collection that you use to answer that research question. We'll take a closer look at methods of data collection in Chapter 8 "Survey Research: A Quantitative Technique" through Chapter 12 "Other Methods of Data Collection and Analysis". For now, let's go back to the example we've been discussing over the course of this chapter, students' addictions to electronic gadgets. We'll consider first how different kinds of research questions about this topic will yield different units of analysis. Then

we'll think about how those questions might be answered and with what kinds of data. This leads us to a variety of units of observation.

If we were to ask, "Which students are most likely to be addicted to their electronic gadgets?" our unit of analysis would be the individual. We might mail a survey to students on campus, and our aim would be to classify individuals according to their membership in certain social classes in order to see how membership in those classes correlated with gadget addiction. For example, we might find that majors in new media, men, and students with high socioeconomic status are all more likely than other students to become addicted to their electronic gadgets. Another possibility would be to ask, "How do students' gadget addictions differ, and how are they similar?" In this case, we could conduct observations of addicted students and record when, where, why, and how they use their gadgets. In both cases, one using a survey and the other using observations, data are collected from individual students. Thus the unit of observation in both examples is the individual. But the units of analysis differ in the two studies. In the first one, our aim is to describe the characteristics of individuals. We may then make generalizations about the populations to which these individuals belong, but our unit of analysis is still the individual. In the second study, we will observe individuals in order to describe some social phenomenon, in this case, types of gadget addictions. Thus our unit of analysis would be the social phenomenon.

Another common unit of analysis in sociological inquiry is groups. Groups of course vary in size, and almost no group is too small or too large to be of interest to sociologists. Families, friendship groups, and street gangs make up some of the more common microlevel groups examined by sociologists. Employees in an organization, professionals in a particular domain (e.g., chefs, lawyers, sociologists), and members of clubs (e.g., Girl Scouts, Rotary, Red Hat Society) are all mesolevel groups that sociologists might study. Finally, at the macro level, sociologists sometimes examine citizens of entire nations or residents of different continents or other regions.

A study of student addictions to their electronic gadgets at the group level might consider whether certain types of social clubs have more or fewer gadget-addicted members than other sorts of clubs. Perhaps we would find that clubs that emphasize physical fitness, such as the rugby club and the scuba club, have fewer gadget-addicted members than clubs that emphasize cerebral activity, such as the chess club and the sociology club. Our unit of analysis in this example is groups. If we had instead asked whether people who join cerebral clubs are more likely to be gadget-addicted than those who join social clubs, then our unit of analysis would have been individuals. In either case, however, our unit of observation would be individuals.

Organizations are yet another potential unit of analysis that social scientists might wish to say something about. As you may recall from your introductory sociology class, organizations include entities like corporations, colleges and universities, and even night clubs. At the organization level, a study of students' electronic gadget addictions might ask, "How do different colleges address the problem of electronic gadget addiction?" In this case, our interest lies not in the experience of individual students but instead in the campus-to-campus differences in confronting gadget

addictions. A researcher conducting a study of this type might examine schools' written policies and procedures, so his unit of observation would be documents. However, because he ultimately wishes to describe differences across campuses, the college would be his unit of analysis.

Of course, it would be silly in a textbook focused on *social* scientific research to neglect *social* phenomena as a potential unit of analysis. I mentioned one such example earlier, but let's look more closely at this sort of unit of analysis. Many sociologists study a variety of social interactions and social problems that fall under this category. Examples include social problems like murder or rape; interactions such as counseling sessions, Facebook chatting, or wrestling; and other social phenomena such as voting and even gadget use or misuse. A researcher interested in students' electronic gadget addictions could ask, "What are the various types of electronic gadget addictions that exist among students?" Perhaps the researcher will discover that some addictions are primarily centered around social media such as chat rooms, Facebook, or texting while other addictions center on gadgets such as handheld, single-player video games or DVR devices that discourage interaction with others. The resultant typology of gadget addictions would tell us something about the social phenomenon (unit of analysis) being studied. As in several of the preceding examples, however, the unit of observation would likely be individual people.

Finally, a number of social scientists examine policies and principles, the last type of unit of analysis we'll consider here. Studies that analyze policies and principles typically rely on documents as the unit of observation. Perhaps a researcher has been hired by a college to help it write an effective policy against electronic gadget addiction. In this case, the researcher might gather all previously written policies from campuses all over the country and compare policies at campuses where addiction rates are low to policies at campuses where addiction rates are high.

In sum, there are many potential units of analysis that a sociologist might examine, but some of the most common units include the following:

1. Individuals
2. Groups
3. Organizations
4. Social phenomena
5. Policies and principles

Table 5.1 "Units of Analysis and Units of Observation: An Example Using a Hypothetical Study of Students' Addictions to Electronic Gadgets" includes a summary of the preceding discussion of units of analysis and units of observation.

Table 5.1 Units of Analysis and Units of Observation: An Example Using a Hypothetical Study of Students' Addictions to Electronic Gadgets

Research question	Unit of analysis	Data collection	Unit of observation	Statement of findings
Which students are most likely to be addicted to their electronic gadgets?	Individuals	Survey of students on campus	Individuals	New Media majors, men, and students with high socioeconomic status are all more likely than other students to become addicted to their electronic gadgets.
Do certain types of social clubs have more gadget-addicted members than other sorts of clubs?	Groups	Survey of students on campus	Individuals	Clubs with a scholarly focus, such as the sociology club and the math club, have more gadget-addicted members than clubs with a social focus, such as the 100-bottles-of-beer-on-the-wall club and the knitting club.
How do different colleges address the problem of electronic gadget addiction?	Organizations	Content analysis of policies	Documents	Campuses without strong computer science programs are more likely than those with such programs to expel students who have been found to have addictions to their electronic gadgets.
What are the various types of electronic gadget addictions that exist among students?	Social phenomena	Observations of students	Individuals	There are two main types of gadget addiction: social and antisocial.
What are the most effective policies against electronic gadget addiction?	Policies and principles	Content analysis of policies and student records	Documents	Policies that require students found to have an addiction to their electronic gadgets to attend group counseling for a minimum of one semester have been found to treat addictions more effectively than those that call for the expulsion of addicted students.
Note: **Please don't forget that the findings described here are hypothetical. There is no reason to think that any of the hypothetical findings described here would actually bear out if tested with empirical research.**				

One common error we see people make when it comes to both causality and units of analysis is something called the **ecological fallacy**. This occurs when claims about one lower-level unit of analysis are made based on data from some higher-level unit of analysis. In many cases, this occurs when claims are made about individuals, but only group-level data have been gathered. For example, we might want to understand whether electronic gadget addictions are more common on certain campuses than on others. Perhaps different campuses around the country have provided us with their campus percentage of gadget-addicted students, and we learn from these data that electronic gadget addictions are more common on campuses that have business programs than on campuses without them. We then conclude that business students are more likely than nonbusiness students to become addicted to their electronic gadgets. However, this would be an inappropriate conclusion to draw. Because we only have addiction rates by campus, we can only draw conclusions about campuses, not about the individual students on those campuses. Perhaps the sociology majors on the business campuses are the ones that caused the addiction rates on those campuses to be so high. The point is we simply don't know because we only have campus-level data.

By drawing conclusions about students when our data are about campuses, we run the risk of committing the ecological fallacy.

On the other hand, another mistake to be aware of is **reductionism**. Reductionism occurs when claims about some higher-level unit of analysis are made based on data from some lower-level unit of analysis. In this case, claims about groups or macrolevel phenomena are made based on individual-level data. An example of reductionism can be seen in some descriptions of the civil rights movement. On occasion, people have proclaimed that Rosa Parks started the civil rights movement in the United States by refusing to give up her seat to a white person while on a city bus in Montgomery, Alabama, in December 1955. Although it is true that Parks played an invaluable role in the movement, and that her act of civil disobedience gave others courage to stand up against racist policies, beliefs, and actions, to credit Parks with *starting* the movement is reductionist. Surely the confluence of many factors, from fights over legalized racial segregation to the Supreme Court's historic decision to desegregate schools in 1954 to the creation of groups such as the Student Nonviolent Coordinating Committee (to name just a few), contributed to the rise and success of the American civil rights movement. In other words, the movement is attributable to many factors—some social, others political, others economic. Did Parks play a role? Of course she did—and a very important one at that. But did she *cause* the movement? To say yes would be reductionist.

It would be a mistake to conclude from the preceding discussion that researchers should avoid making any claims whatsoever about data or about relationships between variables. While it is important to be attentive to the possibility for error in causal reasoning about different levels of analysis, this warning should not prevent you from drawing well-reasoned analytic conclusions from your data. The point is to be cautious but not abandon entirely the social scientific quest to understand patterns of behavior.

Hypotheses

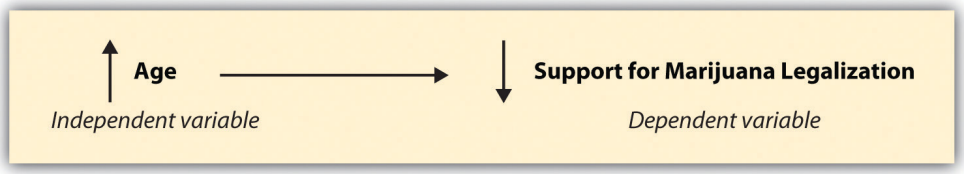
In some cases, the purpose of research is to test a specific hypothesis or hypotheses. At other times, researchers do not have predictions about what they will find but instead conduct research to answer a question or questions, with an open-minded desire to know about a topic, or to help develop hypotheses for later testing. A **hypothesis** is a statement, sometimes but not always causal, describing a researcher's expectation regarding what he or she anticipates finding. Often hypotheses are written to describe the expected relationship between two variables (though this is not a requirement). To develop a hypothesis, one needs to have an understanding of the differences between independent and dependent variables and between units of observation and units of analysis. Hypotheses are typically drawn from theories and usually describe how an independent variable is expected to affect some dependent variable or variables. Researchers following a deductive approach to their research will hypothesize about what they expect to find based on the theory or theories that frame their study. If the theory accurately reflects the phenomenon it is designed to explain, then the researcher's hypotheses about what he or she will observe in the real world should bear out.

Let's consider a couple of examples. In my collaborative research on sexual harassment (Uggen & Blackstone, 2004),Uggen, C., & Blackstone, A. (2004). Sexual harassment as a gendered expression of power. *American Sociological Review, 69*, 64–92. we once hypothesized, based on feminist theories of sexual harassment, that "more females than males will experience specific sexually harassing behaviors." What is the causal relationship being predicted here? Which is the independent and which is the dependent variable? In this case, we hypothesized that a person's sex (independent variable) would predict her or his likelihood to experience sexual harassment (dependent variable).

Sometimes researchers will hypothesize that a relationship will take a specific direction. As a result, an increase or decrease in one area might be said to cause an increase or decrease in another. For example, you might choose to study the relationship between age and legalization of marijuana. Perhaps you've done some reading in your crime and deviance class and, based on the theories you've read, you hypothesize that "age is negatively related to support for marijuana legalization."In fact, there are empirical data that support this hypothesis. Gallup has conducted research on this very question since the 1960s. For more on their findings, see Carroll, J. (2005). Who supports marijuana legalization? Retrieved from http://www.gallup.com/poll/19561/who-supports-marijuana-legalization.aspx What have you just hypothesized? You have hypothesized that as people get older, the likelihood of their supporting marijuana legalization decreases. Thus as age (your independent variable) moves in one direction (up), support for marijuana legalization (your dependent variable) moves in another direction (down). If writing hypotheses feels tricky, it is sometimes helpful to draw them out. Figure 5.8 "Hypothesis Describing the Expected Relationship Between Sex and Sexual Harassment" and Figure 5.9 "Hypothesis Describing the Expected Direction of Relationship Between Age and Support for Marijuana Legalization" depict each of the two hypotheses we have just discussed.

Figure 5.8 *Hypothesis Describing the Expected Relationship Between Sex and Sexual Harassment*

Figure 5.9 *Hypothesis Describing the Expected Direction of Relationship Between Age and Support for Marijuana Legalization*



Note that you will almost never hear researchers say that they have proven their hypotheses. A statement that bold implies that a relationship has been shown to exist with absolute certainty and that there is no chance that there are conditions under which the hypothesis would not bear out. Instead, researchers tend to say that their hypotheses have been supported (or not). This more cautious way of discussing findings allows for the possibility that new evidence or new ways of examining a relationship will be discovered. Researchers may also discuss a **null hypothesis**, one that predicts no relationship between the variables being studied. If a researcher rejects the null hypothesis, he or she is saying that the variables in question are somehow related to one another.

Quantitative and qualitative researchers tend to take different approaches when it comes to hypotheses. In quantitative research, the goal often is to empirically test hypotheses generated from theory. With a qualitative approach, on the other hand, a researcher may begin with some vague expectations about what he or she will find, but the aim is not to test one's expectations against some empirical observations. Instead, theory development or construction is the goal. Qualitative researchers may develop theories from which hypotheses can be drawn and quantitative researchers may then test those hypotheses. Both types of research are crucial to understanding our social world, and both play an important role in the matter of hypothesis development and testing.