

MIXED METHODS

The Third Methodological Movement

Do not copy, post, or distribute

SECTION I

Do not copy, post, or distribute



MIXED METHODS AS THE THIRD RESEARCH COMMUNITY

OBJECTIVES

Upon finishing this chapter, you should be able to:

- Explain what Kuhn meant by the term *paradigm* and the concept of a community of researchers
- Distinguish among the three communities of researchers in the social and behavioral sciences: qualitatively oriented methodologists, quantitatively oriented methodologists, and mixed methodologists
- Explain the differences in how researchers from the three methodological communities approach a research problem
- Describe the paradigms debate, using the concepts of the incompatibility and compatibility theses
- Discuss the issue of coexistence among the three research communities
- Differentiate between methodology, methods, and paradigm
- Identify the stages in the cycle of research (inductive-deductive research cycle)

Mixed methods research has been called the third methodological movement (Teddle & Tashakkori, 2003), the third path (Gorard & Taylor, 2004), the third research paradigm (Johnson & Onwuegbuzie, 2004), and other similar names by various individuals writing in the field. Here, we refer to mixed methods (MM) research as the *third research community* because we are focusing on the relationships that exist within and among the three major groups of scholars currently doing research in the social and behavioral sciences.

Although the mixing of qualitative and quantitative methods has a long history (Johnson & Gray, 2010; Maxwell, 2019), MM research emerged as an explicit methodology in the latter part of the 20th century as an alternative to the dichotomy of qualitative (QUAL) and quantitative (QUAN) traditions. This book focuses on MM, but its emergence must be examined within the context of its two older cousins. In this book, we refer to the QUAN (quantitative) and QUAL (qualitative) traditions, approaches, methodologies, and the like only for pedagogical and discussion purposes. As we discuss in detail in the section on the multidimensional continuum in Chapter 2, virtually any research project has elements of QUAL and QUAN approaches in one or more of its components (e.g., question, data collection, data, analysis, interpretation, etc.). Therefore, we do not believe there are distinct lines separating the QUAL and QUAN approaches to research, making any research study a mixed study at some level and to some degree.

This chapter has four purposes: (1) to briefly introduce the three communities of researchers in the social and behavioral sciences, (2) to demonstrate how the three research orientations differentially address the same research problem, (3) to briefly discuss issues related to conflict and concord among the three communities, and (4) to discuss the similarities and differences between the three communities according to the manner in which they enter the cycle of research (inductive-deductive research cycle).

THREE COMMUNITIES OF RESEARCHERS IN THE SOCIAL AND BEHAVIORAL SCIENCES

Basic Descriptions of the Three Methodological Movements

In general, researchers in the social and behavioral sciences can be categorized into three groups:

- Quantitatively oriented social and behavioral scientists (QUANs) primarily working within the postpositivist/positivist paradigm and principally interested in numerical data and analyses
- Qualitatively oriented social and behavioral scientists (QUALs) primarily working within the constructivist paradigm and principally interested in narrative data and analyses
- Researchers who see the importance of both QUAN and QUAL: these *mixed methods researchers* work primarily within the pragmatist paradigm

The three methodological movements are like communities in that members of each group tend to share similar backgrounds, philosophical assumptions, methodological orientations, and research ideas and practices. Examples of some basic intellectual and “cultural” differences between these researchers are the manner in which they are trained, the types of research programs they pursue, and the types of professional organizations and special interest groups to which they belong. These group differences contribute to a distinct sense of community for each group. It is important to note, however, that there will always be some within group differences.

Thomas Kuhn (1970) described such scientific communities as follows:

Scientists work from models acquired through education and through subsequent exposure to the literature often without quite knowing or needing to know what characteristics have given these models the status of *community* paradigms. (p. 46)

These three methodological communities are evident throughout the social and behavioral sciences and continue to evolve in interesting and sometimes unpredictable ways. Several terms are briefly introduced in Chapter 1 and then presented in greater detail later in this book. Because paradigms are referred to throughout Chapter 1, a **paradigm** (e.g., postpositivism, constructivism, pragmatism) can be defined as a worldview that includes a set of philosophical and methodological assumptions and beliefs. Each of the three communities of researchers in the social and behavioral sciences has been associated with one or more dominant paradigms.

The Quantitative Tradition: Basic Terminology and Two Prototypes

QUAN and its associated positivist/postpositivist paradigm was the dominant and relatively unquestioned methodological orientation in the social and behavioral sciences for much of the 20th century. **Quantitative (QUAN) methods** may be most simply and parsimoniously defined as the techniques associated with the gathering, analysis, interpretation, and presentation of numerical (or transformed to numerical) data and information.

QUAN researchers originally subscribed to the tenets of **positivism**—the view that “social research should adopt scientific method, that this method is exemplified in the work of modern physicists, and that it consists of the rigorous testing of hypotheses by means of data that take the form of quantitative measurements” (Atkinson & Hammersley, 1994, p. 251). **Postpositivism** is a newer, revised, and improved form of positivism that addresses several of the more widely known criticisms of the positivist orientation yet maintains an emphasis on QUAN methods (Phillips & Burbules, 2000). For instance, the positivists’ original position was that scientific research was fully objective and “value free.” Positivists assumed that researchers were able to conduct research and interpret results without being affected by their values. Postpositivists, on the other hand, acknowledge that their value systems play an important role in how they conduct their research and interpret their results (e.g., Phillips & Burbules, 2000). Almost all current quantitative research in the social and behavioral sciences is rooted in the postpositivist perspective, rather than its positivist predecessor (Johnson, 2009). Very few quantitative researchers today in the social and behavioral sciences would fit into the old paradigm of positivism.

Research questions guide investigations and are concerned with unknown aspects of a phenomenon of interest. Answers to quantitative research questions are based on *numerical* data. A **research hypothesis** is a predicted answer to a research question. Before investigators conduct a research study, they make predictions (i.e., form hypotheses) about the relationships among social phenomena. These predictions are based on theory, previous research, or some other rationale. After researchers collect and analyze empirical research data, they determine whether the hypothesis is supported. **Quantitative (statistical) data analysis** is the analysis of numerical data using techniques that include (1) simply describing the phenomenon of interest or (2) looking for differences between groups or relationships among variables.

A variety of classic texts guides the QUAN community, including a trilogy of works by Donald T. Campbell and associates that constitute the core logic for the tradition (e.g., Campbell & Stanley, 1963; Cook & Campbell, 1979). The third in this series, *Experimental and Quasi-Experimental Designs for Generalized Causal Inference* (Shadish, Cook, & Campbell, 2002), was published in the 21st century and effectively updates the QUAN tradition. Boxes 1.1 and 1.2 contain descriptions of two prototypical researchers, named Professor Experimentalista and Professor Numerico, who are members of the QUAN researcher community. We present two prototypes of QUANs here because there are major differences between experimental researchers (Professor Experimentalista) and researchers who work primarily with nonexperimental data such as surveys, developmental research, and other descriptive and correlational/predictive QUAN designs (Professor Numerico). We do not want to give the impression that all QUANs are experimentalists.

**BOX 1.1**

Prototypical QUAN Researcher 1: Professor Experimentalista

Professor Experimentalista is employed by the psychology department at Flagship University. She conducts her research in the laboratories of Thorndike Hall, and her participants are freshman and sophomore students. Professor Experimentalista works in an area known as attribution theory, and she reads the latest journals to determine the current state of knowledge in that area. She uses the hypothetico-deductive model (described in Chapters 2 and 4) and generates a priori hypotheses based on Smith's XYZ theory (as opposed to Jones's ABC theory). Professor Experimentalista hypothesizes that her experimental group of participants will respond better than the control participants to closed-ended items on a questionnaire devised to measure the dependent variables of interest. With her colleague, Dr. Deductivo, who is known for his ability to identify statistically significant results, Dr. Experimentalista tests the hypotheses using statistical analyses.

**BOX 1.2**

Prototypical QUAN Researcher 2: Professor Numerico

Professor Numerico is a medical sociologist at Flagship University. He typically uses questionnaires and telephone interviews to collect his research data. Participants in his studies are adolescents and young adults. Professor Numerico's research focuses on predicting risky behaviors that might lead to contracting AIDS. One of his research interests is to test the adequacy of three theories of behavior prediction: the theory of reasoned action, the theory of planned behavior, and the health belief model. Professor Numerico hypothesizes that the health belief model predicts the risky behaviors of young adults more accurately than the other two theories. He uses complex statistical procedures to predict participants' behaviors based on a number of potentially important factors.

The Qualitative Tradition: Basic Terminology and a Prototype

Qualitatively oriented researchers and theorists wrote several popular books during the last quarter of the 20th century. These authors were highly critical of the positivist orientation and proposed a wide variety of alternative QUAL methods. Their critiques of positivism, which they pejoratively labeled “the received tradition,” helped establish QUAL research as a viable alternative to QUAN research.

Qualitative (QUAL) methods may be most simply and parsimoniously defined as the techniques associated with the gathering, analysis, interpretation, and presentation of *narrative* information that participants provide in their own words in response to open-ended questions.

Many qualitatively oriented researchers subscribe to a worldview known as **constructivism** and its variants (e.g., Guba, 1990; Lincoln & Guba, 1985; Maxcy, 2003). Constructivists believe that researchers individually and collectively construct the meaning of the phenomena under investigation. There are many perspectives or traditions (e.g., critical constructivism) associated with QUAL research in addition to traditional constructivism (e.g., Berger & Luckman, 1967) and its variants. A critical style of constructivism adds the politics of critical theory to it (i.e., it wants to eliminate discrimination and inequalities in the world); this kind of constructivism has been commonly used by researchers contributing to the five editions of the widely read *SAGE Handbook of Qualitative Research*, with the first edition published in 1994 (Denzin & Lincoln, 1994) and the latest edition published in 2018 (Denzin & Lincoln, 2018).

Answers to qualitative research questions are narrative in form. **Qualitative (thematic) data analysis** is the analysis of narrative data using a variety of different inductive and iterative techniques, including categorical strategies and contextualizing (holistic) strategies. **Inductive logic or reasoning** involves working from the particular to the general, which is how inductive analyses occur: The researcher uses a variety of facts to construct a theory out of the particular. A first stage of QUAL data analysis typically produces themes, and the second stage of analysis looks for complex relationships within the data (Bazeley, 2013; Miles, Huberman, & Saldaña, 2020). For simplicity, QUAL data analysis is also sometimes called *thematic analysis*.

The QUAL community also has a variety of classic texts, including works by Glaser and Strauss (1967), Lincoln and Guba (1985), Miles and Huberman (1984, 1994), Patton (1990, 2002, 2015), Stake (1995), and Wolcott (1994). Five editions of the *SAGE Handbook of Qualitative Research* (Denzin & Lincoln, 1994, 2000, 2005a, 2011, 2018) have enjoyed great popularity and may be considered charter texts for the constructivist/QUAL orientation. Box 1.3 contains a description of the prototypical QUAL researcher, named Professor Holistico, who is a member of the QUAL research community.



BOX 1.3

Prototypical QUAL Researcher: Professor Holistico

Professor Holistico is employed by the anthropology department at Flagship University. He conducts his research regarding female gang members in urban high schools around the state. Professor Holistico is developing a theory to explain

(Continued)

(Continued)

the behaviors of these individuals, some of whom he has gotten to know very well in his 2 years of ethnographic data gathering. It took some time for him to develop trusting relationships with the young women, and he has to be careful to maintain their confidence. He has gathered large quantities of narrative data, which he is now reading repeatedly to ascertain emerging themes. He discusses his experiences with his colleague, Professor Inductiva, who is known for her keen analytical abilities and use of catchy metaphors. To check the trustworthiness of his results, Professor Holistico will present them to members of the gangs in a process known as *member checking*.

The Mixed Methods Tradition: Basic Terminology and a Prototype

The MM research tradition is perhaps less well known than the QUAN or QUAL traditions because it formally emerged as a separate orientation more recently. In the last 2 decades of the 20th century, mixed methodologists presented an alternative to the QUAN and QUAL dichotomy by acknowledging the usefulness of *both* QUAL and QUAN and advocating the use of whatever methodological tools are required to answer the research questions under study. In fact, throughout the 20th century, social and behavioral scientists frequently employed MM in their studies, and they continue to do so more widely in the 21st century, as described in several sources (e.g., Brewer & Hunter, 1989, 2006; Greene, Caracelli, & Graham, 1989; Maxwell & Loomis, 2003; Tashakkori & Teddlie, 2003a). In the words of Small (2011):

Dissatisfaction breeds creativity. Empirical researchers have been unhappy with the natural limits of conventional methods, including experiments that do not uncover mechanisms, case studies that do not speak to distributions, interpretive techniques that lack formalization, and statistical techniques that lack contextualization. Their efforts have given rise to a large, diverse literature that combines or integrates either data collection techniques or analytical approaches from multiple perspectives. The literature, still in its infancy in many respects, will likely need to probe methodological questions further as it seeks greater dialogue with traditional methodological perspectives, a task that will require overcoming the challenges presented by commensurability and specialization. . . . Mixed methods projects provide both the challenge and opportunity for researchers to resolve some of the ambiguities that result from pluralism, to take reasoned positions, for example, on the proper way to approach 40 interviews to follow up a survey. Whether researchers will choose to do so remains to be seen. (p. 79)

Mixed methods research (or MM) has been defined as “a type of research design in which QUAL and QUAN approaches are used in types of questions, research methods,

data collection and analysis procedures, and/or inferences” (Tashakkori & Teddlie, 2003a, p. 711). Another definition appeared in the first issue of the *Journal of Mixed Methods Research*, in which MM research was defined as “research in which the investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or program of inquiry” (Tashakkori & Creswell, 2007b, p. 4). In this text, we limit the definition of MM to single studies with multiple strands (QUAL and QUAN) that all address a single general MM question (integrated research question, discussed in Chapter 4). A few mixed methodologists include within MM a set of closely linked separate studies with integrated findings at the end (Johnson, Onwuegbuzie, & Turner, 2007).

The philosophical orientation most often associated with MM is pragmatism (e.g., Biesta & Burbules, 2003; Bryman, 2006b; Johnson & Onwuegbuzie, 2004; Maxcy, 2003; Morgan, 2007; Tashakkori & Teddlie, 1998, 2003a), although some mixed methodologists are more philosophically oriented to the *transformative perspective* (e.g., Mertens, 2003). The transformative perspective can easily (and sometimes should) be merged with pragmatism (i.e., taking a pragmatic research orientation to study and transform inequality in the world). We defined **pragmatism** elsewhere as

a deconstructive paradigm that debunks concepts such as “truth” and “reality” and focuses instead on “what works” as the truth regarding the research questions under investigation. Pragmatism rejects the either/or choices associated with the paradigm wars, advocates for the use of mixed methods in research, and acknowledges that the values of the researcher play a large role in interpretation of results. (Tashakkori & Teddlie, 2003a, p. 713)

Integrated MM research questions guide MM investigations and are best answered with information that is presented in *both narrative and numerical* forms. Several authors writing in the MM tradition refer specifically to the centrality of the research questions to that orientation (e.g., Bryman, 2006b; Erzberger & Kelle, 2003; Tashakkori & Teddlie, 1998). We consider it to be a maxim in research that one’s research methods should follow one’s research questions. We conduct research to answer research questions. Tashakkori and Teddlie (1998) called this the “dictatorship of the research question.”

Mixed methods data analysis involves the integration of statistical and thematic data analytic techniques, plus other strategies unique to MM (e.g., data conversion or transformation), which are discussed later in this text. In properly conducted MM research, investigators go back and forth seamlessly between statistical and thematic analysis (e.g., Onwuegbuzie & Teddlie, 2003).

Mixed methodologists are well versed in the classic texts from both the QUAN and QUAL traditions as well as a growing number of well-known works within the MM field (e.g., Creswell, 1994, 2003; Creswell & Plano Clark, 2007; Greene, 2007; Greene & Caracelli, 1997a; Johnson & Onwuegbuzie, 2004; Morgan, 1998; Morse, 1991; Newman

**BOX 1.4****Prototypical Mixed Methodologist: Professor Eclectica**

Professor Eclectica is employed in the School of Public Health at Flagship University. She is interested in children's health issues, especially the prevention of diabetes in middle school children. Her research program involves both hypotheses related to weight loss and research questions related to why certain interventions work. Professor Eclectica was trained as a sociologist and has expertise in QUAN data analysis that began with her dissertation. She has also gained skills in QUAL data gathering and analysis while working on an interdisciplinary research team. Her research involves interventions with different types of cafeteria offerings and differing types of physical education regimens. She spends time in the field (up to 2 weeks per site) interviewing and observing students to determine why certain interventions work while others do not. Her analyses consist of a mixture of QUAL and QUAN procedures. She describes her research as *confirmatory* (the research hypothesis regarding weight) and *exploratory* (the research questions regarding why different interventions succeed or fail). She tries to integrate her QUAL and QUAN results in dynamic ways to answer *what*, *how*, and *why* questions and to advance her research program.

& Benz, 1998; Reichardt & Rallis, 1994; Tashakkori & Teddlie, 1998, 2003a). Box 1.4 contains a description of a prototypical MM researcher named Professor Eclectica, who is a member of the MM community.

AN EXAMPLE OF HOW THE THREE COMMUNITIES APPROACH A RESEARCH PROBLEM

Introduction to an Evaluation Study

An often-referenced classic article from the MM literature is a study conducted by Maurice Trend (1979) that evaluated a federal housing subsidy program involving both QUAN and QUAL methods. Others have used this article to demonstrate several aspects of MM research, such as the difficulty of conducting studies using researchers from both the QUAL and QUAN orientations; how MM research can be informed by the separate components of QUAL and QUAN research (Maxwell & Loomis, 2003); the value and credibility of QUAL and QUAN data when discrepancies occur (Patton, 2002); and the balance in results that can be achieved when differences between the QUAL and QUAN components are properly reconciled (e.g., Tashakkori & Teddlie, 2003b).

In this chapter, we use the Trend (1979) study in a different way: as a vehicle for demonstrating how the three research communities address the same research problem. Although the study became mixed as it evolved, it started out with two separate components: one

QUAN and one QUAL. The study became mixed when the evaluators had to write reports that synthesized the results from the two separate components. Trend (1979) described the components of the study as follows:

Three types of reports were envisioned by HUD [U.S. Department of Housing and Urban Development, the funding agency for the study] and Abt Associates [the program evaluation firm]. The first consisted of comparative, cross-site function reports. They were to be based mostly on quantitative analysis and would evaluate program *outcomes*. Eight site case studies were planned as a second kind of product. These were designed as narrative, qualitatively based pieces that would enrich the function reports by providing a holistic picture of program *process* at the administrative agencies. A final report would then digest the findings of all the analyses and convert these into policy recommendations. (p. 70, italics in original)

Trend's (1979) opinion was that "different analyses, each based upon a different form of information, should be kept separate until late in the analytic game" (p. 68). Because the QUAL and QUAN components were conducted separately from start to finish, followed by Trend's MM analysis using both sources, this study provides a unique example of how the three communities approach the same research scenario.

The overall project consisted of eight sites located in different areas of the United States. At each site, an administrative agency was selected to implement a federal housing subsidy program whose goal was to provide better housing for low-income families. Each site was to serve up to 900 families. Trend's (1979) article focused on the results from one site (Site B), which had three distinct geographical areas: two rural areas with satellite offices and one urban area with the site's central office.

The Quantitative Approach to the Evaluation Study

The QUAN strand of this study is a good example of an *outcomes-based evaluation*, where the emphasis is on whether a program has met its overall goals, typically (but not always) measured quantitatively.

The QUAN component was set up to determine if the use of direct-cash housing allowance payments would help low-income families obtain better housing on the open market. The QUAN research questions in this study, which were established before the evaluation began, included the following:

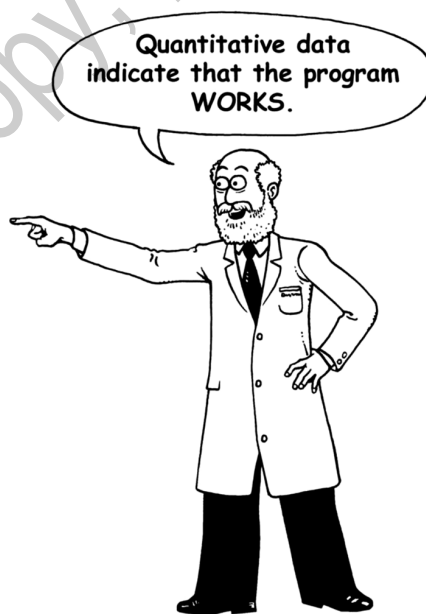
- Did the sites meet their stated goals in terms of enrolling families in the program (i.e., up to 900 families per site)?
- Was the minority population (African American) represented proportionally in the number of families served by the program?
- Did participants move to better housing units as a result of the program?
- Were potential participants processed "efficiently"?
- Did the sites exert proper financial management?

Teams of survey researchers, site financial accountants, and data processors/analysts at Abt Associates headquarters conducted the QUAN component of the study. Numeric survey data were gathered on housing quality, demographic characteristics of participants, agency activities, expenses, and other relevant variables. A common set of six forms was employed to follow the progress of participating families. Teams of survey researchers interviewed samples of participants at scheduled times during the process using structured interview protocols. Accountants kept track of all expenditures, and this information became part of the database. Trend (1979) noted that “eventually, the quantitative data base would comprise more than 55 million *characters*” (p. 70, italics in original).

In summary, this component of the evaluation exhibited several prototypical characteristics of QUAN research, such as establishing well-articulated research questions before the study started, developing and using numeric scales to measure outcome variables of interest, employing professional data gatherers (e.g., survey researchers, accountants) to collect information, and performing statistical analysis of the data using computers at a central location. Statistically significant findings were used to produce an “objective” assessment of the success of the federal housing subsidy program using QUAN techniques.

The computer-generated QUAN outcome data indicated that Site B had done quite well compared to the other sites. Site B completed its quota of enrolling 900 households in the program, and participants experienced an improvement in housing quality that ranked second among the eight sites. Trend (1979) stated additional results of the study: “The cost model indicated that the Site B program had been cheap to run. Revised calculations of site demography showed that minorities were properly represented in the recipient population” (p. 76). Figure 1.1 illustrates the conclusions from the QUAN component of this study.

FIGURE 1.1 ◆ QUAN Researcher’s Point of View



Source: Jason Love

The Qualitative Approach to the Evaluation Study

The QUAL component of this study is a good example of a *process-based evaluation*, where the focus is on how the program is implemented and how it is currently operating or functioning, typically measured qualitatively. The QUAL component of this evaluation involved the generation of eight case studies by observers using field observations, interviews, and documents (e.g., field notes and logs, program planning documents, intraoffice communications). The purpose of the case studies was to provide a holistic description of what actually occurred at each of the program sites.

Unlike the QUAN component, the QUAL research questions were more general in nature, involving the description of what happened in the field when the programs were initiated and how the programs evolved during the first year of operation. As the observations and interviews were conducted, several issues emerged at each program site, and the observers used those problems or concerns to continually refocus their research questions.

Each site had one observer (typically an anthropologist), who was assigned to that site for the first year of the program. Observers were assigned office space by the administrative agency at each site and allowed to collect data daily. They regularly collected field notes and logs and mailed them to the evaluation headquarters. These data “eventually totaled more than 25,000 pages” (Trend, 1979, p. 70).

Unlike the conclusions from the QUAN component, the QUAL data indicated that there were serious problems with the manner in which the program was implemented and operating at Site B. The Site B observer reported that there had been problems from the beginning: There was a delay in opening the local offices (one main urban office, two rural ones), and potential families’ initial response to the program was slow to develop.

As a result of these problems, Site B administrators were forced to increase their efforts to enroll the site’s 900 families. Progress in recruiting families was the slowest at the urban center; the two rural offices met program recruitment requirements more easily.

The administrative agency established recruitment quotas to increase enrollment at the urban center, and conflict emerged between the staff at the urban office and the administrator who had set the quotas. Difficulties escalated at the urban office when staff began to complain about overwork, and personality conflicts emerged. Conditions were different at the rural offices, where the staff members also worked hard but found time to make home visits and inspect all recipient housing units.

Another problem at the urban office concerned the recruitment of minorities. Because African Americans oversubscribed at the urban site (unlike the rural sites), the administrative agency ordered the urban office to curtail their enrollment. Some staff members were angry with this recruiting policy (which they considered racist), and several employees resigned at the end of the enrollment period with months still left on their contracts.

The discrepancies between the QUAN and QUAL results became an issue when the Site B observer wrote an essence paper detailing themes that had emerged from the QUAL analyses, including office strife, personality conflicts, managerial incompetence, and so

forth. Trend (1979) was the overall manager of the case studies and had requested the essence papers from each of the observers as a prelude to the final case study.

This component of the evaluation demonstrated several classic characteristics of QUAL research, including the use of emerging (not predetermined) questions to guide the research; the use of unstructured and semistructured observations, interviews, logs, and documents as data sources; an emphasis on providing a holistic description of the social scene as it emerged from the QUAL data sources; and a close and empathic relationship between the observer and the program participants. The observer at Site B was comfortable with the “subjective” orientation of the essence paper because QUAL research is constructivist in nature, and the paper reflected an informed understanding or reconstruction of the social reality of the program as implemented at Site B. Figure 1.2 illustrates the conclusions from the QUAL component of this study.

The Mixed Methods Approach to the Evaluation Study

The specific MM study described by Trend (1979) emerged as a result of the unexpected discrepant results between the QUAN and QUAL components at Site B. As noted in the previous section, the conclusions from the observer at Site B contradicted the results from the QUAN analysis of program effects at that site. The QUAN data indicated that the program was working, whereas the QUAL data pointed out serious problems with program implementation. The MM approach was used to explain such apparent discrepancies between the QUAN and QUAL results.

FIGURE 1.2 ◆ QUAL Researcher's Point of View



Source: Jason Love

The evaluation study presented by Trend (1979) is an example of a *parallel MM design*, although the author of the study did not use this term. In a parallel MM design, researchers conduct the QUAN and QUAL components separately (and in a parallel manner) and then use a *meta-inference process* to integrate the results. (See Chapter 5 for more details regarding this design.)

The research questions for an MM study integrate those from the separate QUAL and QUAN components plus any questions that might emerge as inferences are made (see Chapter 4). The Trend (1979) study asked the following additional questions about integration: Why were the results of the QUAN and QUAL components discrepant? What explanation can be derived from the combined data that would reconcile the differences?

Trend (1979) rationalized these new questions as follows:

We had to answer the question of how a program could produce such admirable results in so many of its aspects, when all of the observational data indicated that the program would be a failure. What had happened, and how? (p. 78)

Although Trend (1979) was not the observer at Site B, he became involved in writing a revised essence paper after the evaluation company asked the observer to rewrite the report in a manner more consistent with the QUAN results. Trend and the observer then began reanalyzing the data, looking for information that might help them reconcile the differences. One major breakthrough came when they split the data into three parts based on office location (two rural, one urban). They found that very different processes were at work at the rural and urban sites:

- More in-depth investigation led to the discovery of inconsistent patterns of results across the sites, which were more important than the overall average pattern of results in understanding program impact.
- The rural context produced many advantages for the program. Potential recipients there were more likely to be White and to have smaller families and higher incomes, which led to lower-than-average housing subsidies. These lower subsidies reduced the average subsidy paid across all program recipients, thereby contributing to the overall positive QUAN results. Also, families were easier to recruit in the rural areas, and this increased the total number of recipients.
- The urban context had numerous disadvantages. The initial oversubscription of African American families in the urban area led to a quota system that fueled some staff members' negative feelings, which resulted in their alienation from the program. The quota system and small staff size led to a mass-production process in the urban office that increased the number of recipients in a supposedly "efficient" manner.

A number of other factors related to the urban/rural context differences made the overall discrepancies between the QUAN and QUAL results more understandable. Trend (1979)

concluded that “by treating Site B as a single piece the quantitative analysts had missed almost all of what we were now discovering” (p. 80).

Six versions of the essence paper were written before it was finally accepted. Although reconciliation of the discrepancies in the MM data was obviously necessary to truly understand the contextually distinct aspects of the program, the integrated analysis of the QUAN and QUAL data took Trend and the observer 10 weeks to complete. MM research is often more expensive than QUAL or QUAN research alone due to increased data gathering, analysis, and interpretation costs.

If only the QUAN data had been analyzed, then the picture of the federal housing subsidy program would have been inaccurate (too positive). Similarly, if only the case study had occurred, then an inaccurate (too negative) picture of the program would have emerged. When the data were integrated, a more accurate overall picture emerged from the results. In this evaluation, MM first allowed the opportunity for divergent views to be voiced and then served as the catalyst for a more balanced evaluation.

In summary, the evaluation study conducted by Trend and his colleagues exhibited several classical characteristics of MM research, even though it was not planned to be an integrated study: the use of both predetermined and emerging research questions to guide the study, the use of both QUAL and QUAN data sources, the use of both QUAL and QUAN data analyses, and the innovative use of MM techniques to integrate the QUAN and QUAL findings into meta-inferences in a manner that made sense. Figure 1.3 illustrates the context-bound conclusions from the MM component of this study.

FIGURE 1.3 ● MM Researcher's Point of View



Source: Jason Love

THE THREE METHODOLOGICAL COMMUNITIES: CONTINUING DEBATES OR PEACEFUL COEXISTENCE?

The three methodological communities have experienced periods of both philosophical conflict and peaceful coexistence over the past decades. During this time, the QUAL community first emerged to challenge the traditional QUAN orientation and then the MM community visibly surfaced. This section briefly describes the *paradigms debate* or *paradigm war* (e.g., Gage, 1989; Guba, 1990) that occurred as the QUAL community's positions gained acceptance, challenging the preeminence of the QUAN community.

Thomas Kuhn (1962, 1970, 1996) popularized the notion of competing paradigms and paradigm shifts in his classic book *The Structure of Scientific Revolutions*. The paradigms debate in the social and behavioral sciences (circa 1975–1995), which was particularly widespread in educational and evaluation research, is a good example of proponents of competing paradigms disagreeing about the relative merits of their theoretical positions. (See Chapter 3, Box 3.1, for more details regarding Kuhn's positions on paradigms.)

These disagreements were largely a product of the QUAL community's intense criticisms of issues associated with what they called the received tradition of the positivist paradigm. In place of the positivist paradigm, many QUALs advocated for constructivism as a better theoretical perspective for conducting research. The simplest definition of the **paradigms debate** is this—the conflict between the competing scientific worldviews of positivism (and variants, such as postpositivism) and constructivism (and variants, such as interpretivism) on philosophical and methodological issues (e.g., Gage, 1989; Guba & Lincoln, 1994; Tashakkori & Teddlie, 1998). Mixed methods would emerge partially as a result of that debate.

As constructivism emerged, some authors (e.g., Guba & Lincoln, 1994; Lincoln & Guba, 1985) set up paradigm contrast tables (to be discussed later in Chapter 3) summarizing the differences between positivism, postpositivism, critical theory, and constructivism on philosophical issues such as ontology, epistemology, axiology, the possibility of generalizations, the possibility of causal linkages, and so forth. These contrast tables presented fundamental differences (i.e., dichotomies) between the different paradigms, thereby indicating that the paradigms were not compatible with one another.

A major component of the paradigms debate was the **incompatibility thesis**, which stated that it is inappropriate to mix QUAL and QUAN methods due to fundamental differences in the paradigms underlying those methods (e.g., Sale, Lohfeld, & Brazil, 2002; Smith, 1983; Smith & Heshusius, 1986). The incompatibility thesis is associated with the supposed link between paradigms and research methods. According to this thesis, research paradigms are associated with research methods in a kind of one-to-one correspondence. Therefore, if the underlying premises of different paradigms conflict with one another, the methods associated with those paradigms cannot be combined.

Mixed methodologists countered this position with the compatibility thesis, exemplified in the following quote:

However, the pragmatism of employing multiple research methods to study the same general problem by posing different specific questions has some pragmatic implications for social theory. Rather than being wedded to a particular theoretical style . . . and its most compatible method, one might instead combine methods that would encourage or even require integration of different theoretical perspectives to interpret the data. (Brewer & Hunter, 2006, p. 55)

On a philosophical level, mixed methodologists countered the incompatibility thesis by positing a different paradigm: pragmatism (e.g., Johnson & Onwuegbuzie, 2004; Maxcy, 2003; Morgan, 2007, 2014). A major tenet of Howe's (1988) concept of pragmatism was that QUAL and QUAN methods *are compatible* (the **compatibility thesis**), thereby rejecting the either-or choices presented by the incompatibility thesis. Pragmatism offered a third alternative (combine both QUAL and QUAN methods) to the either-or choices (use either QUAL or QUAN methods) of the incompatibility thesis. Howe (1988) described the thesis as follows: "The compatibility thesis supports the view, beginning to dominate practice, that combining quantitative and qualitative methods is a good thing and denies that such a wedding is epistemologically incoherent" (p. 10).

The paradigms debate waned considerably in the mid- and late 1990s (e.g., Patton, 2002), largely because many researchers were becoming tired of polemical philosophical arguments, they saw value in both QUAL and QUAN, and they wanted to focus their work on answering their research questions. Mixed methodologists were actively interested in bringing about reconciliation of the communities and providing a new combined approach to research using a **both-and logic**. This logic said to use what is helpful from both QUAL and QUAN. The emerging mixed methods approach, along with its pragmatism, provided a justification for and a place for combining QUAN and QUAL methods and approaches.

The paradigms debate has been resolved for many researchers (especially mixed methodologists) currently working in the social and behavioral sciences. Nevertheless, the debate still continues in some circles, such as mixed methodologists and researchers who want to consider and *interplay the perspectives from different paradigms* (e.g., Greene, 2007; Johnson, 2011, 2017). The bottom line is that some researchers prefer to highlight the paradigms underlying their work and others prefer to spend much less time considering issues of philosophy: Rather than taking an absolutist position, we follow our *both-and logic* and acknowledge the reasons and benefits of both positions.

Boyatzis (1998) employed the respective terms *quantiphobe* and *qualiphobe* for researchers who have a fear or dislike of either QUAN or QUAL methods (p. viii). We might add *mixiphobes* as another type of researcher, one who subscribes to a purely QUAL or QUAN orientation and has a fear or dislike of MM. Interestingly, MM is still controversial in some quarters, and potential researchers should be aware of this point of view. Although these communities are distinct, they can coexist peacefully, so long as no group proclaims its superiority and tries to dictate the methods of the other groups. Our position is for positive dialogue and collaboration among the three communities, each of which contributes greatly to an understanding of many complex social phenomena. This understanding will be accelerated when researchers realize that some research questions (that are very important) are best answered using QUAN methods, whereas others are best answered using

QUAL methods, and still others require MM. This idea is seen in the following quote from Johnson and Onwuegbuzie (2004):

In general, we recommend *contingency theory* for research approach selection, which accepts that quantitative, qualitative, and mixed research *are all superior under different circumstances* and it is the researcher's task to examine the specific contingencies and make the decision about which research approach, or which combination of approaches, should be used in a specific study. (pp. 22–23, italics in original)

Having said this, we believe that for *many* research questions, the fullest and best answers can be obtained through the use of mixed methods research. If a researcher is not fully trained in QUAN, QUAL, *and* MM, it can be very helpful to work in collaborative teams. Try to identify open-minded researchers operating from different perspectives, such as QUAN, QUAL, and MM and their associated paradigms. The product of such collaborations can be fuller and more rewarding and will likely be viewed positively by more people. This last point occurs because MM research should typically recognize multiple stakeholders and their standpoints. Johnson and colleagues identify a type of validity or legitimation for this idea. The concept is called **multiple stakeholder legitimation**, which is defined as “the degree to which a mixed researcher [or research team] addresses the interests, values, and viewpoints of multiple stakeholders in the research process; it is a synonym for [what Onwuegbuzie and Johnson (2006) originally labeled] sociopolitical legitimation” (Johnson & Christensen, 2020, p. 622).

Of course, our advocacy for multiple perspectives and integration is not a new stance: Many eminent QUAL and QUAN scholars have expressed similar thoughts during the past 50 years. For instance, Glaser and Strauss (1967), the originators of the QUAL methodology known as grounded theory, made the following statement some 40 years ago:

Our position in this book is as follows: there is no fundamental clash between the purposes and capacities of qualitative and quantitative methods or data. What clash there is concerns the primacy of emphasis on verification or generation of theory—to which heated discussions on qualitative *versus* quantitative data have been linked historically. We believe that *each form of data is useful for both verification and generation of theory. . . . In many instances, both forms of data are necessary . . . both used as supplements, as mutual verification and, most important for us, as different forms of data on the same subject, which, when compared, will each generate theory.* (pp. 17–18, italics in original)

Reichardt and Cook (1979) stated the same sentiment from the postpositivist perspective:

It is time to stop building walls between the methods and start building bridges. Perhaps it is even time to go beyond the dialectic language of qualitative and quantitative methods. The real challenge is to fit the research methods to the evaluation problem without parochialism. This may well call for a combination of qualitative and quantitative methods. To distinguish between the two by using separate labels may serve only to polarize them unnecessarily. (p. 27)

DIFFERENCES AMONG PARADIGMS, METHODOLOGIES, AND METHODS

Much of this chapter and Chapter 2 involve definitions of basic terms used in QUAL, QUAN, and MM research. The first topic discussed in this chapter concerns the differences among three basic concepts: paradigms, methodology, and methods. This is a special concern for MM research because there is a history of different terminology. For example, the term *multimethod research* has been popular in sociology and political science, (e.g., Brewer & Hunter, 1989, 2006; Goertz, 2018; Seawright, 2016). From their perspective, multimethod research is any research relying on two or more methods (or methodologies), including three cases: (a) multiple qualitative methods, (b) multiple quantitative methods, and (c) qualitative and quantitative methods. Basically, mixed methods research is the third movement that specializes in the use of a mixture of QUAN and QUAL. The mixed methods movement seems to be larger, but we recognize our multimethod colleagues with whom we share some ideas (e.g., the benefits of using multiple approaches and multiple sources of evidence). For more information on multimethod versus mixed methods research, we recommend comparing two chapters: the first is by Jennifer Greene (2015) who is one of the founders of MM and compares MM to multimethod research, and the second is by Albert Hunter and John Brewer (2015) who are two of the founders of multimethod research and provide the multimethod research perspective. In short, there is some overlap but our book concerns the history and conduct of mixed methods research.

Now we will differentiate the terms *paradigm*, *methodology*, and *method*. As it turns out, there is some overlap and many interconnections among these terms. Furthermore, they are used in multiple ways in the literature because different researchers like to highlight one and make the others subservient. In other words, the terms are framed in different ways by different writers. Nonetheless, we now present an approach that we think works well for making distinctions among the conceptual terms.

Paradigm. Mertens (2003) defines paradigm as a “worldview, complete with the assumptions that are associated with that view” (p. 139). That description seems to echo the viewpoints of several others (e.g., Creswell & Plano Clark, 2007; Lincoln, 1990; Rallis & Rossman, 2003). Morgan (2007) referred to paradigms “as systems of beliefs and practices that influence how researchers select both the questions they study and methods that they use to study them” (p. 49). Paradigm is the broadest and most abstract term. We find the following definition meaningful and easily used: A paradigm is a worldview held by a group of people (e.g., scholars) that includes a distinctive set of assumptions and beliefs about ontology, epistemology, axiology, methodology, and rhetoric. You have probably never heard of some of the terms in that definition, so here are brief explanations of the five additional concepts.

First, **ontology** refers to researchers’ beliefs and assumptions about reality. In particular, what kinds of reality exist? A few different kinds of reality, studied by researchers in different disciplines, are physical, chemical, psychological, economic, sociological, and so forth.

Another way to carve reality is to include *subjective reality* (individuals' internal feelings and experiences), *intersubjective reality* (reality shared by different groups such as their language and culture), and *objective reality* (physical and material things that will exist even if humans did not, such as chemicals, mountains, and physical laws in action). Objective reality also pushes back at us in many ways.

Second, **epistemology** refers to our beliefs about knowledge. One question in epistemology is, "How do we obtain knowledge?" Some ways are through thinking, through our five senses, and through research. Another epistemological question is, "When can we claim that we have knowledge about something?" One popular answer in traditional Anglo-American philosophy is that we have knowledge when we have a justified true belief. Another key epistemological question is, "What standards do we have to meet to claim that we have knowledge about something?" All of the research approaches have sets of standards or validity types that they believe must be met in order to make a knowledge claim.

Third, **axiology** refers to the sets of values that tend to be prioritized by a group of researchers with a common paradigm. For example, prediction and explanation are strongly valued in QUAN. Objectivity is another popular value. In QUAL, a popular value is that of subjective and intersubjective *understanding* of individuals and groups. Another popular value in QUAL (but not *just* in QUAL) is the study and promotion of social justice.

Fourth, in a very general sense, **methodology** refers to how researchers obtain data as they study the world. We explain methodology in more depth soon. Fifth, **rhetoric** refers to the style of language (e.g., formal, informal, traditional, innovative) that researchers use when writing and talking about research.

Here is a simple shorthand to help you remember the five terms commonly discussed with regard to paradigms:

- ontology is about *reality*,
- epistemology is about *knowledge*,
- axiology is about *values*,
- methodology is about collecting research *data*, and
- rhetoric is about *communication* style.

Methodology. Now let's look at the concept of methodology in more detail. In terms of abstraction, paradigm is the most abstract, methodology is the second most, and methods is the least abstract (closest to the action of collecting data). Greene (2006) describes methodology as an inquiry logic, and that logic includes determining (a) the best inquiry logic given one's research questions and purposes, (b) the broad inquiry strategies and designs, (c) the sampling preferences and logic, (d) the validity criteria or quality standards, and (e) the preferred style of writing or research communication. We define methodology as a research style and logic of inquiry that has a history of use along with its methodological requirements and standards. For example, in QUAN, experimental research methodology has a long history.

Methodologies are often associated with a particular paradigm and a set of sanctioned methods of data collection. There are multiple popular methodologies in QUAN, QUAL, and MM (Johnson & Christensen, 2020). The biggest or most popular methodologies within QUAN are experimental research, quasi-experimental research, single-case research, and nonexperimental or survey research. Perhaps the five biggest or most popular methodologies in QUAL are phenomenology, ethnography, narrative and discourse inquiry, case study research, and grounded theory.

Distinctive methodologies in MM are just being developed and articulated. Some examples of mixed methodologies are mixed methods–grounded theory (Creamer & Schoonenboom, 2018; Shim et al., 2017, 2020), mixed methods case studies (Habashi & Worley, 2009; Onghena, Maes, & Heyvaert, 2019), mixed methods experiments (Johnson & Schoonenboom, 2016), and mixed methods phenomenology (Mayoh & Onwuegbuzie, 2015). Creating and using mixed methodologies is an exciting and important area in MM research. The general strategy for MM methodologies is to (a) use a mixture of QUAN and QUAL methodologies in the study or (b) use one primary methodology but collect and analyze both QUAN and QUAL data. In both of these situations, meta-inferences must be produced if it is a truly MM study. The methodology (and paradigm) inform the methods and their logic of use.

Method. Specific methods used in research are determined by researchers' overall paradigmatic and methodological orientation. Greene (2006) views methods as “the how to of social science inquiry” and calls these “guidelines for practice” (p. 94). We define **methods** as the specific strategies, techniques, and procedures for implementing a research design, including sampling, data collection, data analysis, and interpretation of the findings. For example, some popular QUAN probabilistic sampling methods are simple random sampling, stratified sampling, cluster sampling, and systematic sampling (with a random start), and some popular QUAN nonprobability sampling methods are convenience sampling, quota sampling, and snowball sampling. Some popular QUAL sampling methods are extreme case sampling, typical case sampling, critical case sampling, negative case sampling, and theoretical sampling (Johnson & Christensen, 2020). The major methods of data collection are tests, questionnaires, interviews, observations, focus groups, secondary and existing data, and constructed data. There are mixed methods versions of each of these. A few methods of data analysis in QUAN are structural equation modeling and multiple regression; in QUAL, examples include thematic analysis and the constant comparative method. There are many MM data analysis methods emerging in the literature (see Onwuegbuzie & Johnson, 2021). One popular form is the use of joint displays as a type of analysis and presentation of results.

To summarize, a *paradigm* is a worldview including philosophical and sociopolitical issues, whereas a research *methodology* is a general approach to scientific inquiry involving preferences for broad components of the research process. Research *methods* are specific strategies for conducting research.

One might be curious: Why did we choose the title *Foundations of Mixed Methods Research* for this text, rather than *Foundations of Mixed Methodology*? Although the first three chapters of this book address both paradigm and general methodological issues,

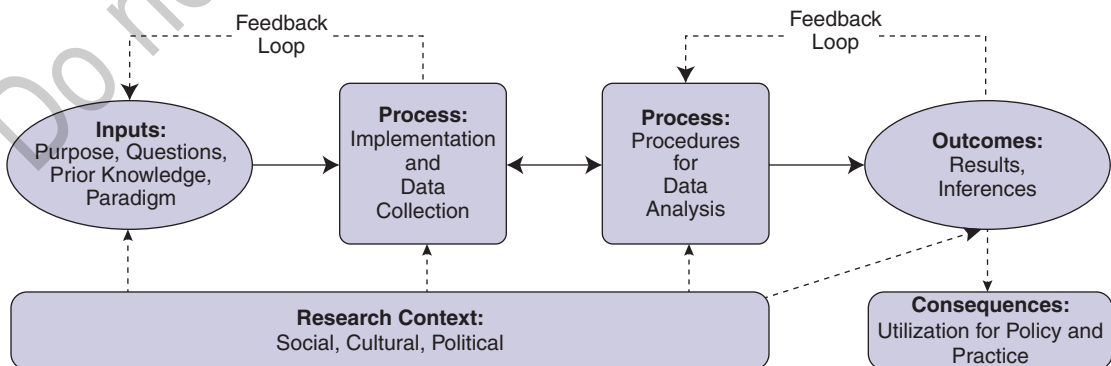
the greater part of the book (Chapters 4–11) discusses specific MM research techniques (i.e., methods). Having said that, methods as used in practice are very much influenced by researchers' paradigms and are interconnected to their methodologies.

STAGES OF RESEARCH: A SYSTEMS APPROACH

Each research project can be conceptualized as a system for formulating questions and finding answers; this process or system includes *inputs*, *processes*, and *outcomes* (outputs). Conceptualized in such a systems approach, there are four interrelated and interdependent **stages of a research strand** of a mixed methods research study: *initiation*, *implementation*, *analysis*, and *inference*. Although these stages occur in more or less linear order, each *stage of research* can influence the previous one—the system includes feedback and is recursive. Some projects have one strand (i.e., traditional *monomethod* designs). Other projects have multiple strands or phases (i.e., *multimethod* and *mixed methods* designs). Regardless of the number of strands, all stages within each strand are impacted by investigators' worldviews in one form or another, although the impact is perhaps more pronounced in the initiation and inference stages.

The initiation stage includes all of the *inputs* (i.e., purposes, questions, prior knowledge, data, etc.). The implementation and analysis stages are the *processes* for implementing the design and obtaining and analyzing the data. This is often identified as methods of study. The *outcomes* (output) of all of these are the findings and the conclusions (i.e., the **inferences**) that are made on the basis of these findings. Figure 1.4 depicts the relationship between these four stages (initiation, implementation, analysis, and inference) of the **input-process-outcome (IPO) model of research**, which serves as a model for research projects.

FIGURE 1.4 The Input-Process-Outcome (IPO) Model for Stages of a Research Project (or a Strand)



This conceptualization of methodology is a complex system in which each part has sub-components and interacts with others, despite having a more or less defined beginning and end. Here are the four stages:

- The **initiation stage** consists of inputs to the process and planning for the next stages. Inputs include purposes, motivations, values of the researcher, the research questions, and all the previous knowledge about the issue (i.e., related literature, previous research, theory). We discuss these in Chapter 4. Data are considered by scholars as inputs to the overall process. We discuss their properties (i.e., attributes, types, data quality) in Chapter 7.
- The **implementation stage** includes all the procedures for implementing the design and collecting data. Gaining entry to the field, introducing interventions/changes (if any), and capturing the attributes and behaviors of the participants occur in this stage of your study. We discuss these in Chapters 5, 6, and 8.
- The **analysis stage** includes all steps taken to code and summarize the data and perform appropriate analysis. We discuss these in Chapter 9.
- Results of data analysis, and interpretation of these results, are the outcomes of research. In the **inference stage**, the investigator makes meaningful interpretations of these results to find answers to the initial research questions. Interpretations also provide further logic for continuing or reorganizing additional data collection and data analysis. We discuss these in Chapter 10.

Figure 1.4 shows arrows from the research context (psychological, cultural, and physical) to all stages of the study. That's because all research projects are impacted by the context, including the events that might occur during the study (for more details, see Nastasi & Hitchcock, 2016). Of course, interpretation of the results is also done within that context. We discuss contextual threats to credibility of inferences in Chapter 10.

Finally, since the researcher does not determine how the outcomes of research are utilized for policy and practice, we have included a dashed arrow from inferences to *utilization* (consequences). Potential for utilization depends on many factors such as the credibility of inferences made on the basis of the results and the degree of similarity of the receiving context to the context of the study (Johnson, 1998)—that's why there is a dashed arrow from outcomes to utilization. The research consequences are not included in the stages of research within each strand (or for the overall study) because they are predominantly carried out by the consumers of research (i.e., are translational) rather than the researcher. The researcher, however, is expected to take all steps possible to maximize the potential for utilization. Providing detailed information regarding the context and processes of the study (thick description, audit trail) is among such steps.

As mentioned above, each of these stages might have smaller substages (i.e., steps within that stage) and must be planned for, as appropriate. For example, research questions need to be refined and restated based on the literature review, data sources need to be identified, the data collection plan needs to be designed, and the data analysis plan needs to be mapped out ahead of time. In Chapter 11, we discuss the components of research proposals that include such plans.

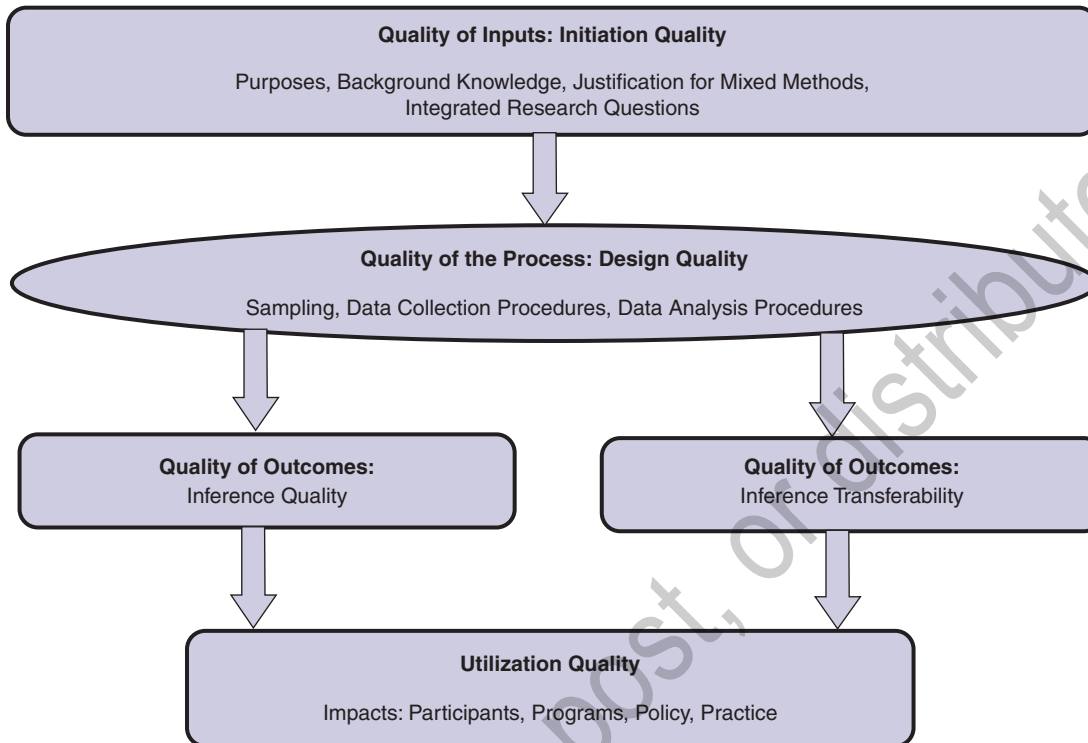
An advantage of this systemic conceptualization of a research project (e.g., each strand of a mixed methods study) is that it directs your focus more closely on the timing (stage) of integration in a mixed methods study (i.e., is integration occurring in inputs, processes, or outcomes?). As we will discuss in Chapter 4, a mixed methods project should have an integrated (mixed) question that acts as an umbrella for all subquestions that are asked in the QUAL and QUAN strands of the study. An effectively integrated study (see Creamer, 2018) has mixed/converted or both QUAL and QUAN data, multiple modes of data analysis that interact with each other, and meta-inferences that provide answers to the initial integrated question. Such a framework helps identify at what stage integration is occurring and what needs to be done to achieve and/or improve it. This is in sharp contrast to frameworks that refer to all integration as “data-integration” (e.g., Uprichard & Downey, 2016).

The MM model explained in this book also includes the conduct of validity or quality checks at each of the four stages of research. Standards for such quality differ across stages within each strand of a study. For example, although necessary, good quality data do not indicate good quality inferences. High-quality data might be analyzed ineffectively or incorrectly. So, within each strand, each stage must be evaluated separately and distinctly.

An MM approach is only advantageous over less complex *monomethod* (or perhaps more appropriately, monoapproach) *designs* if it provides opportunities for higher quality in one or more of these stages and in the final integration of the results/conclusions (i.e., meta-inferences) based on the QUAL and QUAN data and results. We discuss the attributes of a good research question, as an input to the process of research, in Chapter 4. An MM approach is preferable to a monomethod approach when it enables you to ask broader and more flexible questions. Similarly, an MM approach is preferable only if it provides more trustworthy data and/or more credible inferences (outcomes of the process of research).

Figure 1.5 illustrates the need for conducting quality audits separately for each stage of the research process. A more elaborated discussion of this figure is presented in Chapter 10, which discusses the quality of inferences. We specifically discuss quality issues for research questions in Chapter 4, for data in Chapter 7, and for inferences in Chapter 10.

We should also mention that not only do the standards of quality differ for each of the stages depicted in Figure 1.4, they also somewhat differ between the three communities of researchers discussed above (QUALs, QUANs, and mixed). For example, data that are considered rich and trustworthy by the QUAL community might not be perceived as such by the QUANs. A challenge for mixed methods researchers is to apply the quality standards of each approach within each strand of the study that is taking that approach and then effectively merging these into the meta-inferences of the MM study.

FIGURE 1.5 Quality Audits in a Mixed Methods Research Project

MORE DETAILS REGARDING THE METHODOLOGICAL COMMUNITIES

In the previous pages we presented some basic terminology related to the three methodological communities. Now we introduce more details of important QUAL, QUAN, and MM terms together with definitions. These terms are briefly introduced here and in Chapter 2 and then expanded throughout the text.

Almost all of these concepts can be compared on several important dimensions. For example, constructivism, pragmatism, and postpositivism are terms often associated with QUAL, MM, and QUAN methods, respectively, and they can be compared with one another across a dimension labeled “paradigms.”

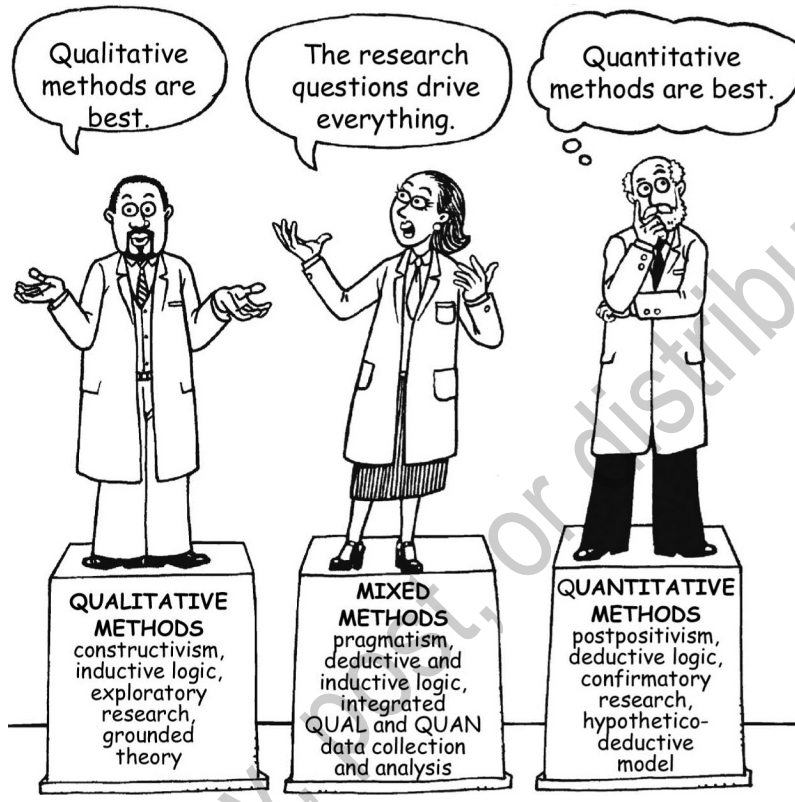
Table 1.1 summarizes the dimensions of comparison among the three methodological communities. The rows in Table 1.1 represent the dimensions of contrast, and the columns represent the three methodological communities. Please remember that there are

no strict lines separating the three communities on any of the components, and there are, in practice, many similarities in addition to the differences on any of the dimensions of comparison.

TABLE 1.1 ◆ General Dimensions of Contrast Between Three Methodological Communities

Dimension of Contrast	Qualitative Position	Mixed Methods Position	Quantitative Position
Paradigms	Constructivism (and variants)	Pragmatism; transformative perspective	Postpositivism; positivism
Researchers	QUALs	Mixed methods researchers	QUANs
Purpose of research	Often exploratory	Exploratory, explanatory, confirmatory	Often explanatory and confirmatory
Research questions	QUAL research questions	Integrated MM research questions (QUAN plus QUAL)	QUAN research questions; research hypotheses
Methods	Qualitative methods	Mixed methods	Quantitative methods
Form of data	Mostly narrative	Narrative plus numeric	Mostly numeric
Role of theory; logic	Grounded theory; inductive logic	Both inductive and deductive process; inductive-deductive research cycle	Rooted in a priori conceptual framework or theory; hypothetico-deductive model
Typical studies or designs	Ethnographic research designs and many others (case study, phenomenology, narrative, and grounded theory)	MM designs, such as parallel and sequential	Correlational; survey; experimental; quasi-experimental; single-case experiment
Sampling; data sources	Mostly purposive	Probability, purposive, and mixed	Mostly probability and convenience
Data analysis	Thematic strategies: categorical and contextualizing; within and across case analysis	Integration of thematic and statistical; data conversion	Statistical analyses: descriptive and inferential
Validity/ trustworthiness/ legitimation issues	Trustworthiness; credibility; transferability	Inference quality; inference transferability; multiple validities legitimation	Internal validity; external validity, construct validity, statistical conclusion validity

FIGURE 1.6 The Three Research Communities and Their Points of View



Source: Jason Love

Figure 1.6 presents the three research communities and their points of view. The following sections of this chapter elaborate the distinctions among the three communities in more detail.

More Details About the Quantitative Tradition

QUAN research is often (but not always) confirmatory in nature and driven by substantive theory and the current state of knowledge about the phenomenon under study. A (formal) **theory** is a systematic explanation of how and why a phenomenon in the world operates. Formal theories are often (but not always) used in QUAN research; these theories often include theoretical propositions (i.e., what the theory says is true about the object or phenomenon), and these propositions are used to generate research hypotheses that can be tested with new empirical data and statistical analysis. **Confirmatory research** involves conducting investigations to test hypotheses that are based on a specific theory and/or a researcher-formulated *conceptual framework*.

A **conceptual framework** (Tashakkori & Teddlie, 2003a) is a “consistent and comprehensive theoretical framework emerging from an inductive integration of previous literature,

theories, and other pertinent information. A conceptual framework is usually the basis for reframing the research questions and for formulating hypotheses or making informal tentative predictions” (p. 704). Conceptual framework has been defined in at least two other ways. According to one view, it is a “visual representation of a study’s organization or major theoretical tenets” (Ravitch & Riggan, 2012, p. 6); *program theory* or (graphically) a *logic model* in program evaluation are examples of this. Yet another view of conceptual framework is “a way of linking all of the elements of the research process: researcher disposition, interest, and positionality; literature and theory and methods” (Ravitch & Riggan, 2012, p. 6).

Although the three approaches to conceptual frameworks are interrelated, in this book we use the term conceptual framework to refer to *an inductive framework that is based on previous knowledge, theory, and research, as a tentative explanation for the phenomenon of interest*. You may consider it your own mini-theory (or informal theory) about the phenomenon under investigation!

Compared to this inductive investigator-formulated framework, a formal theory is usually *a priori* in nature. That is, the theory precedes the researcher’s consideration of the research study; it existed in the literature before the new research study. In social and behavioral research, additional distinctions are sometimes made about theories. Some theories are very broad and comprehensive (and often at a macro level of explanation)—these “big” theories are sometimes called grand theories (e.g., psychoanalytic theory, field theory, structural-functionalism, rational-choice theory). Other theories have a more limited range of applicability and abstraction and are sometimes called middle-range theories (e.g., moral development theory, innovation diffusion, labeling theory, theory of planned behavior, social mobility theory, social learning theory). In some QUAN studies, the research question and/or the predicted outcomes are directly drawn from a formal theory (i.e., aimed at testing a prediction of a theory). In these studies, researchers employ a deductive form of reasoning, which involves arguing from the theory to the predicted outcomes (hypotheses, predicted results).

In **explanatory research**, the **hypothetico-deductive model (H-DM)** involves the *a priori* deduction of the results that must occur *if the research hypothesis is to be considered true*. Once the numerical data are collected, the hypotheses are tested using inferential statistics. If the hypothesis is supported, the researcher tentatively accepts the hypothesis. It is tentatively accepted because we obtain probabilistic evidence of truth (not deductive proof or certain truth).

Other QUAN research is conducted with the goal of exploring and describing the attributes of a phenomenon, determining relationships among variables (e.g., in relationship/correlational studies), and identifying predictors of an outcome of interest (see prediction research, below). In **exploratory QUAN research**, the researcher decides what variables to include in the study, collects data, and inductively constructs a tentative theoretical explanation from the data. This researcher will also use ideas from available knowledge and previous research. The outcomes of this process may become the beginning of a new informal, inductively generated and constructed theory or an expansion of previous theories. We explain in Chapter 10 that the conclusions section of a research article is often where a new informal theory is born. These new frameworks are, in turn, tested and further developed in future studies. Also see Shim et al. (2020) to learn how to inductively and systematically construct a formative theory from the literature.

A related kind of QUAN research is *predictive research*, where the researcher selects a set of predictor variables that might help researchers and practitioners predict an outcome of interest (e.g., drug use, dropping out of high school, recidivism). If the prediction model works well with empirical data, ameliorative actions can be done to help prevent undesirable outcomes.

QUAN researchers use a variety of well-defined research designs, including correlational, survey, experimental, quasi-experimental, and single-case experimental designs. **Correlational/prediction research** looks at the direction and strength of the relationships among variables. This kind of research does not include active experimental manipulation of the causal variable to determine the outcome (as in experimental research) but may statistically control for some variables to rule out alternative explanations. In a simple correlational study, we might pose a research question that would examine the relationship between the average annual temperature of water in the Gulf of Mexico and the annual number of named hurricanes. If the correlation were positive and strong, we would conclude that as the average temperature of water in the gulf increases, so does the number of hurricanes. Correlational research is also increasingly being used to test complex theoretical models. These a priori theoretical models are often tested with nonexperimental quantitative data. The most common statistical analysis approach for these theoretical models is called *structural equation modeling* (e.g., Kline, 2016; Schumacker & Lomax, 2016).

Survey research is a systematic research method with the goal of estimating the characteristics of target populations based on sample data. Survey data are collected using questionnaires and sometimes highly structured interviews. Historically, a major area of interest in survey research has been predicting the percentage of votes that different political candidates will get. If accurate voting predictions are to be obtained, probability sampling methods are used most of the time (although quota sampling, discussed in Chapter 6, is often used as well). Probability sampling involves selecting a large number of units from a population in a random manner (e.g., using a randomization program) in which the probability of including all members of the population is known. When everyone has an equal chance of inclusion, it is called an “equal probability of selection method” or EPSEM. (See Chapter 6 for information about probability samples.)

Experimental research is a type of research based on designs in which the investigator manipulates one or more independent variables (e.g., treatment vs. control group) to ascertain their effects on one or more dependent variables. An **independent variable** is a variable that is presumed to cause or predict changes in a dependent variable. The **dependent variable** is the outcome variable of interest; in experimental and quasi-experimental research, this is the variable that is presumed to be causally affected or influenced by one or more independent variables. Experimental manipulation of an independent variable (e.g., drug or treatment) are hypothesized to cause changes in the characteristics of a dependent variable (e.g., health or depression). In the strongest experimental designs, also called randomized experimental designs, participants are randomly assigned to different conditions (e.g., participants might be randomly assigned to experimental treatment and control groups). The basic logic of this randomized experiment is to make sure the participants in the different groups are the same at the beginning of the experiment (via random assignment); then the researcher implements the treatment conditions; finally, the researcher

determines if the groups become different. If they become different, this is attributed to the independent variable.

Quasi-experimental research (e.g., Cook & Campbell, 1979) is a type of experiment that is not as strong as the randomized experiments just described. Quasi-experimental research does not include random assignment to the groups forming the independent variable. Quasi-experimental studies are usually conducted in the field (called field experiments) rather than in the laboratory (where the researcher has full control of the experimental context and conditions). Quasi-experimental studies also are often conducted when random assignment would be unethical (e.g., randomly assigning participants to a smoking or nonsmoking group) or not feasible or possible (e.g., randomly assigning participants to a nation undergoing civil war or to a country not undergoing a civil war).

Statistical analysis is the analysis of numeric data using descriptive and inferential techniques. **Descriptive statistical analysis** is the analysis of numeric data for the purpose of obtaining summary indicators that can efficiently describe a set of data and the relationships among the variables within that data set. **Inferential statistical analysis** requires procedures for estimating characteristics of populations using sample data (e.g., point estimation and interval estimation using confidence intervals) and for testing research hypotheses (Johnson & Christensen, 2020). In inferential statistics, researchers often determine if the differences between group means or the relationships between variables are statistically significant. In hypothesis testing, researchers are especially interested in whether group differences or relationships are different from chance. Inferential statistical analysis provides probabilistic results and can provide estimates of the degree (probability) of error in making those inferences.

Shadish et al. (2002) defined **internal validity** as “the validity of inferences about whether the relationship between two variables is causal” (p. 508). The internal validity of a hypothesized cause in an experiment is enhanced to the degree that all *plausible alternative explanations* for the obtained results can be eliminated. The same logic holds for nonexperimental research (correlational and survey). Although internal validity is usually associated with QUAN, ruling out alternative plausible explanations for the results also enhances the credibility of inferences in QUAL. The key difference between causation in QUAN and QUAL is that the former is often interested in showing causal relationships among variables, and the latter is more interested in talking about causation among events. The former kind of causation is sometimes called nomothetic causation and the latter kind is sometimes called idiographic or local causation. Both types of causation are of great importance in MM research. For details on these two very important kinds of causation and an explanation of how MM can integrate these, see Johnson, Russo, and Schoonenboom (2019).

According to Shadish et al. (2002), **external validity** (or “generalizing validity”) is “the validity of inferences about whether the causal relationship holds over variations in persons, settings, treatment variables, and measurement variables” (p. 507). External validity may be defined more succinctly as the generalizability or transferability of the results to other persons, settings, or times. (These validity issues are discussed in more detail in Chapter 10.) In short, the question here is to whom and in what contexts might one be able to generalize the study results beyond the particular study participants.

More Details About the Qualitative Tradition

QUAL research has gained widespread acceptance in the social and behavioral sciences, as described by Denzin and Lincoln (1994):

Over the past two decades, a quiet methodological revolution has been taking place in the social sciences. . . . the extent to which the “qualitative revolution” has overtaken the social sciences and related professional fields has been nothing short of amazing. (p. ix)

The terms in this section are additional terms associated with the QUAL tradition and are discussed in more detail throughout the text. Most of these terms are located in the second column of Table 1.1. Their presentation here highlights the differences between the QUAL and QUAN traditions presented in the previous section.

QUAL researchers typically employ inductive reasoning, which involves collecting local data, exploring those data, and arguing from the particular (e.g., results) to the general (e.g., grounded theory). Grounded theory, for example, is a methodology for theory development that is grounded in qualitative data (e.g., words, pictures). The data are systematically collected using observation, interviews, and open-ended questionnaires, and the collected data are then analyzed inductively to determine what findings emerge from the data analysis (e.g., Strauss & Corbin, 1998). Patton (2002) noted these distinctions as follows: “*Inductive analysis* involves *discovering* patterns, themes, and categories in one’s data, in contrast to *deductive analysis* where the data are analyzed according to an existing framework” (p. 453, italics in original).

QUAL research is often descriptive and exploratory, and it can also be explanatory when the researcher uses the **grounded theory** methodology to inductively develop a theory, “grounded in data” (Corbin & Strauss, 2015). Although rare, QUAL research also might include confirmatory approaches. In both QUAN and QUAL research, an exploratory study can generate information about unknown aspects of a phenomenon. Although exploratory research fits especially well with the inductive nature of QUAL research, it can also occur in QUAN research (e.g., in correlational and survey research). As mentioned above, QUAL research sometimes focuses on causation. It is strongest for studying idiographic or local causation among events (rather than causation among variables; see Johnson, Russo, & Schoonenboom, 2019). Sometimes this causal information can be generalized beyond the data. For example, Yin (2013) discussed several case studies that explored causal relations, such as Allison and Zelikow’s (1999) *Essence of Decision: Explaining the Cuban Missile Crisis*: It is very possible that the causal theory developed in this study will apply in additional contexts and circumstances.

The five major traditions or methodologies in QUAL research are grounded theory, ethnography, phenomenology, narrative inquiry, and case study. Probably the oldest tradition in QUAL research is ethnography, which originated in cultural anthropology and sociology during the late 1800s and early 1900s. **Ethnography** involves describing and interpreting human cultures using data collection techniques such as participant observation, interviews, and artifact collection (see Bernard, 2013). In an ethnographic research design data are gathered through well-established techniques with the goal of gaining an in-depth understanding of a distinct culture. **Case study research** (e.g., Stake, 1995, 2005; Yin,

2009) involves developing an in-depth analysis of a single case or of multiple cases. Case study research emerged from several fields, such as political science, evaluation research, business, law, and so forth. Data collection for case study research typically involves a variety of sources that may include QUAN data relevant to the case or cases. Many MM studies employ case studies as the QUAL component of the overall design. For detailed information on the five major QUAL traditions, see Creswell and Poth (2017) and Johnson and Christensen (2020). For review, we need to mention two additional QUAL methodologies. When using the popular QUAL methodology of **phenomenology**, the researcher attempts to understand how one or more individuals experience a specific phenomenon (e.g., the experience of living with an intellectual disability, losing someone you love, or attending a school or workplace where you experience discrimination). The foundational question in phenomenological research is this: “What is the meaning, structure, and essence of the lived experience of this phenomenon by an individual or by many individuals?” (Johnson & Christensen, 2020, p. 444). In contrast, in the QUAL methodology of **narrative inquiry**, the researcher studies experience when experience is understood as lived and told *stories*. One can understand many important events and phenomena by listening to peoples’ stories about their lives. The foundational question in narrative inquiry is this: “What understandings can we gain from people’s storied experiences?” (Johnson & Christensen, 2020, p. 425).

Critical theory is a paradigm often associated with QUAL (but also used in some QUAN) and this research studies human phenomena through an ideological lens or perspective. Some examples are feminism, critical race theory, and social class theory. All of these seek social justice for oppressed groups (e.g., Kincheloe & McLaren, 2005). Importantly, *this kind of research is now quite common in MM*—it is discussed in detail in Chapter 3 under the term *transformative perspective*.

In QUAL, the primary kind of sampling is **purposive sampling**, which involves selecting a group or relatively small number of individuals because they can provide particularly valuable information related to the research questions under examination. Chapter 6 provides more details on 15 specific purposive sampling techniques.

Much of QUAL data analysis can be divided into two types: categorical strategies and contextualizing strategies. **Categorical strategies** break down narrative data into smaller units (codes and categories) and then rearrange them to determine how those units are related or organized to produce categories that facilitate a deeper, more complex, and better understanding of the research question. **Contextualizing (holistic) strategies** interpret narrative data in the context of a coherent whole “text” that includes interconnections among the narrative elements. Researchers working in the grounded theory tradition often first employ categorical strategies (generating categories using open coding) and then examine how the categories are related (axial and theoretical coding) as they work toward the generation of a theory. Grounded theorists also collect additional data (and analyze the data) as they develop their theory.

Trustworthiness is a global term used by some QUALs as a substitute for what QUAN researchers call validity. Trustworthiness was defined by Lincoln and Guba (1985) as the extent to which an inquirer can persuade audiences that the findings are “worth paying attention to” (p. 300). **Credibility** may be defined as whether or not a research report represents the realities of the participants whom the researchers studied. Credibility techniques include

prolonged engagement, persistent observation, and the use of multiple investigators, qualitative methods, and perspectives. **Transferability** is a QUAL analogue to external validity because it refers to the generalizability of inferences from a particular *sending context* (the research setting) to a particular *receiving context* (other similar settings). (Trustworthiness issues are discussed in Chapter 10, Table 10.2.). The degree of transferability is judged by the consumer of research (the receiving entity), rather than by the researcher. However, researchers take every possible step to maximize the future transferability of their conclusions.

More Details About the Mixed Methods Tradition

On many of the dimensions in Table 1.1, the column describing the MM tradition contains a combination of the techniques found in both the QUAL and QUAN traditions. For instance, the form of data used in MM studies can be both narrative (QUAL) and numeric (QUAN). Similarly, MM research can simultaneously address a range of both confirmatory and exploratory questions, a point that is discussed later in Chapter 2 (see “Utility of Mixed Methods Research”).

Investigators working in the MM tradition have created typologies of distinct MM research designs, and we provide details on them in Chapter 5. Here, we list two of the more well-known basic MM research design families, parallel and sequential MM designs, which are defined as follows:

1. In **parallel MM designs** (also called concurrent or simultaneous designs), the QUAN and QUAL strands of the study occur in a parallel manner, either concurrently (starting and ending at approximately the same time) or with some time lapse (i.e., data collection for one strand independently starts or ends later than the other). The QUAL and QUAN strands are planned and implemented to answer related aspects of the same integrated (mixed) research question(s).
2. In **sequential MM designs**, the QUAN and QUAL strands of the study occur in chronological strands and are interdependent, with the latter strand building on the earlier strand. Questions, data, and procedures (e.g., the sample and data collection techniques) of one strand emerge from or are dependent on the previous strand. The research questions for the QUAL and QUAN strands are related to one another, and together form an integrated (mixed) research question, and may evolve as the study unfolds.

Sampling is an area where MM studies can employ both probability (often used in QUAN) and purposive (often used in QUAL) methods, plus a number of other techniques and methods unique to MM studies. These are described in Chapter 6.

MM data analysis involves the integration of the statistical and thematic techniques described earlier in this chapter, plus a number of other unique strategies, such as what was traditionally called triangulation and data conversion. The concept of **triangulation** recommends the use of combinations and comparisons of multiple data sources, data collection and analysis procedures, research methods and investigators, as well as the inferences that are made in a study. The concept originated with Webb, Campbell, Schwartz, and Sechrest (1966), and Denzin (1978) further delineated the terms *data triangulation*,

theory triangulation, *investigator triangulation*, and *methodological triangulation*. For example, methodological triangulation refers to the use of multiple methodologies in a particular research study. For an example in MM, this might include the results from the analysis of data obtained through survey (QUAN) and case study (QUAL) methods regarding the effect of a new reading curriculum that could be “triangulated” to provide a more accurate and perhaps a more comprehensive understanding of that curriculum.

Data conversion (transformation) occurs when collected QUAN data are converted into narratives or when QUAL data are converted into numbers. **Quantitizing** data (e.g., Miles & Huberman, 1994) is the process of converting QUAL data into numbers that can be statistically analyzed. **Qualitizing** data (e.g., Tashakkori & Teddlie, 1998) refers to the process whereby QUAN data are transformed into narrative data that can be analyzed qualitatively. These are explained in depth in Chapter 5.

Inference quality is a term that we use to incorporate the terms *internal validity* (in more general form, beyond the validity of causal inference) and *credibility* (Tashakkori & Teddlie, 1998) to denote the validity/plausibility of inferences made on the basis of the results of a study or a strand of mixed methods research. Bernard (2013) suggests using “conclusion validity” or “finding validity” (p. 46). McCrudden and McTigue (2019) call this “authenticity of the inferences” (p. 392). (This study is provided in Appendix A.) Inference quality refers to the quality of conclusions that are made on the basis of both the QUAN and QUAL results. This is perhaps the most important concept in MM because we want to produce high-quality studies that lead to valid inferences. As we will explain in Chapter 10, quality of inferences or conclusions made on the basis of the results are dependent on how well the study or strand is designed and implemented (**design quality**) and how effectively the results are interpreted (**interpretive rigor**). An important aspect of inference quality is the degree to which the researcher rules out alternative explanations of the findings with some degree of certainty.

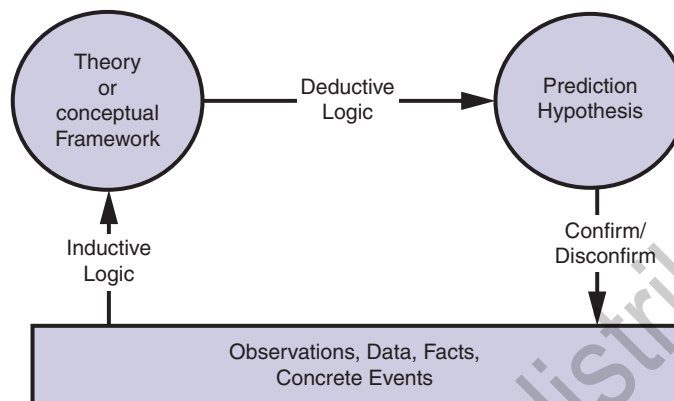
Inference transferability is an umbrella term that we use to incorporate the terms *external validity* (QUAN, broadly defined, denoting the degree of generalizability of the findings) and *transferability* (QUAL). Inference transferability is the degree to which the conclusions from an MM study may be applied to other settings, people, time periods, contexts, and so on. (Chapter 10 provides further details about inference quality and inference transferability.)

We introduce both of these (quality and transferability) as attributes of the *conclusions* made on the basis of the findings in a study (i.e., the outcomes, in Figure 1.4). Quality of the inputs to the research process (e.g., quality of questions, purposes, data) is introduced later in Chapters 4 and 7.

INDUCTIVE-DEDUCTIVE RESEARCH CYCLE (CYCLE OF RESEARCH METHODOLOGY)

One dimension that has traditionally differentiated QUALs from QUANs has been based on the investigator’s reliance on inductive or deductive methods. QUAL research is often inductive, while QUAN research is often deductive or hypothetico-deductive. MM

FIGURE 1.7 ♦ The Inductive-Deductive Research Cycle (Cycle of Research Methodology)



research uses both deductive and inductive logic. The full sequence that is used in science is described as the **inductive-deductive research cycle (or cycle of research methodology)** is shown in Figure 1.7. It also is referred to as the chain of reasoning (Krathwohl, 2004), the cycle of scientific methodology (Tashakkori & Teddlie, 1998), and the research wheel (Johnson & Christensen, 2020).

This inductive-deductive research cycle may be seen as moving from concrete grounded observations and facts (e.g., data, information, previous research findings) through inductive inference to general conclusions (conceptual framework, or theory), then from those general inferences through deductive inference to predictions to specific occurrences or relationships (e.g., formal hypotheses, informal predictions, searching for disconfirming cases, etc.). It is clear that this cycle involves both inductive and deductive reasoning processes and approaches. It is also clear that either induction or deduction could come first, depending on where one starts when studying the phenomenon of interest.

The MM response to the inductive-deductive dichotomy is that *both* are very important in research and science. Research on any given question at any point in time occurs somewhere within this cycle. We should note that almost all studies in social and behavioral sciences these days start from an inductive review of the literature leading to a conceptual framework before the actual project is planned and implemented. Most research reports also end in a revised form of the conceptual framework that has been modified, expanded, or reaffirmed by the results of that study. In other words, virtually all studies go through the inductive-deductive logic at least once, often more. In the McCrudden and McTigue article provided in Appendix A, you can see that explanations for adolescents' judgment about belief-relevant information changed from before the study to after the final conclusions. Based on an inductive review of the literature, the authors expected belief-consistent information to impact these judgments more than belief-inconsistent information. Based on the study results, McCrudden and McTigue (2019) concluded that this was not the case among one group of adolescents ("more objective"), and they proposed a new explanation linking these judgments to "procedural metacognition" (p. 394).

The Three Methodological Communities and the Inductive-Deductive Research Cycle

The three communities of scientists described earlier did not spontaneously appear over the past 2 centuries as the social and behavioral sciences (also referred to as human sciences) emerged. All three groups have historical origins stretching back centuries. The following history focuses on several major points of comparison among the three groups of researchers. Earlier, we introduced what we labeled the *cycle of research methodology* or *inductive-deductive research cycle*. We now introduce additional tensions between the QUAN and QUAL viewpoints that are relevant to that research cycle. A change in philosophical and methodological emphasis within a field of study (e.g., from one part of the inductive-deductive research cycle shown in Figure 1.7 to another) can result in what Kuhn (1962, 1970, 1996) called a *paradigm shift*.

Now, we briefly characterize the general orientations of the three methodological communities on several conceptual dimensions:

1. QUANs—Professors Experimentalista and Numerico (Boxes 1.1 and 1.2) have greater emphasis on **deductive logic or reasoning** in their research; that is, their formal research may start from a general theory and may involve hypotheses from which their observable consequences are deduced (i.e., which must logically be observed if the hypotheses are true). After deducing what logically must be seen in the world *if the hypotheses are true*, some QUAN researchers gather empirical data and test their hypotheses. Professor Numerico is not always as strict as Professor Experimentalista about having formal hypotheses. He is, instead, interested in finding relationships among variables and predicting future behaviors (e.g., using statistical models to predict risky sexual behaviors). Both professors' research logic is predominantly (but not always) *deductive*, arguing from the general (theory, conceptual framework) to the particular (data points).
2. QUALs—Professor Holistico (Box 1.3) emphasizes *inductive research logic* in his research; that is, his research often starts with data that he has collected, from which he then generates theory. The research logic is inductive, placing an emphasis on particular/local data as well as arguing from the particular (data points) to the general (theory). We will discuss in later chapters that following the generation of the theory, investigators are advised to find contrary evidence or confirming/disconfirming cases to assess the credibility of the conclusions and explanations in the theory. As such, there is a small deductive cycle in this type of research as well.

LeCompte and Preissle (1993) differentiated between QUALs and QUANs as follows:

The inductive-deductive dimension refers to the place of theory in a research study. . . . Purely deductive research begins with a theoretical system, develops operational definitions of the propositions and concepts of the theory, and matches them empirically to some body of data. . . . deductive researchers hope to find data to match a theory; inductive researchers hope to find a theory that

matches their data. Purely inductive research begins with collection of data—empirical observations or measurements of some kind—and builds theoretical categories and propositions from relationships discovered among the data. (p. 42)

3. MM researchers—Professor Eclectica (Box 1.4) explicitly uses both inductive and deductive logic, depending on the phase of the research cycle in which she is working. In the example above, she used deductive reasoning to predict that participants experiencing interventions will lose more weight than will participants in the control group. She then used inductive reasoning to piece together all of the QUAL information regarding why the interventions succeeded.

SUMMARY

This chapter introduces the three research communities in the social and behavioral sciences and presents prototypical researchers within each: Professor Experimentalista and Professor Numerico (the QUAN community), Professor Holistico (the QUAL community), and Professor Eclectica (the MM community). Differences and similarities between the three groups are delineated in several areas. We argue throughout the text that these three communities are culturally distinct, each with its own educational and social backgrounds, research traditions, and perceptions of how research should be conducted. Despite this, we also argue that the three communities have many similarities and can coexist peacefully.

A classic evaluation study is described, and then accounts are given showing how researchers from each of the three communities approached the study. Discrepancies between the QUAN and QUAL results from this study are reconciled using the MM approach.

There is a brief discussion of the paradigms debate and of issues related to conflict and concord among the three communities. We and many other mixed methodologists advocate peaceful coexistence based on the compatibility thesis and the idea that each community is more suited to answering certain types of research questions.

We introduce a systems approach to research consisting of inputs, processes, and outcomes (IPO), and we suggest that a mixed methods study will benefit from explicitly identifying its points of integration within each of these components. The inputs are introduced as purposes, questions, and data. Processes are introduced in two stages of implementation (data collection procedures, data analysis procedures). Outputs are introduced as results of data analysis and the inferences made on the basis of those results.

Finally, we explore the similarities and differences between the three communities in their approach to the inductive-deductive research cycle. We suggest that any research project goes through that cycle at least once, regardless of a QUAL or QUAN approach.

Chapter 2 continues our presentation of the three methodological communities by demonstrating that each research project may be placed on many continuous dimensions, rather than on a one-dimensional trichotomy. We suggest that all studies incorporate each of these dimensions to a varying degree and may be considered mixed at some basic level. The chapter ends with a discussion of the utility of mixed methods research.

Review Questions and Exercises

1. What are (a) postpositivism, (b) quantitative methods, and (c) statistical analysis?
2. What are (a) constructivism, (b) qualitative methods, and (c) thematic analysis?
3. What are (a) pragmatism, (b) mixed methods, and (c) mixed methods data analysis?
4. Find a journal article that employs QUAN methods only. Summarize it in one page.
5. Find a journal article that employs QUAL methods only. Summarize it in one page.
6. Find a journal article that employs MM. Summarize it in one page.
7. Compare your MM journal article to the QUAN and QUAL articles. Discuss major differences among the three articles.
8. Describe how Trend (1979) and his colleagues used MM to reconcile discrepant QUAN and QUAL results.
9. What was the paradigms debate and how did the incompatibility thesis contribute to that debate? What is the compatibility thesis and how did it help to reconcile the paradigms debate?
10. What are the differences between methodology, method, and paradigm? Give an example for each.
11. What are the similarities and differences between the QUAL and QUAN communities about the role of theory and the use of inductive-deductive logic? How do MM researchers react to differences?
12. Describe the research cycle (inductive-deductive cycle) and explain how every research article goes through that cycle at least once.
13. Describe the IPO (input-process-outcome) model of research, and explain why it is important to distinguish these components of a research project in mixed methods.

Key Terms

Analysis stage 24	Critical theory 33	External validity 31
Axiology 21	Data conversion	Grounded theory 32
Both-and logic 18	(transformation) 35	Hypothetico-deductive model
Case study research 32	Deductive logic or	(H-DM) 29
Categorical strategies 33	reasoning 37	Implementation stage 24
Compatibility thesis 18	Dependent variable 30	Incompatibility thesis 17
Conceptual framework 28	Descriptive statistical analysis 31	Independent variable 30
Confirmatory research 28	Design quality 35	Inductive logic or reasoning 7
Constructivism 7	Epistemology 21	Inductive-deductive research
Contextualizing (holistic)	Ethnography 32	cycle (cycle of research
strategies 33	Experimental research 30	methodology) 36
Correlational/prediction	Explanatory research 29	Inference quality 35
research 30	Exploratory (QUAN or QUAL)	Inference stage 24
Credibility 33	research 29	Inference transferability 35

Inferences 23	Ontology 20	Quantitative (statistical) data analysis 5
Inferential statistical analysis 31	Paradigm 5	Quantitizing 35
Initiation stage 24	Paradigms debate 17	Quasi-experimental research 31
Input-process-outcome (IPO) model of research 23	Parallel MM designs 34	Research hypothesis 5
Internal validity 31	Phenomenology 33	Research questions 5
Interpretive rigor 35	Positivism 5	Rhetoric 21
Methodology 21	Postpositivism 5	Sequential MM designs 34
Methods 22	Pragmatism 9	Stage of a research strand 23
Mixed methods research (MM) 8	Purposive sampling 33	Survey research 30
Multiple stakeholder legitimation 19	Qualitative (QUAL) methods 7	Theory 28
Narrative inquiry 33	Qualitative (thematic) data analysis 7	Transferability 34
	Qualitizing 35	Triangulation 34
	Quantitative (QUAN) methods 5	Trustworthiness 33

Do not copy, post, or distribute