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# MIXED METHODOLOGY

Combining Qualitative  
and Quantitative Approaches

Abbas Tashakkori  
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# 1

## *Introduction to Mixed Method and Mixed Model Studies in the Social and Behavioral Sciences*

PARADIGM WARS AND  
MIXED METHODOLOGIES

### Examples of the Wars

During the past three decades, several debates or "wars" (e.g., Datta, 1994; Gage, 1989; Guba & Lincoln, 1994; House, 1994; Rossi, 1994) have raged in the social and behavioral sciences regarding the superiority of one or the other of the two major social science paradigms or models. These two models are known alternately as the *positivist/empiricist* approach or the *constructivist/phenomenological* orientation (e.g., Chertycholmes, 1992; Guba & Lincoln, 1994).

*Paradigms* may be defined as the worldviews or belief systems that guide researchers (Guba & Lincoln, 1994). The importance currently attributed to paradigms in the social and behavioral sciences derives from Kuhn's (1970) influential book titled *The Structure of Scientific Revolutions*. In this book, he argues that paradigms are the models that are imitated within any given field, and that competing paradigms may exist simultaneously, especially within immature sciences (Kneller, 1984; Kuhn, 1970).

The positivist paradigm underlies what are called *quantitative methods*, while the constructivist paradigm underlies *qualitative methods* (e.g., Guba & Lincoln, 1994; Howe, 1988; Lincoln & Guba, 1985). Therefore, the debate between these two paradigms has sometimes been called the qualitative-quantitative debate (e.g., Reichardt & Rallis, 1994). The abbreviations QUANs (for those preferring the quantitative point of view) and QUALs (for those preferring the qualitative point of view) have been used in describing participants in these debates or "wars" (e.g., Creswell, 1995; Morse, 1991).

These *paradigm wars* have been fought across several "battlefields" concerning important conceptual issues, such as the "nature of reality" or

the "possibility of causal linkages." No discipline in the social and behavioral sciences has avoided manifestations of these paradigm wars. Datta (1994) called the participants in such wars *wrestlers*; we prefer to use the term *warriors*.

"Warriors" from education include Lincoln and Guba (1985), who have contended that the tenets of positivism and the quantitative methodology that accompanies that paradigm have been discredited. These authors also contend that constructivism and qualitative methods are in ascendance. Smith and Heshusius (1986), also writing in the field of education, suggested "shutting down" the dialogue between the two camps, saying that their incompatibility made further dialogue unproductive. This point of view has been called the *incompatibility thesis*.

Likewise in psychology, the 1970s and 1980s witnessed important methodological debates between scholars such as Cronbach (1982) and Cook and Campbell (1979). These debates focused on the relative importance of internal validity (emphasizing *controlled settings*, which were considered sacrosanct by the positivists) and external validity (emphasizing *natural settings*, which were preferred by the constructivists). Gergen (1973) posed the question, "Is a science of social psychology possible?" challenging the tenets of positivism that underpinned that subarea of psychology, especially the possibility of making time- and context-free generalizations.

Similarly in anthropology, Gardner (1993) criticized Margaret Mead's anthropological work in Samoa for its overreliance on preconceived notions and naive acceptance of the reports of key informants. These responses are typical criticisms of the positivist camp toward the constructivists (or "naturalists").

A final example of these wars comes from the applied area of evaluation research. As noted by Datta (1994), the "dialogues" of three successive presidents of the American Evaluation Association (Fetteman, 1992; Lincoln, 1991; Sechrest, 1991) were very strident in their defense of their own methodological positions and in their attack on the position of the "other side." Although such debate may have been inevitable, it became increasingly unproductive during the 1980s and early 1990s.

#### The End of the Paradigm Wars and the Emergence of Mixed Methods

There have been numerous attempts in the social and behavioral sciences to make peace between the two major paradigmatic positions. "Pacifists" have appeared who state that qualitative and quantitative methods are,

indeed, compatible. In education and evaluation research (e.g., Howe, 1988; Reichardt & Rallis, 1994), authors have presented the compatibility thesis based on a different paradigm, which some have called *pragmatism*. Thus we may refer to the pacifists in the paradigm wars as *pragmatists*.

At this time, the paradigm debates have primary relevance within the history of social science philosophy because many active theorists and researchers have adopted the tenets of *paradigm relativism*, or the use of whatever philosophical and/or methodological approach works for the particular research problem under study (e.g., Howe, 1988; Reichardt & Rallis, 1994). Even some of the most noted warriors (i.e., Guba & Lincoln, 1994) have signaled an end to the wars, stating,

The metaphor of paradigm wars described by Gage (1989) is undoubtedly overdrawn. Describing the discussions and altercations of the past decade or two as wars paints the matter as more confrontational than necessary. A resolution of paradigm differences can occur only when a new paradigm emerges that is more informed and sophisticated than any existing one. That is most likely to occur if and when proponents of these several points of view come together to discuss their differences. (p. 116)

Pragmatically oriented theorists and researchers now refer to "mixed methods" (or mixed methodology or methodological mixes), which contain elements of both the quantitative and qualitative approaches (e.g., Brewer & Hunter, 1989; Patton, 1990). For instance, Greene, Caracelli, and Graham (1989) presented 57 studies that employed mixed methods, and described the design characteristics of these mixed studies. Specific types of mixed methods will be discussed later in this chapter.

#### The Current State of Affairs

We accept the assumptions implicit within paradigm relativism and assume that the paradigm wars are over, having been superseded by the pragmatist orientation briefly described above. As noted by Brewer and Hunter (1989), most major areas of research in the social and behavioral sciences now use multiple methods as a matter of course: "Since the fifties, the social sciences have grown tremendously. And with that growth, there is now virtually no major problem-area that is studied exclusively within one method" (p. 22).

The détente in the paradigm wars has been positive for research development in many fields because most researchers now use whatever method is appropriate for their studies, instead of relying on one method exclu-

sively. Nevertheless, pragmatists have often employed imprecise language in describing their methodologies, using some rather generic terms (e.g., *mixed methods*) to connote several different ways of conducting a study or a series of studies. Datta (1994) recently referred to what she called "mixed-up models" that derived from the "lack of a worldview, paradigm, or theory for mixed-model studies," concluding that "such a theory has yet to be fully articulated" (p. 59).

We don't pretend to present such a formal theory for mixed method and mixed model studies in this brief volume, but we do hope to offer some guidelines for more systematically conceptualizing such studies. Before introducing our taxonomy of mixed method and mixed model studies, however, we briefly describe some of the major issues related to the paradigm wars and their resolution in the next section of this chapter.

#### MORE DETAILS REGARDING THE PARADIGM WARS

The following section is intended for readers unfamiliar with the issues that were debated during the paradigm wars and how they were resolved to the satisfaction of much of the social scientific community. This brief historical review of the paradigm wars is not a treatise on the philosophy of science but is a "Cook's tour" through the paradigm wars and their aftermath. Those familiar with these issues may wish to skip this section.

The historical importance of these debates is partially illustrated by their longevity. Hammersley (1992) has noted that debates about quantitative and qualitative research actually have roots in the mid-nineteenth century and occurred in sociology in the 1920s and 1930s. Recent attention to the debate started with a revival of the fortunes of qualitative research methods in the 1960s in sociology and psychology, which had been dominated by quantitative methods (i.e., survey or experiment) throughout the 1940s and 1950s (Hammersley, 1992).

Although there are the two major opposing points of view, it is apparent that several philosophical orientations, or paradigms, have been posited and defended (e.g., Greene, 1994; Guba, 1990; Guba & Lincoln, 1994). We refer to four philosophical orientations: logical positivism, postpositivism, pragmatism, and constructivism (other variants of which are known as interpretivism, naturalism, and so on). We have chosen these orientations because they represent aspects of what we consider to be major stages in

the paradigm debates: (a) the debunking of logical positivism after World War II, (b) the pervasiveness of the postpositivist position, (c) the ascendance of constructivism, followed by the paradigm wars, and (d) pragmatism and the compatibility thesis. Each of these stages is briefly described in the next four sections of this chapter.

#### The Debunking of Logical Positivism After World War II

Positivism (also called logical positivism) has origins dating back to nineteenth-century French philosopher August Comte. Positivism bases knowledge solely on observable facts and rejects speculation about "ultimate origins." Lincoln and Guba (1985) ascribed several "axioms" to positivism:

1. *Ontology* (nature of reality): Positivists believe that there is a single reality.
2. *Epistemology* (the relationship of the knower to the known): Positivists believe that the knower and the known are independent.
3. *Axiology* (role of values in inquiry): Positivists believe that inquiry is value-free.
4. *Generalizations*: Positivists believe that time- and context-free generalizations are possible.
5. *Causal linkages*: Positivists believe that there are real causes that are temporally precedent to or simultaneous with effects.

We will add a sixth distinction noted by many authors (e.g., Goetz & LeCompte, 1984; Patton, 1990):

6. *Deductive logic*: There is an emphasis on arguing from the general to the particular, or an emphasis on a priori hypotheses (or theory).

Logical positivism was discredited as a philosophy of science after World War II (e.g., Howe, 1988; Phillips, 1990; Reichardt & Rallis, 1994). Dissatisfaction with the axioms of positivism (especially with regard to ontology, epistemology, and axiology) became increasingly widespread throughout the social and behavioral sciences during the 1950s and 1960s, giving rise to *postpositivism*. As Guba and Lincoln (1994) have noted, postpositivism is the intellectual heir to positivism and has addressed several of the more widely discredited tenets of positivism.

### The Pervasiveness of the Postpositivist Position

Landmark works of postpositivism (e.g., Hanson, 1958; Popper, 1959) appeared in the late 1950s, and they quickly gained widespread credibility throughout the social scientific community. Postpositivism was a reaction to the widely discredited axioms of positivism, and many of its tenets were in direct opposition to those of its predecessor.

While many QUANs continued to follow the tenets of positivism in the 1950s and 1960s, Reichardt and Rallis (1994) convincingly contended that some of the most influential quantitative methodologists of that period (e.g., Campbell & Stanley, 1966) were "unabashedly postpositivist" in their orientation. According to Reichardt and Rallis, these quantitative methodologists were postpositivists because their writings indicated that they agreed with the following tenets of that philosophy:

- *Value-ladenness of inquiry:* Research is influenced by the values of investigators.
- *Theory-ladenness of facts:* Research is influenced by the theory or hypotheses or framework that an investigator uses.
- *Nature of reality:* Our understanding of reality is constructed. (See Chapter 2 for a further discussion of these issues.)

These postpositivist tenets are currently shared by both qualitatively and quantitatively oriented researchers because they better reflect common understandings regarding both the "nature of reality" and the conduct of social and behavioral research in the second half of the twentieth century. Reichardt and Rallis (1994) concluded that postpositivism more accurately characterizes contemporary quantitative inquiry than does logical positivism, noting that there is a quantitatively oriented postpositivist camp that includes some of the best known quantitative researchers of the 1960s and 1970s.

For example, the experimental psychologist Rosenthal (1976) discussed at length what was called the experimenter effect: The way the experimenter looks, feels, or acts may unintentionally affect the results of a study. Cook and Campbell (1979), who were certainly quantitatively oriented, acknowledged experimenter bias as a threat to the validity of studies. This experimenter bias is a good example of a methodological flaw that might result in facts that are value- or theory-laden (basic tenets of postpositivism). Cook and Campbell (1979), in a discussion of causation in the social sciences, stated,

We share the postpositivists' belief that observations are theory-laden and that the construction of sophisticated scientific apparatus and procedures for data presentation often involve the explicit or implicit acceptance of well developed scientific theories, over and beyond the theory being tested. (p. 24)

Similarly, experimental social psychologists (e.g., Jones & Davis, 1966; Jones & Nisbett, 1972) explored and discussed dispositional attributions, which involve actor-observer differences in perception. They speculated on whether or not the testing of personality theory may be heavily influenced by the personal attributions (including values) of the researchers doing the work. Again, this is an example of researchers using traditional experimental methods and quantitative data who were actively exploring and discussing postpositivist tenets, such as the value-ladenness of facts.

Thus quantitative methodologists wrote about and provided empirical evidence for some of the tenets of postpositivism in the 1960-1980 time period. While these methodologists held assumptions associated with postpositivism, it is important to remember that they worked within a tradition that emphasized "methodological correctness" (Smith, 1994). When choices came down between the qualitative or quantitative orientations, these methodologists weighed in on the side of the experimental design, which characterizes traditional positivism. For example, Cook and Campbell (1979), in a spirited response to critics of their validity distinctions, concluded, "We assume that readers believe that causal inference is important and that experimentation is one of the most useful, if not *the* most useful, way of gaining knowledge about cause" (p. 91, italics in the original).

It is clear from a reading of this section of their well-known 1979 book that they prefer experimental (or quasi-experimental) work, value internal validity very highly, and believe that causal inferences are possible under certain heavily prescribed circumstances.

### The Ascendance of Constructivism, Followed by the Paradigm Wars

The discrediting of positivism resulted in the increasing popularity of paradigms more "radical" than postpositivism. These paradigms have several names (constructivism, interpretivism, naturalism), with constructivism being the most popular. Theorists associated with these paradigms borrowed from postpositivism but then added dimensions of their own to the models (e.g., Denzin, 1992; Gergen, 1985; Goodman, 1984;

Hammersley, 1989; LeCompte & Preissle, 1993; Schwandt, 1994). Some of these theorists were not content to see positivism, postpositivism, and their own philosophical orientation peacefully coexisting, believing that they had to argue for the superiority of their own paradigm to overcome the biases associated with the deeply embedded traditions of positivism and postpositivism. For example, Lincoln and Guba (1985) criticized one well-known quantitative methodologist for his attempts toward reconciliation of these points of view:

Some scholars insist that postpositivism is nothing more than an over-reaction, and that it is time for a rapprochement that realigns positivism with the relativism that characterizes postpositivism. One such writer is Donald T. Campbell, who suggests that it is time to move into a post-positivist era, in which positivism and postpositivism are married off and live happily ever after. (p. 32)

Lincoln and Guba then set up a series of contrasts between the positivist and naturalist (their version of constructivism) paradigms that made such a "marriage" between them impossible. Referring back to the five axioms of positivism described above, they posited the following five axioms of the naturalist paradigm.

1. *Ontology* (nature of reality): Naturalists believe that there are multiple, constructed realities.
2. *Epistemology* (the relationship of the knower to the known): Naturalists believe that the knower and the known are inseparable.
3. *Axiology* (the role of values in inquiry): Naturalists believe that inquiry is value-bound.
4. *Generalizations*: Naturalists believe that time- and context-free generalizations are not possible.
5. *Causal linkages*: Naturalists believe that it is impossible to distinguish causes from effects.

As indicated above, we will add a sixth distinction noted by many authors:

6. *Inductive logic*: There is an emphasis on arguing from the particular to the general, or an emphasis on "grounded" theory.

Given such black-and-white contrasts, it was inevitable that paradigm wars would break out between individuals convinced of what Smith (1994)

has called the "paradigm purity" of their own position. For example, Guba (1987) stated that one paradigm precludes the other "just as surely as the belief in a round world precludes belief in a flat one" (p. 31). Guba and Lincoln (1990; 1994) have repeatedly emphasized the differences in ontology, epistemology, and axiology that exist among the paradigms, thus fueling the paradigm wars. Smith (1983) stated the incompatibility thesis as follows:

One approach takes a subject-object position on the relationship to subject matter; the other takes a subject-subject position. One separates facts and values, while the other sees them as inextricably mixed. One searches for laws, and the other seeks understanding. These positions do not seem compatible. (p. 12)

Paradigm "purists" have further posited the incompatibility thesis with regard to research methods: Compatibility between quantitative and qualitative methods is impossible due to the incompatibility of the paradigms that underlie the methods. According to these theorists, researchers who try to combine the two methods are doomed to failure due to the inherent differences in the philosophies underlying them.

#### Pragmatism and the Compatibility Thesis

Many influential researchers have stated that the differences between the two paradigms have been overdrawn, and that the schism is not as wide as has been portrayed by "purists." For example, House (1994) concluded that this dichotomization springs from a "misunderstanding of science," as he pointed out strengths and weaknesses of both the positivist and the constructivist traditions. House further contended that there "is no guaranteed methodological path to the promised land" (pp. 20-21).

There are a number of good reasons to declare detente in the paradigm wars. For example, writing within the evaluation discipline, Datta (1994) has given five convincing, practical reasons for "coexistence" between the two methodologies and their underlying paradigms:

- Both paradigms have, in fact, been used for years.
- Many evaluators and researchers have urged using both paradigms.
- Funding agencies have supported both paradigms.
- Both paradigms have influenced policy.
- So much has been taught by both paradigms.

On a philosophical level, pragmatists had to counter the incompatibility thesis of the paradigm warriors, which was predicated upon the link between epistemology and method. To counter this paradigm-method link, Howe (1988) posited the use of a different paradigm: pragmatism. Chery-holmes (1992) and Murphy (1990) have traced the roots of pragmatism to such American scholars as C. S. Peirce, William James, and John Dewey, with more contemporary theorists including W. V. O. Quine, Richard Rorty, and Donald Davidson. The philosophy has been identified almost exclusively with its place of origin (the United States), and European scholars have been somewhat disdainful of pragmatism due to its debunking of metaphysical concepts, such as truth (e.g., Nielsen, 1991; Rorty, 1990). Instead of searching for metaphysical truths, pragmatists consider truth to be "what works." Howe (1988) summarized this orientation as follows:

After all, much of pragmatic philosophy (e.g., Davidson, 1973; Rorty, 1982; Wittgenstein, 1958) is *deconstructive*—an attempt to get philosophers to stop taking concepts such as "truth," "reality," and "conceptual scheme," turning them into superconcepts such as "Truth," "Reality," and "Conceptual Scheme," and generating insoluble pseudoproblems in the process. (p. 15, italics in the original)

A major tenet of Howe's concept of pragmatism was that quantitative and qualitative methods are *compatible*. Thus, because the paradigm says that these methods are compatible, investigators could make use of both of them in their research. Brewer and Hunter (1989) made essentially the same point:

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 wed 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. (p. 74)

Reichardt and Rallis (1994) have gone even further in their analysis of the compatibility of what they call "qualitative and quantitative inquiries." They contend that there are enough similarities in fundamental values between the QUANs and the QUALs to "form an enduring partnership" (Reichardt & Rallis, 1994, p. 85). These similarities in fundamental values

include belief in the value-ladenness of inquiry, belief in the theory-ladenness of facts, belief that reality is multiple and constructed, belief in the fallibility of knowledge, and belief in the underdetermination of theory by fact.

The first three of these beliefs were discussed earlier in this chapter. Reichardt and Rallis (1994) contend that QUANs also believe (along with QUALs) that knowledge is fallible, quoting Cook and Campbell (1979): "We cannot prove a theory or other causal proposition" (Reichardt & Rallis, 1994, p. 22). The authors further contend that the QUANs and QUALs agree with the *principle of the underdetermination of theory by fact*, that is, that "any given set of data can be explained by many theories" (Reichardt & Rallis, 1994, p. 88). Reichardt and Rallis also listed other shared ideologies in the field of evaluation between QUANs and QUALs concerning the importance of understanding and improving the human condition, the importance of communicating results to inform decisions, the belief "that the world is complex and stratified and often difficult to understand" (p. 89).

Thus it can be argued that there is a common set of beliefs that many social and behavioral scientists have that undergird a paradigm distinct from positivism or postpositivism or constructivism, which has been labeled pragmatism. This paradigm allows for the use of mixed methods in social and behavioral research.

#### THE EVOLUTION OF METHODOLOGICAL APPROACHES IN THE SOCIAL AND BEHAVIORAL SCIENCES

Thus there is growing agreement among many social and behavioral scientists concerning the basic assumptions that underlie the philosophical orientation of pragmatism. Now that these philosophical issues have been addressed, we can turn our attention to specific methodological issues associated with mixed method and mixed model studies.

A wide variety of writers from different disciplines (e.g., Blalock, 1978; Brewer & Hunter, 1989; Datta, 1994; Patton, 1990) have been calling for more coherence in our descriptions of the different methodologies that we now have at our disposal in the social and behavioral sciences. Brewer and Hunter (1989) have specifically called for a more integrated methodological approach, focusing on the need for individual researchers (and research teams) to combine methods in their investigations.

Part of that methodological integration involves having more precision in the language that we use to describe multiple methods. The novice researcher is faced with a bewildering array of names for the methods employed in the social and behavioral sciences: *monomethods* (quantitative and qualitative, plus all variants therein), multiple methods, *mixed methods*, multimethod research, *triangulation* of methods, methodological mixes, and so on. In this section, we will present a taxonomy of methodological approaches, including a brief review of the evolution of those methods.

The taxonomy of methodological approaches in the social and behavioral sciences is presented in Table 1.1. There are three broad categories: monomethods (dating from the emergence of the social sciences in the nineteenth century through the 1950s), mixed methods (emerging in the 1960s and becoming more common in the 1980s), and mixed model studies (emerging as a separate type in the 1990s but having earlier precursors).

#### General Stages in the Evolution of Methodological Approaches in the Social and Behavioral Sciences

We will argue in this section that there has been an evolution in the social and behavioral sciences from the use of monomethods to the use of what we call mixed model studies. There are three general points to be made in this discussion: (a) The evolution first involved the acceptance of the use of mixed methods, (b) the evolution then involved the application of the distinctions that emerged during the paradigm wars to all phases of the research process, and (c) this evolution has occurred during the past 30 years at an ever increasing pace.

#### The First Stage of the Evolution: From Monomethods to Mixed Methods

This involved going from the use of one basic scientific method only to the use of a variety of methods. Thus, in Table 1.1, this involved the movement from Period I to Period II. The paradigm wars and their denouement through pragmatism and the compatibility thesis resulted in this transition. The history of this process has been discussed in previous sections of this chapter. A more complete description of the different types of pure and mixed methods will be presented in Chapters 2 and 3.

Table 1.1  
The Evolution of Methodological Approaches  
in the Social and Behavioral Sciences

<p><i>Period I: The Monomethod or "Purist" Era</i> (circa the nineteenth century through 1950s)</p> <p>A. The Purely Quantitative Orientation</p> <ol style="list-style-type: none"> <li>1. Single Data Source (QUAN)</li> <li>2. Within One Paradigm/Model, Multiple Data Sources               <ol style="list-style-type: none"> <li>a. Sequential (QUAN/QUAN)</li> <li>b. Parallel/Simultaneous (QUAN + QUAN)</li> </ol> </li> </ol> <p>B. The Purely Qualitative Orientation</p> <ol style="list-style-type: none"> <li>1. Single Data Source (QUAL)</li> <li>2. Within One Paradigm/Method, Multiple Data Sources               <ol style="list-style-type: none"> <li>a. Sequential (QUAL/QUAL)</li> <li>b. Parallel/Simultaneous (QUAL + QUAL)</li> </ol> </li> </ol>
<p><i>Period II: The Emergence of Mixed Methods</i> (circa the 1960s to 1980s)</p> <p>A. Equivalent Status Designs (across both paradigms/methods)</p> <ol style="list-style-type: none"> <li>1. Sequential (i.e., two-phase sequential studies)               <ol style="list-style-type: none"> <li>a. QUAL/QUAL</li> <li>b. QUAN/QUAL</li> </ol> </li> <li>2. Parallel/Simultaneous               <ol style="list-style-type: none"> <li>a. QUAL + QUAN</li> <li>b. QUAN + QUAL</li> </ol> </li> </ol> <p>B. Dominant-Less Dominant Designs (across both paradigms/methods)</p> <ol style="list-style-type: none"> <li>1. Sequential               <ol style="list-style-type: none"> <li>a. QUAL/quan</li> <li>b. QUAN/qual</li> </ol> </li> <li>2. Parallel/Simultaneous               <ol style="list-style-type: none"> <li>a. QUAL + quan</li> <li>b. QUAN + qual</li> </ol> </li> </ol> <p>C. Designs With Multilevel Use of Approaches</p>
<p><i>Period III: The Emergence of Mixed Model Studies</i> (circa the 1990s)</p> <p>A. Single Application Within Stage of Study*</p> <ol style="list-style-type: none"> <li>1. Type of Inquiry—QUAL or QUAN</li> <li>2. Data Collection/Operations—QUAL or QUAN</li> <li>3. Analysis/Inferences—QUAL or QUAN</li> </ol> <p>B. Multiple Applications Within Stage of Study**</p> <ol style="list-style-type: none"> <li>1. Type of Inquiry—QUAL and/or QUAN</li> <li>2. Data Collection/Operations—QUAL and/or QUAN</li> <li>3. Analysis/Inferences—QUAL and/or QUAN</li> </ol>

\*There must be a mixing such that each approach appears in at least one stage of the study.

\*\*There must be a mixing such that both approaches appear in at least one stage of the study.



*The Second Stage of the Evolution:  
From Mixed Method to Mixed Model Studies*

This involved moving from the consideration of distinctions in method alone to the consideration of distinctions in all phases of the research process. As indicated in Table 1.1, this involved the movement from Period II to Period III. While the emergence of multiple methods typically has been treated as a methodological issue only, the linking of epistemology to method during the paradigm wars made it necessary to consider how different orientations affect other phases of the research process (e.g., the framing of the problem, the design of the study, the analysis of the data, the interpretation of the data). As Howe (1988) concluded, "The qualitative-quantitative distinction is applied at various levels: data, design and analysis, interpretation of results, and epistemological paradigm" (p. 15).

Creswell (1995) asked a basic question regarding this application of the paradigm-method link to other phases of the research process:

The most efficient use of both paradigms would suggest another step toward combining designs: Can aspects of the design process other than methods—such as the introduction to a study, the literature and theory, the purpose statement, and research questions—also be drawn from different paradigms in a single study? (p. 176)

His answer was in the affirmative and he gave examples of how different paradigms or points of view could be applied to these phases of the research process.

Similarly, Brewer and Hunter (1989) applied their multimethod approach to all phases of the research process, not only to the measurement phase. Their phases included the formulation of the problem, the building and testing of theory, sampling, data collection/analysis, and reporting. They concluded,

The decision to adopt a multimethod approach to measurement affects not only measurement but all stages of research. Indeed, multiple measurement is often introduced explicitly to solve problems at other stages of the research process. . . . These wider effects . . . of . . . multimethod tactics need to be examined in detail, including the new challenges that the use of multiple methods poses for data analysis, for writing and evaluating research articles for publication, and for doing research in an ethical manner. (Brewer & Hunter, 1989, p. 21)

In Chapter 3, we will explicitly apply the different philosophical approaches to several phases of a research project (determination of questions/hypotheses, data gathering and research operations, analyses, and inferences) using a taxonomy initially developed by Patton (1990). Indeed, this application will serve as the organizing framework for the remainder of this volume.

*The Escalation of the Evolutionary Process*

This evolutionary process toward the use of mixed method and mixed model studies has been occurring at an ever increasing pace during the past 30 years due to (a) the introduction of a variety of new methodological tools (both quantitative and qualitative), (b) the rapid development of new technologies (computer hardware and software) to access and use those methodological tools more easily, and (c) the increase in communication across the social and behavioral sciences.

*A Taxonomy of Studies With  
Different Methodological Approaches*

Three major types of studies are summarized in Table 1.1: monomethod studies, mixed method studies, and mixed model studies. Each of these basic types of studies is further divided into subcategories. In this section, we will provide brief definitions of these different methodological approaches; more detail with regard to their development and application will be forthcoming in Chapter 3.

*Monomethod Studies*

Monomethod studies are studies conducted by "purists" working exclusively within one of the predominant paradigms. Of course, the subdividing of the monomethod studies into the purely qualitative and the purely quantitative should come as no surprise to the reader. In Chapter 2, we will present examples of these pure designs, which are becoming increasingly rare in the social and behavioral sciences.

*Mixed Method Studies*

Mixed method studies are those that combine the qualitative and quantitative approaches into the research methodology of a single study or

multiphased study. These methods are further subdivided into the five specific types of designs that are listed in Table 1.1.

All of the mixed method designs in Table 1.1 use triangulation techniques. These *triangulation techniques* evolved from the pioneer work of Campbell and Fiske (1959), who used more than one quantitative method to measure a psychological trait, a technique that they called the multi-method-multitrait matrix. Denzin (1978) described four different types of triangulation methods, including data triangulation, investigator triangulation, theory triangulation, and methodological triangulation. Methodological triangulation involves the use of both qualitative and quantitative methods and data to study the same phenomena within the same study or in different complementary studies. Patton (1990), in an influential book on evaluation methods, gave extensive examples of these four types of triangulation.

Creswell (1995) used the following distinctions in defining four of the mixed method designs that are presented in Table 1.1:

- *Sequential studies* (or what Creswell calls two-phase studies): The researcher first conducts a qualitative phase of a study and then a quantitative phase, or vice versa. The two phases are separate.
- *Parallel/simultaneous studies*: The researcher conducts the qualitative and quantitative phase at the same time.
- *Equivalent status designs*: The researcher conducts the study using both the quantitative and the qualitative approaches about equally to understand the phenomenon under study.
- *Dominant-less dominant studies*: The researcher conducts the study "within a single dominant paradigm with a small component of the overall study drawn from an alternative design" (Creswell, 1995, p. 177).

We have defined a fifth type of mixed method design, presented in Table 1.1:

- *Designs with multilevel use of approaches*: Researchers use different types of methods at different levels of data aggregation. For example, data could be analyzed quantitatively at the student level, qualitatively at the class level, quantitatively at the school level, and qualitatively at the district level.

Coincidentally, Miller and Crabtree (1994) presented a set of what they called "tools" for multimethod clinical research that closely resemble the types of studies that Creswell defined. They listed the following mixed

method designs: *concurrent design* (analogous to parallel/simultaneous studies), *nested designs* (similar to dominant-less dominant studies), *sequential design* (analogous to sequential studies), and *combination design* (some combination of the above design options). Their work followed up on that of Stange and Zyzanski (1989), who were among the first to call for the integration of qualitative and quantitative research methods in clinical practice in the medical sciences.

#### *Mixed Model Studies*

The category that we designate as *mixed model studies* in Table 1.1 was defined as "mixed methodology designs" by Creswell (1995), who described them as follows: "This design represents the highest degree of mixing paradigms . . . The researcher would mix aspects of the qualitative and quantitative paradigm at all or many . . . steps" (pp. 177-178).

Our definition of mixed model studies is somewhat different: *These are studies that are products of the pragmatist paradigm and that combine the qualitative and quantitative approaches within different phases of the research process*. There may be single applications within phases of the study, such as a quantitative (experimental) design, followed by qualitative data collection, followed by quantitative analysis after the data are converted. In this application, the qualitative data would be converted to numbers using the "quantitizing" technique described by Miles and Huberman (1994).

There could also be multiple applications within phases of the study, such as the following:

- A research design that calls for a field experiment and extensive ethnographic interviewing to occur simultaneously and in an integrated manner
- Data collection that includes closed-ended items with numerical responses as well as open-ended items on the same survey (e.g., Tashakkori, Aghajanian, & Mehryar, 1996)
- Data analysis that includes factor analysis of Likert scaled items from one portion of a survey, plus use of the constant comparative method (e.g., Glaser & Strauss, 1967; Lincoln & Guba, 1985) to analyze narrative responses to open-ended questions theoretically linked to the Likert scales

The remainder of this volume includes descriptions of several types (see Table 3.1 in Chapter 3) of these mixed model studies and how to design them.