CHAPTER

6

MIXING METHODS ON PURPOSE

WITH THIS chapter, the journey now moves into the domain of mixed methods practice, accompanied by a backpack carrying the inquirer's reflective stances on the nature and role of philosophy in social inquiry practice. This practical part of the journey begins with an engagement with the various purposes for which an inquirer can mix methods. That is, just as social inquiry practice itself is grounded in the purpose and questions for that study, mixed methods design and practice is anchored in the identification of particular purposes for mixing. Five primary purposes for mixing are identified and illustrated: triangulation, complementarity, development, initiation, and expansion. The traveler will develop an understanding of each and thereby begin to assemble his or her mixed methods toolkit.

The character and form of social inquiry are firmly rooted in substantive purpose. Social inquiry today has multiple legitimate purposes, from building generalizable theory to generating contextual understanding, and from catalyzing organizational development to voicing social critique (see Chapter Two). Framed in a broad acceptance of the important role of mixed methods approaches to social inquiry, Newman,

Ridenour, Newman, and DeMarco (2003) offer a "roughly hewn, tentative, fluid, and flexible" (p. 169) list of purposes for social inquiry, displayed in Table 6.1. These authors argue that

> *There is a link between understanding the purpose of one's research and selecting the appropriate methods to investigate the questions that are derived from that purpose. We argue that there is an iterative process between considering the research purpose and the research question. [From] this iterative process . . . decisions about methods are made. [Further] we make the case that when the purpose is complex (as it often is), it is necessary to have multiple questions, and this frequently necessitates the use of mixed methods. (p. 169)*

TABLE 6.1. A "Roughly Hewn" List of Inquiry Purposes.

General Purpose	Examples
Predict.	Build general laws.
Add to the knowledge base.	Confirm findings. Replicate others' work. Reinterpret previously collected data. Clarify structural and ideological connections between important social processes.
Have a personal, social, institutional, or organizational impact.	Deconstruct or reconstruct power structures. Refute claims. Set priorities. Resist authority. Influence change. Improve practice.
Measure change.	Measure consequences of practice. Test treatment effects.
Understand complex phenomena.	Understand culture. Understand change. Understand people.

(Table 6.1 continued)

Test new ideas.	Test innovations. Test hypotheses. Test new solutions.
Generate new ideas.	Generate hypotheses. Generate theory. Uncover relationships. Uncover culture.
Inform constituencies.	Inform the public. Heighten awareness. Hear from those who are affected by the treatment or program.
Examine the past.	Acknowledge past misunderstandings. Reexamine tacit understandings. Examine social and historical origins of current social problems.

Source: Newman et al., 2003.

I fully and enthusiastically support these authors' emphasis on the root importance of inquiry purpose and questions. A study does *not* begin with design or method, but rather with a well-defined and well-justified purpose and a clearly delineated set of inquiry questions (Chelimsky, 2007). One does *not* initiate a study by proclaiming, "I want to do an ethnography," or "I want to do a randomized experiment," or "I want to do a mixed methods study." Rather, social inquiry begins with a substantive intention or purpose and a substantive set of questions. Methodology is ever the servant of purpose, never the master. And because mixed methods purposes are *about methodology*, it is critical to think about identifying and selecting the reasons for mixing methods (or mixed methods purposes) *in service to* the broader substantive purpose and questions being pursued in the study. The question to address about choosing mixed methods purposes is, What form of "better understanding" will serve the substantive purpose and questions of the overall study best?

MIXING METHODS FOR BETTER UNDERSTANDING

As presaged in Chapter Two, the overall broad purpose for mixing methods in social inquiry is to develop a *better understanding* of the phenomena being studied. The fundamental claim being made here is that a mix of methods will generate a better understanding than will a single method alone. This claim, of course, is subject to empirical investigation. Tom Weisner's collection of studies of middle childhood offers examples of mixed methods studies supporting this claim (Weisner, 2005). Yet Lois-Ellin Datta (1997b) cautions us to remember that sometimes a monomethod study will serve the inquiry purpose just as well as or even better than a mixed methods study, likely at lesser cost. Continued research and reflection are needed regarding the contextual, substantive, and political conditions under which a mixed methods study, compared to a monomethod study, would serve the overall inquiry purposes best.

Also from Chapter Two, better understanding within a mixed methods framework can take various forms:

1. Getting it right, enhancing the validity or credibility of our findings.
2. Doing our work better, generating understandings that are broader, deeper, more inclusive, and that more centrally honor the complexity and contingency of human phenomena.
3. Unsettling the settled, probing the contested, challenging the given, engaging multiple, often discordant perspectives and lenses.
4. Foregrounding the political and value dimensions of our work, to not just illuminate them but also to engage with each other about our differences, to advance our dialogues.

Different mixed methods purposes—that is, different forms of "better understanding"—are connected to different inquiry questions, different combinations of methods, and different approaches to mixed methods analysis. These connections are pursued in subsequent chapters; this chapter presents more specific purposes for mixing methods, along with multiple examples. The chapter then describes and illustrates the practical procedures involved in identifying purposes for mixing methods and finally relates mixed methods purposes to mixed methods paradigm stances (from Chapter Five).

PURPOSES FOR MIXING METHODS

My own sustained engagement with the emerging field of mixed methods social inquiry began with a review of a sample of mixed methods evaluation studies that I conducted with two colleagues, Valerie Caracelli and Wendy Graham, in the late 1980s. The idea of mixing methods was a faint smudge on the horizon as the great qualitative-quantitative debate was beginning to wind down. We had read what

conceptual material related to mixing methods that we could find—including, for example, classic references on the concept of triangulation and Thomas Cook's elegant treatise on "post-positivist critical multiplism" (1985), discussed in Chapter Two—and then we were eager to turn to practice. We wanted to describe, analyze, and learn from the state of mixed methods practice in our field of evaluation. So we selected a sample of fifty-seven mixed methods evaluation studies—studies that used at least one quantitative method designed to represent social phenomena numerically and one qualitative method designed to represent social phenomena textually—and systematically reviewed each one for its descriptions of mixed methods purpose, design, data analysis, and utilization, as well as information on study context, management, and resources. In this review, we focused significantly on mixed methods purpose and design, as directed from our theoretical readings, although we also recorded information on the other review components. A full description of this study can be found in Greene, Caracelli, and Graham (1989).

The set of five purposes for mixing methods that emerged from this study was grounded in both the theoretical literature and the empirical evaluation practice reviewed. That is, the mixed methods purposes suggested by the theoretical literature were substantially confirmed by the evaluation studies reviewed. Moreover, this set of mixed methods purposes has held up well in the ensuing decades, offering a meaningful range of reasons and possibilities for mixing different kinds of methods in one social inquiry study. These five mixed methods purposes are described and illustrated next.

The illustrations come from a hypothetical scenario involving an evaluation of a nutrition education program implemented in all middle schools of an urban school district. The district serves a very diverse set of urban communities, including significant socioeconomic and racial and ethnic diversity. Called *Eat Right!* the program is part of a multifaceted policy and programmatic response to the disturbing increase in the incidence of childhood obesity in the United States over the past ten years (Institute of Medicine, 2005, 2006). The *Eat Right!* program (1) provides preteens with information about the benefits of good nutrition and the health risks of diets heavy in fried food, soft drinks, fat, and sugar, and (2) offers more healthy food choices to middle school students in their school cafeteria. The educational strands of the program include video and print materials featuring well-known athletes, hip-hop singers, and writers, notably from communities of color. These educational strands are implemented in health, science, and physical educational classes. The cafeteria changes include eliminating soft drinks and offering fruit drinks (with minimal sugar), milk, and water instead; offering only one fried food at each lunch; and adding a salad bar with low-calorie, low-fat dressing. *Eat Right!* aims to increase middle school students' knowledge about healthy diets and to encourage and enable them to choose healthy foods for themselves at lunch.

The discussion now presents five distinct purposes for mixing methods, derived from Greene et al. (1989), and illustrates each using this hypothetical evaluation scenario.

Mixing Methods for Purposes of Triangulation

In its classic sense, triangulation seeks convergence, corroboration, or correspondence of results from multiple methods. The classic rationale for triangulation is to increase the validity of construct and inquiry inferences by using methods with offsetting biases, thereby counteracting irrelevant sources of variation and misinformation or error. In a mixed methods study with a triangulation intent, different methods are used to measure the *same phenomenon*. If the results provide consistent or convergent information, then confidence in inquiry inferences is increased. So mixing methods for purposes of triangulation may be particularly important for inquiry constructs of high leverage or importance in a given context.

In the *Eat Right!* evaluation context, program outcomes are likely to be constructs of high importance, especially in today's climate of high accountability, and therefore good candidates for multiple measurement. For the outcome of increased nutrition knowledge, the evaluator could use a pre-post structured knowledge test as well as semi-structured individual or group interviews. Test data represent student responses to particular bits of nutrition knowledge, and the interviews could gather students' knowledge about parallel but broader principles of healthy eating. (The interviews could not be completely open or unstructured, as the evaluator must ensure that they are measuring the *same* conceptualization of nutrition knowledge as the knowledge test. Triangulation is not possible across assessments of different constructs.) And for the outcome of choosing healthier foods for lunch in the school cafeteria, the evaluator might consider some mix of direct observation, a self-report survey, or even analysis of leftover and disposed-of food from a sample of lunchtimes. Each of these methods captures a different lens or perspective on the focal phenomenon of healthy eating.

The question often arises—as in the Trend study of housing vouchers presented in Chapter Two—what if one mixes methods for purposes of triangulation, but the results don't converge? In Thomas Cook's words, well then, you have an "empirical puzzle" that warrants further examination, probing, and analysis. Interesting empirical puzzles are actually sought after in a mixed methods study with an *initiation* intent, as discussed shortly, because they can lead to unexpected and highly valuable insights. Again, the insights generated by Trend's further probing and analysis of the discrepant results of the administrative and observation data for one site well illustrate this generative potential of mixed methods inquiry.

The concept and allure of triangulation have featured prominently in the mixed methods conversation, both historically and presently (see Chapter Three). Some of the thoughtful discussions on triangulation incorporate possibilities of nonconvergence of results within the triangulation framework. Mathison (1988), for example, discusses three possible patterns of results attained from the use of different methods in a triangulation study: results that do converge, results that are only partially consistent, and results that are actually contradictory. In the emerging theories about mixed methods inquiry, these other patterns of results can be usefully connected to other mixed methods purposes. Moreover, different mixed methods purposes call for different mixed methods designs, as discussed in the next chapter. So I find it more conceptually valuable to retain the classic conceptualization of triangulation as convergence for purposes of enhanced validity and credibility of inference, and I will do so throughout this book.

Mixing Methods for Purposes of Complementarity

The second purpose for mixing methods is one of the most common in practice: mixing methods for purposes of complementarity. In our original review of fifty-seven mixed methods evaluation studies, one-third of the studies had a complementarity mixed methods purpose. With this purpose, a mixed methods study seeks broader, deeper, and more comprehensive social understandings by using methods that tap into different facets or dimensions of the *same complex phenomenon*. In a complementarity mixed methods study, results from the different methods serve to elaborate, enhance, deepen, and broaden the overall interpretations and inferences from the study. It is because most social phenomena are complex and multifaceted that a complementarity mixed methods purpose fits many inquiry contexts.

In the *Eat Right!* evaluation context, a number of phenomena could benefit from a complementary mix of methods. The evaluator could assess the quality and meaningfulness of the implementation of the educational components of the program from both student and teacher perspectives, using surveys, interviews, or both for each perspective. Having data on how both students and teachers experienced the program provides a more complete and comprehensive understanding of its implementation. The evaluator could also assess the intended program outcome of choosing healthy foods for lunch through a combination of direct observation and student group interviews. If this mix were identified for purposes of triangulation, as discussed earlier, the two methods must measure the *same* conceptualization of the phenomenon of interest (choosing healthy foods for lunch). For a complementarity purpose, however, methods are intentionally chosen or designed to measure different facets of the same complex phenomenon. In this example, direct observation may record actual food choices made, while student interviews may engage peer influences on such food choices. Together, these two sets of data provide a more comprehensive and complete account of this intended program outcome.

In practice, the patterns of results from a mix of methods designed to be complementary may range from convergence (as in triangulation) to divergence (as in initiation), even though an overlapping or interlocking pattern is the one intended. These different patterns of results are not inherently problematic, nor do they violate the intended purpose of complementarity. Mixed methods *practice* is ever so much more complicated and challenging than mixed methods *theory*. So mixed methods purposes—along with other components of practice—can evolve and change during the course of the study. Such evolution is likely to reflect unanticipated insights and perceptions that indeed contribute to better understanding.

Mixing Methods for Purposes of Development

Rooted in the classic ideas of sociologist Sam Sieber (1973) and evaluator Doren Madey (1982) (see Chapter Three), a third purpose for mixing methods is development. In a mixed methods development study, the results of one method are used to inform the development of the other method, where development is broadly construed to include sampling and implementation, as well as actual instrument construction. By definition, methods in a development mixed methods study are implemented sequentially. Most often, both methods would be assessing *a set of constructs or phenomena* (for example, attitudes and beliefs about immigration policies and practices). And the second method may assess all of the constructs assessed in the first method, or a subset of them (for example, responses to hypothetical immigration scenarios). The mixed methods development rationale aims for better understanding via capitalizing on inherent method strengths.

In the *Eat Right!* evaluation context, the evaluator might enact a development purpose by first using a questionnaire to assess student perceptions of the value and meaningfulness of their experiences in the program. Then the results of the questionnaire could be used to purposefully select a sample of extremes—students with substantially higher than average and substantially lower than average positive program perceptions—for individual interviews designed to gather in-depth information about students' program experiences. The questionnaire results could also inform the particular questions asked in the interviews; for example, issues on which there was considerable variation in student response or consistently negative responses. In some mixed methods development studies, findings and interpretations could be significantly enriched by returning to the results of the first method, after the second method is implemented, and conducting some kind of integrated analysis of both sets of data together. This would constitute a complementarity mixed methods intent and is currently an underutilized mixed methods design option.

The basic idea of development—of using the results of one method to inform the development of another—is not unique to mixed methods social inquiry, nor is it an innovative idea. Social scientists in many fields quite routinely use some form of qualitative method to learn more about a context—salient events, relational norms, linguistic idiosyncrasies—in order to develop or adapt a questionnaire that is well suited to that context. And using the results of a quantitative analysis to identify individuals or cases for further qualitative study is also common practice in many corners of the social science community. Similarly, some other concepts in the emerging theories about mixed methodology represent time-honored traditions in social science, perhaps most notably triangulation. In these cases, the unique contributions of these emerging mixed methods theories then are the collection, assembly, and orchestration of these ideas, along with the generation of new ideas, within an overall conceptual framework attuned to the particular parameters and possibilities of mixing (Caracelli & Greene, 1993, 1997).

Mixing Methods for Purposes of Initiation

Fourth, the mixed methods purpose of initiation represents the most generative of the purposes for mixing, as it evokes paradox, contradiction, divergence—all in the service of fresh insights, new perspectives, original understandings (Greene, 2005c). With initiation, different methods are implemented to assess various facets of the *same complex phenomenon*, much like complementarity, but the intended result is indeed divergence or dissonance. Initiation is the planned incarnation of Tom Cook's "empirical puzzle"—a puzzle that warrants further investigative analysis, which in turn can lead to important insights and new learnings. Further, should such a puzzle arise in a study with a different purpose for mixing—say, triangulation or complementarity—it would be wholly consistent with a *mixed methods way of thinking* (Chapter Two) to actively pursue this puzzle rather than interpret it as a failure to attain convergence or consonance. Some of the empirical classics in the mixed methods literature well illustrate this generative value of mixed methods initiation.

The generative potential of a mixed methods study with an initiation intent is likely to be enhanced by identifying methods that are significantly different from one another in stance, form, and perspective. Our *Eat Right!* evaluator, for example, could endeavor to better understand the context in which these middle school students are making food choices, both in and out of school. The evaluator could mix student self-reports of what they choose to eat for lunch in the school cafeteria, as well as what food they choose or are served during the rest of the day, with community assessments of the number and type of grocery stores, fast-food restaurants, and other food establishments in the students' home neighborhoods. This broadened lens is likely to offer a complex portrait of the food landscape for these students, including peaks and valleys of both dissonance and consonance. As another example of initiation, the evaluator could attend to different ethnic and cultural traditions regarding healthy diets by using one method based in mainstream American culture and another method rooted in contemporary subcultures in the United States, including Mexican-, African-, and Asian-American. Interesting points of convergence and divergence are likely to emerge from such a juxtaposition of cultural beliefs and practices about healthy diets.

Mixing Methods for Purposes of Expansion

Finally, methods can be mixed in social inquiry for purposes of expanding the scope and range of the study. In an *expansion* mixed methods study, different methods are used to assess *different phenomena*. So the scope of the study is expanded by extending methods choices to more than one methodological tradition, thus enabling selection of the most appropriate method for each construct within an expanded set of study foci.

In our initial review of fifty-seven mixed methods evaluation studies, expansion was the most prevalent of all mixed methods purposes, characterizing nearly half of the studies. This is not surprising as a very common evaluation design of that era was the use of quantitative methods to assess program outcomes and qualitative methods to assess program implementation. This was the classic early expansion design in the field of evaluation, signaling evaluators' eagerness to incorporate newly learned qualitative traditions and methods into their work. A more sophisticated expansion design would be to use a mix of different methods for assessing more features of both program implementation and program outcomes.

In the *Eat Right!* program evaluation, the evaluator could assess student knowledge gains with a standardized pre-post test of nutrition knowledge, possible changes in lunchroom norms via a modest ethnographic inquiry component, and parental awareness of the program through a random selection of families for phone interviews. Each method assesses a different phenomenon; collectively, they expand the range of the study well beyond the reach of a single method or methodological tradition.

AN ILLUSTRATION OF MIXED METHODS PURPOSES IN PRACTICE

An evaluation study by Mark Waysman and Riki Savaya (1997) well illustrates these varied purposes for mixing methods. Because it also well illustrates different dimensions of mixed methods design, I will return to this example in Chapter Seven.

In the 1990s, Waysman and Savaya (1997) conducted an evaluation of the work of a nonprofit agency in Israel that provided technical assistance to other nonprofit community-based organizations. SHATIL was founded in 1982 by the New Israel Fund to provide technical assistance to the organizations supported by the Fund, numbering approximately four hundred. At that time, these funded organizations worked for social change in varied domains, including human rights, social and economic development for the poor, Jewish-Arab relationships, and religious pluralism and tolerance. The organizations were staffed by people from a great diversity of ethnic, cultural, and religious backgrounds. SHATIL provided direct assistance in five areas: organizational consultation, fundraising and finance, advocacy, media and public relations, and volunteer recruitment and management. SHATIL also provided indirect assistance in the form of professional development and workshops for groups of organizations, support for organizational collaborations, and maintenance of specialized libraries and data sets of benefit to client organizations.

The evaluation was initiated by SHATIL after ten years of activity. SHATIL was interested in gathering feedback from client organizations as a way to look ahead and engage in some prospective planning. SHATIL raised funds for the evaluation from the Ford Foundation in the United States. The evaluation had four objectives:

1. To map the characteristics of organizations that apply to SHATIL;
2. To map the services provided to these organizations;
3. To assess the perceived contribution of SHATIL to the development and goal attainment of these organizations; and
4. To evaluate the satisfaction of these organizations with the services provided by SHATIL. (Waysman and Savaya, 1997, p. 229)

Key evaluation challenges included the diversity of organizations served and especially the diversity of services provided to these organizations by SHATIL. Further, while SHATIL was interested in "narrative descriptions of how clients perceive their experiences with SHATIL, [the funder] required 'hard data' about outcomes" (p. 229).

The evaluation was designed in three phases that progressed from the general to the specific, "both in sources of information and in types of information solicited" (p. 229).

> *The first phase employed [qualitative] open-ended methods (focus group and personal interviews) to elicit general information about SHATIL, its clients and their concerns. The following phase was based on a survey questionnaire, whose items were more specific and focused. In the final phase (a second round of focus groups), the information sought was even more specific and focused on one particular issue (sources of satisfaction and dissatisfaction). The data in each phase [were] used in planning the following phase. (pp. 229–230)*

Further details about the methods used in each phase will be provided in the Chapter Seven discussion of mixed method design dimensions. The present discussion will now turn to the various mixed methods purposes incorporated into this evaluation study, relying extensively on the words of the authors.

> *The main aim of using mixed-methods in this study was* expansion, *which occurs when researchers mix methods in order to extend the scope, breadth and range of inquiry. . . . Different methods are employed to learn about different phenomena within the same study, thereby expanding its reach. The different methods are chosen based on their respective fit for studying the phenomena in question. . . . The use of mixed methods in this study enabled us to capture the richness and diversity of the program and to provide SHATIL with the different types of knowledge that they sought (narrative description as well as statistical analysis) in a way that no single method could possibly have done.*
>
> *Worth noting here is that different methods were adopted not only to evaluate different components of the study . . . but also to examine different aspects* within components. *For example, we examined two different process variables: amount of services received and critical turning points in the consultation process. We chose to measure amount of services quantitatively—by counting hours—using existing data from SHATIL's management information system. . . . In contrast, we felt that the best way to study critical turning points in the consultation process was via open-ended questions that were included in both the focus groups and the survey questionnaire. This mixture of methods thus enabled us to expand the number of process variables that the study covered.*
>
> *The second major reason for employing mixed methods in this study was* development. *This entails the sequential use of data from one method to plan and devise the use of another method. . . . For example, participants in the first round of focus groups were asked to specify which consultant behaviors and characteristics had, in their experience, helped or hindered the consultation process. They mentioned a number of traits, such as task versus process orientation, degree to which consultant*

blocks or encourages open discussion, and degree to which s/he promotes autonomy versus dependency. The survey instrument in the following stage incorporated a quantitative semantic differential measure with items formulated to cover these constructs that had emerged in the qualitative group interview.

We also employed mixed methods in this evaluation for purposes of . . . complementarity *. . . which refers to the added complexity and detail that ensue from combining methods. . . . The second round of focus groups with most and least satisfied clients provided descriptive information about sources of satisfaction and dissatisfaction, which helped to interpret the findings obtained from the statistical analysis of the survey.*

Although the use of mixed methods was not planned for the purposes of corroboration [triangulation] or initiation, it seems in retrospect that these benefits were also realized here, at least to some degree. . . . For instance [for corroboration], one of the major aims of the study was to learn about client organizations' degree of satisfaction with SAHTIL services. In the first round of focus groups, clients expressed a high degree of satisfaction with SHATIL staff and services. They emphasized the emotional nurturing provided by SHATIL staff, their consistent availability, and the benefits derived from the instrumental assistance provided by SHATIL. Findings from the quantitative survey corroborated this picture: 72% of clients [responding] rated their overall satisfaction with SHATIL as high.

On the other hand, some of the [first round] focus group participants expressed feelings of being patronized by SHATIL staff. . . . Findings from the quantitative measure, however, revealed that only a small minority of clients [responding] (15%) shared this sentiment. If we had included only the qualitative component, we might have overestimated the prevalence of this finding. . . .

[Related to mixing methods for purposes of initiation, in] the first round of focus groups . . . participants raised several issues that neither the evaluators nor the staff of SHATIL had thought to address in the study. One critical issue that emerged unexpectedly . . . pertained to the lack of clarity regarding eligibility for services. . . . It was thus decided to explore this issue further by including relevant items in the survey questionnaire, whose findings subsequently confirmed the existence of a problem in this area. These results resonated strongly among SHATIL staff, who were not aware of the problem, and several meetings were held to develop procedures to cope with this issue. . . . Had we used quantitative measures exclusively, we would have missed these important issues, some of which were of utmost relevance to SHATIL. . . .

[Also] as noted earlier, the qualitative and quantitative components of this study raised contradictory findings regarding paternalistic behavior on the part of SHATIL staff. . . . This inconsistency forced us to reconcile these apparent contradictions by raising a new research question: can we characterize the organizations for whom this issue is of concern? Further examination of the data did, in fact, reveal that the problem had been raised primarily by minority organizations (Arabs and Ethiopians). In response to this finding, SHATIL initiated a search for ways to increase the cultural sensitivity of service delivery. (pp. 233–235, emphasis in original)

This reflective discussion by Waysman and Savaya on the mixed methods purposes of their evaluation study attends to both planned and unplanned-but-actualized purposes for mixing methods. In this way, this discussion models strong and effective mixed methods thinking. In applied social inquiry, plans sometimes go awry and more often do not fully anticipate all the events that actually unfold. The Waysman and Savaya discussion focuses on the particular constructs and issues they were endeavoring to understand, as in client *satisfaction* with SHATIL services, and how and why they might mix methods to better understand these constructs and issues. In these ways, this discussion also models strong and useful practical thinking regarding the planning of mixed methods purposes and subsequent methods choices. This point is elaborated in the section that follows.

PRACTICAL PROCEDURES FOR THINKING ABOUT AND IDENTIFYING MIXED METHODS PURPOSES

The practice of social inquiry is substantially more complicated, contingent, and organic than any theory of methodology could ever hope to prescribe. And this is especially true for theories of mixing methods in social inquiry. Most practical social inquiry studies have multiple questions or hypotheses, each involving multiple constructs or variables, or issues or concerns to be addressed. So does one mix methods for different questions or hypotheses, different constructs or issues, or what? And what about overall inquiry design, as in survey or quasi-experiment or action research or case study? Does one mix at this level of methodology, or is mixing centered on the assessment and understanding of particular constructs or issues or concerns?

These are questions with as yet uncertain answers, questions that are more fully engaged in the next chapter on mixed methods design. At this point, various participants in the mixed methods conversation offer different and distinctive views on just what is being triangulated with a mixed methods purpose of triangulation, or just what is being expanded with an expansion purpose, as well as just what is being mixed in a mixed methods study.

The guidance offered in this book focuses on mixing methods around the assessment or measurement of particular constructs or variables, or issues or concerns, or in some cases around the inquiry questions being posed. There are several reasons underlying this perspective. First, this perspective maintains and reinforces the idea that methods choices *follow* substantive decisions, that methods are positioned *in service to* the substantive questions of interest in a given context. It is only after an overall inquiry purpose is identified—say, to *explain changes* in middle school students' lunch choices accompanying the implementation of the *Eat Right!* program—and after the particular

constructs or variables of interest have been identified—say, calorie and nutritional content of food chosen and students' reasons for choosing foods at lunch—that the inquirer considers methods choices. In this context, the inquirer may productively choose a mix of observational, unobtrusive, and interview methods. Second, one of the most generative possibilities in mixed methods inquiry is the troubling of assumed or taken-for-granted meanings of a given construct—for example, what constitutes a healthy diet for children and youth—with dissonant data from another source or perspective. Healthy diets from the perspective of a nutrition expert are likely to be quite different from what young people themselves think is healthy, and this may well vary by ethnic subculture in the United States today. This dissonance can offer highly generative and meaningful opportunities for better understanding and, in turn, more thoughtful and effective action in the context at hand.

Third, by focusing on the mixing of methods around the assessment of key inquiry constructs, attention is drawn conceptually to the paradigmatic and mental models that could accompany each method choice, and thereby to the issues related to mixed methods paradigmatic stances discussed in Chapter Five. So in making decisions about the purposes for mixing methods around the assessment of a given construct and then about the particular methods to mix, the inquirer also engages the more abstract question of mixing paradigms along with mixing methods. At the same time, by focusing the mixing of methods around the assessment of key inquiry constructs, attention is drawn practically to the more concrete issues of sampling, analysis, and quality criteria. Placing the focus on deciding how to measure the inquiry constructs of interest thus simultaneously engages the more abstract questions of philosophical assumptions and conceptual stances *and* the more concrete decisions about actual data gathering and analysis.

Fourth and finally, beyond these conceptual reasons, there is the practicality of considering and making mixed methods decisions. At this stage in the development of the field of mixed methods social inquiry, it is most straightforward and easiest to focus the mixing on the assessment of the key constructs and issues being studied in a given context. This is not to reject the value of mixing at other stages in the inquiry. As discussed more fully in Chapter Seven, several contributors to the mixed methods conversation have offered thoughtful ideas about mixing inquiry designs and even inquiry purposes that go beyond the mixing of methods for data gathering, analysis, and interpretation (*and their accompanying mental models*). From a practical view, I would maintain, however, that the mixing of methods for assessing inquiry constructs and issues of interest—and the associated sampling, analysis, and interpretive mixes invoked—constitute the most basic, straightforward, and again, generative approach to choosing what to mix and why.

These ideas can be illustrated with an example from the SHATIL evaluation. Waysman and Savaya were especially interested in the *satisfaction* of client organizations with the services provided by SHATIL. This construct of satisfaction was measured in all three phases of the evaluation. In the first phase, qualitative focus

group interviews with a purposeful sample (aiming for diversity) of representatives from client organizations yielded information on the "perceptions and experiences from a broad range of SHATIL's clients regarding service delivery, unmet needs, and areas of concern" (p. 231). This information thus contributed to the contextual definition and understanding of the construct of client satisfaction in this evaluation context. The use of qualitative methods in phase I represents the authors' choice of the mixed methods purpose of expansion. The authors then engaged a mixed methods development purpose when they used the information generated in phase I to construct the questionnaire used in phase II. This questionnaire was administered to all client organizations, yielding a more structured assessment of client satisfaction. Then, again with a mixed method development purpose, the authors chose questionnaire respondents with extremely high and extremely low satisfaction scores on the questionnaire and conducted two follow-up focus groups in phase III, specifically pursuing the factors related to satisfaction and dissatisfaction for these two groups.

MIXED METHODS PURPOSES AND STANCES ON MIXING PARADIGMS WHILE MIXING METHODS

The final entry in this chapter on mixed methods purposes addresses the connections between such purposes and the various stances on mixing paradigms or mental models while mixing methods that were discussed in Chapter Five. Struggling with connections of this kind is an important part of the development of any theory of methodology. A stronger, more coherent, and more useful methodological theory comprises interconnected and integrated parts (Greene, 2006).

Although there is no one-to-one correspondence between stances on mixing paradigms or mental models and mixed methods purposes, there are some logical alignments and connections. There are presented in Table 6.2. A review of this table provokes

TABLE 6.2. Connections Between Mixed Methods Paradigm Stances and Purposes.

Mixed Methods Paradigm Stances	Logically Compatible Mixed Methods Purposes
Purist stance ■ Different paradigms have incommensurable assumptions. ■ Paradigms guide and direct practical decisions.	*Within one paradigm*, all purposes except initiation are compatible. Because it is not possible to mix paradigms while mixing methods, initiation is not a good fit to a purist stance

(continued)

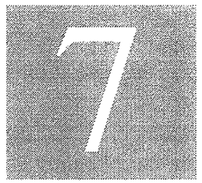
(Table 6.2 continued)

A-paradigmatic stance ■ Paradigm attributes can be easily mixed and matched. ■ Context, not paradigms, guides practical decisions.	All purposes are compatible and could constitute a good fit, depending on the context.
Substantive theory stance ■ Paradigms are importantly different but not incommensurable. ■ But substantive theory, not paradigms, guides practical decisions.	*Within one substantive theory*, all purposes except initiation could be a good fit.
Complementary strengths stance ■ Paradigms are importantly different but not incommensurable. ■ Paradigms, context, and theory all guide practical decisions, but paradigms should be kept separate.	Triangulation and expansion are the best fit because methods, and accompanying paradigms, need to be kept separate. Complementarity and development could also be compatible.
Dialectic stance ■ Paradigms are importantly different but not incommensurable. ■ Paradigms, context, and theory all guide practical decisions, and paradigms should engage in dialogue.	Initiation is the best fit. Complementarity and development could also be compatible.
Alternative paradigm stance ■ Old paradigms should give way to new ones that embrace multiple methods. ■ New paradigms, context, and theory all guide practical decisions.	This depends on the characteristics of the alternative paradigm being used.

several important reflections. First, further work on the connections between paradigm stance and mixed methods purpose is needed, as the alignments suggested in Table 6.2 remain quite rough. Second, to fulfill its strong generative potential, the mixed methods purpose of initiation requires some important mixing of underlying paradigmatic assumptions, or conceptual ideas and perspectives, or both. Absent such mixes, an initiation mix is more likely to be disappointing. And third, compatibility and fit are also importantly influenced by context, as suggested by several of the contingent entries in this table.

The discussion now turns to issues of mixed methods designs. As will be evident by the discussion in Chapter Seven, the planning of a mixed methods study is just as iterative as the planning and design of most other social inquiry studies. Identifying purposes for mixing methods and developing a design that fulfills such purposes—including choices of specific methods, samples, analyses, quality criteria, and interpretation and reporting strategies to employ—both involve an iterative process of negotiation, review, and refinement.

CHAPTER



DESIGNING MIXED METHODS STUDIES

THE PRACTICAL part of this mixed methods journey continues. In this chapter, the traveler will visit the relatively well developed territory of mixed methods design. Distinctively, this territory is quite crowded with multiple ideas for different kinds of mixed methods designs, each offering a useful framework. The traveler will visit various design frameworks and develop an understanding of the particular character of each, as well as the commonalities and differences among them. To aid understanding, illustrations of selected designs will also be offered. The traveler's toolkit will be significantly expanded upon leaving this territory of mixed methods design.

The design of a mixed methods study follows directly from the identified purpose for mixing, because different purposes call for different *mixes* of methods, different *priorities* or weights allocated to the different methods, different *interactions* among the methods during the course of the study, and different *sequences* of implementation. These are the primary dimensions of mixed methods design that have emerged as important thus far in the developing theories of mixed methods social inquiry.

In this chapter, I will discuss these dimensions of mixed methods design, present their connections to mixed methods purposes and paradigm stances, and illustrate their applications in inquiry practice. Because, in my thinking, types of mixed methods designs

follow on from the identified purposes for mixing, different mixed methods designs will be portrayed as closely linked to their respective mixed methods purposes. In addition, I will briefly describe selected other formulations of mixed methods design alternatives championed by other contributors to the mixed methods conversation.

Prior to this discussion of different types of mixed methods designs, I will present two other perspectives and sets of ideas on the nature and potential of mixed methods design. These perspectives relate to broader, more macro design issues and represent important continuing challenges for the field. Specifically, these broader issues are (1) the challenges of mixing methods at different stages of the inquiry process, as most thoughtfully engaged by Abbas Tashakkori and Charles Teddlie, and (2) the merits and feasibility of mixing methods within a single inquiry study or across studies within an integrated program of research, as engaged by Janice Morse and others.

MIXING METHODS AT DIFFERENT STAGES OF SOCIAL INQUIRY: MIXED METHODS AND MIXED MODEL DESIGNS

This discussion outlines the evolution of thinking by Abbas Tashakkori and Charles Teddlie about mixed methods design typologies and their associated thinking regarding what are the critical design dimensions for mixed methods inquiry and what are meaningful variants of mixed methods design. This story not only relates important information about mixing at different stages of inquiry, but also provides a glimpse of the rapid pace at which the field has evolved in recent years.

Beginning with their 1998 book *Mixed Methodology: Combining Qualitative and Quantitative Approaches,* Tashakkori and Teddlie have advanced important ideas about the mixing of methods and methodologies at different stages of the inquiry process. Rooted in their embracement of the end of the paradigm wars and their adoption of a pragmatic orientation for social inquiry, these theorists have turned their lens on the big picture of social inquiry design, with a bounded focus on traditional quantitative and qualitative inquiry traditions. Their work has differentiated the mixing of these two broad inquiry traditions at the level of overall design (such as survey, quasi-experiment, or case study) from the mixing of more specific techniques of data gathering and analysis characteristically but not inherently linked to different inquiry traditions (such as structured, standardized, theory-driven, quantitative techniques, contrasted with unstructured, contextual, emergent, qualitative techniques). Mixing at the level of overall design was until recently called *mixed model social inquiry* by Tashakkori and Teddlie. This overall design level primarily refers to inquiry purpose and questions and engages differences like a broad orientation to exploration or confirmation for the study. Mixing at the level of data gathering and analysis technique was until recently called *mixed methods inquiry* by these authors; it refers to the mixing only of different kinds of data gathering and analysis methods (qualitative and quantitative).

As elaborated in the following discussion, Tashakkori and Teddlie's perspectives conceptualize method as separate or at least separable from philosophical paradigm or mental model. Thus they have perceived the need to discuss mixed *model* designs,

which feature the mixing of paradigms and broad inquiry orientations and purposes, in addition to mixed *method* designs, which in their formulation do not. In this book, I have adopted the stance that method cannot be divorced from the inquirer's assumptions about the world and about knowledge, the inquirer's theoretical predispositions, professional experience, and so forth. Rather, I believe that method is always implemented from *within* a particular assumptive framework. So when one mixes methods, one may also mix paradigmatic and mental model assumptions as well as broad features of inquiry methodology. This explanation of our different perspectives notwithstanding, Tashakkori and Teddlie's concentration on different stages of inquiry remains valuable.

In their 1998 book, these authors offered a typology of mixed model designs that incorporated three distinct stages of inquiry and the possibility of mixing at each stage. Rooted in evaluation theorist Michael Patton's earlier ideas about mixed methodology (1980), these three stages are:

1. Type of investigation, including the formulation of inquiry questions or hypotheses—exploratory versus confirmatory. Exploratory studies pose questions and usually precede confirmatory studies, which test hypotheses.
2. Data collection operations, including design, measurement techniques, sampling, and data quality criteria and procedures—qualitative versus quantitative.
3. Data analysis and inference—qualitative versus statistical.

> *A 2×2×2 cross-classification of these [three stages] leads to eight types of models for conducting research. . . . Two of the eight resulting types of studies are the traditional qualitative and quantitative models. The other six categories are mixed model studies, combining components of the qualitative-quantitative distinction across different stages of the research process. (Tashakkori and Teddlie, 1998, p. 56)*

For example, one mixed model features a confirmatory intent and qualitative data operations and analysis. Another, noted as "rare," features an exploratory intent and qualitative analysis of quantitative data (with prior "qualitizing" of the quantitative data).

Finally, more complex mixed model designs, called *multiple mixed model designs* by Tashakkori and Teddlie, feature mixing *within* one or more stages of inquiry. These studies, that is, could combine both an exploratory and confirmatory intent, both qualitative and quantitative data collection operations, both qualitative and statistical analysis and inference. In many ways, the discussion in the present book focuses on these more complex mixed model studies, as my focus is on mixing different ways of gathering, analyzing, representing, and thus knowing human phenomena. And in critical ways, Tashakkori and Teddlie's emphasis on the prior importance of the purpose of the inquiry—"the preeminence of the research question over considerations of either paradigm or method" (p. 167)—echoes my own convictions that methodological decisions are always made in service to substance (Chapter Six).

In the introductory (Teddlie & Tashakkori, 2003) and concluding (Tashakkori & Teddlie, 2003b) chapters of the ambitious *Handbook of Mixed Methods*, these authors refine and expand their earlier thinking about mixed methods and especially mixed model designs. They distinguish between monostrand and multistrand mixed model studies. Monostrand studies are the eight models generated in the 1998 matrix formed by crossing the three stages of inquiry. In these studies, the mixing happens across stages of inquiry such that one stage is of a different inquiry genre than the other two. Multistrand mixed model studies—acknowledged by Tashakkori and Teddlie as actually more common than monostrand studies in both theory and practice and clearly the emphasis in this book—involve "multiple types of questions . . . and both types of data and data analysis techniques. The inferences that are made on the basis of the results are both subjectivist/constructivist . . . [and] objectivist . . . in approach. This type of design may be sequential or parallel," meaning the methods are implemented one after the other or at the same time (Teddlie & Tashakkori, 2003, p. 30).

Teddlie and Tashakkori (2003) further identify more specific subtypes of multistrand mixed model designs, based on (1) whether or not the overall orientation, purpose, and questions of the study are mixed; (2) whether or not methods for data collection, analysis, and inferencing are mixed; and (3) which procedure for mixing is used—concurrent implementation, sequential implementation, or conversion of one data type into another. And they reemphasize that a mixed model design requires mixing in more than one stage of inquiry, whereas a mixed methods design mixes only during the methods stage. For example, in a sequential mixed model design, one type of study is conducted as the first strand (say, a survey). Then the results of that strand are used to generate purposes and questions for the second strand, which involves a study of a different type (say, a case study). Inferences from both strands together contribute to overall meta-inferences from the study. Finally, "fully integrated mixed model designs are the most advanced, and most dynamic of all mixed model designs. . . . In this type of study, multiple approach questions are asked and answered through the collection and analysis of both QUAL and QUAN data" (p. 689). In the *Handbook* final chapter, these design ideas are very usefully illustrated with diagrams that help the reader differentiate one from another.

The latest update on mixed methods and mixed model designs from these authors (Teddlie & Tashakkori, 2006) offers still further refinements on their thinking and situates mixed methods studies in a "general typology of research designs." Notably, they drop their prior distinction between mixed methods and mixed model studies, arguing that "newer conceptualizations of mixed methods research all recognize the fact that a study is not considered mixed if there is no integration across stages" (p. 14). And they point out that the definition of mixed methods research adopted for the new *Journal of Mixed Methods Research* also emphasizes the importance of integration. For this journal, "mixed methods research is 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" (p. 15). In this regard, these authors coin the label *quasi-mixed design* for

studies that lack this important integration across inquiry stages. Second, Teddlie and Tashakkori focus their latest design typology on four major dimensions:

1. The number of methodological approaches used, distinguishing between mono-method and mixed methods designs (and thus situating mixed methods inquiry in a more general typology of inquiry design)
2. The number of strands or phases in the inquiry design, distinguishing between monostrand and multistrand designs
3. The type of implementation process—concurrent, sequential, or conversion
4. The stage of integration

An example of a mixed methods design in this typology is a *concurrent mixed design*, in which "there are at least two relatively independent strands: one with QUAL questions and data collection and analysis techniques and the other with QUAN questions and data collection and analysis techniques. Inferences made on the basis of the results from each strand are synthesized to form meta-inferences at the end of the study" (p. 20). This and other mixed methods designs are also illustrated in this paper with examples from the field.

The work of Tashakkori and Teddlie has centered around the development of a meaningful and useful *typology* for designing mixed methods studies. They have argued, generally convincingly, for the value of mixed methods design typologies for guiding practice, legitimizing the field, generating possibilities, and serving as useful pedagogical tools (Tashakkori & Teddlie, 2003b; Teddlie & Tashakkori, 2006). Typologies are organized conceptual categorizations of possibilities that are generated by cross-classifying key dimensions of interest. In my view, the most important features of a typology are the dimensions used to create it. And in this regard, the work of Tashakkori and Teddlie has contributed generative ideas and possibilities to the mixed methods field. Their work has singled out key dimensions of difference in mixed methods inquiry and creatively engaged such dimensions in the generation of various mixed methods design typologies. They have made the further point that an exhaustive typology of mixed methods designs is not possible, due significantly to the frequent mutation of a planned design into other diverse forms. For example, as noted in the previous chapter, a mixed methods study developed for purposes of complementarity could readily generate results that do provide, in a complementary fashion, an enriched understanding of a complex phenomenon (as intended), alongside results that converge on particular facets of this phenomenon as well as results that are more dissonant and divergent (not as intended). As observed by Maxwell and Loomis, "the actual diversity in mixed methods studies is far greater than any typology can adequately encompass" (2003, p. 244). These observations notwithstanding, the typology development of Tashakkori and Teddlie constitutes an important contribution to the ongoing development of mixed methods thinking and practice.

As discussed further in the following discussion, my own thinking about mixed methods design shares considerable intellectual space with that of Tashakkori and Teddlie, but also contains some differences. As noted already, one difference is that in my view, method is always implemented from *within* a particular assumptive framework. This is not to say that methods are wedded to particular paradigms or inquiry traditions (see chapters Four and Five), but rather that an inquirer's own interpretive understanding of the social world and of the theoretical and practical intent of the study inevitably color the ways in which methods are implemented and data understood. Self-conscious attention to these assumptive frameworks (paradigms, mental models) is engaged at the outset of a mixed methods study when the inquirer decides which paradigmatic stance makes the most sense for that study (Chapter Five). This idea of paradigmatic stance is aligned with Tashakkori and Teddlie's design dimension of "number of methodological approaches used," but constitutes a more elaborated conceptualization of what it may mean to mix methodological approaches or paradigms or mental models when one conducts a mixed methods study. A second difference between my design thinking and that of Tashakkori and Teddlie is that I intentionally seek to provide space for multiple different paradigms and methodological approaches, whereas these authors concentrate on broad quantitative and qualitative traditions. Finally, although we all agree that methods decisions are made in service of *substantive* purpose, I perceive a stronger link between an intended *purpose for mixing* and mixed method design decisions. There is certainly ample space in the contemporary mixed methods conversation for these complementary yet distinct sets of ideas.

MIXING METHODS WITHIN A SINGLE STUDY OR ACROSS STUDIES IN A PROGRAM OF RESEARCH

Our early empirical study of fifty-seven mixed methods evaluation studies (Greene et al., 1989) yielded a number of key dimensions that distinguish various mixed methods designs in practice, one of which was whether the methods were mixed within a single study or across studies in a coordinated program of research. (The other dimensions that surfaced in this review will be further discussed later in this chapter.) In some important ways, this design dimension stands apart from the others in character and in underlying rationales for one position or another.

As presented in Chapter Five in discussing the "complementary strengths paradigm stance" for mixed methods studies, several contributors to the mixed methods literature have argued that the mixing of methods and associated assumptive stances can be risky to the integrity of any given method and thus the quality of the data obtained from that method (Brewer & Hunter, 1989). These authors have argued that therefore methods must be kept carefully separated from one another to preserve the distinctive strengths of each one.

Janice Morse (2003) shares this concern about methodological integrity and argues that to preserve such integrity requires that any given study has only *one* "theoretical drive," defined as "the overall direction of the project as determined from the original

questions or purpose and is primarily inductive or deductive" (p. 190). So in a study with an inductive drive, qualitative data would be likely primary and quantitative data supplemental, serving only to illustrate or support the inductive inferences attained. For a study with a deductive drive, the reverse would be true. Then different drives could be used across studies in the same program of research and meta-inferences developed from them collectively. But a given study cannot mix primary drives or purposes; specifically, argues Morse, a given study cannot be both inductive and deductive in intent. This stance is importantly different from that presented in this book and from that presented by Tashakkori and Teddlie (see also Yin, 2006). These latter theorists distinguish a major mixed methods design dimension as the "number of methodological approaches used." And a primary argument of this book is that some of the greatest potential of mixed methods inquiry is the generative possibilities that accompany the mixing of different ways of knowing, perceiving, and understanding. So this design dimension of mixing within or across studies remains strongly contested in the field. The remaining discussion of mixed methods designs will focus on the mixing of methods *within a given study,* as that is more consonant with the premises of this book.

DIMENSIONS OF DIFFERENCE IN MIXED METHODS DESIGN

In addition to the five particular and interesting mixed methods purposes discussed in Chapter Six, our empirical review of mixed methods evaluation studies (Greene et al., 1989) also generated seven design dimensions along which this sample of studies took distinctive form. These dimensions, which we called *characteristics* or *elements* but conceptualized as continua or dimensions, and our original descriptions of them follow (from Greene et al., 1989). As is evident, our focus at that time was on the mixing of qualitative and quantitative methods and traditions, although this was more informed by practice than intentionally framed by theory.

1. *Paradigms.* The design characteristic labeled *paradigms* refers to the degree to which the different method types are implemented within the same or different paradigms. We recognize that any given pair of methods either is or is not implemented within the same paradigm, rendering this design characteristic dichotomous. Evaluation practice, however, commonly includes multiple methods of both types. [So this characteristic should be considered] holistically, representing the degree to which the whole set of methods is conceptualized, designed, and implemented with the same or different epistemological frameworks.
2. *Phenomena.* The term *phenomena* refers to the degree to which the qualitative and quantitative methods are intended to assess totally different phenomena or exactly the same phenomenon.
3. *Methods.* The methods characteristic represents the degree to which the qualitative and quantitative methods selected for a given study are similar to or different from one another in form, assumptions, strengths, and limitations or biases.

4. *Status.* This characteristic represents the degree to which a study's qualitative and quantitative methods have equally important or central roles vis-à-vis the study's overall objectives. . . . [That is, status refers to] the relative weight and influence of the qualitative and quantitative methods with respect to their frequency and their centrality to study objectives.
5. *Implementation: Independence.* The degree to which the qualitative and quantitative methods are conceptualized, designed, and implemented interactively or independently can be viewed on a continuum.
6. *Implementation: Timing.* [This refers to whether the different methods are implemented concurrently or sequentially.] Although we represent this characteristic as a continuum, we again recognize that a given pair of methods is typically implemented concurrently or sequentially, not in between. Yet, a short quantitative method could be paired with a longer qualitative method, or pre-post tests could be implemented before and after participant observation. . . . Variation on this design element also arises from the use of multiple methods within a mixed set.
7. *Study.* The final design characteristic labeled *study* is essentially categorical. The empirical research . . . encompassed [either] one study or more than one study. (pp. 262–264)

Like the initial set of purposes, these design dimensions continue to be relevant to mixed methods discussions. Different participants in these discussions use different labels for these dimensions and identify different ones as most important. Some of these design dimensions have been reallocated to other parts of mixed methods thinking and emerging theory. And a few other dimensions of importance to mixed methods design have been added over the years, notably the "number of strands or phases" included in Teddlie and Tashakkori's most recent design typology (2006). Yet for the most part this initial set of design dimensions that can usefully differentiate one kind of mixed methods design from another has been remarkably resilient.

In my own thinking, different mixed methods designs appear to be most centrally distinguished by the design dimensions of (1) the intended independence or interaction among different methods during the process of a study, and (2) status (called *dominance* in John Creswell's design types). A mixed methods study in which the various methods remain independent from one another is very different from a study in which the various methods are intentionally interactive during the course of the study's implementation. And a mixed methods study with one primary and one supplementary methodology (or sets of methods) is quite different from a study in which the various methodologies or sets of methods are granted relatively equal weight and status in the study. With respect to the other five design dimensions from our original empirical review, in my thinking the *paradigms* dimension is now incorporated into the idea of varying mixed method paradigmatic stances presented in Chapter Five, and the *phenomena* dimension is actually well captured by variations in mixed method

purposes discussed in Chapter Six. The *timing* of the implementation of different sets of methods is often linked to purpose, determined by practical considerations, or of little consequence to the overall study. For example, timing in a mixed methods study with a development purpose is necessarily sequential, whereas timing in a mixed methods study with a triangulation purpose is necessarily concurrent. So this design dimension continues to usefully describe different mixed methods designs but less usefully helps an inquirer thoughtfully consider design options of consequence. And as noted earlier, the mixing in one *study* or across a set of studies is a distinct design element that is accompanied by its own continuing debate.

That leaves the design dimension of *methods,* referring to "the degree to which the qualitative and quantitative methods selected for a given study are similar to or different from one another in form, assumptions, strengths, and limitations or biases" (Greene et al., 1989, p. 262). In some important ways, this design dimension has not received the attention it merits, even though the opportunity to compensate for inherent method weaknesses, capitalize on inherent method strengths, and offset inevitable method biases was a strong and compelling initial rationale for the mixing of methods in social inquiry (Cook, 1985; Mark & Shotland, 1987b), and remains so for some theorists today (Onwuegbuzie & Johnson, 2006). This dimension of mixed methods design could give important guidance on what particular kinds of methods to select in a given inquiry context. Yet not enough is known about methodological strengths and weaknesses, propensities and biases. And these are not only technical concerns, as in social desirability biases in survey responses or overestimates of pre-post gains due to regression to the mean. These are also contextual and political concerns, as in the varying credibility of some forms of data among different audiences for social inquiry and the differential capacity of different methods to meaningfully capture and represent the interests and perspectives of different members of a social context. Especially lacking is good empirical research on many of these issues. May I encourage the mixed methods community to take up this challenge of learning more about methodological strengths and weaknesses through empirical study alongside conceptual analysis?

In the next section, I present my ideas about designing mixed methods studies, focusing on the two key design dimensions of interaction-independence and status but also carrying along the popular design dimension of sequence and, again, directly connecting these design ideas to mixed methods purpose. In some important ways, my ideas about mixed methods purposes represent the broad macro level of design intention and rationale.

COMPONENT AND INTEGRATED MIXED METHODS DESIGNS

As noted previously, in my thinking, the most salient and critical dimensions of mixed methods design are (1) whether the methods chosen are implemented relatively independently from one another and connected or mixed only at the level of inference

or the methods are implemented in planned interaction one with the other throughout the course of the study, and (2) whether the methods are intended to be of relatively equal weight in a study *or* one (set) is considered primary and the other secondary. Sequencing of methods (concurrent or sequential) is also relevant to mixed methods design distinctions, but again more descriptively and linked closely to the intended purpose for mixing. These key design dimensions do not form a meaningful or practically useful typology in my view, but rather constitute two broad clusters, based on the independent-interactive design dimension of difference, which my colleague Valerie Caracelli and I have called component and integrated designs, respectively (Caracelli & Greene, 1997).

> *In component designs, the methods are implemented as discrete aspects of the overall inquiry and remain distinct throughout the inquiry. The combining of different method components occurs at the level of interpretation and conclusion rather than at prior stages of data collection or analysis. . . .*
>
> *[Integrated designs] characteristically attain a greater integration of the different method types. The methods can be mixed in ways that integrate elements of disparate paradigms and have the potential to produce significantly more insightful, even dialectically transformed, understandings of the phenomenon under investigation. (Caracelli & Greene, 1997, pp. 22–23)*

Metaphorically, component designs bring different methods into common action or harmony, yet the methods remain distinctly identifiable throughout the study, whereas in integrated designs the different methods are blended or united into a whole. Component designs are high school bands, integrated designs are exquisite symphony orchestras. Component designs are tossed salads, integrated designs are cream soups. Component designs bring into the same family purebred dogs like standard poodles or Labrador retrievers, integrated designs favor intentional mixed breeds like labradoodles (http://labradoodle-dogs.net/) or yorkiepoos (http://www.mixedbreedpups.com/yorkiepoo.htm).

Each cluster of mixed methods design is more fully described in the following section, along with illustrative examples. A complete listing of all possible designs in each cluster is not possible, because, as discussed previously in this chapter and in Chapter Six, mixed methods practice is considerably more varied than any design framework could comprehensively describe. In particular, in mixed methods theories, design clusters and typologies focus on the mixing of two different kinds (or sets) of methods for purposes of assessing one or more discrete constructs. Yet like much social inquiry, most mixed methods practice entails multiple sets of methods, each assessing multiple constructs. This discrepancy between the simplicity of mixed methods theory and the complexities of social inquiry practice is further pursued through examples later in this chapter.

Component Designs

Mixed methods studies in which different types of methods generally remain separate and are discretely identifiable throughout the study—that is, component designs—are arguably more common in practice than mixed methods studies with intentional blending or merging of methods, data, and inference. It is quite common today for applied social inquirers to use a variety of methods in an empirical study, analyze the data from each independently, develop a set of conclusions or inferences that represent each method and data set, and then at the end of the study endeavor to make some linkages or connections among the various sets of results. The kind of linkage made often reflects the purpose for mixing. Yet making such linkages effectively and defensibly remains a nontrivial task and thus an important area for further work in the mixed methods field.

For example, qualitative data are often intentionally used to help "explain" quantitative findings. To illustrate, an educational researcher studying organizational correlates of the achievement gap may conduct ethnographic classroom observations of purposefully selected interactions among students and between teachers and students as a way to identify additional classroom-level factors of possible importance. The researcher wishes to use these qualitative data to help explain the results of her regression analysis, which assessed the relationship of multiple organizational factors at the district, school, and classroom level to student achievement. How can defensible explanations be generated when the data come from different samples and represent different lenses? In another common example, program evaluators often use qualitative methods to assess the quality of program implementation and quantitative methods to assess the magnitude of program outcomes, and they also wish to use the implementation data to help understand and explain the outcome results. How can evaluators meaningfully and defensibly connect implementation and outcome data when the data take different forms and represent different phenomena?

This challenge of linking or connecting the results from different methods is likely a combination of an analytic challenge and an interpretive challenge. Analytically, some of the ideas presented in Chapter Eight on mixed methods data analysis may be relevant. Interpretively, the challenges of defensibility and warrant of inference remain, to which some of the ideas in Chapter Nine on quality criteria for mixed methods studies may pertain.

Back to component designs: there are two well-established examples of component mixed methods designs and other less well-established possibilities. These possibilities are imagined by categorizing the key characteristics of the well established designs, as presented in Table 7.1, and then envisioning the remaining possibilities. Such imaginings are one value of typologies.

Convergence. The use of two or more different methods to measure the same phenomenon for purposes of convergence represents the classic mixed methods purpose of triangulation. This design may most useful when a study includes critical constructs or phenomena that require inferences of nearly unquestioned quality. Key outcomes in an evaluation study can require multiple measurement for just such

TABLE 7.1. Component Mixed Methods Design Examples.

Example of Component Design	Relevant Mixed Methods Purpose	Phenomena Assessed with the Different Methods	Status of Methods	Sequence of Implementation	Linking Task
Convergence	Triangulation	Same	Equal	Concurrent	Comparison of results
Extension	Expansion	Different	Variable	Variable	None or connection of results

reasons. The strongest convergence design requires not just separation but independence of method, one from the other. With independence, convergence in results cannot be attributed to one method possibly influencing the other during the course of the study. The strongest convergence design also includes methods of relatively equal weight and methods that are implemented close enough in time to each other that the phenomenon being assessed does not change. The linking or connective task in a design intended for triangulation purposes is one of comparison—that is, comparing the results of one method to the results of another method and assessing the nature and degree of convergence. In a classic mixed methods article, Todd Jick observed in a now well-quoted commentary:

> *It is a delicate exercise to decide whether or not results have converged. In theory, a multiple confirmation of findings may appear routine. If there is congruence, it presumably is apparent. In practice, though, there are few guidelines for systematically ordering eclectic data in order to determine congruence or validity. For example, should all components of a multimethod approach be weighted equally, that is, is all the evidence equally useful? If not, then it is not clear on what basis the data should be weighted, aside from personal preference. Given the differing nature of multimethod results, the determination [of convergence] is likely to be subjective. (Jick, 1983, p. 142)*

A classic mixed methods study by Gretchen Rossman and Bruce Wilson (1985) provides excellent examples of convergence and triangulation in action. The study involved a three-year evaluation of regional educational service agencies (RESAs), which operated regionally to provide services to groups of school districts not available to each district separately. Data collection methods included surveys and

interviews of school and RESA personnel and analysis of documents. The methods appeared to be of relatively equal weight and implemented at the same time. Two analyses seeking "convergence in argument" are shared by the authors. The first, "qualitative converging with quantitative," focused on the perceived helpfulness of the RESAs by local school personnel. The quantitative survey data from school administrators were used to identify RESAs at both extremes of perceived helpfulness and the qualitative interview data from these same administrators then reviewed to assess convergence. "Farmland" was most positively rated on the survey and was characterized in the interviews as "extremely helpful, innovative, and entrepreneurial" (p. 635). "Rural-Industrial" was most negatively rated on the survey and was described in the interviews as "not much help and as not having any curriculum service" (p. 635).

> *Thus, interview data were used to corroborate the idea that the two RESAs were perceived quite differently. In this case, the quantitative data drove the selection of agencies for [follow-up qualitative analysis] and built the initial argument about variation in service orientation. Qualitative data were then used to show convergence with the initial quantitative data—to corroborate through another method that variation existed. (p. 635)*

The second convergence analysis in this study illustrated "quantitative converging with qualitative" results. This analysis focused on the primary role adopted by the RESAs being evaluated. A document analysis of agency mission statements yielded roles that included two types of assistance and one of enforcement—general assistance through multiple services, focused assistance through training and knowledge dissemination, and regulation or enforcement of state policy. This qualitative categorization was then corroborated through analysis of survey data from employees in each agency. The survey "probed the extent to which [employees] played eleven different roles (designed to reflect the differences between assistance and enforcement)" (p. 636). Factor analyses of these data, followed by bivariate plots of each agency on the two resulting factors, "yielded data that corroborated findings generated through qualitative methods" (p. 636). Rossman and Wilson's creative and thoughtful mixed method analytic work remains exemplary today.

Extension. The use of different methods to assess different phenomena represents the mixed methods purpose of expansion. In this purpose, a mixed method lens extends methods choices to more than one methodological tradition, thus enabling selection of the most appropriate method for each construct in an expanded set of study foci. The specifics of this design are contextually and practically determined, rather than guided by methodological considerations related to the mix of methods. As noted earlier, there can be an interesting analytic challenge of connection in this design—finding ways to link the results of one method with those of a different method. So although common in practice, the extension mixed methods study does not present or offer particular opportunities for a mixed methods way of thinking.

Integrated Designs

Integrated mixed methods designs, in which the methods intentionally interact with one another during the course of study, offer more varied and differentiated design possibilities. Like the linking challenge in component designs, the interaction challenge in integrated designs is undertheorized and understudied. Yet the particular ways in which samples, instruments, data sets, and analyses may "interact" or "have a conversation" with one another during the conduct of a study constitutes the very heart of integrative mixed methods inquiry. Thus, in addition to the mixed methods classics and the excellent empirical examples that are beginning to appear in both mixed methodological and substantive forums, continued conceptual work on this challenge is needed.

Examples of integrative mixed methods designs are offered next and tabulated in Table 7.2. Because in integrated designs the methods are always assessing the same phenomenon (though often both different and overlapping facets of this phenomenon), this column is excluded from Table 7.2.

TABLE 7.2. Integrated Mixed Methods Design Examples.

Example of Integrated Design	Relevant Mixed Methods Purposes	Status of Methods	Sequence of Implementation	Integrative Task
Iteration	Development	Preferably equal	Sequential	Data representation
Blending	Complementarity Initiation	Preferably equal	Concurrent	Joint analysis or connection during analysis
Nesting or embedding	Complementarity Initiation	One method primary	Concurrent	Joint analysis or connection during analysis
Mixing for reasons of substance or values	Complementarity Initiation	Preferably equal	Variable	Joint analysis, comparison or connection during analysis

Iteration. A mixed methods study in which the results of one method are used to inform the development of another (including instrumentation, sample selection, and implementation) represents long-standing inquiry practice in multiple methodological traditions, now brought under the mixed methods umbrella. In an iterative design, the methods are by definition implemented sequentially and are preferably—though not necessarily—of equal weight. The preference for parity in method influence reflects my bias toward the generative and dialogic possibilities in mixed methods inquiry, which are best enacted in spaces with equity of perspective and voice. But iterative designs may just as effectively meet the needs of a given context with one primary and one supplementary method. An excellent example of an iterative design, which included three stages over a period of several years, is the Eckert (1987) study of the displacement of low-income elderly residents of single room occupancy hotels by gentrification that was presented in Chapter Five. This study was initiated with a four-year ethnographic stage, followed by two stages of quasi-experimental comparison of seniors forced to move with those who lived and remained in nearby hotels.

The integrative task in an iterative design is to represent the results of one method in ways that meaningfully inform the desired development of another. For example, in the Eckert study, the extensive results of the ethnography needed to be represented in thematic ways that captured important or vulnerable facets of the seniors' daily lives that could be threatened by relocation; for example, eating a nutritious diet. These themes then constituted the starting point for the development of more structured instruments that could measure these facets of seniors' lives in the next quasi-experimental phase, pre-post and longer-term follow-up.

Blending. A very common mixed methods design in practice is the use of two or more different methods to assess varied facets of the same complex phenomenon, representing the mixed methods purposes of complementarity or initiation. Again, the methods are preferably (in my view) of generally equal weight in the study and are implemented concurrently so that the phenomenon of interest does not change across methods. And the integrative task is one of joint analysis or connection between data of different kinds during the analysis process.

The Rossman and Wilson (1985) evaluation of RESAs cited earlier offers an interesting example of a blended design for purposes of complementarity, involving the surveys and interviews they conducted with school personnel. Recall that these two methods appeared to be of relatively equal status in the study and were implemented at the same time. The blended part of this mix of methods involved the assessment of how the RESAs delivered services to local educators.

> *Analysis of interviews with district administrators identified five different service delivery modes: long-term project assistance, workshops, brief interactions, telephone contacts, and use of the resource center.* How *contacts are made is important to service agencies. However, further elaboration is needed to understand* to what groups *services should be targeted. To answer that we made use of quantitative data. (Rossman and Wilson, 1985, p. 637, emphasis added)*

Analysis of the survey data explored how frequently teachers and administrators used each of these service delivery modes.

> *We found that administrators received considerably more services from their RESA than did teachers. Most dramatically, administrators were in touch with RESA personnel via the telephone over ten times as often as teachers. . . . Teachers apparently did not have the same informational needs, although we had anticipated much higher teacher use of workshops and resource centers. (p. 637)*

In this example, then, the interviews identified different types of service delivery modes and the survey contributed the frequency of use of each mode by local administrators compared to teachers. Together, these data offered a more complete portrait of RESA service delivery and use than either could alone. This same study further illustrates a blended design implemented for the mixed methods purpose of initiation, which Rossman and Wilson describe as "the analytic function that turns ideas around" (p. 637).

I have used the Rossman and Wilson evaluation study to illustrate both a convergence and a blended design. And both designs have been illustrated with the same set of methods—document analysis as well as interviews and surveys (with both RESA and school personnel). This study thus provides an excellent example of how mixed methods practice characteristically happens; specifically, how a given set of methods can in fact be mixed for more than one purpose. This is primarily because each method is measuring multiple constructs and the mix happens at the level of construct or phenomenon. The convergence example focused on the constructs of the perceived helpfulness of the RESA by local educators and the primary role adopted by each RESA (assistance or enforcement). The blended example focused on the construct of RESA service delivery. The methods used thus assessed all of these constructs and others, permitting multiple purposes for mixing and multiple design types—all with the same set of methods. Clearly, not all mixed methods purposes can be fulfilled with the same mix of methods, as some purposes require method independence and others method interaction, and some require sequential and others concurrent method implementation. But many mixed methods purposes can be fulfilled with the same mix of methods. Finally, this evaluation study preceded much of the conceptual work in mixed methods inquiry by a good ten years. Thus it is likely that the evaluators engaged these various mixed methods purposes through thoughtful and creative analyses, rather than by intentional design. The educational value of their work remains enduring nonetheless.

Embedding or Nesting. A somewhat rare but potentially generative integrative mixed methods design involves the embedding or nesting of a supplementary or secondary method in the design and implementation of the study's primary methodology or set of methods. *Distinctively in this design, the secondary method follows or adheres to key parameters of the primary method—for example, sampling or designed controls—rather than following the parameters usually associated with this secondary*

method. This design can serve mixed methods purposes of complementarity or initiation. And like the blended design, the integrative challenge is one of joint analysis or connection between differing data sets during the process of analysis.

Another classic mixed methods study illustrates this embedded or nested design, with a mixed methods purpose of initiation. Maxwell, Bashook, and Sandlow (1986) embedded ethnographic observation methods in an experimental evaluation of the outcomes of physicians' participation in one hospital's medical care evaluation (MCE) committees. These committees were charged with regularly reviewing patient records against explicit criteria for the treatment of particular diseases. The committees aimed to identify instances in which the quality of care provided in the hospital could be improved.

In the quasi-experimental design, some MCEs were selected to participate in an educational program developed to improve the functioning of MCEs. A set of matched control MCEs was also identified. Multiple quantitative measures— including knowledge tests, clinical case recall interviews, and analysis of patient records—were used to assess knowledge and performance outcomes for physicians in both experimental and control MCEs. In addition, ethnographic observations were conducted of both experimental and matched control MCEs, *following the sampling parameters of the quasi-experiment rather than the characteristic purposive sampling associated with ethnography.* The observations focused on documenting the committees' functioning and learning. (See also Gibson-Davis & Duncan, 2005, for an example of ethnographic methods implemented in tandem with a randomized experimental design, and another example of the ethnographic methods using the sampling parameters of the experiment.) The quantitative measures demonstrated significant positive effects for the experimental MCEs, results that were illuminated and enhanced by the ethnographic data.

Specifically, the authors of this study intentionally joined critical features *of meaning and understanding* (from the ethnographic methods) with *causal explanation* (from the quasi-experimental design), thus well illustrating an initiation intent. And the ethnographic data indicated that the knowledge and performance changes yielded by the quantitative measures came from an unanticipated causal process (again, well illustrating the generative potential of the mixed methods purpose of initiation). The design of the study assumed that participation in the revised MCEs would directly increase physicians' knowledge regarding diagnosis and treatment. Instead, the ethnographic data revealed that the program's effects were achieved indirectly by increasing the physicians' confidence in applying knowledge that they already possessed.

Mixing for Reasons of Substance or Values. Finally, there are integrated mixed methods designs that use a mix of methods for particular forms of "better understanding" (the overall purpose or rationale for mixing methods) that are directly tied to the substantive or ideological framework being employed in the study. In previous work, we called the former of these designs *holistic,* in which "the mixed methods tension invoked by juxtaposing different inquiry facets [representing different methodological traditions] is transferred to a substantive framework, which then becomes the structure

within which integration occurs" (Caracelli & Greene, 1997, p. 27). Examples of such substantive frameworks include a social science theory, a program theory in an evaluation study, and a concept map.

Mixing methods for more values-based or ideological reasons has been commonly called a *transformative* mixed methods design, following the "transformative paradigm" advanced by Donna Mertens for mixed methods inquiry (Mertens, 2003). In this design, "the rationale for mixing methods ha[s] less to do with methodology and more to do with values or ideology . . . [for example, mixing methods] to represent pluralistic interests, voices, and perspectives, and through this representation, both to challenge and transform entrenched positions through the dialog that the . . . inquiry fostered" (Caracelli & Greene, 1997, p. 29).

Reprise

As suggested by this discussion, the process of developing a thoughtful and appropriate mixed methods design is less a process of following a formula or a set of prescriptive guidelines and more an artful crafting of the kind of mix that will best fulfill the intended purposes for mixing within the practical resources and contexts at hand. Key dimensions of difference in mixed methods designs include the planned independence or interaction among the methods and data sets during the course of the study and the equal or unequal status and prominence accorded to each method or set of methods. Design is importantly anchored in mixed methods purpose—which stems directly from overall inquiry purpose—and is shaped by context and resources. To reiterate two other important aspects of designing mixed methods studies, first, a selected mixed methods purpose—and associated design—for a given inquiry may not always be fulfilled. Intended triangulation may become complementarity or even initiation, as results may diverge instead of converge. Intended complementarity may become either triangulation (in cases of convergence) or initiation (in cases of divergence), or even both for different phenomena. This is not inherently problematic, but likely engages the generative potential of mixed methods inquiry. And second, mixed methods practice is very much more complicated than theory. Theory suggests simplistic mixing of two or more methods for one purpose. Yet because our methods assess multiple phenomena, one mix of methods may be designed for multiple purposes. This is illustrated in the following discussion by revisiting the SHATIL evaluation that was introduced in Chapter Six, as well as the RESA evaluation used as examples in this chapter. Prior to this illustration, other authors' formulations of mixed methods designs will be briefly presented.

OTHER FORMULATIONS OF MIXED METHODS DESIGN

Ideas about mixed methods design have constituted the busiest site of creative development in the mixed methods theoretical literature. The ideas of Tashakorri and Teddlie and of Morse were presented at the beginning of this chapter. Snapshots of three additional prominent mixed methods design frameworks follow.

The Interactive Design Approach

Joseph Maxwell (Maxwell, 1996; Maxwell & Loomis, 2003) has offered a different way of thinking about and approaching the design of mixed methods studies. Rather than focusing on "types" of and typologies for mixed methods designs, Maxwell presents an interactive approach that engages all of the primary components of inquiry design (inquiry purposes, conceptual framework, inquiry questions, validity strategies, and methods) in a networked or weblike association rather than a linear or cyclical sequence. This approach also employs

> *a distinction between two approaches to explanation, which we call* variance theory *and* process theory, *[evoking] somewhat different definitions of these two types of research [quantitative and qualitative, respectively] from those found in most other works, and thus it leads to a somewhat different idea of what mixed methods research consists of. (Maxwell & Loomis, 2003, p. 243, emphasis in original)*

Maxwell presents his ideas as complementary to rather than competitive with others in the field.

At the center of Maxwell's interactive framework for designing social inquiry, including mixed methods studies, are the inquiry questions. The inquiry questions "function as the hub or heart of the design because they form the component that is most directly linked to the other four. The [inquiry] questions need to inform, and be responsive to, all of the other components of the design" (p. 246). The process of design then involves the iterative development of the inquiry questions, in interaction with the overall inquiry purposes and conceptual framework *and* in interaction with the planned data gathering and analysis methods and validation criteria and strategies. Maxwell and Loomis offer thoughtful discussion of the paradigm issue in their formulation of mixed methods design, as well as highly instructive analyses of existing designs using the interactive framework. They conclude by citing five particular advantages or contributions of the interactive approach to mixed methods design, including the following:

- The interactive design model that we have presented can be a valuable tool in understanding the integration of qualitative and quantitative approaches and elements in a particular study. . . .
- There is considerable value in a detailed understanding of how qualitative and quantitative methods are actually integrated in particular studies. For example, the degree of integration of qualitative and quantitative elements in the conceptual framework, analysis, or validity components of a study might not correspond to the integration of data collection methods. . . .
- [Finally], the design model that we have presented is a tool for designing or analyzing an actual study rather than a template for designing a particular *type* of study. In a sense, we are presenting a more qualitative approach to mixed methods design, emphasizing particularity, context, holistic understanding, and the process by which a particular combination of qualitative and quantitative elements plays out in practice, in contrast to a more quantitative approach based on categorization and comparison. As with qualitative and quantitative approaches in general, we advocate an integration of the two approaches. (pp. 267–269, emphasis in original)

A Typology of Mixed Methods Design that Focuses on Sequencing and Status of Methods

The work of John Creswell (Creswell, 2002; Creswell, Plano Clark, Gutmann, & Hanson, 2003) has focused on the development of a mixed methods design typology that is anchored in the design dimensions of (1) sequence of implementation—sequential or concurrent—and (2) the priority given to one method or set of methods versus methods of equal status. Attention is also given to the stage of mixing and the presence of an explicit "theoretical perspective." These dimensions form six major types of mixed methods designs in Creswell's typology, as follows:

1. Sequential explanatory design, "characterized by the collection and analysis of quantitative data followed by the collection and analysis of qualitative data. Priority is typically given to the quantitative data, and the two methods are integrated during the interpretation phase of the study" (Creswell et al., 2003, p. 223). In this design, the qualitative data function to help explain and interpret the findings of a primarily quantitative study.
2. Sequential exploratory design, "characterized by an initial phase of qualitative data collection and analysis followed by a phase of quantitative data collection and analysis . . . [with] priority given to the qualitative aspect of the study [and] the findings . . . integrated during the interpretation phase. . . . The primary focus of this design is to explore a phenomenon" (p. 227).
3. Sequential transformative design, in which one method precedes the other, priority may be given to either method, and the results are integrated during interpretation. This design is guided primarily by a theoretical perspective, "whether it be a conceptual framework, a specific ideology, or advocacy" (p. 228).
4. Concurrent triangulation design, which has the same attributes as the convergence design for purposes of triangulation described earlier.
5. Concurrent nested design, similar to the preceding discussion of an embedded or nested design, prescribes the nesting of one method within a study dominated by another method.
6. Concurrent transformative design, which is guided primarily by the inquirer's use of a specific theoretical perspective, as in the sequential transformative design presented earlier.

Extended-Term Mixed-Method (ETMM) Evaluation Designs

As an example of continued developments in the mixed methods field, Madhabi Chatterji (2005) proposed a design for evaluation studies that responds to contemporary pressures for rigorous evidence from experimental studies while simultaneously attending meaningfully to the contextual and temporal dimensions of social phenomena. Dubbed the extended-term mixed-method (ETMM) design, this alternative rests fundamentally on the assumed importance of:

> *a temporal factor to be considered in gaining understandings of programs as they develop and take hold in organizational or community settings. . . . In-depth and often site-specific studies of context variables, along with systematic examinations of program inputs and processes as potential moderators and intervening factors, are a* necessary prerequisite *to both designing and implementing sound field experiments geared toward answering causal questions on program impact. (Chatterji, 2005, p. 15, emphasis in original)*

Chatterji then outlines five principles of the ETMM design and presents a generally convincing argument for its value, especially in policy-oriented evaluation studies.

ILLUSTRATIONS OF MIXED METHODS DESIGNS IN PRACTICE

Two studies described previously are revisited in this section with an eye to the particularities of their mixed methods designs.

The SHATIL Evaluation (Continued)

Design features of the SHATIL evaluation conducted by Mark Waysman and Riki Savaya (1997) well illustrate the core ideas in this chapter. To reiterate descriptive information about this evaluation study from Chapter Six, SHATIL was founded in 1982 by the New Israel Fund to provide technical assistance to the approximately 400 organizations supported by this fund. At that time, these funded organizations worked for social change in varied domains, including human rights, social and economic development for the poor, Jewish-Arab relationships, and religious pluralism and tolerance. SHATIL provided direct assistance in five areas—organizational consultation, fundraising and finance, advocacy, media and public relations, and volunteer recruitment and management—as well as indirect assistance in such forms as professional development and information dissemination.

The evaluation was initiated by SHATIL about ten years after its founding in order to gather feedback from client organizations as input to prospective planning. The evaluation had four objectives:

1. To map the characteristics of organizations that apply to SHATIL;
2. To map the services provided to these organizations;
3. To assess the perceived contribution of SHATIL to the development and goal attainment of these organizations; and
4. To evaluate the satisfaction of these organizations with the services provided by SHATIL. (Waysman & Savaya, 1997, p. 229)

The three phases of the evaluation, progressing from the general to the specific, included the following aims and methods.

1. Phase I "used an open-ended, qualitative learning approach to examine the program's aims, the characteristics of the client organizations, and their needs and experiences. It consisted of two parts: (1) structured personal interviews with senior SHATIL staff, and (2) a series of four focus groups with representatives of organizations that received assistance from SHATIL" (p. 230).
2. For Phase II, a modular questionnaire was developed and administered to all client organizations based on the information gathered in Phase I. The questionnaire assessed client perceptions of SHATIL's services in general, as well their perceptions of the particular services they received.
3. Phase III returned to qualitative methods to assess in more depth particular sources of client satisfaction and dissatisfaction with SHATIL's services. Staff from organizations who responded to the Phase II survey and indicated extremely high or low satisfaction with SHATIL were invited to participate in one of two follow-up focus groups (representing high and low satisfaction).

Table 7.3 offers one matrix portrayal of the methods used and some of the constructs measured in this three-phase evaluation study.

In Table 7.3, method mixes are apparent for several constructs using the same set of methods (the initial client focus groups and the client questionnaire), notably client experiences in applying to SHATIL, client unmet needs, and especially client satisfaction with SHATIL's services. In the design framework presented in this chapter, these mixes best represent the integrated designs of *iteration,* whereby the results of one set of methods (Phase I staff interviews and client focus groups) inform the development of another method (Phase II client questionnaire), and *blending,* whereby different methods tap into different facets of the same complex phenomenon (such as client satisfaction). As noted in the Chapter Six discussion of this evaluation study, additional subfeatures of the design were intended to represent other mixed methods purposes.

The RESA Evaluation

The three-year evaluation of the regional educational service agencies (RESAs) by Rossman and Wilson (1985), cited previously, also well illustrates the use of one set of mixed methods in different design configurations, for different mixed methods purposes. RESAs operated regionally to provide services to groups of school districts not

TABLE 7.3. Mixed Methods Design Features of the SHATIL Evaluation.

Construct Assessed	Phase I Staff Interviews	Phase I Client Focus Groups	Phase II Client Modular Questionnaire	Phase III Client Focus Groups
Specific components and goals of SHATIL services	X			
Client experiences in applying to and working with SHATIL		X	X	
Client satisfaction with SHATIL service delivery		X	X	X
Client unmet needs and areas of concern		X	X	

available to each district separately. Table 7.4 offers one portrayal of the various methods used in this evaluation and a selection of the constructs measured, drawing from the examples presented in this chapter. In these examples, the first two constructs were assessed with a convergence design and the third with a blending design.

CONNECTING MIXED METHODS DESIGNS TO MIXED METHODS PARADIGM STANCES AND MIXED METHODS PURPOSES

The final entry in this design chapter revisits the prior practical steps in planning and implementing mixed methods inquiry—identifying a meaningful stance on mixing paradigms or mental models in the context at hand (Chapter Five) and identifying appropriate purposes for mixing methods for that study (Chapter Six)—and offers logical links to mixed methods design in Table 7.5. As observed at the end of Chapter Six, struggling with connections of this kind is an important part of the development of any theory of methodology. A stronger, more coherent, and more useful methodological theory comprises interconnected and integrated parts (Greene, 2006).

TABLE 7.4. Mixed Methods Design Features of the RESA Evaluation.

Construct Assessed	Document Review	Interviews with School Personnel	Surveys for School Personnel	Interviews with RESA Staff	Surveys for RESA Staff
Perceived helpfulness of RESAs by school personnel		X (administrators)	X (administrators)		
Primary RESA role (assistance or enforcement)	X				X
RESA service delivery mode		X (administrators)	X (administrators, teachers)		

And like the discussion concluding Chapter Six, this portrayal of logical links among the different steps in mixed methods social inquiry provokes further reflections. One, for several constellations of mixed methods paradigm stance and mixed methods purpose, a variety of both component and integrated designs would be compatible. And for the others, there is a stronger logical connection to one broad cluster of mixed methods designs than the other. But these are logical connections, not prescriptive dictates for practice. Two, mixed methods design decisions—even in the presence of a philosophically strong paradigm stance—are *at least* as importantly influenced by overall inquiry purpose, by the substantive character of the phenomena being studied, and by critical features of the context as they are by the assumptions of the paradigm(s) being invoked. And three, this portrayal clearly reinforces the contingent, contextual, and artful character of crafting thoughtful and defensible mixed methods designs. The theoretical ideas presented in these chapters offer sets of conceptual oars for guiding a mixed method, but the rower remains the artist.

TABLE 7.5. Connecting Mixed Methods Designs to Mixed Methods Paradigm Stances and Mixed Methods Purposes.

Mixed Methods Paradigm Stances	Logically Compatible Mixed Methods Purposes	Logically Compatible Mixed Methods Designs
Purist stance ■ Different paradigms have incommensurable assumptions. ■ Paradigms guide and direct practical decisions.	*Within one paradigm*, all purposes except initiation are compatible. Because it is not possible to mix paradigms while mixing methods, initiation is not a good fit to a purist stance.	*Within one paradigm*, most designs are possible.
A-paradigmatic stance ■ Paradigm attributes can be easily mixed and matched. ■ Context, not paradigms, guides practical decisions.	All purposes are compatible and could constitute a good fit, depending on the context.	Component designs Integrated designs
Substantive theory stance ■ Paradigms are importantly different but not incommensurable. ■ But substantive theory, not paradigms, guides practical decisions.	*Within one substantive theory*, all purposes except initiation could be a good fit.	Integrated designs are likely a better fit than component designs.
Complementary strengths stance ■ Paradigms are importantly different but not incommensurable. ■ Paradigms, context, and theory all guide practical decisions, but paradigms should be kept separate.	Triangulation and expansion are the best fit because methods, and accompanying paradigms, need to be kept separate. Complementarity and development could also be compatible.	Components designs are likely a better fit than integrated designs.

(Table 7.5 continued)

Dialectic stance ■ Paradigms are importantly different but not incommensurable. ■ Paradigms, context, and theory all guide practical decisions, and paradigms should engage in dialogue.	Initiation is the best fit. Complementarity and development could also be compatible.	Integrated designs
Alternative paradigm stance ■ Old paradigms should give way to new ones that embrace multiple methods. ■ New paradigms, context, and theory all guide practical decisions.	This depends on the characteristics of the alternative paradigm being used.	Component designs Integrated designs

INTERLUDE

2

MIXED METHODS PURPOSES AND DESIGNS IN ACTION

Moving to Opportunity (MTO) is an ongoing federal demonstration project (initiated in 1994) that provided families living in high-poverty public housing projects with rent subsidy vouchers that could help them move to better neighborhoods. For the experimental group, the voucher could be used only in a community where the poverty rate was less than 10 percent. The experimental group also received housing and relocation counseling. A comparison group was offered Section 8 vouchers that they could use anywhere, and no counseling. A control group continued whatever housing assistance they already had. The vouchers and counseling were offered to some families but not others through a randomized lottery, thus creating a field experiment. This "design provides a unique opportunity to definitively measure and to understand the impacts of a change in neighborhood on the social well-being of low-income families" (http://www.nber.org/~kling/mto/). An excerpt from the ongoing study of MTO in one of its five urban sites (Boston) well illustrates the complexity and variety of mixed methods purposes and designs in practice. This work also dramatically underscores the valuable contributions made possible by mixing methodological perspectives and techniques in the same inquiry project.

Jeffrey Kling, Jeffrey Liebman, and Lawrence Katz (2005) describe the first several years of their mixed methods inquiry in Boston with the provocative title, "Bullets don't got no name: Consequences of fear in the ghetto." This presentation is included

in Tom Weisner's (2005) edited book of mixed methods inquiry in the domain of child development. Broadly, this inquiry project included qualitative methods of direct observation of the operation of the MTO program in Boston and in-depth interviews with housing counselors and with samples of both program and comparison group participants. The primary quantitative methods were a baseline survey administered to all program enrollees, a follow-up survey administered to all families in the study about two years after program enrollment, and an analysis of administrative data on employment and welfare status. The story recounted in the "Bullets don't got no name" write-up describes four ways in which the authors say that "qualitative fieldwork had a profound effect on our MTO research" (p. 244). I will use the mixed methods language of purpose and design presented in chapters Six and Seven to describe this study and then illustratively share some of the ways in which the qualitative fieldwork contributed "profoundly" to the study.

OVERALL MIXED METHODS PURPOSES AND DESIGN

As is customary in social inquiry today, Kling, Liebman, and Katz do not begin their write-up with an explicit statement of paradigmatic beliefs or of the mental models guiding this important empirical study. Yet, as argued throughout this book, social inquiry always proceeds within the assumptive frameworks of the inquirers. And in a mixed methods context, it is important to assess if philosophical assumptions and stances within a mental model are also being mixed, along with techniques from different methodological traditions. For just what is being mixed in a mixed methods study is interlaced with mixed methods purposes and designs. That is, an understanding of the mixed methods purposes and design dimensions employed in a given study requires some understanding of underlying mixed methods paradigmatic stance.

So what is the mixed methods paradigm stance adopted for this early study of MTO in Boston? Based on a careful reading of the written account of this study available *and* on hearing firsthand a presentation of an earlier version of this paper by the lead author, I believe the researchers conducting this study understood, appreciated, and accepted the distinctive character of quantitative and qualitative methodologies. In particular, I believe they understood and valued the inherent contextuality, particularity, and experiential nature of qualitative data, alongside the potential of quantitative data to offer generalizable results and findings. This was especially evident in the narrative and storied character of the qualitative interview guides and resulting data and in the careful econometric estimates of actual treatment-control group differences in outcomes in the quantitative data. That said, I am not sure if the researchers in this study actually mixed paradigms or mental models. I believe that the most likely mixed methods paradigmatic stance used in this study was a substantive theory stance. With this stance, the methods and analytic decisions are guided primarily by the characteristics and contours of what is being studied—in this case, changes in low-income families' lives afforded by moving to a better community—rather than by the assumptive stances

of a philosophical paradigm or mental model. This supposition that these authors' methodological decisions were guided primarily by their conceptual agenda is supported by the emphasis placed in this write-up on the development of "an overall conceptual framework for thinking about the mechanisms through which changes in outcomes due to moves out of high-poverty areas might occur" (p. 244).

The overall design of this study was an *integrated* mixed methods design in which the different methods were of relatively equal weight and were implemented in intentional interaction with one another during the course of the study. The design further involved a sequential and iterative implementation of the different methods for the multiple mixed methods purposes of complementarity, initiation, and development. The *blended* (interactive) character of the design served the mixed methods purposes of complementarity and initiation, and the *iterative* character of the mixed methods design served the mixed methods purpose of development. And again, the underlying driver of this work was the quest for more a complete, elaborated, and nuanced conceptual understanding of the phenomenon and especially the consequences of relocation, along with policy lessons of importance.

More specifically, the study began with a baseline survey of all enrollees in MTO in Boston, which assessed their current living situation and employment, their reasons for wanting to move, and their connections to their neighborhood among other issues. Next, qualitative field work was undertaken to better understand program implementation in context; to "further explore issues, such as the importance of drugs and gangs, highlighted in the Baseline Survey and previous literature; . . . [and] to listen carefully to the stories of MTO families in order to develop new themes for our research that we had not anticipated in advance" (p. 248). The qualitative fieldwork at this stage of the study included onsite observations, extended interviews with the experimental group counselors, and personal interviews with a stratified random sample of twelve participants from the experimental group and the comparison group. (Noteworthy here is the use of the sampling logic of quantitative methodology to select individuals for in-depth qualitative interviews. This mixed methods idea of applying the framework and logic of one methodology to some aspect of a different methodology—an aspect like sampling or analysis—is discussed in both chapters Seven and Eight.) The use of the baseline survey to help *develop* priority questions for the qualitative interviews is evident in this methodological description—as is the *initiation* intent to develop new themes not anticipated in advance.

Following completion of the interviews, Kling et al. developed a structured survey instrument that comprised the basis for the study's quantitative analysis. The results of the interviews, say the authors, importantly "caused us to refocus our quantitative data collection strategy on a substantially different set of outcomes" (p. 244) from those initially planned, again well illustrating a development agenda. The outcomes initially planned were those familiar to labor economists—the employment patterns and earnings of MTO adults and the school experiences of MTO children. Yet of often dramatic salience to MTO parents in the interviews were concerns about safety and health,

especially the safety of their children amidst daily crime and violence. So the study's main survey was refocused to include these other dimensions of daily life, well illustrating a complementarity agenda.

MIXED METHODS CONTRIBUTIONS TO THE MTO STUDY

Examples of the understandings attained in this study from its mix of methods are offered below. Readers are encouraged to read for themselves this account, and others from the MTO program of research, to better appreciate the powerful contributions of both stories and statistics.

Inclusion of a Broader, More Comprehensive Set of Outcomes

As noted earlier, this study assessed a broad set of possible outcomes of relocation, extending beyond those often studied by economists to those of salience to program participants (and reflecting such other disciplines as community and child development). Interestingly, the largest program effects were demonstrated for the outcomes related to health and safety. If these had not been added to the study, the MTO program might have been judged a failure, when in fact dramatic improvements in some families' well-being were accomplished through their MTO participation. In turn, without the survey, the generalizable importance of these health and safety outcomes for families moving out of high-poverty communities would not have been demonstrated.

Development of a Broader, More Comprehensive Conceptual Framework for Understanding Relocation

The need to live life "on the watch" captures key strands of the nuanced conceptual framework generated in this study to help explain the salient consequences of moving out of a high-poverty community. The interviews with MTO mothers yielded powerful descriptions of the fear for their children's safety that they experienced on a daily basis in their original home community. These mothers did not perceive the violence in their community as directed at them, but they were terrified that their children would be hurt simply by being in the wrong place at the wrong time. This fear engendered a vigilance on the part of their mothers such that "their entire daily routine was focused on keeping their children safe" (p. 244). Clearly then, moving to a community with a much less intense incidence of violence relieved some MTO mothers, who moved out from under the enormous responsibility of keeping their children safe every minute of every day, which opened up spaces in their lives for other things, like engaging with their children's school and education more fully.

And the fullness, complexities, and contextuality of this conceptual framework very well fulfills the ambition of integrated mixed methods designs to generate a more comprehensive understanding and account of the human phenomena being studied. (See further information on this study at www.jcpr.org/wp/wpprofile.cfm?id=247.)

CHAPTER

8

MIXED METHODS DATA ANALYSIS

THE MIXED METHODS traveler will visit the territory of mixed methods data analysis in this chapter. This territory presents many creative ideas for analyses that integrate different kinds of empirical data, most of which continue to be contributed by practitioners. So the conceptual territory of mixed methods data analysis itself still remains under development. Thus the traveler through this territory will sample from the rich storehouse of mixed methods analyses in practice and ideally be inspired to contribute his or her own creative work to this emerging site of mixed methods development.

The analysis strands of social inquiry are the heart of the investigative and interpretive process. Whether analysis is guided and assisted by statistical models and sophisticated software or by a sorting of narrative content and inductive reorganization of data collected, the meanings of the data are interlaced throughout the analytic process. These meanings, however, are not so much readily apparent in analytic results as they are inferred and interpreted by the inquirer as he or she engages in the work of data analysis. That is, statements of inquiry conclusions, interpretations, or warranted assertions arise from the mind of the inquirer, not directly from the output of a statistical or thematic analysis. Inference and interpretation are fundamentally human cognitive processes.

So it is with mixed methods data analysis and, in particular, with the mixing part of mixed methods data analysis. Such mixing can be aided by analytic frameworks, procedures, strategies, and even software, as the work of Pat Bazeley—to be described later in this chapter—enticingly illustrates. Yet the mix itself—in particular, the interpretations of the meanings of the mix—reside in the cognitive processing of the inquirer. As such, the mixing part of mixed methods social inquiry will always defy complete codification and will always resist inflexible prescriptions (Miles and Huberman, 1994).

Nevertheless, the mixed methods field remains ripe for further conceptual work on the challenges of analyzing, in well-planned and meaningful ways, multiple data sets of different form, content, and character. These challenges are especially important for integrated designs that intentionally incorporate a back-and-forth conversation among diverse methods and data sets. The mixed methods field can also continue to benefit from the creative thinking of diverse social inquirers in the form in exemplars of empirical mixed methods analytic work. Excellent exemplars exist; several will be shared in this chapter. And in the time-honored tradition of learning from case examples, these exemplars are highly instructive. They offer windows into numerous and distinctive analytic possibilities and potentialities. And further, they well illustrate how a mix of methods generated understandings and inferences that would not have been possible in a monomethod study.

This chapter first presents some ways of thinking about mixed methods data analysis, ways that are consonant both with the inherent cognitive character of data interpretation and inferencing and with the mixed methods way of thinking that is the signature message of this book (see Chapter Two). Then, extant work on approaches to mixed methods data analysis is presented in a framework that focuses on the particular analytic phases and processes that constitute important opportunities for mixing. Various forms of mixing are also discussed. The chapter concludes with three exemplary and highly instructive cases of creative mixed methods analysis.

The discussion in this chapter concentrates on analysis in integrated designs, as these require meaningful mixing during the conduct of the analysis, and as strategies and procedures for integrative analyses remain underdeveloped. The ideas in their general form are also relevant to component designs, especially to the nontrivial challenge of connecting results and conclusions from two or more different methodologies. But the mix for component designs is only at this stage of conclusions and inferences and thus presents fewer challenges.

THINKING ABOUT MIXED METHODS DATA ANALYSIS

These thoughts represent several key principles that guide my own thinking about, planning for, and conducting mixed methods data analyses:

- Decisions about analytic strategies and procedures in a mixed methods study are importantly connected to, but not dictated by prior methodological decisions. That is, the inquirer's identified mixed methods paradigm stance, purposes for mixing,

and design dimensions for a particular study characteristically indicate broad analytic directions, but rarely specify particular analytic procedures or strategies.

- Mixed methods analysis for component designs proceeds more or less *independently* for each method or set of methods, following the procedures of each methodological tradition. Then the mixing or linking or connecting happens at the inquiry stage of interpretation and inferencing. In contrast, a hallmark characteristic of integrated mixed methods designs is the intentional *interaction* among different sets of data during the study, especially during the analysis stage. Just how that interaction takes place represents an opportunity for creative ideas and imaginative thinking.
- Interactive mixed methods analyses are highly iterative and are best undertaken with a spirit of adventure.
- Not every creative idea for interactive analyses will generate sensible or meaningful results. As in all social inquiry analyses, some routes undertaken with hopeful excitement turn out to be dead ends.
- Interactive analyses should include planned stopping points at which the inquirer intentionally looks for ways in which one analysis could inform another. These stopping points are best planned during the analytic phases that are most opportune for mixed analysis work. These phases are discussed in the next section.
- Convergence, consistency, and corroboration are overrated in social inquiry. The interactive mixed methods analyst looks just as keenly for instances of divergence and dissonance, as these may represent important nodes for further and highly generative analytic work.
- Challenges to data quality and integrity can arise in interactive mixed methods data analysis, as the data themselves become changed, even transformed into other forms and frames. The discussion in Chapter Nine takes up these challenges but does not fully address them, as issues of data quality in mixed methods work are just beginning to be addressed.

MIXED METHODS DATA ANALYSIS STRATEGIES

In all forms of social inquiry, data analysis serves to (1) reduce and organize the raw data into a manageable form that enables comprehensive descriptive reporting, as well as defensible further analyses; (2) assess patterns of interrelationships, connections, or trends, as well as differences, in the data; and (3) support and validate conclusions and inferences. The primary activities or phases of data analysis characteristically include some or all of the following:

1. Data cleaning—The data set is reviewed for valid responses, methodological soundness, and indicators of variability and range. This phase can also include psychometric analyses related to instrument and data quality. Data considered suspect or not defensible are deleted or set aside for further review at a later time.
2. Data reduction—The raw data are analyzed and reduced to descriptive form. This form could consist of frequencies, descriptive statistics, factors, case summaries, descriptive themes, or other reduced displays of descriptive information.
3. Data transformation—In this phase, quantitative data may be standardized, scaled, factor analyzed, or transformed into log linear form; qualitative data may be transformed into critical incidents, chronological narratives, or other forms of displays; and symbolic data (for example, photographs) may be transformed into a different sequence or display. Transformation may also take the form of data consolidation, whereby data from different instruments, time periods, sites, cases, and so forth are merged into one overall data set. The development of indices representing multiple variables or constructs is one popular form of data consolidation. *It is also possible to transform one form of data into another—notably quantitative to qualitative and vice versa—and to consolidate different forms of data into one merged data set.* The primary purposes of transformation, including consolidation, are to enable further higher-order analyses.
4. Data correlation and comparison—This phase investigates patterns of relationship in the data set, marking clusters of variables, themes, or stories that appear to go together, as well as what importantly differentiates one data cluster from the others. Quantitative analyses in this phase can include correlations, cluster analyses, and various analyses of variation. Qualitative analyses can include matrix cross-tabulations of themes, contexts, critical incidents, and stories, as well as comparative analyses across cases or contexts or stories. *It is also possible to assess patterns of relationship across different forms of data (qualitative and quantitative) and to compare relational findings from one form of data to relational findings from a different form of data.*
5. Analyses for inquiry conclusions and inferences—In this final phase of analysis, higher-order analyses are conducted in support of study conclusions or inferences. For quantitative data, these characteristically include multivariate analyses, such as multiple regression and multivariate analyses of variance, as well as modeling techniques such as structural equation modeling, path analysis, and hierarchical linear modeling. For qualitative data, these analyses may include the inductive development of warranted assertions from the data, the creation of composite stories, the reordering and recoding of the data into a final set of coherent and cohesive themes, or sophisticated cross-node analyses with NVivo or another software system. *Once again, it is possible to conduct these higher-order analyses across data sets of different forms.*

The italicized entries in this list signal critical points for analyses across data sets of different forms; in other words, interactive mixed methods data analysis in an

integrated mixed methods design. These critical points include the analytic phases of data transformation, data correlation and comparison, and analyses for inquiry conclusions and inferences. The discussion now turns to extant ideas and strategies for such interactive analyses for each of these critical points in the analytic process. It should be noted that the interactive strategies are not necessarily exclusive to the phase of the analysis in which they are discussed. In the adventurous spirit of interactive mixed methods data analysis, social inquirers are encouraged to imagine different enactments of at least some of these strategies for other junctures in their mixed methods analysis.

Data Transformation and Consolidation

In our empirical review of empirical mixed methods evaluation studies (Greene et al., 1989), we observed only a handful (five of fifty-seven studies) in which different forms of data were integrated during the analysis process. A closer look at these five studies yielded several initial ideas regarding interactive mixed methods data analysis (Caracelli & Greene, 1993).

One of these ideas was "data transformation—the conversion of one data type into the other so that both can be analyzed together. [Specifically], qualitative data are numerically coded and included with quantitative data in statistical analyses, [and] quantitative data are transformed into narrative and included with qualitative data in thematic or pattern analysis" (Caracelli & Greene, 1993, p. 197). Teddlie and Tashakkori (2003) also underscore the value of data transformation in mixed methods data analysis, using the concepts of *quantitized* and *qualitized* data to refer to this analytic strategy. And in their latest thinking, Teddlie and Tashakkori (2006) elevate this analytic approach to a mixed methods design feature, which they label *conversion*. In addition to sequential and concurrent options for the ordering and implementation of different methods in a mixed methods study, these authors suggest that conversion or transformation is a third option within this design dimension.

A second interactive mixed methods data analysis strategy that was yielded by our close examination of the five evaluation studies that had some kind of interactive analysis we labeled "data consolidation/merging—the joint review of both data types to create new or consolidated variables or data sets, which can be expressed in either quantitative or qualitative form. These consolidated variables or data sets are then typically used in further analyses" (Caracelli & Greene, 1993, p. 197). Consolidation is thus a particular form of transformation. To illustrate the potential power and reach of this analytic approach, I will quote at length from our earlier description of one of the evaluation studies that used this approach.

> *Louis (1981, 1982) describes an interactive analytic model . . . [that] is explicitly focused on integrating the data obtained from different instruments, respondents, and observers. The model evolved during a multisite longitudinal evaluation of the Research and Development Utilization Program (RDU). This $8 million demonstration project was funded by the National Institute of Education between 1976 and 1979 to promote the adoption and implementation of new curriculum and staff development materials in 300 local schools.*
>
> *A variety of data collection methods were used throughout the project, including mini-ethnographies based on interviews, observations, and document analysis; . . . standardized site-visit field reports; "event-triggered" reports monitoring a school's progress through the project; and formal principal and teacher surveys. Site-level data were thus rich and diverse; however, no more than 20% of the sites had a complete data set, which seriously constrained cross-site analysis possibilities. To overcome this constraint, these evaluators created a transformed and consolidated site-level data set via the development and application of a "consolidated coding form" (CCF). The form constituted 240 dichotomous or Likert scale items, which were scored by senior staff members who had visited at least four of the sites and were involved in an intensive 2-day session in which common interpretations for consolidated coding were reached. Included on the CCF were variables that could not be readily obtained through traditional survey methods, for example, quality of the decision-making process and pattern of influence of different actors over decisions at various stages in the change process. Moreover, the consolidated data base reflected the holistic knowledge the site-visit team brought to the cases, as well as the reliability of standardized data, integrated both within and across sites.*
>
> *The level of integration of qualitative and quantitative data achieved in the RDU evaluation is captured in the following summary statement: "Can a database composed of numbers that is entirely dependent on the iterative, holistic judgments of experienced site field teams be described as only quantitative? While the analysis procedures used to manipulate the data are statistical, the data itself [sic], and any interpretation of results is totally conditioned by its origins. On the other hand, as we approach any given analysis using case materials rather than quantified data, it has become genuinely impossible not to embed that activity in our knowledge of the descriptive statistics and correlational relationships that were available to us well before data collection had ended" (Louis, 1981, p. 21).*
>
> *Louis cautions that this comprehensive, interactive approach requires constant attention by staff members who are skilled in both quantitative and qualitative data analysis techniques. Low rates of turnover among project staff, who are relatively free of paradigmatic preferences, would also be essential to achieving a high level of integration that was obtained in this evaluation. (Caracelli & Greene, 1993, pp. 201–202)*

Data Correlation and Comparison

A third strategy that was yielded when we more carefully scrutinized the five evaluation studies that had some kind of interactive analysis we labeled "typology development—the analysis of one data type yields a typology (or set of substantive categories) that is

then used as a framework applied in analyzing the contrasting data type" (Caracelli & Greene, 1993, p. 197). At this time, I would relabel this approach *data importation*, referring to the importation of midstream results from the analysis of one data type into the analysis of a different data type. This broader label is not restricted to the development of typologies but rather encompasses multiple and diverse ways that results of midstream analyses of diverse data sets might inform each other. This form of interactive mixed methods data analysis often also includes the analytic strategy of comparison. The key idea here is one of assessing the relational patterns in a data set and identifying what chiefly distinguishes one relational cluster from another, often through some kind of comparative analysis.

One natural example of this interactive mixed methods analytic strategy is to use the factors yielded from a factor analysis of data from a quantitative instrument to sort qualitative interview or observation data and then investigate patterns of commonality and difference among the different factor-groups of qualitative data. Conversely, another example is to use the descriptive themes from an analysis of qualitative interview data to group cases in a quantitative data set and then, again, investigate patterns of commonality and difference among the different theme-groups of quantitative cases. More generally, classificatory results of varying types from an analysis of one type of data could be imported into an analysis of a different type of data and used to group the data and then assess patterns of commonality and differences among the various groups.

The work of Australian Pat Bazeley (2003, 2006) catalogues computerized procedures—involving quantitative and qualitative software packages—for data importation of numerical and textual data into analyses of the other data type. Specifically, Bazeley concentrates on "the use of computers in combining qualitative and quantitative data and in integrating textual analyses (taken here to include analyses of pictorial, audio, and video material) and statistical analyses within the same project" (2003, p. 388). In doing so, Bazeley illustrates various interactive possibilities that engage data correlation and comparison. Some of these procedures involve data transformation as well, and Bazeley's discussion includes features of computer programs that facilitate transformation or conversion. A sampling of the interactive strategies Bazeley (2003) describes is offered next. (The reader is also encouraged to read Bazeley's writing in the original for details of which computer software enable these analyses and how, and also because her approach to analysis and especially her examples well illustrate a "mixed methods way of thinking.")

- *Transferring quantitative data to a qualitative program.* This strategy is commonly used to include demographic data, or less commonly other scaled quantitative data, in an analysis of qualitative data. "The primary purpose of importing demographic and other categorical information into a qualitative database is to allow for comparative analysis of the responses of subgroups [formed by the quantitative responses] . . . with respect to themes, concepts, or issues raised in the qualitative material. It becomes possible to ask how those, say, in their 30s report an experience and then to determine whether this differs from the experience of those who are older and younger" (Bazeley, 2003, p. 396).

- *Transferring qualitative data to a quantitative program.* This strategy requires a transformation or coding of qualitative data into quantitative form, so that they can be analyzed along with the quantitative data, characteristically using nonparametric techniques. Codes can represent the presence or absence or the frequency of themes or categories, or ratings based on an interpretation of text. The inclusion of these indicators of qualitative information can substantially enrich an analysis and resulting conclusions. In an elaboration of this strategy, qualitative data can be arrayed in matrix form (following guidelines of Miles & Huberman, 1994) and then coded in this matrix form for exportation "to a statistical or mathematical database for further analysis using techniques such as cluster and correspondence analysis" (Bazeley, 2003, p. 400).

- *Other forms of data transfer and manipulation.* Bazeley notes that software other than statistical or textual analysis programs permit transfer across programs. In this discussion she highlights the valuable contributions of mapping techniques to mixed methods analysis. "Programs that create a visual representation of links in data through network or concept maps provide a powerful extension to text or numerical descriptions of those data" (2003, p. 410). Examples provided include the graphical output of social network analysis and the relational maps generated by semantic network analysis and various forms of concept mapping.

Bazeley (2003) further offers some thoughtful and instructive reflections on the computer-related issues that can arise in conducting these kinds of interactive analyses. First are issues related to the fundamentally different meanings of codes in quantitative and qualitative data analysis tools.

> *Because codes are the only medium for communicating information in a quantitative data set, they are necessarily precise in what they are conveying. . . . Qualitative coding, by contrast, is often conceptually based and multidirectional in that all text about a particular issue, idea, or experience will be assigned the same code, regardless of the way in which it is expressed. . . . Given these differences in the way in which codes and coding are managed, the critical issue from the point of view of mixed methods computing becomes the meaning of the code that is exported from one type of analysis program to another. (Bazeley, 2003, pp. 414–415)*

Second are issues related to sampling and the goal of the analysis. Qualitative studies characteristically use small, purposefully selected samples aiming for in-depth understanding, whereas quantitative studies characteristically use large, representative samples that aim for generalizability. Applying statistical analyses to coded data from a small sample can be problematic, and applying qualitative inductive analyses to large data sets can be overwhelmingly daunting. Other issues include problems with segmentation of texts and exported coding and additional issues for statistical analysis

of coded qualitative data. Bazeley concludes this *Handbook* chapter by reminding readers that all data analysis, including computer-assisted interactive mixed methods analyses, is not simply a technical activity but rather involves significant craftsmanship and must also be chosen and implemented in service to the overall inquiry questions.

Finally, the Amazon land use study by John Sydenstricker-Neto that was reported in Interlude One also illustrates a particular kind of data correlation and comparison analysis well suited to mixed methods inquiry: the use of fuzzy set analysis. Fuzzy set analysis is a clustering type of analysis that particularly useful for analyzing data representing complex constructs with multiple dimensions, data representing transitions or continua rather than discrete categories, or data that are heterogeneous.

Analyses for Inquiry Conclusions and Inferences

The final cluster of interactive analysis strategies involves joint analyses of datasets of different types that directly support inquiry inferences. This cluster refers not to analyses that follow data transformation or correlation and comparison (because those are implied in the preceding discussion), but rather to analysis strategies that are intended to directly generate study inferences or conclusions. Two promising strategies have appeared in the mixed methods literature and a third elsewhere, each of which relies quite extensively on inquirer judgment and interpretation.

The first is an adaptation by Mary Lee Smith (1997) of a qualitative data analysis technique originally developed by Fred Erickson (1986). Smith's study involved a large-scale, longitudinal policy study of the Arizona Student Assessment Program (ASAP) (1990–1995), which represented an early incarnation of now-widespread standards-based accountability measures in U.S. public education. The study's aim was "to understand educators' responses to this sweeping mandate, in particular how the introduction of the ASAP might have influenced curriculum, pedagogy, school organization, and teachers' meanings and actions" (Smith, 1997, p. 78). The first stage of the study was undertaken with an interpretivist mental model and involved case studies in four ASAP schools. The results revealed particular contextual conditions that influenced how educators in each context responded to the ASAP, including financial resources, the availability of a local reform expert, and the district's valuing of accountability and authority.

> *Although our mental model predisposed us toward qualitative approaches, we believed that survey techniques could provide another angle on the program and could possibly allow us to generalize the working hypotheses and patterns that we developed in the case studies to broad and representative sample. We also recognized that some audiences attach greater credence to quantitative data. (p. 79)*

So in a classic development design, the second stage of the research involved the use of the case study qualitative data to construct a survey assessing ASAP principles, test characteristics (validity and fairness), and testing program effects related to teaching and learning. The survey was administered to teachers and principals using

survey-appropriate procedures for sample selection and data analysis. For the mixed methods purpose of complementarity, the survey was accompanied by teacher focus groups in four selected schools. Additional, nonrepresentative but rich qualitative data were available from the open-ended responses to the survey.

> *Taken together, the components of the study left us with a massive amount of data of such unevenness and apparent dissimilarity that they nearly defied synthesis. Although each component had been analyzed by appropriate methods and reported separately, we felt that the power of the study must lie in the integration of data. We decided to apply Erickson's modified method (1986) of analytic induction as a way to integrate these data.*
>
> *Erickson's method is based on the researcher's repeated reading of the data as a whole and then arriving inductively and intuitively at a set of credible [textual or qualitative] assertions. Assertions are statements that the researcher believes to be true based on an understanding of all the data. Next, the researcher goes through a process of establishing the warrant for each assertion, assembling the confirming evidence from the record of data, searching vigorously for disconfirming evidence, weighing the evidence one way or another, and then casting out unwarranted assertions or substantially altering them so they fit with the data. . . . [The assertions are presented, along with their supportive evidence,] striving for a credible, coherent report based on evidence adequate in amount and varied in kind. (pp. 80–81)*

Smith conducted Erickson's warranted assertion method with the whole ASAP data set, over 2,500 pages. She used data in their rawest form and, despite her own mental model, treated both quantitative and qualitative data as equivalent in "potential to inform" (p. 81). She also engaged the analysis as an exercise in disciplined skepticism. The result was eight warranted assertions (for example, "State inattention to the technical and administrative adequacy of the assessment and accountability system impeded coherent responses to ASAP intentions") and the evidence that supported them. The details of Smith's analytic process are commended to the reader.

The second mixed methods analysis strategy in direct support of inquiry inferences is a quantitative "results synthesis" procedure developed by McConney, Rudd, and Ayres (2002), specifically although perhaps not exclusively for evaluators. In this procedure, "quality of evidence assessments, in combination with judgment-based estimates of what each line of evidence says about program effect, can then be aggregated across diverse data-gathering methods to arrive at reasoned estimates of program effectiveness" (p. 124). The procedure consists of four steps, conducted separately for each program outcome:

1. Rate the program's effect according to each evidence set . . . positive effect, no effect, or negative effect [on a 5-point scale of −2 to +2].
2. Rate each evidence set's worth . . . according to a "CoW" [coefficient of worth] [using criteria] aligned with the particular program [and developed collaboratively with program stakeholders].

3. Combine [by multiplying] program effect ratings with "CoW" ratings, according to the program goal or outcome being examined.
4. Aggregate [by summing] combined ratings [for each outcome] to arrive at a summary program "effectiveness estimate." (p. 124)

These authors present this approach as especially relevant to contexts in need of summative evaluation conclusions "where data divergence is evident and not likely to be resolved (e.g., some lines of evidence suggest that the evaluand is effective, while others suggest that it is not)" (p. 124). As suggested throughout this book, it is also important to acknowledge and respect the value of divergence and dissonance as generative of unanticipated insights and understandings.

Finally, a pattern matching approach (originating with Donald Campbell, 1966) offers a characteristically graphical representational mode for analyzing mixed data sets for purposes of drawing inquiry conclusions and inferences. The essence of pattern matching is the comparison of empirically observed data with conceptually expected patterns of data. Expected patterns are commonly generated from a social science theory of intended effects or, in evaluation, a statement of the theory of the program being evaluated. Observed effects are derived from the data collected. Although not explicitly discussed as an analysis option in the mixed methods literature, pattern matching offers untapped potential for mixed methods analyses supporting inquiry conclusions and inferences. This is, in part, because patterns can be represented numerically, textually, or perhaps more usefully, in graphical and other pictorial form.

Jules Marquart (1990) made creative use of pattern matching ideas in an evaluation of an employer-sponsored child care program provided by a large medical complex in the Midwest. The evaluation focused on the connections between the child care program and employees' performance-related attitudes and behaviors, not on the program's effects on children. Marquart initiated the evaluation by generating a conceptual representation of the child care program based on the understandings of administrators in hospitals that offered the child care program. The representation focused on key employee attitudes and behaviors identified in the relevant literature (for example, recruitment, organizational commitment, stress in balancing work and family, absenteeism). The administrators were also asked to rate the expected causal effect of employer-sponsored child care programs on each of the attitudes and behaviors in the study. A questionnaire assessing these same concepts was also administered to samples of employees who used the child care program and employees who did not.

Marquart conducted two pattern matches comparing expected and observed patterns. The first, a "measurement pattern match," compared a concept map of the administrators' perceptions of the relationships among the key attitudes and behaviors being studied with a concept map representing the observed correlations among these attitudes and behaviors from the employee questionnaire. Comparisons were made with a "coefficient of configurational similarity," which is a Pearson correlation of the distances between the concepts on the two maps. This spatial correspondence coefficient was 0.76, thus supporting the construct validity of the evaluation questionnaire.

The second, an "outcomes pattern match," compared the administrators' ratings of expected causal effects with actual effects observed. This compared the order and magnitude of the effects. "A graphic representation of the two patterns was constructed by lining up the predicted and observed order of effects in columns, side by side, and drawing lines between the two. A Spearman correlation coefficient was calculated between the predicted means and the observed t-values," comparing program users and nonusers (Marquart, 1990, p. 103). The lines drawn evidenced many crisscrosses and the Spearman coefficient was but 0.23, suggesting only limited support for the correspondence between administrators' conceptualizations of significant program effects and those observed. "The implied theory of the causal effects of the program was not supported by the empirical data" (p. 104). (Marquart also used several other creative techniques for assessing pattern matches. The reader is encouraged to read the full article for these details.)

In this example, Marquart was creatively comparing expected and observed patterns of data. The logic and graphical power of pattern matching might also lend itself well to comparisons among different forms and types of data. The evaluation study of technology use in several middle schools (by Cooksy, Gill, and Kelly, 2001) that was presented in Chapter Five takes an initial step in using the logic of pattern matching for a mixed methods analysis. In this study, a program theory was developed to frame the overall evaluation, including data collection and analysis. During the analysis, all data relevant to *implementation* and use of the technology were reviewed and expectations were generated for program *outcomes*. The program theory thus provided both a substantive framework in which multiple data sets could be analyzed, as well as a chronological sequence of program components from which expectations about subsequent components could be generated.

Using Aspects of the Analytic Framework of One Methodological Tradition in the Analysis of Data from Another Tradition

There is one more set of analytic ideas in the mixed methods literature that is connected not to a particular analytic phase, but rather to a broad analytic concept. That is the idea of taking aspects of the analytic framework of one methodological tradition and using them in the analysis of data from another tradition. The idea of conducting ethnographic work—not with *purposeful* samples of people, places, and events, but rather with *random* samples of cases from both an experimental group and a comparison group (as discussed in Chapter Seven)—illustrates this concept in the domain of mixed methods design. Three incarnations of this concept in the domain of analysis follow.

First, more than a decade ago, Matthew Miles and Michael Huberman (1994) proposed the use of *matrices* and *displays* as integral parts of the analysis of qualitative data. A matrix represents an ordered cross-tabulation of data, and a display a characteristically spatial representation of relationships in a data set. Thus the idea of a matrix—specifically the notions of ordered dimensions and cross-tabulation—is rooted in more

quantitative traditions. Yet this idea can be productively and generatively applied to qualitative data to assess possible relationships not otherwise pursued. (See also Lee, 2005, which will be referenced in Interlude Three, for a highly instructive example of a matrix display that combined multiple sets of qualitative and quantitative data.)

Second, the groundbreaking mixed methods work of comparative social scientist Charles Ragin (1987, 2000), briefly cited in Chapter Three, is organized around the contrasting conceptualizations of variable-oriented and case-oriented research. Variable-oriented research seeks explanations of human phenomena in the isolation of influential variables. Case-oriented research seeks to understand human phenomena in all of their historical and contextual complexity. Ragin has developed an application of Boolean algebra that permits joint analysis of variables and cases, especially useful with small samples. Briefly, in this analysis, the qualitative data for each case are coded 0 or 1 (that is, they are transformed) to indicate the absence or presence of selected descriptors, conditions, events, or outcomes. The selection of these descriptors, conditions, and so forth may well be based on a separate analysis of quantitative data. Boolean algebra is then applied to the coded data set to identify the critical configurations of codes that are needed to adequately describe each of the cases in the sample. A "truth table" is constructed that lists the configurations, the number of cases identified by each configuration, and relevant outcome values, leading to the construction of logical equations that summarize the revealed relationships. Boolean algebra enables the analyst to focus on patterns of covariation across cases and to see causal factors as conjunctural rather than additive: "that is, as working together to create an outcome rather than being potentially masked by an associated variable in a multivariate model. The ultimate goal of such analysis is the construction of typologies to describe the cases studied" (Bazeley, 2003, p. 412). Thus, again, an analytic procedure—algebraic processing of numbers—usually associated with quantitative data is used to assess conjunctural relationships among recoded descriptors, conditions, and themes in a case-oriented qualitative data set.

The third instance of mixed methods analysis in which aspects of one methodological tradition are brought over into the analysis of data from another methodological tradition is the work of Onwuegbuzie and Teddlie (2003). This handbook chapter presents a "framework for analyzing data in mixed methods research." This framework rests on two major rationales for mixed methods data analysis: (1) representation or the "ability to extract adequate information from the underlying data" and (2) legitimation or "the validity of data interpretations" (Onwuegbuzie & Teddlie, 2003, p. 353). These concepts of representation and legitimation are themselves taken from continuing conversations primarily in interpretivist and postmodern methodological circles, framed therein as *crises* of representation and legitimation (Schwandt, 2001). Thus, at the outset, these authors are constructing their analytic framework by using concepts that are of currency primarily in one methodological tradition. The authors also include in their framework a generative conceptualization of various kinds of effect sizes for qualitative data (from Onwuegbuzie, 2001), clearly borrowing an aspect of quantitative analysis and using it for legitimation purposes in qualitative data analysis. Finally, the authors propose a seven-step process for mixed methods data analysis—data reduction, display, transformation, correlation, consolidation, comparison, and integration—that is quite similar to that offered in this chapter and that features iterative cycles of interaction among data from different sources and of different types.

TABLE 8.1. Summary of Mixed Methods Data Analysis Strategies.

Phase of Analysis	Analysis Strategy
Data transformation	Data transformation, conversion Data consolidation, merging
Data correlation and comparison	Data importation
Analysis for inquiry conclusions and inferences	Qualitative warranted assertion analysis Quantitative results synthesis analysis Pattern matching
Broad idea: Using aspects of the analytic framework of one methodological tradition in the analysis of data from another tradition	Developing matrices and displays in qualitative data analysis Using Boolean algebra to generate a typology of cases from coded qualitative data Grounding a mixed methods analysis in rationales of representation and legitimation; generating effect sizes for qualitative data

Table 8.1 summarizes the mixed methods data analysis strategies discussed in this chapter.

MIXED METHODS DATA ANALYSIS EXEMPLARS

In this final section of this chapter, three highly instructive examples of mixed methods data analysis are presented. All come from large-scale educational inquiries, two representing research and one, evaluation. The description of the first one draws considerably from a previous description of this same study in a mixed methods journal article (Greene, Benjamin, & Goodyear, 2001).

Adopting a "Mixed Methods Way of Thinking" for Analyzing Data from a Study of Preschool Inclusion

In an oft-cited educational research study of the meanings and correlates of including children with developmental disabilities alongside their typically developing peers in preschool and child care contexts, Shouming Li, Jules Marquart, and Craig Zercher (2000) engaged in multiple, highly creative interactive analyses that epitomize the generative potential of a "mixed methods way of thinking." This study was conducted by the Early Childhood Research Institute on Inclusion, a consortium of five universities across the United States, as part of five-year program of research on preschool inclusion in the 1990s. The overall goal of this program of research was to identify promising strategies for inclusion.

> *The foundational . . . study was an in-depth analysis of the ecological systems of inclusion . . . designed to answer questions about the goals that families, teachers, program administrators, and policy makers have for inclusion; multiple definitions and ways of implementing inclusion; and barriers to and facilitators of inclusion in various settings. (Li et al., 2000, p. 117)*

The study was conducted on a sample of sixteen inclusive preschool programs, four each in four different sites around the country. The programs were identified as inclusive by key informants in each site. They were also purposively selected to demonstrate diversity on program model for inclusion and child and family demographics. In each program, seven children were purposively selected for study—five children were disabled and had an Individualized Educational Plan and two were typically developing peers in the same classroom—for a total of 112 children. In addition, these children's families and teachers and the administrators and policy makers for each program were studied.

The mixed methods design was broadly intended to "provide a broader perspective and deeper understanding of different levels of the ecological systems and the interactions among different levels than could be achieved by a single-method design" (p. 117). More specifically, the mix of methods was selected intentionally to gather both emic, contextualized meanings of key study constructs, and data representing etic, standardized definitions of these same and other constructs. This design thus well illustrates a dialectic paradigm stance (Chapter Five), engaged for mixed methods purposes of complementarity and initiation, among others. A summary of the classroom and family instruments and methods used in this study is presented in Table 8.2.

The analyses from this study were intentionally interactive (befitting the mixed methods paradigm stance and purposes) and included, for example, planned iterations of "qualitative—then quantitative—then qualitative" data analysis; inventive transformations of data from one type to the other; and planned stages of data reduction, transformation, comparison, and integration. During their work, the authors generated three distinct approaches to mixed methods data analysis: (1) a parallel tracks analysis, in which analysis of the different data sets "proceeds separately through the steps of data reduction and transformation until the point of data comparison and integration"

TABLE 8.2. Classroom and Family Measures in the Ecological Systems Study.

Domain	Quantitative Measures	Qualitative Measures
Classroom	CASPERII (Code for Active Student Participation and Engagement, Revised), a direct observational measure of preschool environment and child and adult behavior Peer rating sociometric assessment Battelle Developmental Inventory, a standardized test of development	Participant observation Post-CASPER notes Teacher survey about children's friendships Teacher, service provider, and administrator interviews
Family	Telephone survey	Family interviews Family survey about children's friendships

Source: Li et al., 2000, p. 118.

(Li et al, 2000, p. 120); (2) a crossover tracks analysis, involving the ongoing concurrent analysis of both qualitative and quantitative data, with a focus on facilitating "data comparison, the central stage of mixed-method analysis, by transforming the formats of quantitative and qualitative data to make them more comparable" (p. 126); and (3) a single-track analysis formed by merging or consolidating the data sets early on (Marquart, 1997). The crossover tracks analysis recounted in Li et al. (2000) will be shared next.

This analysis involved the development of case summaries for each of the sixteen programs, which were intended "to provide an in-depth analysis of [the meanings of] inclusion in the programs, to determine barriers to and facilitators of inclusion, and to describe idiosyncratic issues" (p. 125). First, relevant data of both types were analyzed descriptively and reduced in standard ways—quantitative data to graphs and tables, and qualitative data to descriptive themes, narrative sums, and vignettes. Second, selected sets of these reduced data were transformed—the most salient points in quantitative tables and graphs were summed in narrative form, and ordered matrices were developed to capture the main points in the narrative sums. Third—and this is the heart of this analytic approach—the two sets of tables-graphs-matrices (the original quantitative set and the transformed qualitative set) were carefully *compared* for instances of convergence, complementarity, and discordance. Parallel comparisons were conducted on the two sets of narrative sums (the original qualitative set and the

transformed quantitative set). Congruence in these comparisons led to stronger, more valid inferences, and incongruence to further probing and generative insights.

One example of one generative insight for one case summary follows.

- The *descriptive quantitative graphs* of observation data in this site revealed that one child with disabilities "spent more time than her peers staying by herself outside a group setting . . . [and] the least time in circle time, which was the main instructional time each day" (p. 128).
- A *comparison* of these graphs with the (transformed and ordered) matrices of qualitative observation notes pointed to some possible reasons for the initial observation. This comparison indicated that all of this child's "negative behaviors had something to do with her difficulty in staying with a group . . . [suggesting] that her problem was not confined to circle time alone, but might occur in any of the teacher-directed group activities such as work group, story time, and gym class" (pp. 128–129).
- *Further probing* of field notes and teacher interview data revealed a discrepancy in inclusion philosophy and child expectations between the regular teacher and the special education teacher, a discrepancy that was complex, nuanced, and multifaceted. Notably, the special education teacher gave this child tacit permission to leave the group whenever she felt like it, believing that "all children should try their best, but if they still could not follow the rules [for example, sitting still in group time], they should be given time to learn" (p. 129). The general education teacher, in contrast, said that high and consistent expectations are needed for all children so that they can get what they need from the educational program. When a child is exempted from the rules, like participating in group time, "'she is not getting what she should get because she is not staying with the group. She doesn't sit down long enough to pick up what we are doing . . . I feel she is not getting what she really needs as far as an education is concerned'" (p. 129).

This discrepancy in teacher philosophies was viewed as a major barrier to inclusion in this particular program.

Creativity in Analyzing Implementation Data from an Evaluation of the Reading Excellence Act in Illinois

The Reading Excellence Act (REA) was a precursor to Reading First, a federal educational program developed around research-based principles of learning to read. These principles included phonemic awareness (K–1 only), decoding, fluency, background knowledge and vocabulary, comprehension, and motivation. Both initiatives were designed to improve the reading skills of K–3 children in "low performing" schools. In 2001–2003, forty-eight schools in twelve Illinois districts received REA grants (of $100,000 to $200,000) to support the implementation of the REA model, including

acquisition of new reading materials, teacher professional development, and extra staffing in the form of local reading coaches.

The two-year evaluation of REA was designed as a mixed methods study, emphasizing multiple data sources for primary purposes of triangulation and enhanced validity of inferences (DeStefano, Hammer, & Ryan, 2003; Ryan, DeStefano, & Greene, 2001). In particular, the evaluation used multiple methods in assessing implementation of the REA model. "Classroom instructional practices will be represented by local teachers' perceptions . . . data from independent observations of instruction . . . and ratings of student work assembled in school portfolios" (Ryan et al., 2001, pp. 19–20). Consistent with a triangulation intent, all of these measures were organized around the six principles of early reading that formed the substantive basis for the REA program.

In an enhancement of this original purpose, a subgroup of the evaluation team undertook a mixed methods analysis of the program implementation data, focusing on the classroom observation and teacher survey data (as the portfolio data collection was still in process at that time). The primary analytic question was an open one—what can be learned about the extent and quality of REA implementation from a joint analysis of the various data sources? This analysis well illustrates the iterative nature of interactive mixed methods data analysis, the considerable value of working with a team on this kind of analysis, and the spirit of adventure that can substantially enhance the results. In fact, in a conference presentation of the analytic process and findings, the team called their experience "our mixed methods journey" (Kallemeyn, Hammer, Zhu, DeStefano, & Greene, 2003). Using this metaphor, highlights from this analysis are presented next.

First, each member of the team selected one implementation data set to work with—Rongchun Zhu worked with the teacher survey data, Leanne Kallemeyn with the quantitative classroom observation data, and Victoria Hammer with the qualitative classroom observer notes. Second, the team decided to use the classification of sites (districts) into categories of high, medium, and low implementation as a *vehicle to initiate and facilitate the analysis,* not because this classification was of inherent interest and value. The interesting questions here were these: What basis was used for classifying sites into high, medium, and low implementation for each data set? Did the classificatory schemes yield similar or different results? And what sense could be made of patterns of both congruence and dissonance? Third, each team member began the journey by "traveling alone" and conducted the classificatory analysis on his or her own data set, striving to honor the rules of rigor and evidence in that methodological tradition while simultaneously anticipating the need to converse with the other data sets. These solo journeys featured the following highly creative and adventuresome analytic work:

- In working with the teacher survey data, Zhu created a set of rules, rooted in the logic of confidence intervals, for classifying each site as high, medium, or low implementation (for each early reading principle) based on its distance from the overall mean. Then, Zhu used the pattern of these deviations across the six reading principles to classify each site.

- In analyzing the quantitative classroom observation data, Kallemeyn used a rule-guided visual analysis of bar graphs representing the extent of implementation of each reading principle in each site to sort the sites into the categories of high, medium, and low implementation.
- In analyzing the qualitative classroom observer notes, Hammer sought to honor the contextual and holistic nature of observer perceptions and thus focused on the observers' accounts of classroom activities, teacher pedagogical strategies, salient contextual features, and unique characteristics of each observed site. Her classification system incorporated all of these strands of the data.

Fourth, the team "crossed paths" to share and compare the results of their site classifications. (This was actually an iterative process, involving several returns to the separate analyses and then back to the conversation, and back and forth several times.) Finally, a chart that identified the classifications of each site by each analyst was prepared (see Table 8.3). Extensive discussion of this chart—not to resolve the discrepancies but to learn from them—yielded a set of site and implementation characteristics believed to be importantly influential in the REA program. These included, for example, the centralized or decentralized nature of the program implementation leadership, the degree to which extant programs in each site align with the REA principles of early reading, and the degree of administrative knowledge of and support for the REA program. Without this mixed methods analysis, these insights would not have been generated.

Flexibility and Practical Judgment in Analyzing Data on Family Involvement in the School Transition Study

The final example of an instructive mixed methods data analysis illustrates the limitations of mixed methods theory in the midst of an adventuresome exploration about a complex issue in a complicated data set. The researchers in this case developed a thoughtful plan for their analysis, based on many of the ideas shared in this chapter. Yet they reflectively observed that

> *studying different analytic models in advance and setting up collaborative team processes did not prepare us for the messiness and pragmatically driven nature of our analysis. . . . Our analytic tracks [those of the various team members] crossed over frequently as expected but not when we thought they would nor how we thought they would nor for the same reasons as anticipated. (Weiss, Kreider, Mayer, Hencke, & Vaughan, 2005, p. 55)*

Excerpts from this analytic adventure follow. (See also Weiss, Mayer, Kreider, Vaughan, Dearing, Hencke, & Pinto, 2003, for additional discussion of the substantive findings of this analysis, and Greene, Kreider, & Mayer, 2005, for additional discussion of the mixed methods framework for the overall study.)

TABLE 8.3. Site-level Implementation of the REA Reading Principles, by Data Set.

Clusters	Class Observation Quantitative	Class Observation Qualitative	Teacher Survey	Overall
High	Site B	Site B		Site B
		Site E		
	Site F	Site F	Site F	Site F
		Site J	Site J	Site J
		Site G		
High/Medium			Site H	Site E
Medium	Site A			
			Site B	
			Site D	
	Site G		Site G	Site G?
	Site H			Site H?
	Site I		Site I	
Medium/Low	Site D			Site D
				Site I
Low	Site C	Site C	Site C	Site C
		Site A	Site A	Site A
		Site D		
		Site H		
		Site I		
Unidentified	Site E		Site E	
	Site J			

Source: Kallemeyn et al., 2003, reprinted with permission.

The data for this analysis came from the School Transition Study (STS), a large, mixed methods longitudinal study that followed approximately four hundred ethnically diverse children in low-income families from kindergarten through fifth grade (in the late 1990s). The study aimed ambitiously to "understand low-income children's successful pathways through middle childhood and through the school, family, and community contexts in which they live and learn" (Weiss et al., 2005, p. 47). The mixed methods design of the study included annual structured interviews with children's caregivers and teachers and the collection of academic and social indicators of

achievement from the children's schools. A two-year ethnographic component studied in more depth a sample of twenty-three children when they were in first and second grade. These data included caregiver, teacher, and child interviews; community studies; and participant observation.

The researchers' prior interest in the meanings and influence of family involvement in children's developmental pathways, in particular their educational pathways, was piqued by repeated references in the STS interview data to the importance of parents' work. These interview references suggested positive connections between parent work and involvement, contrary to available evidence. So the researchers embarked on a mixed methods analysis of the nature and role of parental employment in the larger framework of family involvement. Their analytic plan was guided by the Li et al. (2000) model of crossover tracks analysis and also included planned and structured team meetings and reflections, as well as a strong mixed methods way of thinking. "A stance of openness and discovery is inherent in mixed-methods work . . . openness to other views and perspectives,[including] not just rival explanatory hypotheses but more profoundly rival ways of thinking and valuing" (Weiss et al., 2005, p. 52).

At the outset, descriptive analyses of the quantitative data set (which focused on school-centric indicators of family involvement, such as attending parent-teacher conferences), yielded "varied and high levels of involvement to further explore" (p. 53). These analyses also "showed parental work as a perceived barrier to family involvement, especially through the time demands it imposed" (p. 53). Yet the initial qualitative analyses, which generated portraits of the work life of case study mothers, revealed a different picture. "Several working mothers described work as a resource for parenting, child learning, and family involvement. . . . Some mothers even took their children to work on a regular basis" (p. 54).

Back to the quantitative data: these qualitative findings generated the construction of several composite variables, from survey scales and factor analyses, to represent the combined time demands of mothers' employment and mothers' educational training (maternal work and education), as well as two family involvement variables—involvement in school and home teaching, or the ways in which mothers supported their child's education at home. Univariate and multivariate analyses with these composite variables indicated that maternal work and education (time demands) "was significantly associated not only with school involvement but also with broadly defined family involvement, which included both school and home activities" (p. 55). To make sense of and interpret these and other quantitative results, the case study members of the team relied increasingly on "their stores of internalized qualitative case study knowledge" (p. 56).

Building on this quantitative analysis, the qualitative data were further analyzed across cases to generate better understanding of the meanings and character of school and family involvement, and especially the role of work therein. The result was a typology of maternal strategies for being involved in their child's education. The categories included developing a complex "kith and kin network" that helped mothers support their child's learning and use their workplace as a home base for a variety of

involvement activities usually performed in other settings, such as telephone conferences with their child's teacher.

Among the reflections offered by this team of analysts are the following:

> *Our contrasting findings about maternal work as a barrier and an opportunity for family involvement underscored the value of mixing methods. . . . This contrast led to new learning beyond what "everyone knows"—that work poses obstacles to involvement—to an understanding that work can also . . . support involvement at school, open up new avenues for family involvement, and contribute to children's learning beyond school walls. (p. 61)*

> *Through this [mixed methods analysis] process we learned to be open to discovery . . . but also to be pragmatic and tolerate complexities. . . . [We learned] that mixed-methods approaches could only be rough guides and that intentional [analytic] designs might have to give way to real-world problems of data availability and deadlines. Accordingly, we developed a sense of our mixed-methods work as a dynamic, hands-on process, guided only very generally by mixed-methods analytic models. (p. 61)*

These reflections underscore the craftspersonship required in mixed methods data analysis. As emphasized in Chapter Seven on mixed methods design, decisions about mixed methods practice involve thoughtful use of theoretical ideas, wise practical judgment, and considerable artistry.

REPRISE

This chapter has presented a portrait of interactive mixed methods data analysis as an adventurous journey. One can plan for this journey by mapping possible routes, scheduling rest stops for checking on progress and well-being, and traveling collaboratively and respectfully with others, even as parts of the journey may also be traversed solo. Yet the plans can only be rough guides, as the data landscapes being explored may present unanticipated challenges—as in missing data or a looming report deadline—*as well as* unanticipated opportunities—as in an empirical puzzle that needs further pursuit or a strand of especially enlightening evidence.

On the one hand, this portrait of mixed methods analysis is not all that different from analyses in other methodological traditions. All analyses are in part detective work and insight. On the other, the unique potential of mixed methods social inquiry is its promise of better understanding. So the mixed methods analysis team should embark on their analytic journey in ways perhaps a bit more open, flexible, creative, and adventuresome than those of other inquirers—with routes more imagined than fixed, with guideposts drawn from the travels of others (many recounted in this chapter), and with a commitment, if not fully to a mixed methods way of thinking, then more modestly to the importance of diverse ways of knowing and valuing.

CHAPTER

9

JUDGING THE QUALITY OF MIXED METHODS SOCIAL INQUIRY

PRACTICAL ISSUES of quality are the focus of this part of the mixed methods journey. The traveler will engage with the challenges of warranting inquiry claims from studies that include a mix of methods representing different inquiry traditions—and thus different ideas about what constitutes a valid or credible inquiry finding. Ideas related to inference quality and to legitimation are showcased in this chapter, along with additional ideas for practices that mixed methods inquirers can use to assess the quality and defensibility of their own inquiry findings. The traveler will be encouraged to add all of these ideas to his or her toolkit, along with a commitment to trying them out in practice, critically and reflectively.

When different forms of data, different kinds of methods, and, particularly, different mental models, or assumptive stances about the social world and social knowledge, are mixed in social inquiry, then how is the quality of that inquiry assessed and judged? What criteria or standards are employed to gauge the level and nature of confidence one can have in the

data? What arguments are mounted to persuade readers of the warrants and justifications for the inquiry results?

In particular, if readers of this volume are engaged by a mixed methods way of thinking, which inherently values difference of multiple kinds, how are such differences respected when making judgments of inquiry quality? For example, some traditions of inquiry are judged by the representativeness of the samples and the generality of the inferences. Others are judged by the richness of the samples and the contextual meaningfulness of the inferences. And still others are judged by the actionability of the inquiry process and especially the knowledge generated. In mixed methods inquiry, are these different criteria and judgments also mixed, and if so, how? Or are there alternative ways of approaching the challenges of judging quality in mixed methods social inquiry?

There are few significant responses to these challenges of judging inquiry quality in the mixed methods literature. So, once again, adventuresome readers are encouraged to put their creativity and ingenuity to this task. Meanwhile, this chapter offers a way of thinking about inquiry quality in mixed methods inquiry, reviews extant work in this domain, and includes selected examples.

THINKING ABOUT INQUIRY CRITERIA IN MIXED METHODS SOCIAL INQUIRY

Mixed methods social inquiry that is conducted from *within* a given paradigm, mental model, or methodological tradition does not present serious challenges of validation, justification, or warrant, because conceptualizations of quality are rooted in philosophical frameworks and their assumptions. What constitutes defensible methods and warranted knowledge are fundamentally philosophical matters. From such philosophical assumptions come the methodological criteria, processes, and arguments about the quality of the methods used and the warrants or justification for the inferences reached. That is, "methodologies are discourses comprised of epistemological assumptions, principles, and procedures through which social scientists construct the aim of understanding" (Schwandt, 2004, p. 34). So in a study with only one paradigm or mental model, there is only one set of guidelines, criteria, and processes for warranting method and knowledge claim. Different understandings of inquiry quality are not being mixed in such a study.

To use some familiar examples, in a classic post-positivist world view or paradigm, objectivity—defined as the minimization of inquirer and methodological bias in the quest for truth—is considered a major criterion for inquiry quality. And methodological traditions that use a post-positivist framework have numerous procedures and techniques both for minimizing bias and error and for assessing how free the data actually are from such bias. These include standardization of measures and their administration, estimates of reliability and validity coefficients, as well as statistical adjustments for unwanted variation. In contrast, objectivity in some feminist traditions means the challenging of prevailing but false assumptions (such as the biological inferiority of women)

through an intentional stance of political nonneutrality (Harding, 1993). In ideologically oriented inquiry frameworks—such as participatory action research (Kemmis & McTaggart, 2000) and democratic evaluation (House & Howe, 1999)—objectivity is supplanted by political ideals of fairness and equity, such that a good study is one that advances the interests and well-being of the most underserved. Some even argue that such inquiry is, in fact, more objective in the sense of being more impartial and fair, because it includes and gives voice to all legitimate perspectives and interests, rather than just the privileged few (House & Howe, 1999).

And, of course, there are philosophical frameworks and mental models in which objectivity is viewed as unattainable, given the intertwined relationship of the knower and the known. In these frameworks, including interpretivism and constructivism, warranted knowledge is attained not by distance or the protective shields of sophisticated methods, but rather by closeness, engagement, and sufficient time on site to understand the inside or emic perspective. In these frameworks, subjectivity is accepted as an inevitable strand of meaningful contextual understanding. And in hermeneutic traditions, inquiry is less a matter of producing scientific knowledge (distant or near) and more a dialogic process of understanding self and other, invoking aesthetics, imagination, and craftspersonship (Schwandt, 2004).

So in what kinds of mixed methods studies are paradigms, mental models, and methodological traditions mixed? This answer to this question depends, of course, on the individual study and individual inquirer—as I have said before, mixed methods practice is so much more complicated than mixed methods theory. Mixing at the level of paradigm or mental model is an inquirer decision, rather than a prescription of a particular mixed methods design or mix of methods. In general, however, the mixed methods paradigm stances presented in Chapter Five offer some rough guidance on this issue. Mixing at the paradigm or mental model level is precluded by definition for the *purist stance*, and required by definition for the *dialectic stance*. Mixing paradigms or mental models is less likely for the *a-paradigmatic stance*—as it is context, not philosophy, that drives methodological decisions in this stance—and for the *alternative paradigm stance*, as this stance intentionally adopts a single paradigm in which mixing at multiple levels is welcomed and not intrinsically problematic. Although the *complementary strengths stance* includes multiple paradigms, there is little mixing of them in order to maintain the integrity of each. Finally, the *substantive theory stance* could likely benefit from a mix of paradigms and mental models, but such mixing is a matter of inquirer discretion and choice.

For those mixed methods studies in which paradigms, mental models, and methodological traditions are being mixed, how then should we think about the challenges of inquiry quality? Here are two ideas.

1. For warranting the *quality of method* and the data obtained, adhere to the quality criteria and procedures of the tradition in which the method is being implemented. In survey methodology, for example, such quality criteria include minimization of response bias, maximization of the number of respondents, and measurement considerations of reliability and validity. In participant observation, such criteria include appropriate balance of participant and observer roles, lengthy time on site, keen perceptive acuity, and reporting of observations in rich, descriptive contextualized detail.

2. For warranting the *quality of the inferences*, conclusions, and interpretations made, adopt a multiplistic stance that (a) focuses on the available data support for the inferences, using data of multiple and diverse kinds; (b) could include criteria or stances from different methodological traditions; (c) considers warrants for inquiry inferences a matter of persuasive argument, in addition to a matter of fulfilling established criteria; and (d) attends to the nature and extent of the better understanding that is reached with this mixed methods design, as that is the overall aim of mixed methods inquiry.

The idea of focusing on inference quality in judging the quality of mixed methods work is attributable to Teddlie and Tashakkori (2003). Their ideas about inference quality are presented in the next section. These ideas offer thoughtful starting points, in the form of various kinds or dimensions of inference quality, for engaging the challenges of warrant in mixed methods social inquiry. The multiplistic stance about inference quality that I just outlined incorporates Teddlie and Tashakkori's good thinking and also extends this thinking beyond a criterial approach to warranting inferences to include deliberative practices as well. This multiplistic stance further includes warrants anchored in the fundamental aim of mixed methods inquiry, and that is the better understanding of social and human phenomena.

INFERENCE QUALITY IN MIXED METHODS SOCIAL INQUIRY

Teddlie and Tashakkori (2003) consider an inference to be the investigator's interpretations of the study results. Inferences are study outcomes or conclusions; they can take the form of explanations, understandings, or other accounts of what was learned from the study. The term is attractive in a mixed methods context because it is generically applicable to multiple inquiry traditions.

Inference quality, then, is "the mixed methods term for the accuracy with which we have drawn both our inductively and deductively derived conclusions from a study" (Teddlie & Tashakkori, 2003, p. 36). (I must observe that the term *accuracy* in this definition suggests a realist ontology and a relatively conventional idea about the purpose of social inquiry. Likely omitted from this conceptualization are ideological, action-oriented, and postmodern social inquiry traditions. This fits with Teddlie and Tashakkori's concentration in their mixed methods work on customary understandings of basic qualitative and quantitative methodological frameworks, signaled in the foregoing definition by the use of both inductive and deductive reasoning, respectively. I would like to also note that throughout this discussion of inference quality these authors rely heavily on conventional criteria for quantitative inquiry, as presented in

Cook and Campbell, 1979, and on the trustworthiness criteria for qualitative inquiry articulated by Lincoln and Guba, 1985.)

Teddlie and Tashakkori further distinguish between "two important aspects of inference quality. The first we call *design quality*, which comprises the standards for the evaluation of the methodological rigor of the mixed methods research, and the second we call *interpretive rigor*, which comprises the standards for the evaluation of the accuracy or authenticity of the conclusions" (p. 37, emphasis in original). These two aspects parallel the distinction I made earlier between warranting the quality of method and warranting the quality of inference or interpretation. I also agree with these authors that extant criteria and standards from existing traditions can be used to assess design quality or the quality of method. Warranting study inferences, or interpretive rigor, however, is another matter altogether.

In this regard, Teddlie and Tashakkori offer ideas for more specific criteria related to mixed methods inference quality (see also Tashakkori & Teddlie, 2006). These include the following:

- *Conceptual consistency* refers to the "degree to which the inferences are consistent with each other and with the known state of knowledge and theory" (p. 40).
- *Interpretive agreement* refers to the consistency of interpretations across people, including scholars as well as the members of the setting being studied.
- *Interpretive distinctiveness* refers to "the degree to which the inferences are distinctively different from other possible interpretations of the results and the rival explanations are ruled out" (p. 41). (Ruling out rival explanations is a time-honored practice in experimental inquiry but is less customary in many qualitative traditions, which often seek understanding rather than explanation.)

LEGITIMATION AS QUALITY IN MIXED METHODS SOCIAL INQUIRY

Onwuegbuzie and Johnson (2006) offer a variation of Teddlie and Tashakkori's conceptualization of mixed methods inference quality. Their argument is rooted in their own particular conceptualization of mixed methods inquiry as inquiry that combines complementary strengths and nonoverlapping weaknesses of quantitative and qualitative research. Their work concentrates on the concept of *legitimation* as a conceptual framework for mixed methods validity. Legitimation encompasses warrants for the quality of both method and inference and is construed as both an outcome of and a continuous process in mixed methods inquiry. This legitimation framework builds on the prior development of legitimation models for both quantitative and qualitative inquiry by Onwuegbuzie (2003) and Onwuegbuzie and Leech (in press), respectively. Onwuegbuzie and Johnson position their legitimation framework as directly engaging

the mixed methods challenges of integrating data and interpretations from very different stances, methods, samples, and analyses.

Onwuegbuzie and Johnson offer nine different types of legitimation:

1. Samples for purposes of making statistical generalizations from research samples (qualitative and quantitative) to larger populations
2. The inclusion of both inside and outside perspectives
3. The degree to which one method well compensates for weaknesses in another
4. Inferences in a sequential design, specifically that the inferences do not arise singularly from the sequence used
5. Conversions or transformations of data from one type to another
6. The (single or multiple) paradigm assumptions being included in the study
7. The cognitive commensurability of different worldviews
8. The methodological soundness of each method used
9. The appropriate engagement with the politics of mixing methods in the context at hand

Each of these legitimation types is presented as a discussion of its distinctive complexities in mixed methods inquiry. For example, the sampling issues include the challenges of generalization when the inference is based on the integration of data from a large representative sample and a nonoverlapping small purposive sample. These legitimation ideas are richly complex and offer considerable potential to meaningfully inform the continued development of responses to the challenges of warrant in mixed methods social inquiry.

WARRANTING THE QUALITY OF INFERENCES IN MIXED METHODS INQUIRY

The discussion now turns to my own thinking about the criteria and processes for warranting the quality of inferences from mixed methods social inquiry. Like Teddlie and Tashakkori, I construe an inference as the overall conclusion, interpretation, or learning achieved in a study. As presented previously, my ideas about warranting the quality of the inferences in mixed methods inquiry feature the adoption of a multiplistic stance that (1) focuses on the available data support for the inferences, using data of multiple and diverse kinds; (2) could include criteria or stances from different methodological traditions; (3) considers warrants for inquiry inferences a matter of persuasive argument, in addition to a matter of fulfilling established criteria; and (4) attends to the nature and extent of the better understanding that is reached with this mixed methods design, as that is the overall aim of mixed methods inquiry. I will attend to each of these considerations in the discussion that follows.

Providing Data Support for Inferences

In Chapter Eight on data analysis, Mary Lee Smith's (1997) adaptation of Fred Erickson's (1986) "warranted assertion" approach to analyzing qualitative data was presented as a strong candidate for mixed methods analyses for purposes of directly generating inquiry conclusions. In this approach, an iterative and critical review of all of the data available in a study—*without prejudice to data type or source*—is used to establish study assertions or conclusions. *Data of all types* are then assembled and displayed in support of each assertion.

I believe that this idea of presenting the data that support a given mixed methods inference is of generally valuable use, in contexts beyond those in which this particular mixed methods analysis approach is used. In particular, depending on the inquirer's mixed methods stance, purpose, and design, data of different types could be presented without prejudice as to source and only on their merits to inform and substantiate the inference. Such a presentation could itself support particular mixed methods stances and purposes, notably those with dialectic, interactive, and integrative intent.

Including Criteria or Stances from Different Methodological Traditions

When warranting the inferences attained from a mixed methods data analysis involving data gathered in multiple methodological traditions, it is also possible to use criteria that are resident in one tradition or another. Yet this would not be an automatic or conventional application of inquiry criteria, but rather a more nuanced way of judging the quality of an integrated set of inquiry findings from multiple perspectives. That is, it would not likely make sense to judge the quality of an integrated set of inferences by applying within-paradigm criteria as they are usually applied, because neither the form of the analysis nor the form of the inferences would conform to usual standards. But it still may be relevant and useful to use the concepts represented in criteria from various inquiry traditions, again in a more nuanced way, for judging inference quality. Here are two different arguments for doing this.

First, also discussed in Chapter Eight was the idea of using aspects of the analytic framework of one methodological tradition in the analysis of data from another tradition. The examples of this analytic idea provided included the use of traditionally quantitative matrices and displays for qualitative data (Miles & Huberman, 1994); the use of Boolean algebra to jointly analyze data from cases and from variables (Ragin, 1987); and the use of the concepts of legitimation and representation—substantially from interpretive traditions—as anchoring rationales for a mixed methods data analysis framework (Onwuegbuzie & Teddlie, 2003). This same idea could be applied to judging the quality of inferences from mixed data analyses. Aspects of the *criterial frameworks of multiple inquiry traditions* could be applied to help judge inference quality. These would need to be aspects of importance to the respective inquiry traditions, but probably not aspects that represent one pole of long-standing dualisms in philosophical thought. For how can an inference be simultaneously objective—free from inquirer bias and predispositions—and subjective—representing an engaged and contextually embedded inquirer stance?

Valerie Caracelli and I identified several characteristics of traditional interpretivist and post-positivist inquiry traditions

> *that constitute important facets of [these] inquiry traditions and therefore warrant our attention and respect but that are also not logically irreconcilable when juxtaposed with contrasting characteristics. Contrasts, conflicts, and tensions between different . . . findings are an expected, even welcome dimension of mixed-method inquiry, for it is in the tension that the boundaries of what is known are most generatively challenged and stretched. The analytic space created by the tension, however, must offer the possibility of coordination, integration, and synthesis. [Thus] the constitutive characteristics must be other than irreconcilable philosophical assumptions. (Greene & Caracelli, 1997a)*

Some of the characteristics we identified pertain to the criteria for judging the quality and soundness of inquiry inferences. For the interpretivist and post-positivist traditions, these include the following:

- Particularity and generality
- Closeness and distance
- Meaning and causality
- The unusual and the representative
- The diversity within the range and the central tendency of the average
- Micro- and macro-lenses, or setting and structural perspectives
- Insider and outsider viewpoints
- The contextualized understanding of local meanings and the general identification of recurring regularities

Our argument at that time for this idea fits the current argument very well.

> *A mixed method[s] study that combines these two traditions would strive for knowledge claims that are grounded in the lives of the participants studied and that also have some generality to other participants and other contexts, that enhance understanding of both the unusual and the typical case, that isolate factors of particular significance while also integrating the whole, that are full of emic meaning at the same time as they offer causal connections of broad significance. (Greene & Caracelli, 1997a, p. 13)*

A second idea for using inquiry criteria from different traditions for warranting inferences from mixed methods studies involves logical and philosophical challenges to

historic dualisms themselves. Clearly, those advancing an alternative paradigm for mixed methods inquiry, or social inquiry more broadly, do just this, as illustrated in chapters Four and Five when discussing American pragmatism and a transformative, emancipatory framework for social inquiry. Another form of challenge to dualistic thinking is to argue for a reconceptualization of traditionally opposed inquiry characteristics and warrants more as continua than as either/or competitors. Evaluation theorist Michael Patton has done this as part of his argument for a "paradigm of choices" in evaluation practice (1980). He argues, for example, that program evaluators do not have choose whether to have standardized, quantitative measures of constructs or contextualized, emergent conversations with inquiry participants. Rather, both standardization and contextualization can be conceptualized as continua, so that a given study can partake of both kinds of measurement and data collection.

A recent and more elaborated argument in this genre was offered by Ercikan & Roth (2006). These educational researchers argue first that quantity and quality are inherent characteristics of phenomena in diverse natural and social fields, and then that objectivity and subjectivity are inevitable strands of both qualitative and quantitative social inquiry traditions. In a move "beyond dichotomies," Ercikan and Roth then reframe eight core "knowledge characteristics" of educational inquiry as continua along a dimension of low-level to high-level inference. These eight characteristics are standardization, contingency, universality, particularity, distance, being affected, abstraction, and concretization. With this framework, "the aim of education research should be to produce research results that are characterized simultaneously by high and low inference levels, with results that include the standardizing, universalizing, distancing, and abstracting aspects of knowledge, as well as the contingent, particular, and concrete aspects" (p. 22). These authors conclude their argument by restating the priority of the research question over method and by encouraging researchers from diverse traditions to work together.

Considering Warrants for Inquiry Inferences a Matter of Persuasive Argument as Well as Fulfilling Criteria

This multiplistic approach to warranting the inferences from mixed methods social inquiry further advances the importance of warrants that are a matter of deliberation, in addition to warrants that are a matter of the procedural application of criteria. The rationale for this stance is rooted in Thomas Schwandt's eloquent appeal for a social science (particularly evaluation) framed by the tenets of "practical philosophy," as the nonfoundational heir to outdated and, for the most part, discarded foundational philosophies (notably logical positivism) (Schwandt, 2002). Social inquirers guided by practical philosophy (1) seek not explanatory knowledge but better understanding of *praxis* (or the human actions and practices of everyday life); (2) must attend to the moral, ethical, and political dimensions of human endeavor, because these are central to praxis; and (3) envision the "rationality of everyday life . . . *as intrinsically dialogical and communicative*" (Schwandt, 1996, p. 62, emphasis added). Social inquiry guided by practical philosophy is descriptive and normative, seeking to enable practitioners to refine the rationality of their own practices through data-informed critical reflection and dialogue. This form of social inquiry is thus collaborative and cogenerative, inquiry *with* rather than *on* participants, deliberations *with* participants rather than *about* them.

With a turn toward social inquiry as practical philosophy, argued Schwandt (1996), judgments about the goodness of the practice and its inferences must seek an alternative to the criterial approach to judging quality and warranting inferences. This is because the criterial approach is historically rooted in foundationalist epistemologies, which used criteria to establish a firm foundation for scientific knowledge and to distinguish true scientific knowledge from biased knowledge and mere belief. As an alternative to criteria, Schwandt proposed a "guiding ideal" of democracy and several enabling conditions that emphasize deliberation and dialogue because, again, social inquiry as practical philosophy is intrinsically dialogic and communicative. Among these conditions is this view:

> *The activity of deliberation is inescapably rhetorical in character. We aim to persuade other interpreters of a particular interpretation through a discourse that is characterized by qualities such as coherence, expansiveness, interpretive insight, relevance, rhetorical force, beauty and texture of argument, and so forth. The conversation among interpreters is an act of persuasion and involves using language infected by partisan agendas and interests. . . .*
>
> *[However] parties to the encounter are not viewed as opponents who seek to expose the weaknesses in each other's arguments. Rather, the conversation begins with the assumption that "the other has something to say to us and to contribute to our understanding. . . . The other is not an adversary or opponent, but a conversational partner" (Bernstein, 1991, p. 337). (Schwandt, 1996, pp. 66–67)*

It is indeed consistent with a mixed methods way of thinking to envision dialogues and other conversations held among interested parties regarding the quality of and warrant for particular study inferences. Such dialogues would complement, not replace, the use of multiple forms of inquiry criteria themselves. Such dialogues could engage possible dissonance in judgments yielded by multiple criteria, could assess the consequential or "so what?" character of inquiry conclusions, or could involve a range and variety of people with a vested interest in the matter at hand—conversing with "coherence, expansiveness, interpretive insight, relevance . . . [and] beauty" (Schwandt, 1996, p. 66) and with respect and acceptance, one of the other. The broader literature on dialogue in social inquiry is highly relevant to this set of ideas (for example, Abma, 1998, 2001; Schwandt, 2002).

Attending to the Nature and Extent of the Better Understanding That Is Reached with This Mixed Methods Design

Finally, I propose that the quality of inferences in mixed methods social inquiry be judged by the ways in which and the extent to which the study contributed to better understanding. This is primarily a conceptual challenge but also one of resources.

The conceptual challenge is one of demonstrating that the understandings and insights generated in the mixed methods study would not have been attained with a single methodology. The book edited by Tom Weisner (2005) presents mixed methods studies in the domain of child development. The papers in the book were originally offered at a working conference, orchestrated specifically to showcase empirical examples of mixed methods inquiry that led to conclusions not attainable with a single methodology. This volume thus offers excellent examples of this kind of demonstration. For the most part, the contributors to this volume were able to single out insights and understandings achieved through their mix of methods and to demonstrate just how they were attained. The resource question is also important. With fixed resources, the decision to use more than one kind of method may risk the quality of implementation of each method; for example, in smaller than desired sample sizes (Chen, 1997). Moreover, there is always the important question of when a mixed methods study is not a justifiable choice (Datta, 1997b).

Reprise

The knotty issue of judging the quality of inferences yielded by a study with multiple and interactive assumptions and stances remains a conceptual and procedural challenge. In this chapter, I have offered several different ways of thinking about and engaging with this challenge, not all of which would be expected to be used in a single study. Yet collectively they offer a multiplicity of perspectives on just what constitutes a defensible and warranted inference in social inquiry. They also ideally offer an invitation to invoke imagination and creativity as part of rationality. In these ways they well illustrate a mixed methods way of thinking.

AN ILLUSTRATION

Examples of these various ways of warranting inference quality in mixed methods social inquiry are now offered in a hypothetical adaptation and elaboration of a mixed methods dissertation study. (The illustration is invented because actual examples of these ideas for warranting inference quality remain for future encounters, if then.) Yang Yang (2005) studied the effects of a traditional Tai Chi movement program for seniors using standardized physiological measures, as well as personalized interviews with a purposeful sample of participants who were observed to have especially intense engagement during the six-month program. This example is anchored in Yang's exceptionally thoughtful work, but no parts of the example should be attributed to Yang or interpreted as other than inventive elaborations of his work.

> *Many seniors who are otherwise in fine health are at major risk for falling and breaking a bone (often a hip), or otherwise damaging muscles and tissues, such that their mobility is permanently restricted. This study investigated the beneficial effects of Tai Chi on seniors' balance, stride, and strength. In addition, given the emphasis in traditional Tai Chi on the movement and channeling of* qigong *(which includes mental and spiritual dimensions like confidence, connectedness, and tranquility), the researcher was also interested in participants' experiences of these broader and potentially deeper benefits. The study used a wait-list comparison group. Seniors who agreed to participate in the study were randomly assigned to the main intervention or to the same Tai Chi program that started six months later (n=50 in each at the start, though attrition from the comparison group was greater than attrition from the treatment group). All participants in both groups were administered a battery of physiological measures and a short survey at pretest, at midpoint of the intervention, and again at posttest. The physiological measures focused on balance, stride, agility, flexibility, and strength. The short survey gathered seniors' self-reports of the kind and extent of both social and cognitive activities in which they had participated during the previous week. At the end of the six months of intervention, a small sample of five Tai Chi participants who were observed to have especially intense engagement in the program were also personally interviewed, with a narrative approach that asked, "Tell me the story of your participation in the Tai Chi program."*

Primary inferences from the study included the following two:

1. Participation in Tai Chi afforded seniors sustainable improvements in balance, stride, and strength, as well as modest to marked changes in their social and cognitive activity patterns, compared with a similar group who did not participate in the Tai Chi intervention.
2. For a small group of seniors, participation in Tai Chi can be a life-transforming experience, marked most significantly by an integrated and profound sense of well-being, permeating all aspects of life, including physical balance and strength, social and cognitive engagement, and deep spiritual renewal.

Illustrations of the ideas just presented for warranting inferences in mixed methods studies will be provided for these two hypothetical inferences.

> *Inference:* Participation in Tai Chi afforded seniors sustainable improvements in balance, stride, and strength, as well as modest to marked changes in their social and cognitive activity patterns, compared with a similar group who did not participate in the Tai Chi intervention.

Warranting this inference by providing available data support could include the following:

- Controlling for the small demographic differences in the two groups, the average scores of seniors who participated in Tai Chi were significantly higher on the balance, stride, and strength measures than were the average scores of seniors in

the comparison group. This difference was noticeable at the program midpoint and sustained through the end of the program. And there were no average differences at pretest.

- Seniors who participated in Tai Chi reported a modest to significant increase in the frequency and variety of their social and cognitive activities while in the program, whereas comparison group seniors reported maintaining a similar level and variety of social and cognitive activities. These differences were again noticeable at midpoint and sustained through the end of the program.
- Senior interviewees were enthusiastic about what one called "major changes in my daily quality of life," attributed to their Tai Chi participation. These changes included a dramatic increase in physical activity—for example, walking daily around an exercise track—as well as significantly more active engagement in family and community activities; for example, caring for grandchildren once a week and volunteering at a local library.

Inference: For a small group of seniors, participation in Tai Chi can be a life-transforming experience, marked most significantly by an integrated and profound sense of well-being, permeating all aspects of life, including physical balance and strength, social and cognitive engagement, and deep spiritual renewal.

Warranting this inference by providing available data support could include the following:

- A highly distinguishing feature of the Tai Chi stories told by the interviewees (who were all intensely engaged in the program) was their integrated and holistic character. When recounting the profound differences Tai Chi has made in their lives, these participants blended and interwove in ways not separable the various physical, socioemotional, intellectual, and spiritual ("life affirming") dimensions and activities of their daily life.
- Scores on the balance, stride, and strength measures for the five interviewees were, without exception, the highest in the treatment group at midpoint and posttest, whereas they were near the average of the treatment group at pretest.

Warranting this inference by including criteria or stances from different methodological traditions might take the following form:

Although not distinguishable from others in the treatment group at the outset of the intervention, the five interviewees reported a remarkable life-transforming experience during their Tai Chi participation. Their own narratives are linguistically and rhetorically compelling and again marked by the integrative and holistic character of

their experience. Moreover, the pattern of their scores on all other measures in the study exhibits similar interconnections. Nonparametric indicators of relationship among all scores are consistently strong for this subgroup of participants and consistently stronger than these relational indicators for all others in the treatment group.

Warranting both inferences through deliberation, in addition to fulfilling criteria might include the following excerpt from a follow-up discussion among a handful of seniors who participated in the Tai Chi program and the medical staff at the nursing home where they reside:

Mr. A: You know, I haven't felt this good in about ten years! I used to walk every day, but I stopped walking . . . hmm, I don't remember when. But now, I can't tell you how enjoyable it is to get out there again in the sunshine and warm breeze and feel so nourished by mother nature.

Mrs. B: And I started doing those Sudoku puzzles, you know, the ones with the numbers. I used to love to do puzzles, but couldn't really muster the energy to do them after a while. Now, I join the lunchtime Sudoku competition, which is more of a collaboration than a competition. But I still love it when I get one all on my own!

Nurse C: What do you think accounts for this increase in energy? You know, both of you have stopped taking your energy medication, yet I can just look at you and see that you have more energy than before and that you are doing things you haven't done in a long time.

Dr. D: I wonder if maybe it has something to do with blood flow and better circulation. I was reading some recent research out of China that suggested this was one medical explanation for the benefits of Tai Chi.

Mr. A: Well, now that you mention that, I haven't experienced the numbness or cramping in my legs that I had earlier in the year. But I think it also has to do with mental energy and acuity. I seem to simply be able to notice and pay attention to things more and better than I did before Tai Chi. And lots of these things that I notice catch my attention, and I get engaged. I think that is one reason I enjoy my walks so much. I really attend to what is around me when I am walking.

Nurse C: Maybe it is like being more present in the world, more connected to people and actions around you?

Mrs. B: Yes, exactly! It's like feeling part of a global web of interconnections, with strands in all directions full of possibility and even mystery.

Dr. D: Can we bottle it and share it with others?

Warranting both inferences by attending to the nature and extent of the better understanding that is reached with this mixed methods design could include the following argument:

> This study's main inferences—that Tai Chi can significantly and sustainably enhance life quality for some seniors, in a moderate to transformative way—were attained primarily because of the combination of methods used. Absent one method or another, the study could have identified the comparative physiological benefits of Tai Chi on the average or the contextualized transformative potential of Tai Chi for selected seniors. In combination, these methods enabled assessments of both the magnitude of measured and experienced differences as well as their contextual meaningfulness for the seniors involved. In particular, the mix of methods helped to identify and substantiate the integrated and holistic nature of these life changes and their enhancing or transforming import for some seniors' daily lives.

In the next and final chapter on mixed methods practice, issues of writing and reporting the work of mixed methods inquirers are taken up and discussed. A brief concluding chapter brings this journey to a close.

CHAPTER

10

WRITING UP AND REPORTING MIXED METHODS SOCIAL INQUIRY

THE JOURNEY nears its end in this chapter on writing up mixed methods studies. Like other territories of mixed methods practice, this one engages the challenges of respecting multiple traditions of social inquiry while simultaneously endeavoring to integrate them in the process of writing up and reporting inquiry results. These multiple inquiry traditions have their own modes of persuasive writing and voice, not all of which are congruent one with the other. Ideas of multiple representational forms are offered in this chapter as one valuable strategy to both respect and integrate different writing traditions.

It was 9:00 AM on Wednesday. The HIV/AIDS work group of the Foundation was meeting in the seventh floor conference room to discuss the annual evaluation