

# Mixed Methods Research Design and Analysis With Validity: A Primer

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# Mixed Methods Research Design and Analysis With Validity: A Primer

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Some of the material in this primer is based on the following research methods textbook:

*“Educational Research: Quantitative, Qualitative, and Mixed Approaches”* 5th ed.)

by

Burke Johnson and Larry Christensen

(2014, Sage Publications)

# Mixed Methods Research

## Introduction

- **Mixed methods research (MMR)**—(also called mixed research or mixed methodology) is the type of research in which a researcher or team of researchers mixes or combines qualitative and quantitative research philosophies/paradigms, methodologies, methods, techniques, approaches, concepts, or language into a single research study or a set of related studies. The use of multiple disciplines is also integral to MMR.

# MMR Introduction (cont.)

- Greene (2014) contends, and I agree, that mixed methods research encourages interactive combination or mixing at 3 levels (or more):
  1. **Method** (or what I call *method of data collection*)
  2. **Methodology** (or what I call *research method* in quantitative research and *theoretical framework* in qualitative research)
  3. **Paradigm.**

# MMR Introduction (cont.)

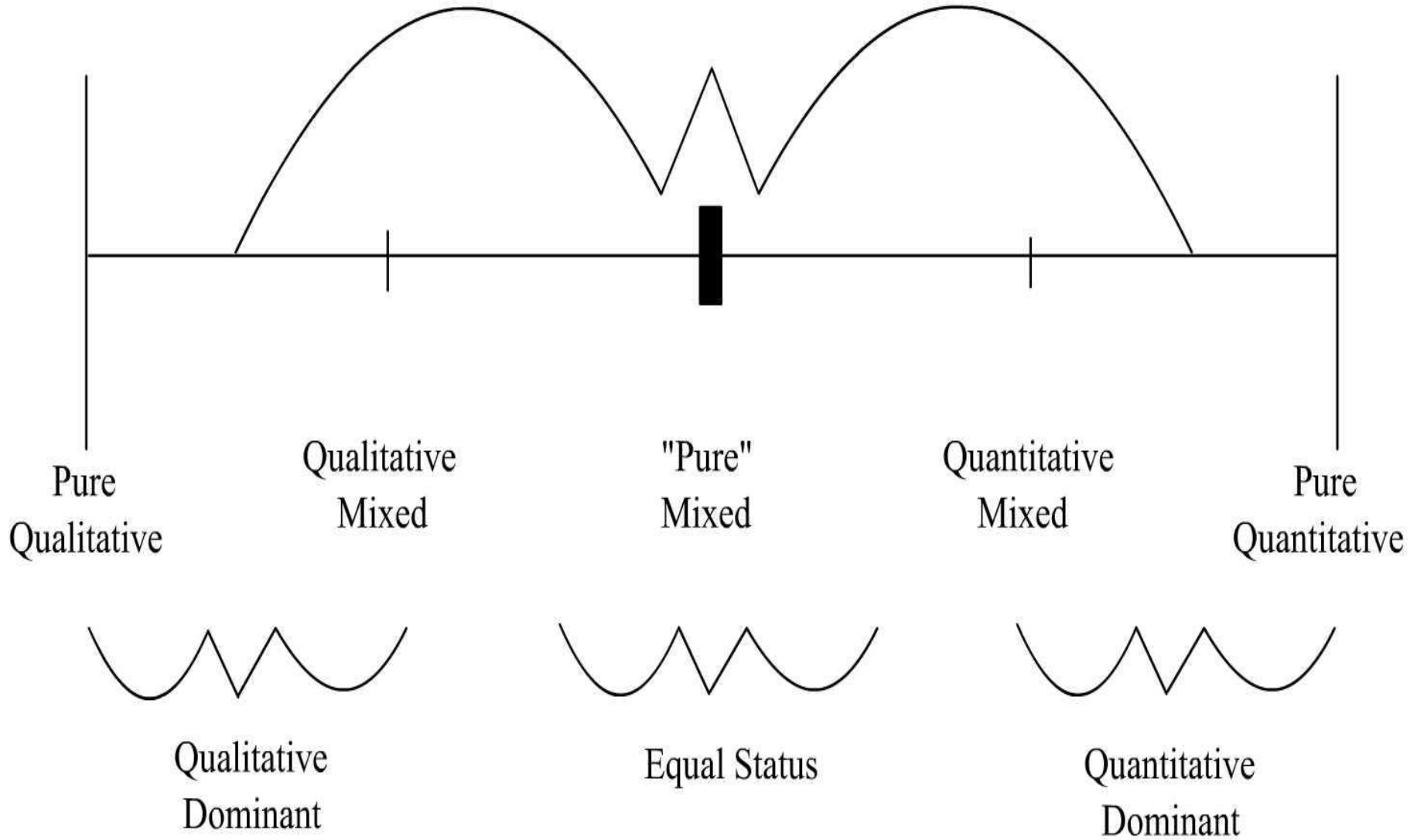
Three major types of MMR:

- Qualitatively driven or qualitative dominant
- Quantitatively driven or quantitative dominant
- Interactive or equal status.

(Read: Johnson, Onwuegbuzie, & Turner's 2007 JMMR article. [Click here](#))

Note: Teddlie and Tashakkori call the first two *quasi* mixed research.

Mixed Methods  
Broadly Speaking





# MMR Introduction (cont.)

Proponents of mixed research adhere to some form of the *compatibility thesis* (i.e., “it’s okay to thoughtfully mix”) and, often (but not always), to the philosophy of ***pragmatism*** (provides ontology, epistemology, axiology, and philosophical methodology) (Note: some prefer critical realism)

- Epistemologically, goal is to make *warranted assertions*
- See Johnson and Onwuegbuzie (2004) article ([click here](#)) and Johnson and Gray (2010) chapter ([click here](#))

# MMR Introduction (cont.)

- Mixing usually is done to obtain breadth and depth of understanding, perspective, complexity, and difference and/or corroboration.
- Example: would be important to study the quantitative *and* qualitative aspects of an organization such as a school or a city government.

# MMR Introduction (cont.)

- Mixed methods research is one of the three major research methodology paradigms:
  - Qualitative research
  - Quantitative research
  - Mixed research.
- [Click here for an overview of quantitative, qualitative, and mixed research](#)
- [Click here](#) for Comparison Table

■ TABLE 2.1 Emphases of Quantitative, Mixed, and Qualitative Research

	<i>Quantitative Research</i>	<i>Mixed Research</i>	<i>Qualitative Research</i>
Scientific method	Confirmatory or "top-down" The researcher tests hypotheses and theory with data.	Confirmatory and exploratory	Exploratory or "bottom-up"  The researcher generates or constructs knowledge, hypotheses, and grounded theory from data collected during fieldwork.
Ontology (i.e., nature of reality/truth)	Objective, material, structural, agreed-upon	Pluralism; appreciation of objective, subjective, and intersubjective reality and their interrelations	Subjective, mental, personal, and constructed
Epistemology (i.e., theory of knowledge)	Scientific realism; search for Truth; justification by empirical confirmation of hypotheses; universal scientific standards	Dialectical pragmatism; pragmatic justification (what works for whom in specific contexts); mixture of universal (e.g., always be ethical) and community-specific needs-based standards	Relativism; individual and group justification; varying standards
View of human thought and behavior	Regular and predictable	Dynamic, complex, and partially predictable Multiple influences include environment/nurture, biology/nature, freewill/agency, and chance/fortuity.	Situational, social, contextual, personal, and unpredictable
Most common research objectives	Quantitative/numerical description, causal explanation, and prediction	Multiple objectives; provide complex and fuller explanation and understanding; understand multiple perspectives	Qualitative/subjective description, empathetic understanding, and exploration
Interest	Identify general scientific laws; inform national policy.	Connect theory and practice; understand multiple causation, nomothetic (i.e., general) causation, and idiographic (i.e., particular, individual) causation; connect national and local interests and policy.	Understand and appreciate particular groups and individuals; inform local policy.
"Focus"	Narrow-angle lens, testing specific hypotheses	Multilens focus	Wide-angle and "deep-angle" lens, examining the breadth and depth of phenomena to learn more about them
Nature of observation	Study behavior under controlled conditions; isolate the causal effect of single variables.	Study multiple contexts, perspectives, or conditions; study multiple factors as they operate together.	Study groups and individuals in natural settings; attempt to understand insiders' views, meanings, and perspectives.
Form of data collected	Collect quantitative data based on precise measurement using structured and validated data-collection instruments.	Collect multiple kinds of data.	Collect qualitative data such as in-depth interviews, participant observation, field notes, and open-ended questions. The researcher is the primary data-collection instrument.
Nature of data	Variables	Mixture of variables, words, categories, and images	Words, images, categories
Data analysis	Identify statistical relationships among variables.	Quantitative and qualitative analysis used separately and in combination.	Use descriptive data; search for patterns, themes, and holistic features; and appreciate difference/variation.

Results	Generalizable findings providing representation of objective outsider viewpoint of populations	Provision of "subjective insider" and "objective outsider" viewpoints; presentation and integration of multiple dimensions and perspectives	Particularistic findings; provision of insider viewpoints
Form of final report	Formal statistical report (e.g., with correlations, comparisons of means, and reporting of statistical significance of findings)	Mixture of numbers and narrative	Informal narrative report with contextual description and direct quotations from research participants

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# MMR Introduction (cont.)

- Example: study the quantitative and qualitative aspects of a school.
- *Fundamental principle of mixed research*: advises researchers to thoughtfully and strategically mix or combine qualitative and quantitative research methods, approaches, procedures, concepts, and other paradigm characteristics in a way that produces an overall design with multiple (divergent and convergent) and complementary strengths (broadly viewed) and nonoverlapping weaknesses.

# MMR Introduction (cont.)

In my *fundamental principle*, I view the “complementary strengths” condition broadly to include all of the purposes for mixing identified by Jennifer Greene et al. (1989) to produce a better “whole”:

- Triangulation (convergence, corroboration)
- Complementarity (elaboration, enhancement)
- Development (one method informs the other)
- Initiation (find contradictions, perspectives)
- Expansion (expand the breadth of study)

# Purposes for mixing

There are perhaps hundreds of more specific reasons for mixing in addition to the five identified by Greene et al. (1989). Here are a few:

- Explaining complexity,
- Juxtaposition-dialogue/comparison-synthesis,
- Explaining interaction between/among natural and human systems,
- Determining what works for whom and the relevance/importance of context,
- Describing/explaining process and outcomes,
- Sequentially generating and testing theory,
- Continued on next page



# Purposes for Mixing (cont.)

- Producing interdisciplinary substantive theory, including/comparing multiple perspectives and data regarding a phenomenon;
- Breaking down binaries/dualisms (some of both);
- Iteratively/sequentially connecting local/idiographic knowledge with national/general/nomothetic knowledge;
- Learning from different perspectives on teams and in the field and literature;
- Achieving multiple participation, social justice, and action . . .
- and the list continues.

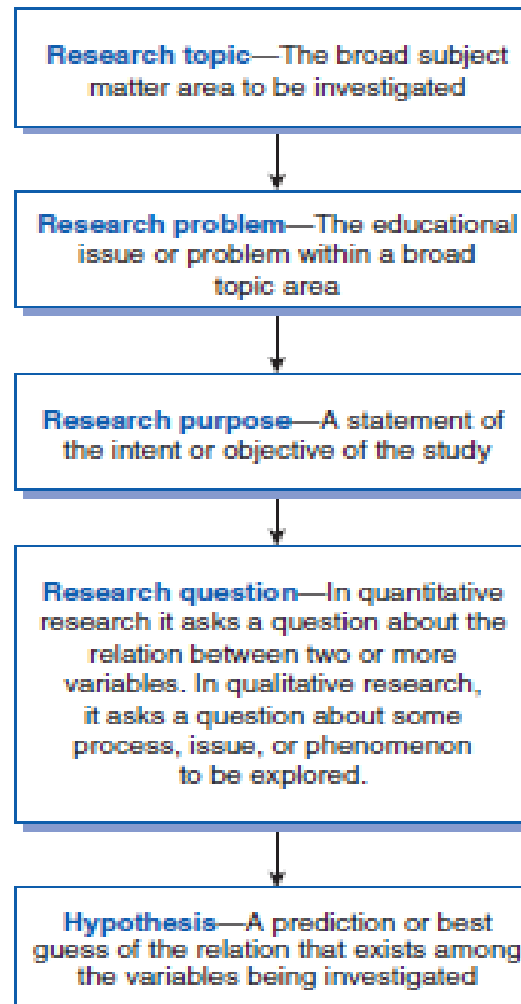
# Mixed Methods Research Questions

In all research, the research questions should drive the study.

- Your goal is to answer your research questions (which can be thoughtfully modified during your study if needed)
- Methods are tools that help us obtain data to answer our substantive research questions
- Methods also can suggest new ways of looking at issues/questions, but must be careful to not be method-centric (e.g., I only use qualitative research methods or I only use any one kind of research method)

# Flowchart of topic, problem, purpose RQs, hypotheses.

■ FIGURE 4.1 Flowchart of the development of a research idea



# Mixed Methods Research Questions

Multiple perspectives about MM RQs:

- In QUAN or QUAL driven, you have (a) primary questions and (b) supplemental questions that add to the overall topic
- Can use separate QUAN and QUAL questions and then combine in analysis and interpretation
- QUAL and QUAN can address one question. Robert Yin (and I) claims QUAL or QUAN can virtually always add something to the RQ answer. Recommends that you examine your question both ways. Look at the “research object” quantitatively and qualitatively.

# Mixed Methods Data Collection

(For Burke's overview of the major *methods of data collection* [click here](#))(For the 2003 Johnson and Turner chapter on data collection in MMR, [click here](#))

I contend there are six **major** methods of data collection (and many additional smaller types and creative combinations/constructions). . .

# Data collection (cont.)

Here are the six **major** methods of data collection:

1. Tests
2. Questionnaires
3. Interviews
4. Observation
5. Focus groups
6. Constructed and secondary-or-existing data.

Note: technological advancements can be used for each of these (e.g., internet for questionnaires, GIS for observation).

# Data collection (cont.)

The six major methods can be mixed with each other;

--Called *inter-method mixing*

and

The six major methods have mixed versions;

--Called *intra-method mixing*.

Note: The terms inter- and intra-method also can be used at the level of methodology and paradigm.

(Terms were coined in chapter by Johnson and Turner, 2003)

# Data collection (cont.)

Before I list some MMR data collection approaches, an important point:

- Method of data collection does not logically entail epistemology (and vice versa) but there is mutual influence
- A qualitative researcher and a quantitative researcher will instantiate quite different forms of, e.g., observations or interviews



# Data collection (cont.)

- In the Handbook of Mixed Methods, our chapter (Johnson & Turner, 2003) outlines intra- and inter-data collection method mixing
- There are quantitative and qualitative versions of the six major methods of data collection
- And, there are **mixed versions of each of the six major methods of data collection (intra-method mixing)**

# Data collection (cont.)

- *Mixed questionnaires*
- Includes a mixture of open-ended and closed-ended items on one or more questionnaires
- Note: a single open-ended question at the end of a questionnaire, practically speaking, does not produce a “mixed questionnaire.”  
Technically speaking, it does.

# Data collection (cont.)

- *Mixed interviews*
- Includes a mixture of depth-interviewing and systematic/targeted/variable-oriented interviewing.
- Can be done in a single interview or
- Can be done in separate interviews in a study

# Data collection (cont.)

- *Mixed focus groups*
- Includes a mixture of a priori and emergent/flowing focus group strategies.
- Usually done in single focus group because focus groups are primarily qualitative

# Data collection (cont.)

- *Mixed testing*
- Includes a mixture of standardized open-ended and closed-ended pre-made tests or test components
- Testing tends to be primarily qualitative, but even this can be complemented via QUAL

# Data collection (cont.)

- *Mixed observation*
- Includes mixture of standardized/confirmatory and less structured/exploratory observation
- Often alternates between participatory and nonparticipatory researcher roles

# Data collection (cont.)

- *Mixed constructed and secondary or existing data*
- Includes mixture of non-numeric and numeric information, documents, and archived data based on narrative/stories/pictures and numbers, open-ended and closed-ended information

# Sampling Overview

(For Burke's notes on sampling in quantitative, qualitative, and mixed research, [click here](#))



# Sampling in Mixed Research

Typically, researcher selects quantitative sample using quantitative sampling technique and qualitative using qualitative sampling technique.

A question is, how do they interrelate?

# MMR Sampling (cont.)

- Mixed research relies on both QUAN and QUAL sampling methods
- Mixed research sampling classified into “mixed sampling designs.”
- The following typology was developed in collaboration with Tony Onwuegbuzie

# MMR Sampling (cont.)

Mixed sampling designs are classified on two major criteria:

1. *Time orientation*: “Do the quantitative and qualitative phases/components occur concurrently or sequentially?”

- *Concurrent* time orientation: data collected for quantitative and qualitative at approximately same time.
- *Sequential* time orientation: data obtained in stages.

# MMR Sampling (cont.)

2. *Sample relationship* “Is relationship between quantitative and qualitative samples identical, parallel, nested, or multilevel?”:
- *Identical* : same people participate in quantitative and qualitative phases of study.
  - *Parallel* : separate quantitative and qualitative samples drawn from the population.
  - *Nested* : participants selected for one phase/component are subset of participants selected for other.
  - *Multilevel* : quantitative and qualitative samples selected from different levels of a hierarchical population.

# MMR Sampling (cont.)

Combine these two criteria—time orientation (which has two types) and sample relationship (which has four types)—to form eight **mixed sampling designs**:

- (1) identical concurrent
- (2) identical sequential
- (3) parallel concurrent
- (4) parallel sequential
- (5) nested concurrent
- (6) nested sequential
- (7) multilevel concurrent
- (8) multilevel sequential.

# MMR Sampling (cont.)

Examples:

- In *identical concurrent* sampling design, quantitative and qualitative data are collected from same people (identical) at approximately the same time (i.e., concurrently).
- In *identical sequential* sampling design, quantitative and qualitative data are collected from same people (identical) in stages (sequential).

# MMR Sampling (cont.)

Once the mixed sampling design has been determined (or concurrently)...

- The researcher determines the specific qualitative sampling method, the specific quantitative sampling method, and determines the QUAN and QUAL sample sizes.
- Then the samples (of people, sites) are located and data are collected.

# Validity of Research Findings

- For an overview of validity of research results in quantitative, qualitative, and mixed methods research, [click here](#).
- (The term validity also is used in measurement: For an overview of measurement validity, [click here](#).)



# Multiple Validities

I am reviewing validity in quantitative and qualitative research because of the requirement of multiple validities in MMR (Johnson & Onwuegbuzie, 2006).

**Multiple validities:** the extent to which all of the pertinent validities (quantitative, qualitative, and mixed) are addressed and resolved successfully.

--this important idea is currently ignored in some mixed methods textbooks.

# Review: QUAN Validity

If you are not familiar with validation in QUAN, [go here](#) to read the relevant lecture.

Cook and Campbell's four QUAN types include

1. Statistical conclusion validity (the ability to infer that the independent and dependent variables are related and the strength of that relationship)
2. Construct validity (the extent to which a higher-order construct is accurately represented in a particular study)

# Review: QUAN Validity

3. Internal (causation) validity (the ability to infer that a causal relationship exists between two variables)
4. External (generalization) validity (the extent to which the study results can be generalized to and across populations of persons, settings, times, outcomes, and treatment variations)

# Review: QUAN Validity

Because of the importance of **causation** in social/behavioral/health research, I want to review the criteria that must be met for causation.

# Internal (Causation) Validity

## ■ TABLE 14.1 The Three Required Conditions for Causation

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Researchers must establish three conditions if they are to conclude that changes in variable *A* cause changes in variable *B*.

Condition 1: Variable *A* and variable *B* must be related (the relationship condition).

Condition 2: Proper time order must be established (the temporal antecedence condition).

Condition 3: The relationship between variable *A* and variable *B* must *not* be due to some confounding extraneous or “third” variable (the lack of alternative or rival explanation condition).

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NOTE: To fully understand causation, you must also determine any relevant mediating variables and moderating variables. See next slides for definitions.

# Review: QUAN Validity

■ **TABLE 2.2** Common Types of Variables Classified by Level of Measurement and by Role of Variable

<i>Variable Type</i>	<i>Key Characteristic</i>	<i>Example</i>
<b>Level of Measurement</b>		
Categorical variable	A variable that is made up of different types or categories of a phenomenon	The variable <i>gender</i> is made up of the categories of male and female.
Quantitative variable	A variable that varies in degree or amount of a phenomenon	The variable <i>annual income</i> varies from zero income to a very high income level.
<b>Role Taken by the Variable</b>		
Independent variable (symbolized as IV)	A variable that is presumed to cause changes to occur in another variable; a causal variable	Amount of studying (IV) affects test grades (DV).

# Review: QUAN Validity

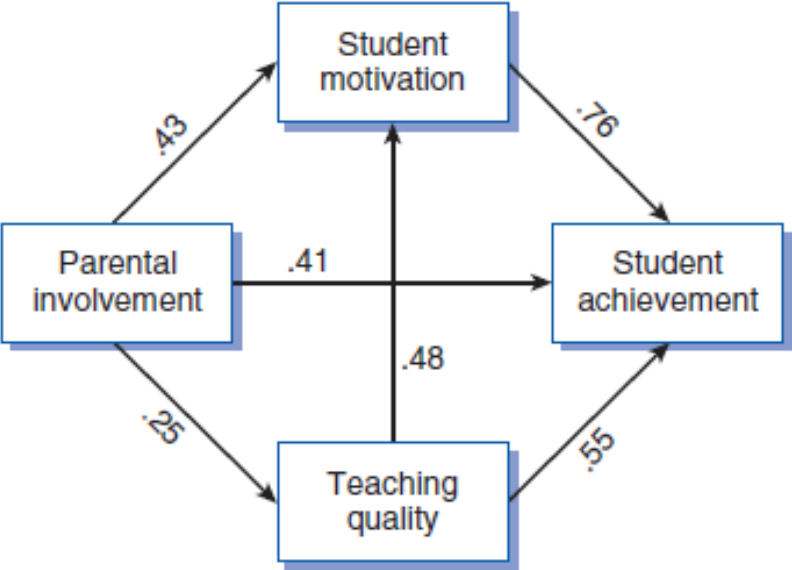
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<i>Variable Type</i>	<i>Key Characteristic</i>	<i>Example</i>
Dependent variable (symbolized as DV)	A variable that changes because of another variable; the effect or outcome variable	Amount of studying (IV) affects test grades (DV).
Mediating variable (also called an intervening variable)	A variable that comes in between other variables, helping to delineate the process through which variables affect one another	Amount of studying (IV) leads to input and organization of knowledge in long-term memory (mediating variable), which affects test grades (DV).
Moderator variable	A variable that delineates how a relationship of interest changes under different conditions or circumstances	Perhaps the relationship between studying (IV) and test grades (DV) changes according to the different levels of use of a drug such as Ritalin (moderator).
Extraneous variable	A variable that may compete with the independent variable in explaining an outcome	Perhaps an observed relationship between coffee drinking (IV) and cancer (DV) is actually due to smoking cigarettes

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# Review: QUAN Validity: Mediating Variables

■ FIGURE 14.3 A causal model of student achievement





# Review: QUAN Validity:

For causation as used in epidemiology, [click here](#).

# Review: QUAL Validity

If you're not familiar with validation in qualitative research, [go here](#) for overview.

Joseph Maxwell's (1992) QUAL validity types include

1. Descriptive validity (the factual accuracy of an account as reported by the researcher)
2. Interpretative validity (accurately portraying the participants' perspectives and meanings, and providing the insider's viewpoint)

# Review: QUAL Validity

3. Theoretical validity (the degree to which a theoretical explanation fits the data)
4. And internal (causation) and external (generalizing) validity. Same as with quan except that (according to Johnson and Christensen, 2014) you can view internal validity as including both “local/idiographic causation” (particular causes, including intentions, of specific or local attitudes, conditions, and events) and “nomological/general causation” (the standard view of causation in science; it refers to causation among variables)

# Review: QUAL Validity (cont.)

On the next slide I list some useful strategies for conducting defensible **qualitative** research...

**TABLE 11.2** Strategies Used to Promote Qualitative Research Validity

<i>Strategy</i>	<i>Description</i>
Critical friend	A type of peer review in action research. A critical friend is useful throughout a research project (beginning, middle, and end).
Extended fieldwork	To provide for both discovery and validation, the collection of data in the field over an extended time period
External audit	Using outside experts to assess the study's quality
Low-inference descriptors	The use of description phrased very similarly to the participants' accounts and researchers' field notes. Verbatims (i.e., direct quotations) are a commonly used type of low-inference descriptors.
Multiple data sources	The use of multiple sources of data to help understand a phenomenon (e.g., interviewing different people, including those who might have different perspectives about the research object)
Multiple investigators	The use of multiple researchers and observers (including participant researchers in participatory research) in collecting, analyzing, and interpreting data
Multiple methods	The use of multiple research methods (e.g., ethnography and grounded theory) and methods of data collection (e.g., questionnaires, observations, and focus groups) to study a phenomenon
Multiple theoretical perspectives	The use of multiple theories, disciplines, and perspectives to help interpret and explain the data
Negative-case sampling	Attempting to identify cases that might disconfirm the researcher's expectations and generalizations
Participant feedback or member checking	The discussion of the researcher's interpretations and conclusions with the study participants and other members of the participant community for verification, insight, and deeper understanding
Pattern matching	Predicting a series of results that form a distinctive pattern and then determining the degree to which the actual results fit the predicted pattern or "fingerprint" or "signature"
Peer review	Discussion of the researcher's actions and interpretations during a study and conclusions at the end of the study with other people. This includes discussion with a disinterested peer (e.g., with another researcher not directly involved). This peer should be skeptical and play the devil's advocate, challenging the researcher to provide solid evidence for any interpretations or conclusions. Discussion with peers who are familiar with the research can also provide useful challenges and insights.
Reflexivity	Continual self-awareness and critical self-reflection by the researcher on his or her potential biases and predispositions as these may affect the research process and conclusions
Researcher-as-detective	A metaphor characterizing the qualitative researcher as he or she searches for evidence about causes and effects. The researcher develops an understanding of the data through careful consideration of potential causes and effects and by systematically eliminating rival explanations or hypotheses until the final case is made beyond a reasonable doubt. The detective can utilize any of the strategies listed here.
Ruling out alternative explanations	Making sure that you have carefully examined evidence for competing or rival explanations and that yours is the best explanation
Triangulation	Cross-checking information and conclusions through the use of multiple procedures or sources. When the different procedures or sources are in agreement, you have corroboration or convergence; when the procedures or sources are not in agreement, you have divergence.

■ **TABLE 11.3\*** Applying Qualitative Research Validity Strategies: Example of a Checklist That Might Appear in a Research Proposal to Evaluate a New Mathematics Textbook and Curriculum

<i>Strategy</i>	<i>Sample Application</i>
Researcher-as-detective	I expect several stakeholders will wonder if the new book causes better student achievement. Although it will be hard to be sure without a comparison group, I will look at performance of the district before it adopted the book, as well as the performance of similar districts, to arrive at some tentative findings. I will also look at the developer's claims about the product's instructional effectiveness and see if I can find any evidence that these features are present in the classroom.
Ruling out alternative explanations	I will listen to the math teachers' beliefs and opinions, but before assuming that their conclusions are correct, I will try to check out alternative reasons for what they say and for what appears to be occurring as a result of the new book. I will try to be vigilant to the possibility that whatever they say could be influenced by other factors. Perhaps this district has a long history of changing curricula and teachers will be inclined to say they like the book just to promote stability. Or perhaps the teachers will be inadvertently pressured into supporting administrative decisions.
Extended fieldwork	I plan to interview school staff at the beginning of the book adoption period and check in with them throughout.
Low-inference descriptors	"I think this book represents a real advancement over competing options, and I am glad we adopted it. Hopefully we'll keep it for a while." This type of quote could be quite telling about how at least one person feels about the book. This also might suggest that staff could experience some fatigue in terms of changing curricula. At any rate, the quote can be a real help in describing findings in the participants' own words.
Triangulation	My data-collection procedures will include interviews with key stakeholders, focus groups with teachers, classroom observations, and reviews of relevant school records. Based on the principle of triangulation, I hope to find corroborating information across these sources. However, I will also carefully examine any differences in descriptions and conclusions across the approaches because it might not be realistic to expect everyone to agree. For example, it is possible that the administrators will like the book but teachers will not. I will attempt to understand and explain both similarities and differences.
Multiple data and methods	Are interviews from teachers consistent with observations? If, for example, teachers report near daily use of the book, can I see its use in the classroom?
Multiple investigators	I'll ask a colleague to help me collect and interpret data from the study so that it is not based on the observations and analysis of a single investigator. Does my co-investigator reach similar conclusions when analyzing raw interview data he or she did not collect? Do we think we were consistent in terms of how we observed and interpreted behaviors? How do we know?

(Continued)

**TABLE 11.3** (Continued)

<i>Strategy</i>	<i>Sample Application</i>
Multiple theoretical perspectives	Often a product will assume a “theory of change” that covers how and why it should work. Perhaps the developer claims to use advanced learning theory that is developmentally appropriate. I will check to see if the developer’s stated theory matches the advanced learning theory. I also will develop a theory-in-practice to see how the textbook seems to operate. I will get the teachers to explain how they use the book to make the theory-in-practice explicit. Ultimately, I hope these theories will be similar, but if not, I will determine where the difference lies and note whether this seems to be causing a problem in terms of the intended result of the text/curriculum program.
Member checking or participant feedback	I’ll ask a diverse group of interviewees to check the accuracy of my transcripts and/or interpretations. I want to make sure that I understood what they said, and they will be able to tell me this. I also will run primary findings past participants to see if they view them as sensible, and if not, I’ll see if I can figure out why.
Peer review	I’ll share my progress with other researchers (e.g., a dissertation committee) and ask for feedback at conferences that focus on mathematics instruction (I’ll consult Table 1.1 for some ideas). If my peers take umbrage at some of my interpretations, I’ll not necessarily assume something is wrong, but I will take the time to investigate why.
External audit	If possible, I will try to find an advanced student or a professor to read my report and look at my sources of information. He or she will check what I did, check my conclusions, and check my linkages between my data and conclusions. I will use this information, as needed, to adjust my claims and list any weaknesses that they identify. I also will use this critique to improve my continuing work in this area.
Negative-case sampling	I will search for and see if I can explain any cases or data points that seem to run contrary to my findings. For example, if most stakeholders seem to like the new textbook, I’ll try to find respondents who have negative things to say, and I will see if I can explain these discrepancies.
Reflexivity	I assume I’ll have some a priori biases about the textbook as well as what stakeholder groups should have an important say in its adoption. I’ll try to keep this in my mind as I observe and think about what I learn. I also plan to maintain a reflective journal that documents my perceptions across the course of the study. If I maintain a record of what I like and dislike about the book, the journal might help me conduct negative-case sampling. It also might help me make judicious selections of data to run through an external audit.
Pattern matching	The textbook developers claim that adoption requires no training, that it can be fully implemented within a matter of weeks, and that the results will be positive regardless of the type of student. I will ask teachers if this is the case a few weeks into the school year. I will ask different stakeholders what they like about the book and if and how they would improve it, given the chance. I’ll compare their responses to features of the actual book (e.g., its length, reported readability, target audience, etc.) and any marketing materials used to promote it. In sum, I will test their multifaceted prediction/“pattern” to see if it is supported. If it is, then I will have relatively good evidence of the book’s/curriculum’s viability.

\*This table was kindly contributed by our colleague, Professor John Hitchcock of Indiana University.

[Click here](#) for Table on Strategies to Promote Qualitative Validity

[Click here](#) for application/companion-table.



# Research Validity or Legitimation in Mixed Research

- Goal is to make justified qualitative, quantitative, and integrated claims.
- Often want to make *meta-inferences*, which are inferences or conclusions that build on or integrates quan and qual findings
- Only a subset of the following typically will be relevant/pertinent for a particular research study, and **multiple validities legitimation** is the most important.

# MMR Research Validity (cont.)

1. *Inside-outside validity* – The extent to which the researcher accurately understands, uses, and presents the participants' subjective insider or “native” views and the researcher's objective outsider view
  - These also are called the emic and etic viewpoints
  - Strategy: Try to move back-and-forth, step-in-step-out
  - Represent both viewpoints and create a third MMR viewpoint; make meta inferences.

# MMR Research Validity (cont.)

2. *Paradigmatic/philosophical validity* – the degree to which the mixed researcher clearly explains his or her philosophical beliefs about research
  - The most popular paradigms or worldviews are pragmatism, critical realism, transformative, and dialecticalism
  - This will enable the conduct of MMR.
    - This set of beliefs should be logical and defensible

# MMR Research Validity (cont.)

3. *Commensurability approximation validity* – the degree to which a mixed researcher can make Gestalt switches between the lenses of a qualitative researcher and a quantitative researcher and integrate the two views into an “integrated” or third viewpoint
  - Need to become a QUAL researcher, a QUAN, and by moving back-and-forth become a MMR researcher.
  - Requires extensive training
  - More easily/quickly done by team of a QUAN, a QUAL, and a mediator/integrator MMR researcher

# MMR Research Validity (cont.)

4. *Weakness minimization validity* – extent to which the weakness from one research method or approach is compensated by the strengths from another method or approach.
- MMR researcher designs/combines QUAN & QUAL methods/approaches to have nonoverlapping weaknesses.
  - Use QUAL or QUAN help you to see what you would have missed had you only used one method/approach.
  - E.g., use depth interviews to pick up on what the standardized test failed to measure.

# MMR Research Validity (cont.)

5. *Sequential validity* – the degree to which a mixed researcher appropriately addresses and/or builds on effects, understandings, knowledge, or findings from earlier qualitative and quantitative phases
  - Ask: would results have been different, in a negative way, if sequencing had been reversed?
  - Ask: was second stage appropriately informed by first stage (and third, fourth, etc. by prior stages)

# MMR Research Validity (cont.)

6. *Conversion validity* – accuracy/quality of data transformations (quantitizing qualitative data and qualitzing quantitative data) and appropriate interpretations made on transformed data.
  - Only relevant in studies where data are converted
- Example of *quantitizing* is counting QUAL data (e.g., words, categories, themes); converting to quantitative codes for statistical analysis.
- Examples of *qualitzing* are labeling factors and developing categories and types from QUAN data

# MMR Research Validity (cont.)

7. *Sample integration validity* – the degree to which a mixed researcher makes appropriate conclusions, generalizations, and meta-inferences from mixed samples (combination of QUAN and QUAL samples).
- E.g., sample to population “statistical” generalizations are better with large random samples; “meaning” and experiential statements are better justified with purposive samples studied in depth.



# MMR Research Validity (cont.)

8. Integrative/integration validity – degree to which the researcher has achieved integration of data, analysis, and conclusions. Integrative conclusions are sometimes called meta-inferences.

# MMR Research Validity (cont.)

9. *Socio-Political validity* – the degree to which a mixed researcher addresses the interests, values, and viewpoints of multiple standpoints and stakeholders in the research process.
- Need to understand the value positions and viewpoints in order to effectively address them
  - Try to be extra sensitive to needs of stakeholders with minimal power and voice
  - Ask: Is the study defensible to multiple stakeholders?

# MMR Research Validity (cont.)

10. *Multiple validities* – the extent to which all of the pertinent validities (quantitative, qualitative, and mixed) are addressed and resolved successfully.
- Valid/legitimate MMR requires the conduct of good qualitative *and* good quantitative research.
  - Two poorly designed and executed components does not = good design with defensible findings.
  - Need to identify and use **combination** of relevant QUAL, QUAN, and Mixed validity types and strategies.

# Research Designs in Mixed Methods Research

I will examine the typologies and approaches of

- John Creswell (2014)
- Jennifer Greene (2007)
- Burke Johnson and Tony Onwuegbuzie (equal order)(2004, 2014)
- Joseph Maxwell (2003)
- Jan Morse (1991) (Just her notation system)
- Charles Teddlie and Abbas Tashakkori (2009)

# MMR Designs (cont.)

Creswell (2014) has revised his typology to the following:

Three “basic” designs:

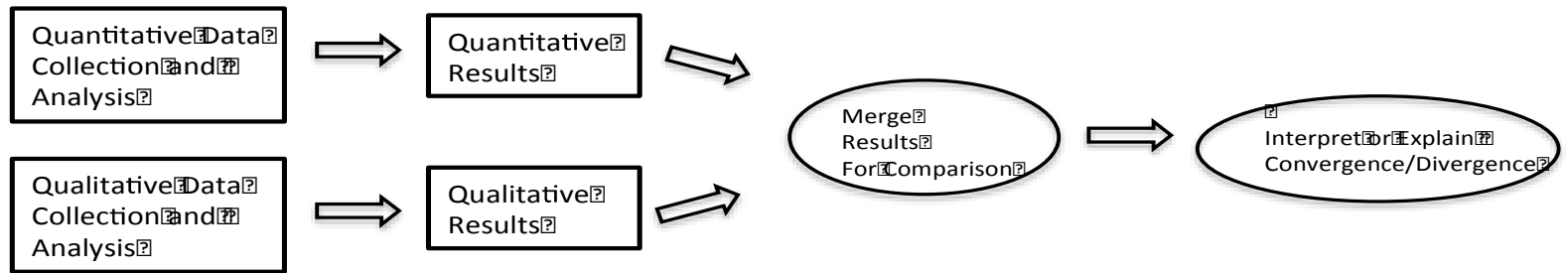
- Convergent parallel design (qual and quan data collection and analysis is done concurrently)
- Explanatory sequential design (quan→qual)
- Exploratory sequential design (qual→quan)

Three “advanced” designs:

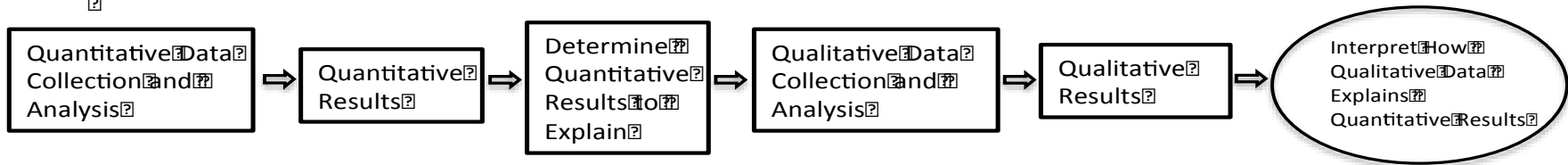
- Experimental intervention design (collect qual data before, during, and after experiment)
- Social Justice/participatory design (quan→qual)
- Program evaluation design (qual→quan→qual→quan)

Figure 1  
 Basic Mixed Methods Designs

⇒ Convergent Parallel Design



⇒ Explanatory Sequential Design



⇒ Exploratory Sequential Design

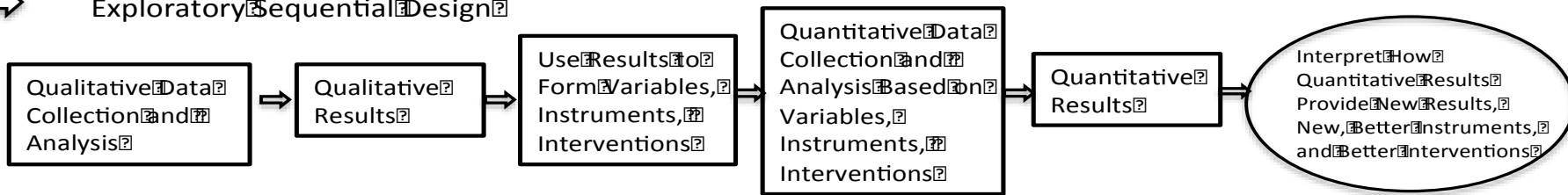
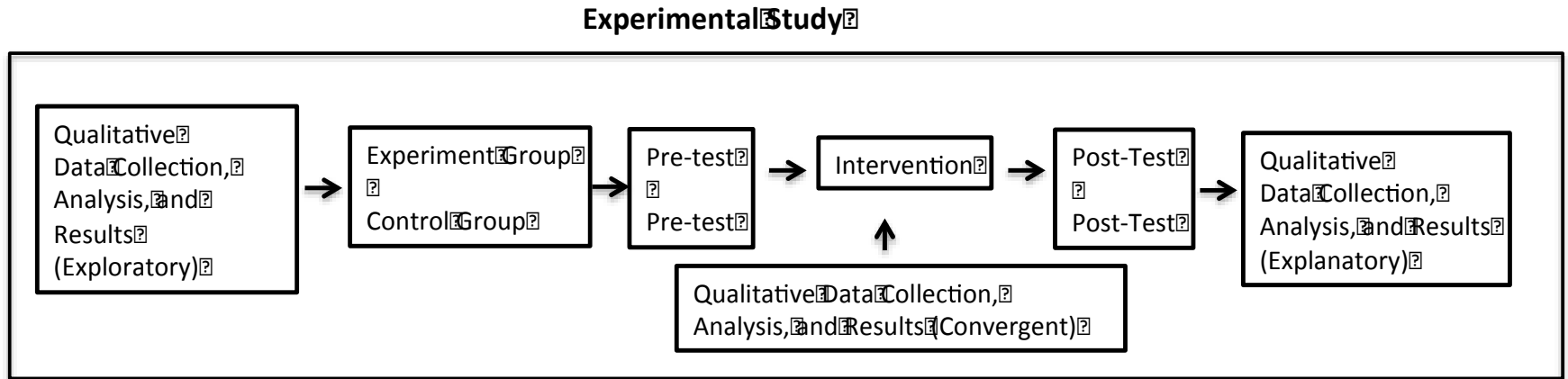


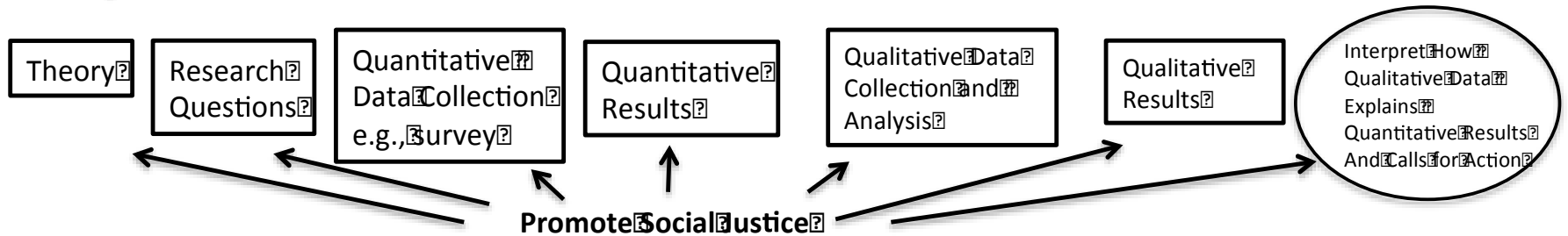
Figure 2.2

# Advanced Mixed Methods Designs

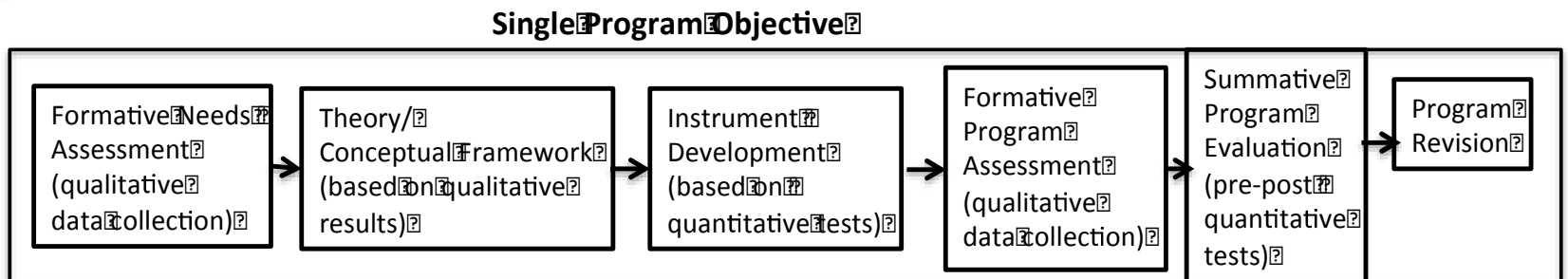
## Experimental Mixed Methods Design



## Social Justice Design (using an Explanatory Sequential Design example)



## Multistage Evaluation Design (using an Exploratory Sequential Design example)



# T&T's MMR Designs

Here are the major MMR designs in the Teddlie & Tashakkori typology (cell 4 in next slide):

- Parallel mixed designs
- Sequential mixed designs
- Conversion mixed designs
- Multilevel mixed designs
- Fully integrated mixed designs.



**Table 7.2** The Methods-Strands Matrix: A Typology of Research Designs Featuring Mixed Methods

<i>Design Type</i>	<i>Monostrand Designs</i>	<i>Multistrand Designs</i>
Monomethod designs	<p><b>Cell 1</b></p> <p>Monomethod monostrand designs</p> <ol style="list-style-type: none"> <li>1. Traditional QUAN designs</li> <li>2. Traditional QUAL designs</li> </ol> <p>(not MM)</p>	<p><b>Cell 2</b></p> <p>Monomethod multistrand designs</p> <ol style="list-style-type: none"> <li>1. Parallel monomethod               <ol style="list-style-type: none"> <li>a. QUAN + QUAN</li> <li>b. QUAL + QUAL</li> </ol> </li> <li>2. Sequential monomethod (not)               <ol style="list-style-type: none"> <li>a. QUAN → QUAN</li> <li>b. QUAL → QUAL</li> </ol> </li> </ol>
Mixed methods designs	<p><b>Cell 3</b></p> <p>Quasi-mixed monostrand designs</p> <ol style="list-style-type: none"> <li>1. Monostrand conversion design</li> </ol>	<p><b>Cell 4</b></p> <p>Mixed methods multistrand designs</p> <ol style="list-style-type: none"> <li>1. Parallel mixed designs</li> <li>2. Sequential mixed designs</li> <li>3. Conversion mixed designs</li> <li>4. Multilevel mixed designs</li> <li>5. Fully integrated mixed designs</li> </ol> <p>Quasi-mixed multistrand designs (designs mixed at the experiential stage only, including the parallel quasi-mixed design)</p>

Note: See Tashakkori and Teddlie (2003c, pp. 685–689) for more details regarding the quasi-mixed designs.

# Teddlie and Tashakkori's Designs

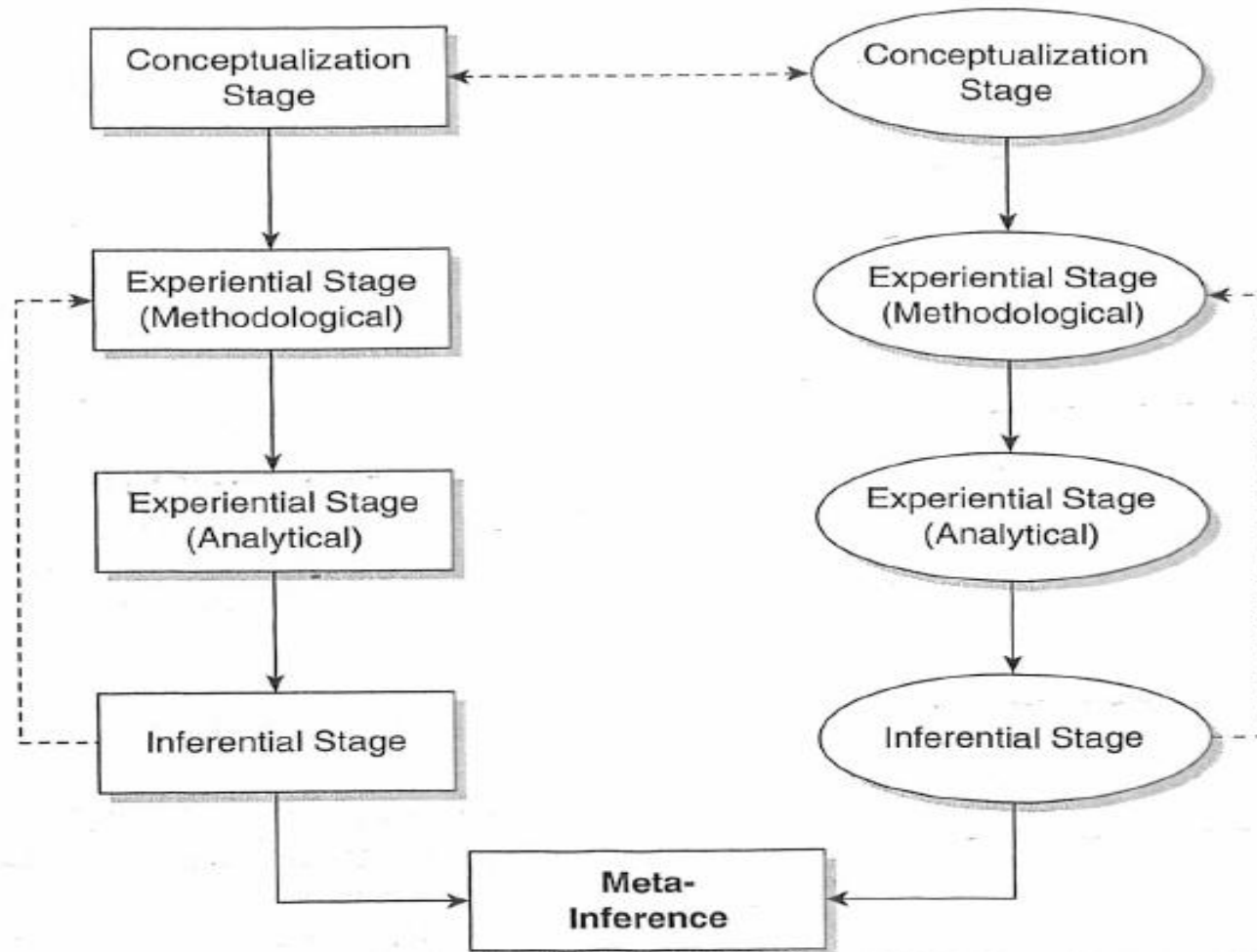
## Box 7.4

### Five Families of MM Designs

Cell 4 of the Methods-Strands Matrix contains five families of MM designs based on implementation processes. *Families* means that there could be numerous permutations of each design based on other design characteristics. For example, the descriptions of these designs typically include only two strands, and the addition of more strands results in different "family members." Following are brief definitions of the five families of MM designs:

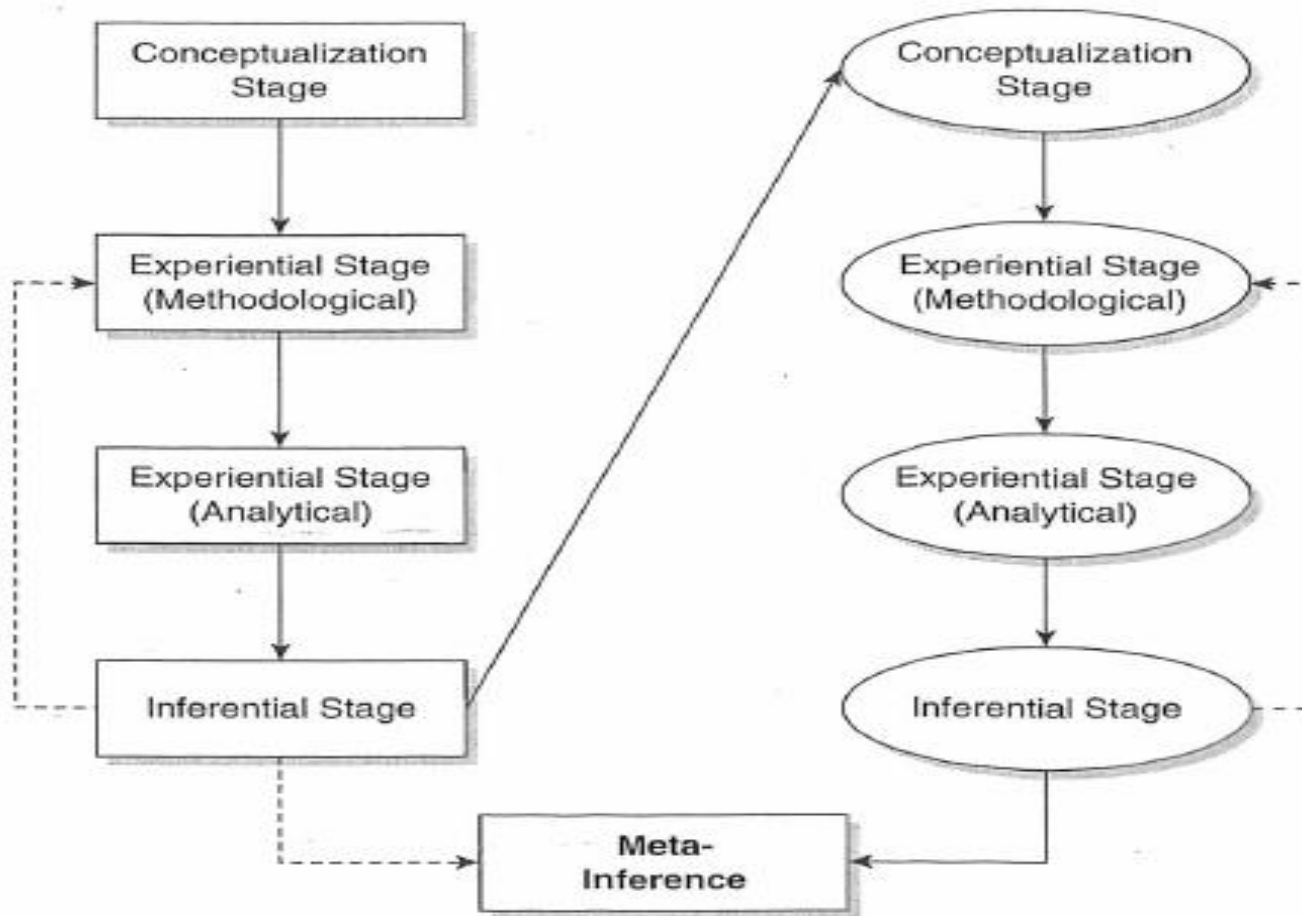
- Parallel mixed designs—In these designs, mixing occurs in a parallel manner, either simultaneously or with some time lapse; planned and implemented QUAL and QUAN phases answer related aspects of the same questions.
- Sequential mixed designs—In these designs, mixing occurs across chronological phases (QUAL, QUAN) of the study, questions or procedures of one strand emerge from or depend on the previous strand, and research questions are related to one another and may evolve as the study unfolds.
- Conversion mixed designs—In these parallel designs, mixing occurs when one type of data is transformed and analyzed both qualitatively and quantitatively; this design answers related aspects of the same questions.
- Multilevel mixed designs—In these parallel or sequential designs, mixing occurs across multiple levels of analysis, as QUAN and QUAL data from these different levels are analyzed and integrated to answer aspects of the same question or related questions.
- Fully integrated mixed designs—In these designs, mixing occurs in an interactive manner at all stages of the study. At each stage, one approach affects the formulation of the other, and multiple types of implementation processes occur.

# Parallel Mixed Design (Teddlie and Tashakkori)



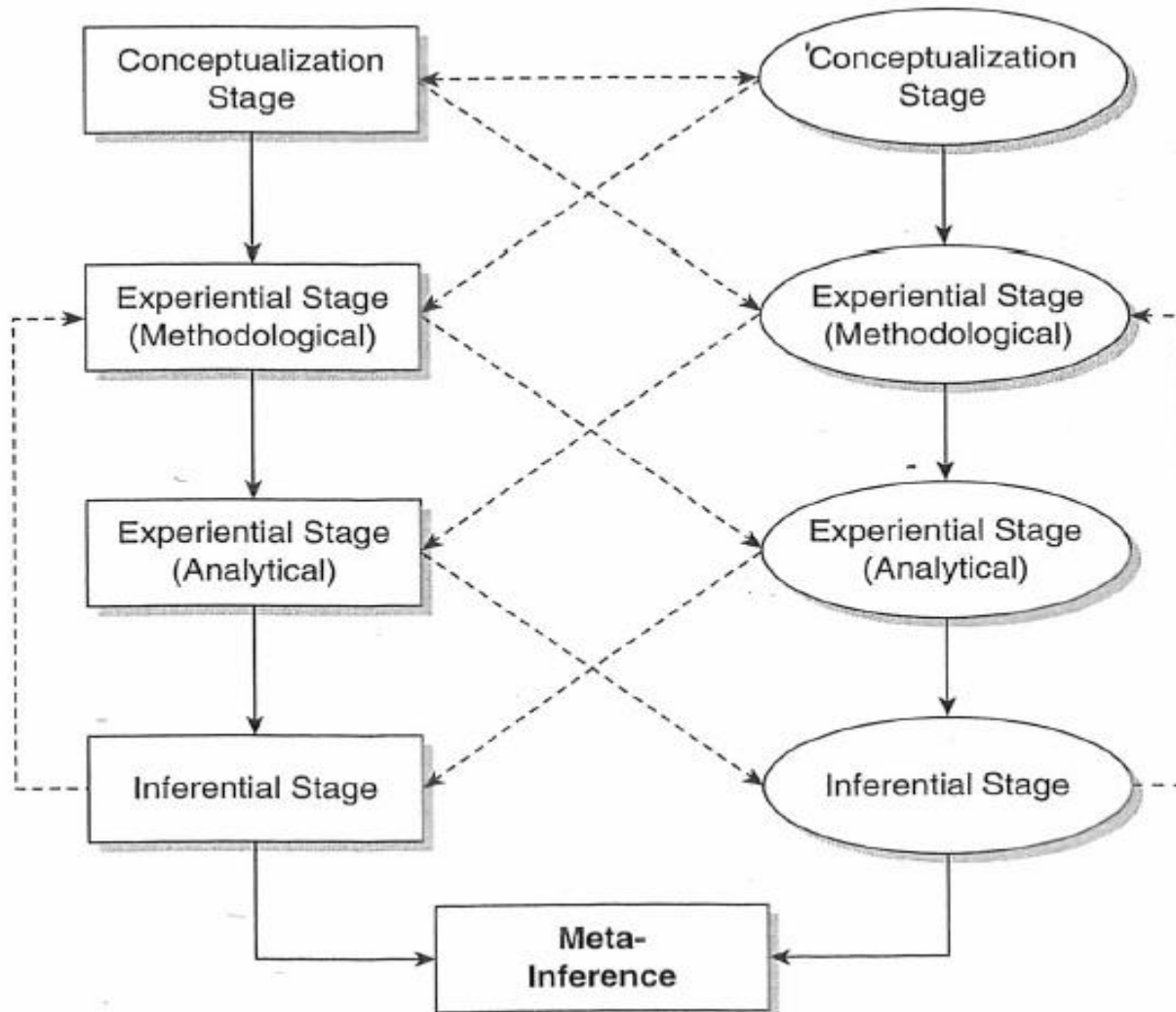
Graphic Illustration of Parallel Mixed Designs

# Sequential Mixed Design (Teddlie and Tashakkori)

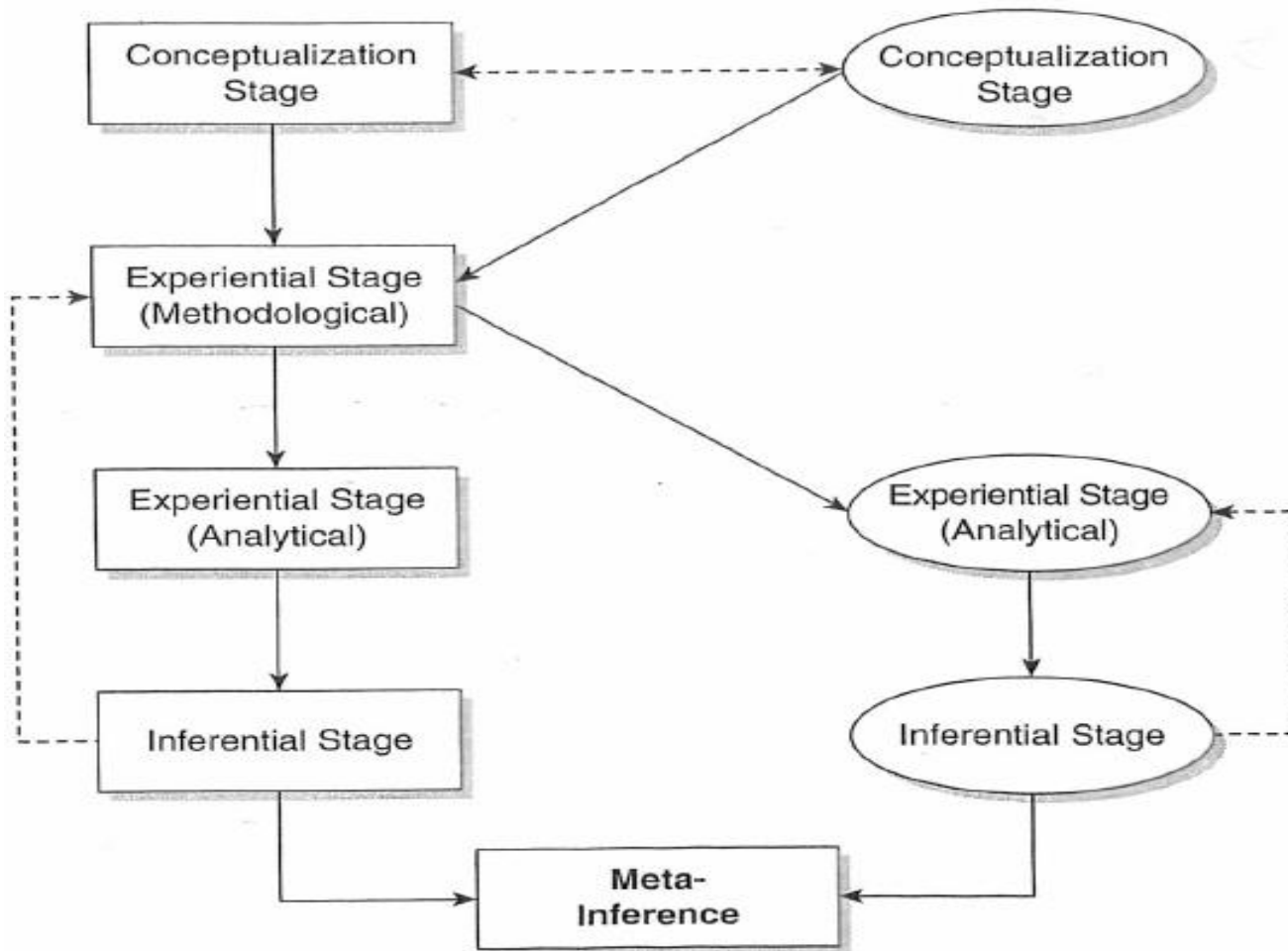


Graphic Illustration of Sequential Mixed Designs

# Fully Integrated Mixed Design (Teddlie and Tashakkori)



# Conversion Mixed Design (Teddlie and Tashakkori)



Graphic Illustration of Conversion Mixed Designs

# MMR Designs (cont.)

Ultimately, design should be based on multiple dimensions in a way to best answer your research question.

Here are 7 design dimensions discussed by Teddlie & Tashakkori (2009):

1. Number of methodological approaches (monomethods vs. mixed methods);
2. Number of strands or phases (monostrand vs. multistrand);

# MMR Designs (cont.)

3. Type of implementation process (parallel, sequential, conversion, multilevel, combination);
4. Stage of integration of approaches (across all stages, within experiential stage only, other variants possible);
5. Priority of methodological approach (QUAL+quan, QUAN+qual, QUAN→qual, QUAL→quan);



# MMR Designs (cont.)

6. Functions of the research study (triangulation, complementarity, development, initiation, expansion, other functions possible);
7. Theoretical or ideological perspective (some variant of transformative perspective or other perspectives vs. no theoretical or ideological perspective).

# MMR Designs (cont.)

6. Functions of the research study
7. Theoretical or ideological perspective

# MMR Design Criteria (Greene)

Jennifer Greene also has a list of design dimensions (2007):

1. Paradigms (relative weight of paradigm);
2. Phenomena (addressing same or different phenomena?);
3. Methods (how similar or different are the methods selected?);
4. Status (relative weight of methods);

# MMR Design Criteria (Greene)

5. Implementation independence (conceptualized and implemented interactively or independently);
6. Implementation timing (concurrent or sequential);
7. Study (essentially one research study or two?).

# Greene's MMR Designs

Greene (2007):

- Has two broad categories of designs
  - *Component designs* (QUAL and QUAN kept distinct)
  - *Integrated designs* (QUAL and QUAN mixed, blended, iterated, nested, nuanced, complex)
- She does not believe design typologies are especially useful.

# MMR Designs (cont.)

Greene, Teddlie & Tashakkori, Guest, Hesse-Biber, Morse, Onwuegbuzie, and I, and many others make an important point:

- **Do not limit yourself to designs provided in any one current design typology.**
- Learn how to **construct** the design you need!
- Prepackaged/canned designs are very useful starting points that you can build on.

# MMR Designs (cont.)

[Click here](#) for a new, more advanced approach to mixed design that I am currently developing. I call it the **multiple-dimension approach to mixed design**, and it allows researchers to deal with many technical complexities in MMR design and construct a justified design.

# MMR Designs (cont.)

Now, I present some design notation and a resulting typology developed by Johnson and Onwuegbuzie (2004) (and based on the Morse, Patton, Teddlie, Tashakkori, and Morgan).

- It provides a common notation used in MMR from Morse, 1991.
- It provides a way of visualizing the relationship of the components in your design.
- Like the other typologies, however, it is only a starting point for constructing your design to answer your research questions.



# MMR Designs (cont.)

Mixed research designs - classified on two major dimensions:

- Time order (concurrent, sequential)
- Method/methodology/paradigm emphasis (interactive or equal status versus qualitatively driven or quantitatively driven where one methodology is the core that is supplemented by qual or quan).

These dimensions produce a 2-by-2 matrix, with 9 basic mixed methods research designs that you can build on.

# MMR Designs (cont.)

To use design Figure provided in the next slide, you answer two questions:

1. Do your research questions suggest that you operate largely within one method/methodology/paradigm or not?
2. Should you conduct the QUAL and QUAN phases/components concurrently or sequentially?

# MMR Designs (cont.)

## ■ FIGURE 16.2

Mixed method design matrix.  
Mixed method research designs  
are shown in the four cells.

		Time Order Decision	
		Concurrent	Sequential
Paradigm Emphasis Decision	Equal Status	QUAL + QUAN	QUAL → QUAN QUAN → QUAL
	Dominant Status	QUAL + quan  QUAN + qual	QUAL → quan qual → QUAN  QUAN → qual quan → QUAL

# MMR Designs (cont.)

## Notation:

- QUAL and qual stand for qualitative research.
- QUAN and quan stand for quantitative research.
- Capital letters denote priority or increased weight.
- Lowercase letters denote lower priority.
- Plus sign (+) denotes concurrent collection of data.
- Arrow ( $\rightarrow$ ) denotes sequential collection of data.

# MMR Designs (cont.)

Example: qual→QUAN

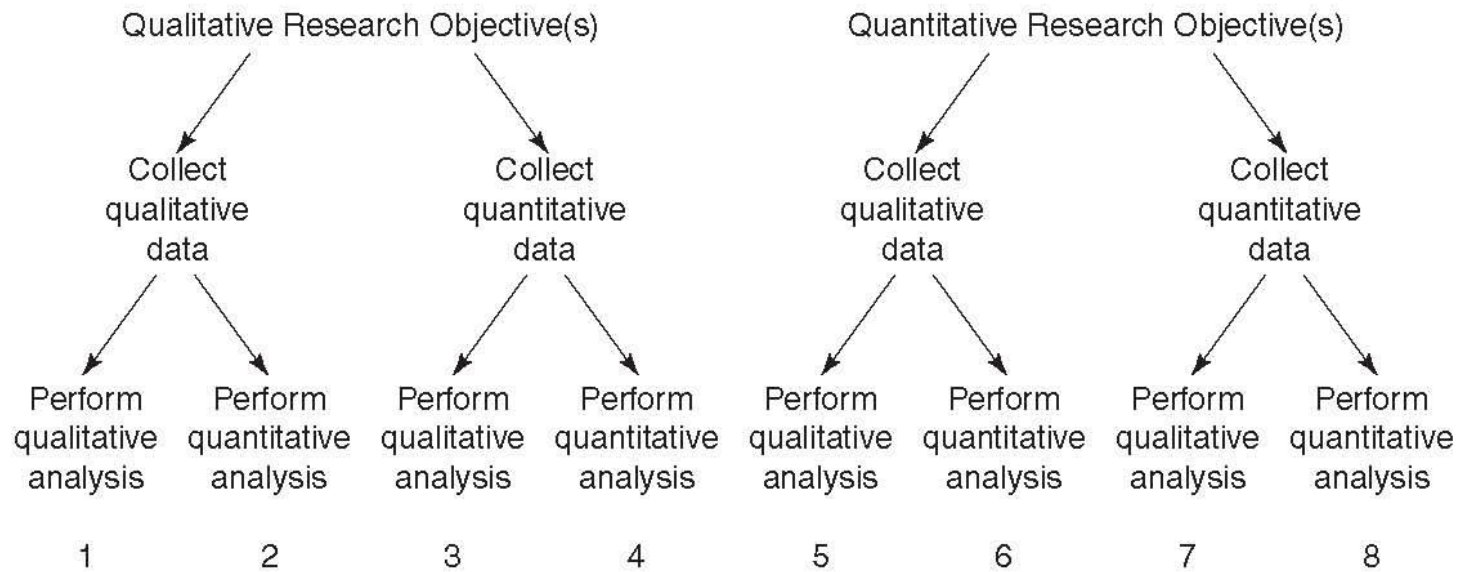
- Quantitatively driven, sequential design
- Quantitative core design, preceded by supplemental qualitative phase.
- E.g.: Phase one: open-ended interviews on dropping out of on-line .
- Phase two: quantitative study of predictors of dropping out, with random sample and using statistical methods.
- Qualitative part plays important but supportive role.

# MMR Designs (cont.)

More complexity:

On the next slide I show “Mixed Model” designs.

- This terminology has largely been dropped
- Now called “conversion” designs
- Usually part of more complex MMR design
- The point is that mixing can take place across stages (e.g., QUAL data collection followed by QUAN data analysis).



■ **FIGURE 14.2** Monomethod and mixed model designs

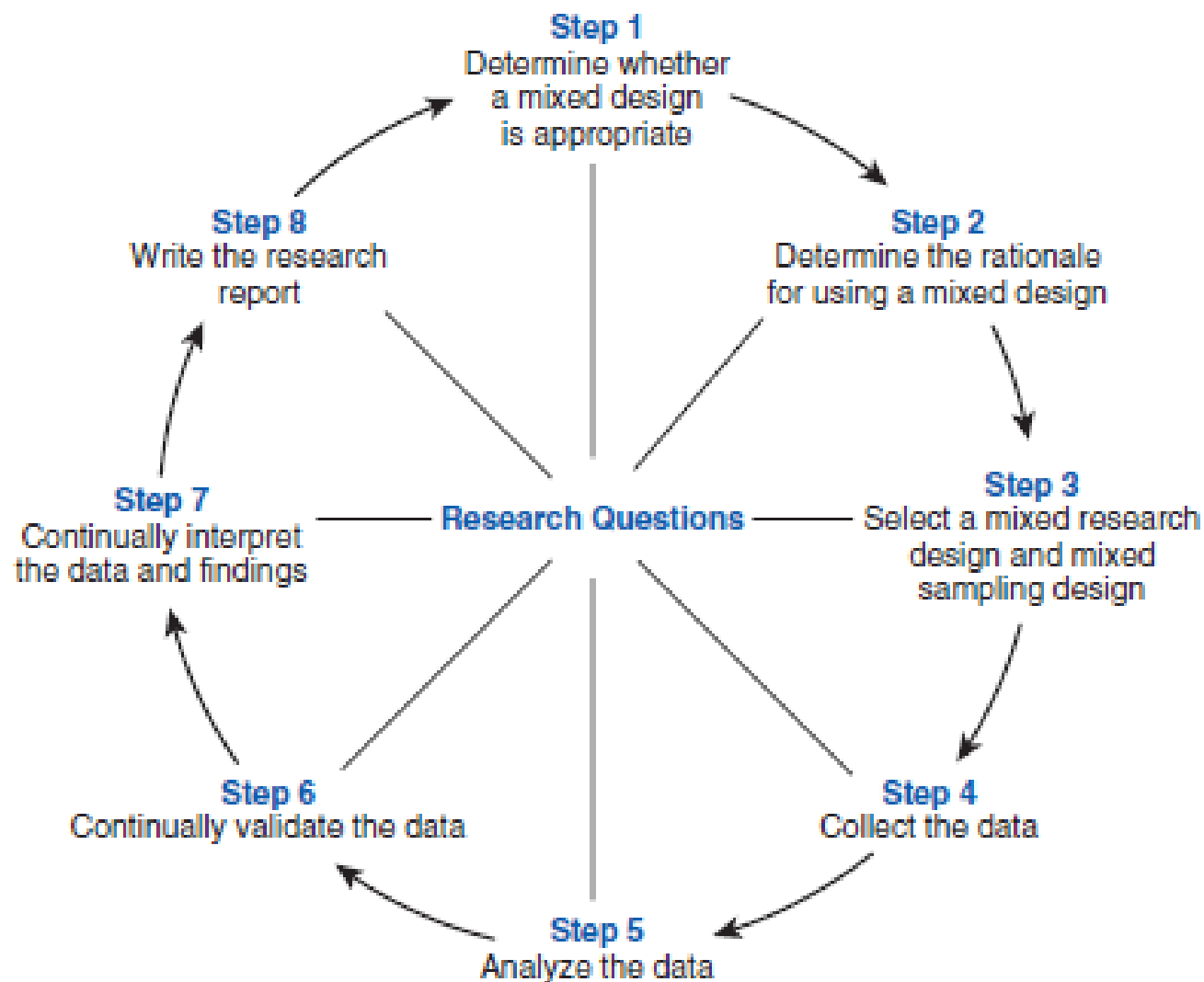
Designs 1 and 8 on the outer edges are the monomethod designs. The mixed model designs are designs 2, 3, 4, 5, 6, and 7.

# MMR Designs (cont.)

In case you like steps or process, the next slide shows the nonlinear/recursive process (or tries to)...



■ **FIGURE 18.3** Important steps in a mixed research study with your research questions at the core of the study.



*Note:* Although the steps are numbered, researchers often move around in the circle in multiple directions (especially in steps 4 through 7). Feedback loops can occur at any place.

# MMR Designs (cont.)

I reemphasize “stage 6” and “stage 7”:

(6) Continually validate data.

(7) Continually interpret data and findings.

The **process of conducting a defensible (“valid”) research study is continual**. It must be considered and addressed at every point in what the researcher does!

# MMR Designs (cont.)

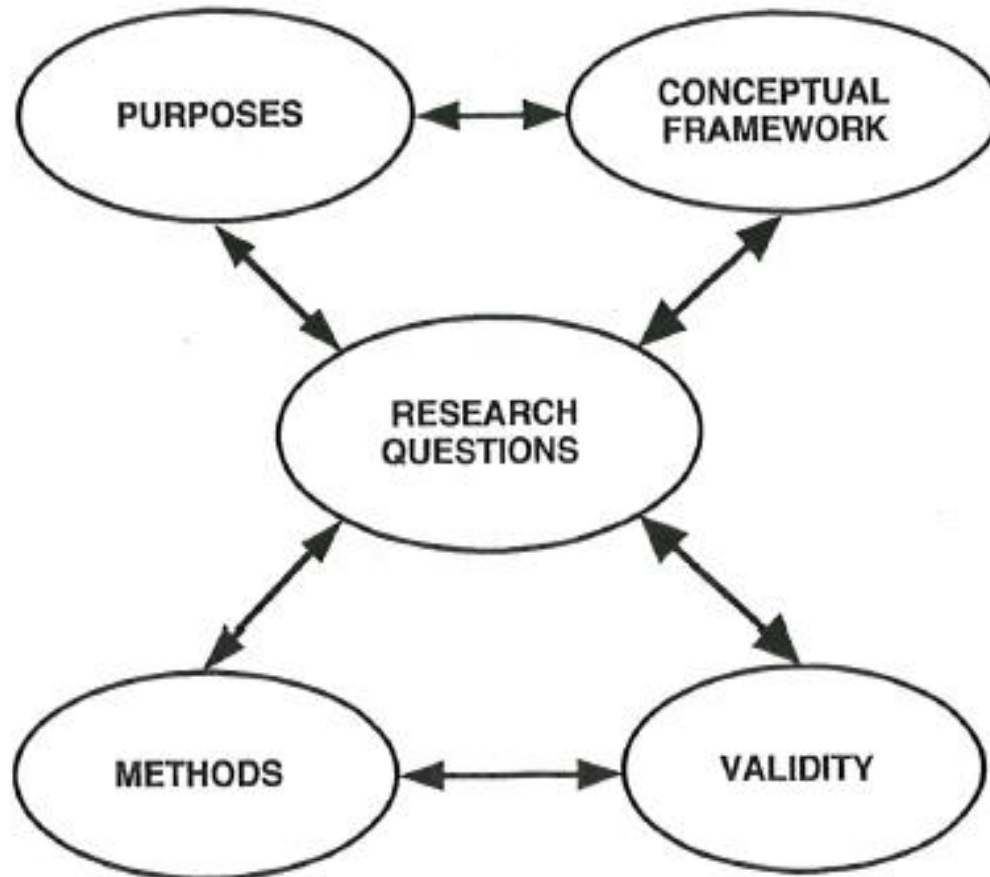
One last approach to design (Joseph Maxwell and D. Loomis, 2003) is focused on the **interactive process** of design rather than selecting or constructing an a priori design.

Design is viewed as the continual interaction of

- Research questions (the substantive questions to be answered via the research)
- Purposes (intellectual, practical, personal)
- Conceptual model (the theory to be generated or tested)
- Methods (research methods and methods of data collection)
- Validity (addressing threats to validity; ruling out alternative explanations)

# MMR Designs (cont.)

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An Interactive Model of Research Design

# Data Analysis in Mixed Methods Research

Mixed data analysis – use of both quantitative and qualitative analytical procedures in a research study.

- First, I will provide a classification of mixed methods data analysis (based on work of Onwuegbuzie)

# MMR Data Analysis (cont.)

Onwuegbuzie and I and colleagues have developed a Mixed Analysis Matrix.

- It's shown in the next slide.

# MMR Data Analysis (cont.)

To find your cell in the matrix, answer two questions:

■ **TABLE 19.8** The Mixed Research Data Analysis Matrix

<i>Data Types<sup>b</sup></i>	<i>Analysis Types<sup>a</sup></i>	
	<i>One Type of Analysis: Monoanalysis</i>	<i>Both Types of Analysis: Multianalysis</i>
One Type of Data: Monodata	<p><b>Cell 1</b></p> <p>Monodata-monoanalysis This is not a type of <i>mixed</i> data analysis.</p>	<p><b>Cell 2</b></p> <p>Monodata-multianalysis (a) For quantitative data: Quantitative analysis (QUAN) and qualitative analysis of quantitative data (QUALITIZE).  OR (b) For qualitative data: Qualitative analysis (QUAL) and quantitative analysis of qualitative data (QUANTITIZE)</p>
Both Types of Data: Multidata	<p><b>Cell 3</b></p> <p>Multidata-monoanalysis This type is not frequently used. Only quantitative analysis of both quantitative and qualitative data  OR Only qualitative analysis of both qualitative and quantitative data</p>	<p><b>Cell 4</b></p> <p>Multidata-multianalysis This is a combination of “(a)” AND “(b)” from cell 2.</p>

<sup>a</sup> An analysis type is either quantitative (i.e., statistical) or qualitative.

<sup>b</sup> A data type is either quantitative or qualitative.

Notation: “QUAL” stands for qualitative analysis; “QUAN” stands for quantitative analysis.



# MMR Data Analysis (cont.)

1. What type(s) of data do you have?
  - *Monodata* – have one data type.
  - *Multidata* – have both qualitative and quantitative data.

# MMR Data Analysis (cont.)

2. How many data analysis approaches will you use?
  - Use of only one type of analysis (qualitative analysis or quantitative analysis) called *monoanalysis*.
  - Use of both types of analysis called *multianalysis*.

# MMR Data Analysis (cont.)

Based on answers to the two questions, your analysis fits into one of four possible types:

1. *Monodata-monoanalysis.*

- This is not type of mixed data analysis.

# MMR Data Analysis (cont.)

2. *Monodata-multianalysis* – analysis of one type of data using both qualitative and quantitative analysis.
  - First: analyze data with standard approach.
  - Second, either qualitize or quantitize data for additional analysis.
    - Qualitize – transform quantitative data into qualitative data.
    - Quantitize data – transform qualitative data into quantitative data.

# MMR Data Analysis (cont.)

3. *Multidata-monoanalysis* – analysis of both data types (QUAL and QUAN) using only one analysis type.
- Results in:
    - Only QUAN analysis of QUAN and QUAL data, or
    - Only QUAL analysis of QUAN and QUAL data.
  - Recommend avoiding this approach.

# MMR Data Analysis (cont.)

4. *Multitype mixed analysis* – analysis of both types of data (QUAL data and QUAN data) using both types of analysis (QUAL and QUAN analysis).
- Includes many specific approaches to mixed data analysis.
  - This is recommended type of mixed analysis.

# MMR Data Analysis (cont.)

Now, I will provide several **data analytic strategies**

- They also can be viewed as “steps” in MMR data analysis; Onwuegbuzie & Teddlie, 2003)...

# MMR Data Analysis (cont.)

1. *Data reduction*—reduce number of dimensions in QUAN and QUAL data
  - QUAN via descriptive statistics, exploratory factor analysis
  - QUAL via thematic analysis, memoing



# “You know what you display” (Miles and Huberman, 1994)

2. *Data display*—visually describe and depict your QUAN and QUAL data
- QUAN via tables, graphs
  - QUAL via graphs, charts, matrices, checklists, rubrics, networks, Venn diagrams
  - And QUAN and QUAL combined in the same tables, graphs, matrices

# MMR Data Analysis (cont.)

3. *Data transformation*—quantitizing and qualitzing the data.
- Quantitizing (convert QUAN to QUAL)
  - Qualitizing (convert QUAL to QUAN)

# MMR Data Analysis (cont.)

4. *Data correlation*—Correlate or cross-classify different data types.
- Convert one or both QUAL into “variables” and correlate.
  - For example, point-biserial correlation, cross-tabulation tables, and use of multiple-response variables.

# MMR Data Analysis (cont.)

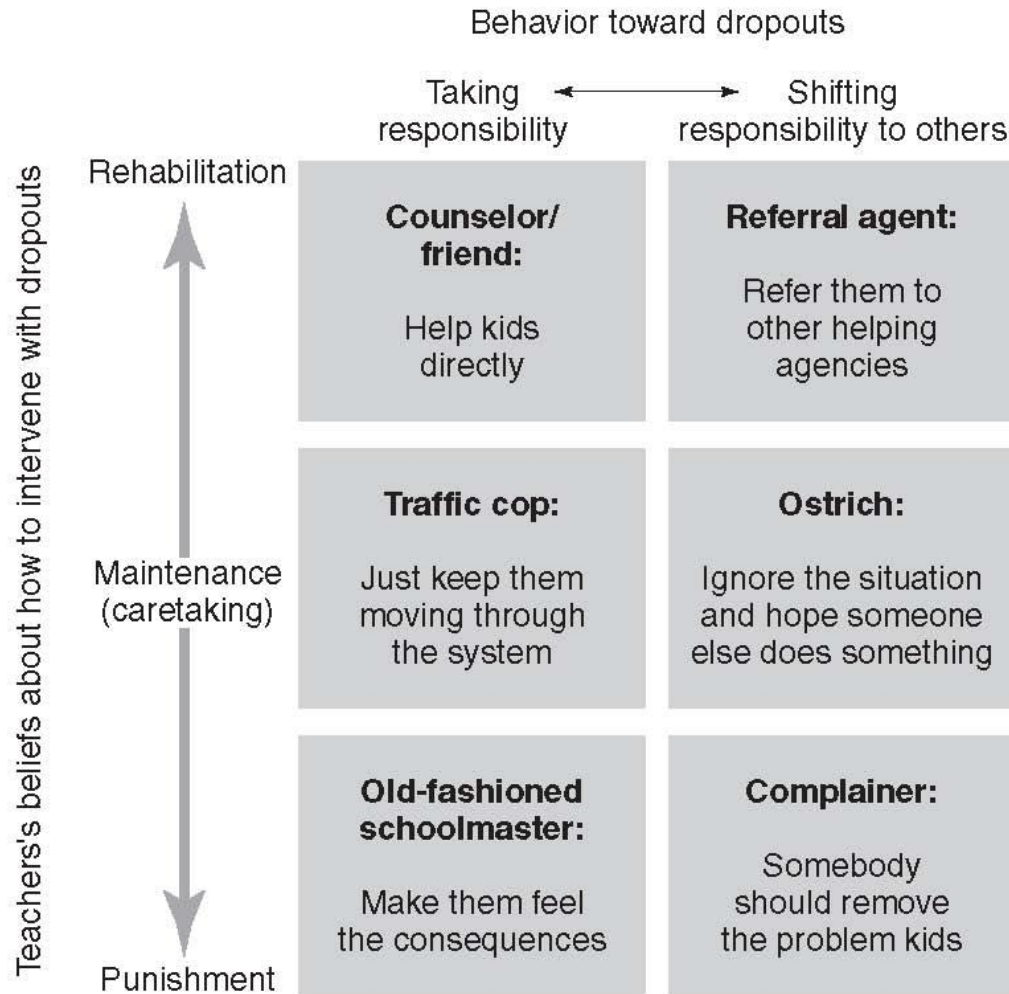
5. *Data consolidation*—combine QUAN and QUAL data (in data analysis software: SPSS, SAS, MAXQDA, QDA-Miner, etc.)
  - Create consolidated
    - codes,
    - variables,
    - data sets.

# MMR Data Analysis (cont.)

6. *Data comparison*—compare research findings from QUAN and QUAL data and analysis.
  
7. *Data integration*—integrate QUAN and QUAL findings into coherent whole;  
--make **meta-inferences** (inference or conclusion that builds on or integrates QUAL and QUAN findings)

# MMR Data Analysis (cont.)

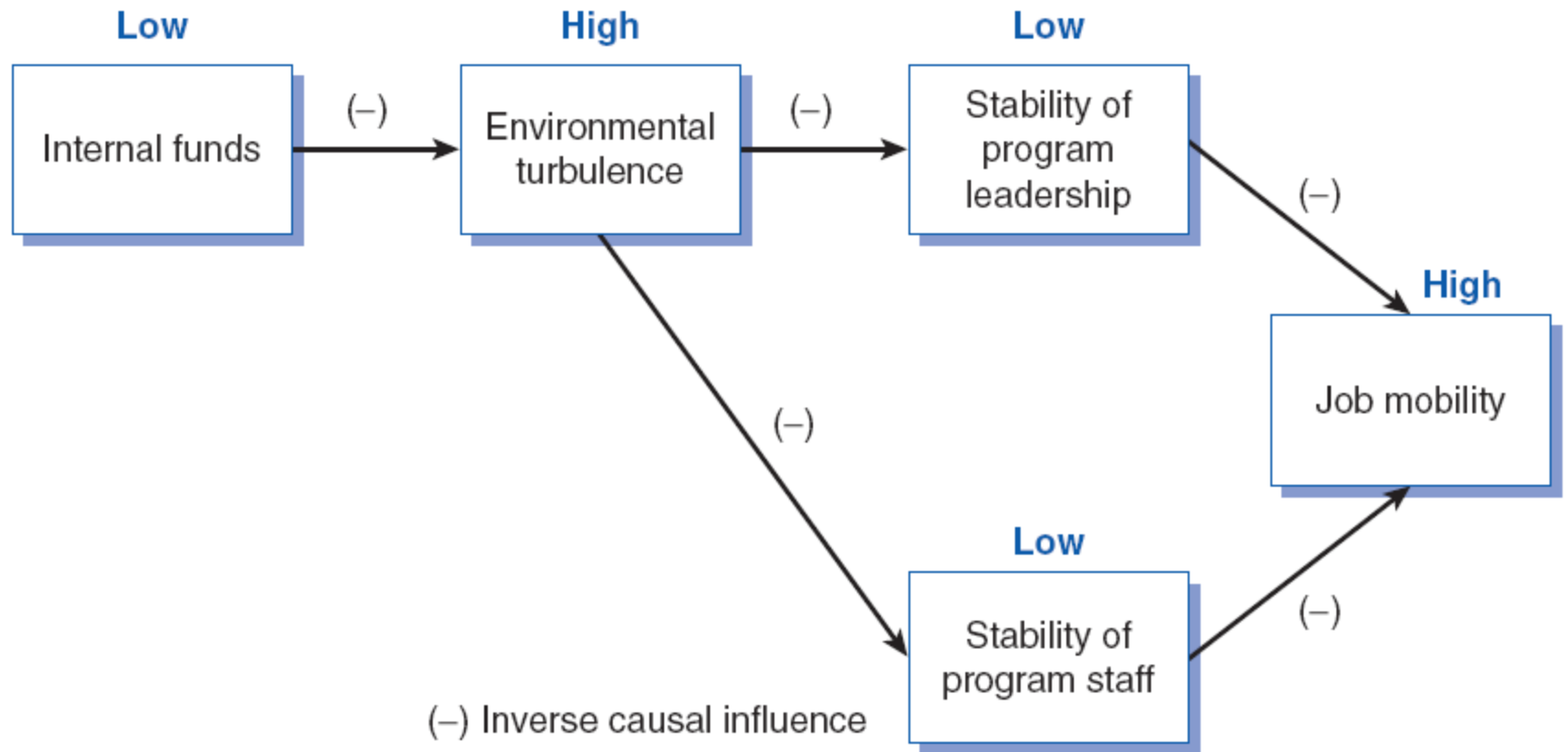
On the next two slides, I show two examples of analyses from QUAL that work well with MMR...



■ **FIGURE 17.3** Patton's typology of teacher roles in dealing with high school dropouts

Reprinted from M. Q. Patton, *Qualitative Evaluation and Research Methods*, p. 413, copyright © 1990 by Sage Publications, Inc. Reprinted by Permission of Sage Publications, Inc.

■ **FIGURE 19.4** Network diagram for job mobility



*Source:* From M.B. Miles and A.M. Huberman. *Qualitative Data Analysis: An Expanded Source Book*. Thousand Oaks, CA ( p. 231). Copyright © 1994. Reprinted by permission of Sage Publications, Inc.



# More on Integration

Construct **matrices** to analyze, compare, and present results (this strategy originally suggested by Miles & Huberman, 1994). Be creative!

For example:

- Rows=research question; columns=quan result, qual result, integrated statement (called a **joint display**)
- Rows=research question; columns=quan result, qual result, difference, explanation for difference
- Rows=independent/predictor variables; columns=dependent variable outcomes (this is an input-output matrix)

# More on Integration

More matrices (remember be creative):

- Rows=cases; columns=outcomes on quan and qual measures
- Rows=issues, locations, events, situations; columns=stakeholder groups on quan and qual measures (e.g., students, teachers, parents, administrators)
- Rows=(IVs, location, or whatever you like); columns=time-ordered outcomes

# Writing Mixed Research Reports

General suggestions:

- Overall, consider using major sections of APA report as broad divisions (Intro, Methods, Results/Findings, Discussion).
- However, be creative, and provide multiple perspectives in these sections.
- One creative strategy I've seen is to alternate between emic and etic perspectives when discussing results.

# MMR Reports (cont.)

- One effective organization for Results section is list qualitative, quantitative, and integrated results for each research question.
  - That is, answer one question at a time using qual and quan data/results/findings/interpretations.
- **Integration** is the key, throughout (e.g., in data analysis, results, discussion, and theoretical understanding/explanation).
- At a minimum, integration is needed in the discussion section of the report.

# MMR Reports (cont.)

For more guidance on mixed methods research reports, see

- Pat Bazeley (in press) ([click here](#)) and
- Nancy Leech (2012)([click here](#))

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For references, [click here](#).

Or, here they are...

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