

## Software and Qualitative Analysis

### 1. Learning Objectives

After reviewing this chapter readers should better be able to:

- Understand the main stages or steps in the analysis of qualitative data
- Understand the key principals for establishing rigor in qualitative research
- Know the principal techniques for marking up the data as you read through and interpret them
- Know the tactics and principles for drawing sound conclusions from qualitative data
- Understand the principles and techniques for verifying the conclusions you draw



## 2. Introduction

There are a great many positions, attitudes, beliefs, even dogmas about qualitative research. There are those who use qualitative methods for exploratory research, and those who use them for confirmatory, theory-testing research. Some argue that qualitative methods are best used when the domain is poorly defined, in order to identify key constructs and make possible probability-based quantitative research. Others use qualitative methods to better understand the underlying meaning of quantitative findings. Further, there are a great range of approaches to qualitative research grounded in differing epistemologies.

The intent of this chapter is to provide an introduction to a set of methods that reap the unique benefits of qualitative research, and maintain standards of empirical rigor. No doubt, some will find these methods too “soft,” and some will find them too “positivist.” I hope that these readers will still find some value here.

## 3. Conducting Rigorous Qualitative Research

A key to establishing the scientific soundness and acceptability of qualitative research lies in the rigor with which analyses are carried out: doing analysis thoroughly and carefully, so that it has demonstrable reliability and validity (Weitzman, 1999b; 2003). Traditional notions of reliability and validity, as developed for quantitative research, require adaptation for application to qualitative research. Yet, they provide a starting point.

Some of the very advantages of qualitative research can also turn out to be weaknesses. It is a strength that the researcher can look at the text of what people had to say, and use his or her intelligence flexibly to consider multiple possible interpretations of what it all means. This also means there are multiple conclusions a researcher might arrive at, not all of them necessarily of equal validity. Miles and Huberman (1994) argue that verification of conclusions is a critical step; they sum up the situation thus:

**“Qualitative analyses can be evocative, illuminating, masterful—and wrong. The story [the researcher relates], well told as it is, [may] not fit the data. Reasonable colleagues double-checking the case [may] come up with quite different findings. The interpretations of case informants [may] not match those of the researchers.” (Miles and Huberman, 1994:247)**

This possibility calls for methods that account for such pitfalls.

## 3. Conducting Rigorous Qualitative Research

Complicating the story is one of the key features of qualitative data: they're messy, and usually voluminous. We wind up with huge piles of texts: transcripts, field notes, documents, questionnaires, and so on, and have to sort our way through them. Whether what we're doing is looking for what we think are identifiable phenomena that we can cluster together into categories or themes, or some more emergent, holistic sense of the data, we need to be able to organize the data in some way.

**Researchers need to be able to find our way through the data, whether by chronology, narrative structure, topic, case type, theme, or by some other kind of relationship between one piece of text and another.**

We may need to be able to pull together all the pieces of text that have to do with a topic. We may need to be able to see each utterance in its original context to know what it means. Or, we may need to be able to find support for a proposition, or find the data that contradict it. When working with the often enormous piles of text generated in qualitative research, being careful, diligent, and thorough can be a tremendous challenge, both because of the volume of the data, and the complexity of the thought required to analyze it.

**Computers can be a big help in qualitative research. While they are not the answer to the problem of rigor in qualitative research, they can make possible rigorous (and thus more scientifically sound) approaches to analysis that we otherwise could not or would not undertake.**

## 3. Conducting Rigorous Qualitative Research

Approaches to the problem of rigor in qualitative research are varied, but typically involve methods that allow the researcher in some way, after having been deeply immersed in the data, to pull back a bit and see things from a broader perspective. Such methods might involve “triangulating”—checking for convergence among different sources of information, different investigators, or different methods of data collection (Creswell, 1994)—or systematically going back through the data in a variety of ways, checking to find out if there are data that argue against the conclusion you are reaching. Miles and Huberman (1994) offer a list of tactics for verifying conclusions that include:

- Checking for representativeness;
- Checking for researcher effects;
- Triangulation across sources and methods;
- Checking the meaning of outliers;
- Looking for negative evidence;
- Making if-then tests;
- Ruling out spurious relations;
- Replicating a finding;
- Checking out rival explanations; and
- Getting feedback from informants.

They also offer a wide variety of methods for building matrices and other kinds of displays that can assist the analyst in seeing larger patterns, both within and between cases, and performing the kinds of checks referred to above consistently and on broad scales. But these tasks can be extraordinarily labor intensive—even well-funded projects can be hard-pressed to carry them out consistently. This chapter provides an introduction to a set of techniques that can make the process manageable.

## 4. The Qualitative Research Process

### Establishing Research

#### Questions and a

#### Conceptual Framework

Let's begin with a set of research questions and a conceptual framework (which comes first being determined by whether the approach is *inductive* or *deductive*) and move toward reaching conclusions.

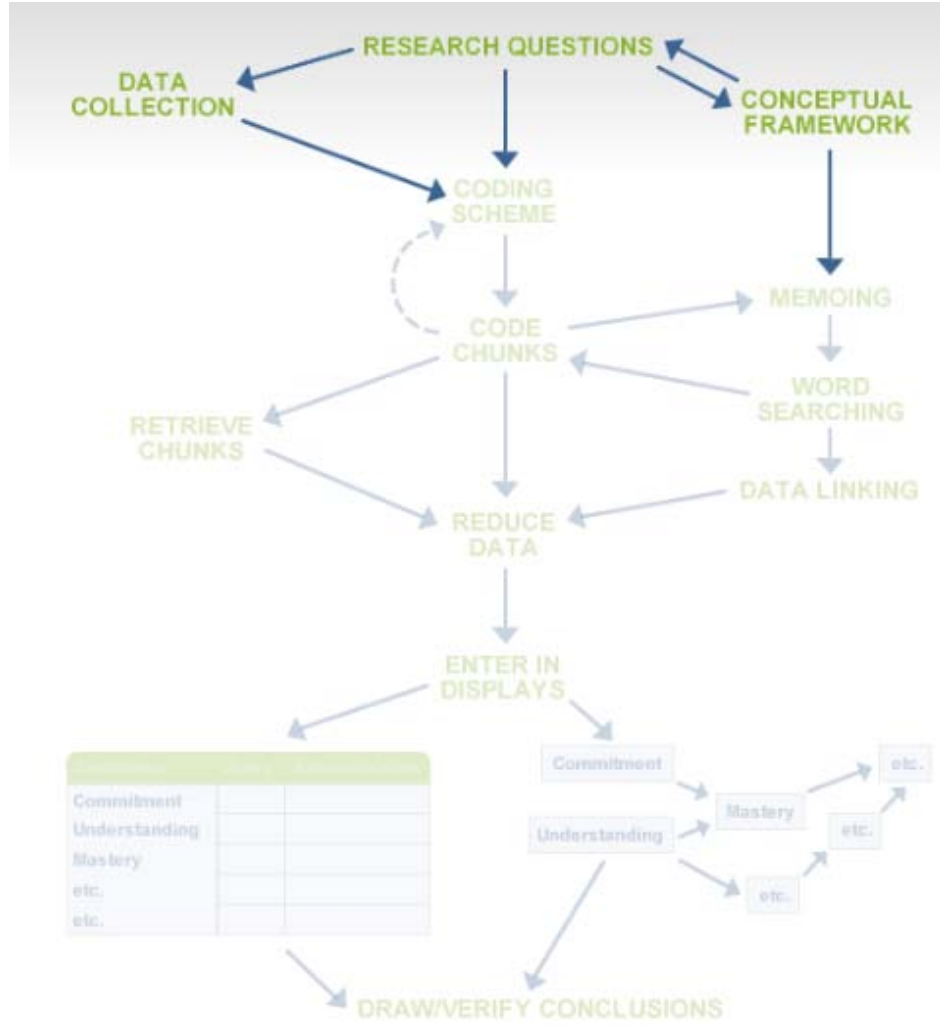
### Collecting Data

Data are collected in order to answer the research questions, and in qualitative studies the data are often voluminous. If the researcher is going to do something more rigorous than simply read through the mountain of data and report his or her impressions, the data must then be somehow reduced into a form in which it can be examined for patterns and relationships.

**In a deductive approach the researcher is likely to begin with a conceptual framework (a theory) and from that generate the specific research questions for the current study, while in an inductive approach he is likely to begin with a set of research questions of interest, and then create a conceptual framework to guide and shape the study.**



Figure 1a: Collecting Data



## 4. The Qualitative Research Process

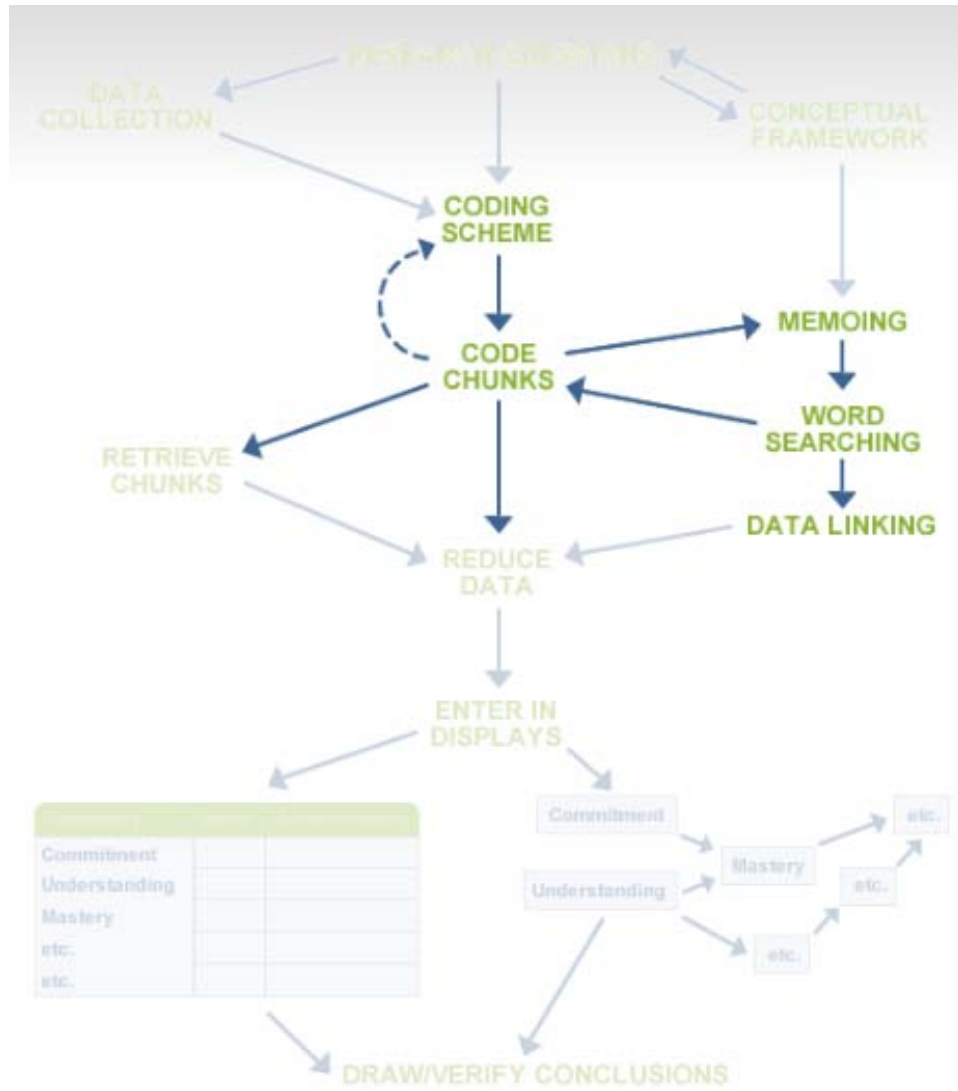
### Sorting/Coding Data

In most approaches, the researcher will begin by sorting the data by topic, and will begin this process by developing some sort of coding scheme: a set of tags or labels representing the conceptual categories into which to sort the data. These may be developed either a *priori* from the conceptual framework driving the study, inductively as the analysis proceeds and the analyst begins to identify issues in the data, or by some combination of the two. Next, segments of the data—often paragraphs or sentences—are marked with relevant codes (coded). This is the critical step in which the data are sorted into conceptual categories. In many cases, researchers write memos as they code, recording emerging ideas and early conclusions about both theory and methods. As insights accrue, it often becomes useful to search back through the data for places where specific words or phrases are used, and to locate related phenomena in the text, both in order to code these new chunks, and to check the validity of emerging conclusions. It may sometimes be useful to create pointers (or links) between different places in the text where the same issues arise, as, for example, when in one interview a patient describes an episode that is elsewhere also described by his or her caregiver.

**This whole process will in many cases give rise to modification of any a *priori* coding scheme, and many researchers follow an iterative process, making repeated coding passes through the data.**



Figure 1b: Sorting and Coding Data



## 4. The Qualitative Research Process

### Retrieving and Summarizing Text

The next step in reducing the data is often to retrieve the chunks of text associated with particular codes, reading these passages to refine the analyst's understanding of that conceptual category. It may also be desirable to retrieve text according to combinations of codes—for example, to see where a concept having to do with a particular caregiver attitude, say, "empathizes with patient," coincides with a particular context, say, "extended one-on-one caregiver-patient contact." The researcher would then be able to read all of the chunks (text passages) where both of these codes had been applied, to see what, if any, relationship might exist between the two. Depending on the nature of the study, it might also be desirable to identify all of the cases where both of these codes apply, even if the two concepts do not happen to emerge from the same text chunk.

In this way, the researcher begins to be able to write summaries of the main conceptual issues that appear in the data. These preliminary write-ups have the virtues of being much smaller in physical length than the original transcripts, and of representing a move from the original concrete data to a more conceptual level. They also have the disadvantage of being one step removed from the original data, with the danger that some original meaning and context may be lost. It is therefore important for the researcher to have the ability to examine and re-examine the underlying data as analysis and write-up proceeds, in order to continually check interpretations against the data.



Figure 1c: Retrieving and Summarizing Data



## 4. The Qualitative Research Process

### Displaying Data

Finally, the researcher may enter these summaries into displays, for example text matrices or network diagrams, that aid in summarizing cases and themes, and identifying patterns and relationships in the data (Miles and Huberman, 1994). In Figure 1 the displays are offered as an example, and the categories are adapted from the work of Huberman and Miles (Huberman and Miles, 1983, 1984; Miles and Huberman, 1994). The example matrix is composed of rows representing several conditions for success of a school innovation (commitment, understanding, mastery) and columns representing some key stakeholder groups: users of the innovation (teachers) and the school administrators. The cells of the matrix would be filled with summaries of each stakeholder group's views of each condition, allowing the researcher to look for patterns across the data. The network diagram, similarly, shows the researcher's representation of the connections among the different conditions. These displays are intended primarily as analytical tools for the researcher, rather than as illustrations for a reader, though they may be adapted for the latter purpose as well.

From these summaries of the data—which may now exist in memos, code “definitions,” mini write-ups, and/or displays—the researcher draws conclusions. In order to verify these conclusions, the researcher can employ many of the same mechanisms of searching through the data (looking, for example, for disconfirming evidence) and constructing matrices (for example, to check a conclusion by triangulating from multiple sources or methods) to determine whether the conclusions reached are in fact supported by the data. And, finally, a report is produced.



Figure 1d: Displaying Data



## 5. Logic of Qualitative Research

### Inductive vs Deductive

You may have heard or read the position taken that quantitative methods are for deductive research, while qualitative methods are for inductive research. While this is often the way these methods are used, **it is by no means the case that these methods are or should always be linked with those logical approaches.**

#### **Deductive logic**

*Reasoning from the general to the specific.* In this approach, you begin by specifying a theory. From the theory, you generate hypotheses about what should happen in specific circumstances. If you wish to test the theory, you can collect data to see whether what you hypothesize happens. If it does, the specific data you examine provide support for your theory. The direction of reasoning is often thought of as “top down,” from theory (the general) to data (the specific).

#### **Inductive logic**

*Reasoning from the specific to the general.* In this approach, you begin by examining concrete events or phenomena—your data. From the data, you attempt to identify larger categories of phenomena (or constructs, or variables), and to understand the relationships among them. In other words, you use the data to build theory. The direction of reasoning is often thought of as “bottom up,” from the data (the specific) to theory (the general).

Certainly, quantitative methods lend themselves well to deductive research. Statistical techniques and the laws of probability provide an excellent framework for testing hypotheses and making specific statements about the level of certainty we can have about the generalizability of our findings. Likewise, qualitative methods lend themselves well to inductive research. When we are exploring a new domain and do not yet know what the important factors are, qualitative methods provide an excellent framework for unearthing unknown or unexpected phenomena. However, neither of these is exclusive. Descriptive statistics, crosstabs,

correlations, clustering techniques, factor analysis and the like are often used to great advantage in exploratory (or inductive) studies. Many qualitative studies operate in a deductive mode, beginning with a theory, and collecting and examining data in systematic ways to see whether the theory is supported or should be rejected or modified.

## 5. Logic of Qualitative Research

### Identifying the Important Phenomena in your Data

Generally speaking, the first stage of qualitative analysis is to identify the important phenomena in your data. The analyst will comb through the data—usually this means reading through transcripts or other documents, though it can also include studying images, listening to audio, or watching video—assigning chunks of data (e.g., passages of text) to conceptual categories. (Many researchers find it helpful to think of this process as one of sorting chunks of text into categories.) For example, one might determine that in a particular paragraph what the respondent is saying can be classified as an expression of hopefulness. In some cases, the respondent might say that explicitly, while in other cases there may be more interpretation on the part of the analyst. As argued above, pulling meaning out of qualitative data is partly an intuitive and inspirational process. In many ways, that's good. It allows us to use aspects of our intelligence that often get neglected in quantitative research. However, it also means that you have to go back and check. **Intuitive and inspirational leaps can lead to great discoveries, but they can also be wrong** (Miles and Huberman, 1994). Through a process of carefully sorting, checking, and resorting the data, the analyst arrives at a **set of phenomena, or conceptual categories, which can be shown convincingly to be present in the data.** **Qualitative researchers often refer to these as “themes.”**

#### Conditions for Establishing Cause and Effect

Once the important phenomena, or themes, are identified, the next step is often to look to see how they relate to each other. Sometimes this is done by looking for causal connections.

1. Variables Covary.
2. Covariance is not spurious.
3. Logical time order.
4. Mechanism is available: A THEORY (Bernard, 2000).

At other times, the researcher may look for clusters of phenomena, identifying things that tend often to show up together, even if the causal connection is not clear.

## 5. Logic of Qualitative Research

### Drawing Conclusions

It can be helpful to think about establishing findings in two pieces. The first is drawing conclusions, and the second confirming them. Establishing relationships among phenomena, or patterns across cases, can be done in a number of ways. Miles and Huberman (1994) suggest noting patterns, counting, making metaphors, clustering, partitioning variables, building chains of evidence, and other tactics. Many of these approaches can be greatly aided through the construction of matrix displays (or tables). Matrices that summarize individual cases can help the analyst get an overview of the set of phenomena present or absent in each case, while those that summarize multiple cases can help his or her discover patterns across cases. Matrices can be designed to focus on describing cases, or to elucidate relationships between variables. We deal with this in more detail below, but for a full treatment, see Miles and Huberman.

### Determining Whether your Conclusions are “Valid”

While many of the standards of rigor applied to quantitative research cannot be applied directly to qualitative research (for example, measures such as Cronbach’s  $\alpha$  to assess a scale’s reliability), it is still possible to specify a set of standards that do work, and Miles and Huberman (1994) set out an excellent framework. For each of these, the authors suggest a set of assessment questions. Click on each concept for an expanded discussion of these:

#### CONCEPTS

##### Objectivity/Confirmability

The first assessment to be made is of the extent to which the analyst has been able to be true to the data, without imposing his own assumptions. In any form of research—qualitative or quantitative—it is often impossible to completely eliminate the biases of the researcher. Researchers conducting any type of study do their best work when they acknowledge this problem. Miles and Huberman’s (1994) suggested question for qualitative researchers, then, is, “Is this overly influenced by bias?” Has the researcher been successful at reaching a reasonable and demonstrable conclusion, which others upon examining the same data would agree was reasonable? In other words, could the findings be confirmed by others?

## Reliability/Dependability

The question here is, “Is the process consistent and stable?” This may refer to the way in which the data were gathered, or the way in which they were analyzed. For data collection, consider questions such as, did each of the interviewers approach their interviews in comparable ways? Or, did each of the respondents have the opportunity to provide answers on the same topics? For data analysis, it can be helpful to have multiple researchers code the same documents, and compare and discuss their coding. It can be helpful both to have discussions about coding differences, working to get consensus on the meaning and usage of the code categories, and also to calculate percentage of agreement, which can then be reported. (See Miles and Huberman, 1994, for more detail.)

## Internal Validity

In order to assess internal validity in a qualitative study, it can be helpful to think of it as a matter of the “Truth value” of the finding. Miles and Huberman (1994) suggest a series of criteria for this, including credibility, convergent/discriminant validity, plausibility, and coherence.

## External Validity/Transferability

In qualitative work, where samples are rarely drawn at random and where statistically calculated probability statements about the likelihood of a finding holding true for an entire population are generally impossible, the question of external validity can be vexing. Qualitative researchers often make the mistake of assuming that all bets are off when it comes to external validity, and simply present their findings as though they do generalize to an entire population. Miles and Huberman (1994) propose instead that we pose the question, “How far can these findings be generalized?” Often the way to answer that question is to describe your sample to the reader, and to avoid making claims about how far the findings can be generalized. If your study included a group of 15 middle-school boys from a rural school, for example, you might describe your sample, and then simply state what you learned about them. If it is important to the argument being made, you might speculate about ways in which these boys might differ from or be similar to boys—or girls—in other settings, but the answer to the question of generalizability is left open. The interesting question becomes whether and to what extent the findings can be transferred, say, to an intervention with a group of similar-aged boys in an urban environment. In

larger, multi-site studies, by way of contrast, it may be possible for the same principles to lead to broader conclusions. If, for example, your study included in-depth study of 10 hospitals as cases, distributed across different types of socio-economic contexts, you might be able to make convincing arguments about how the differences in context did or did not impact the constructs you were studying. You would still frame your findings in terms of what was found in this study, but the implications for transferability to other cases would be stronger than in the study of 15 boys suggested above.

### **Utilization/Application**

Finally, qualitative research is often—though by no means always—focused on application and action. Accordingly, the validity of the study is often usefully assessed with questions such as “Do the findings make sense to users?” or “Are they transferable into action?” (Miles and Huberman, 1994). If my findings on improving nursing care, for example, don’t make sense to nurses, or are not practicable in the field, one might question whether the study has held together, accomplished its goals, or reached trustworthy conclusions.

## 6. The First Stage

### Reading, Interpreting, and Marking Up

Have a look back to Figure 1, from the section “The Qualitative Research Process”. You’ll see that there is a whole lot of work that goes on between collection of the data, and the drawing of conclusions. It is time now to dig into how that work gets done.

Now that we have collected our data, we have to begin the task of sorting the data into topics. Many people find it helpful to use the analogy of sorting paper into folders. Ultimately, we want to be able to look at all the statements people made (which become our *data points*) about a particular topic, so that we can make a *faithful representation* of what the participants are saying about that thing.

The notion of *faithful representation* is very important. This is not just our impression of what is being said. Our impressions are highly vulnerable. We may be subject to such cognitive biases as primacy effects—in which the first things we observe are remembered most clearly, and unduly shape our impressions—recency effects—in which the last things we observe are best remembered—as well as other salience effects, where, say, a particularly eloquent respondent, or one who is particularly emotional, or even who reminds us, say, of a family member, may stand out more strongly in our minds than other respondents. It is critical then that we look carefully and honestly at all the data, checking and re-checking our conclusions.

## 6. The First Stage

### Coding

**WHY: Because you have to be able to pull the important information out and collect it together.**

The purpose of coding is to make it possible to organize your data by topic. In short, you read through the text (see box), and when you come across a passage that has a meaning you want to pay attention to (let's say the respondent says something expressing their hopefulness), you mark that passage—usually by drawing a bracket in the margin—and write the name of a code or codes that represent the meaning you have found here. In essence, you are labeling, or indexing, that passage of text, marking it with and connecting it to the conceptual category it belongs to.

Researchers who carry out this procedure on paper will often later cut up a copy of the transcript, and place all the passages that relate to a particular conceptual category (e.g., hopefulness) together into a folder. Computer programs for analyzing qualitative data allow you to create these collections in real time.

### Coding

You may also look at pictures, listen to audio, or watch video. In each of those cases, however, the operations are essentially the same. The discussion here will continue to refer to text, and the reader is encouraged to reflect on how these processes would transfer to other media. For example, instead of selecting a passage of text, you might mark a region on a graphic, or a time-segment of an audio or video file.



Figure 2: The Coming of Machines

## Coding text using the program Atlas.ti

WPA Shoe Factory Study--coded - ATLAS.ti

File Edit Documents Quotations Codes Memos Networks Views Tools Extras A-Docs Windows Help

P-Docs P 1: The Coming of Machi... Quotes 1:2 That wuz stopped thc... Codes Couldn't get scraps [1-0] Memos

woman kept a house full a boarders warm all winter on scraps a shoe leather.

"That wuz stopped though when the Jewish junk dealers found they could make money on scrap leather. They started ta buy it and ta sell it ta concerns that made diffrent uses a it. Some usta bury it and get chemicals outa it in that way ... Fore the machinery come in sa strong, we din't get sech high pay, but we wuz sure a our jobs. But after 1900 the machines wuz comin' in more'n more. And during the World War, when a lotta men went ta war, and the demand fur shoes wuz sa great, the machines come in strong. Then when the men come back again, there wuz plenty a shoe help and not enough jobs. Because the machinery kept right on doin' the work that the men done before and there wuz no way a pushin' the machines out and gettin' the men back.

"Taday everything is set so as ta make it easy fur a man ta make a lotta shoes quacker'n they made 'em in my day. Good machines and good light. [?]

"We usta work by oil lamps. We'd start in the mornin' before the light wuz good and offen we'd work 'till after dark in the winter time. We'd have a lamp settin' at each end of our cuttin' table.

"There'd be oil lamps strapped ta the stitchin' machines too. After that they had gas jets ta work with[,?] ... and today they have electric lights on dark days when they don't get enough light from outside...

[?] DEPARTMENTS AND FAULTY WORK ... Each group that worked in a shop wuz sorta like a part of one of them picture puzzles that are out apart and havta be fitted together. If one group din't stand up, ya coun't make a shoe.

"Maybe the most important part a that puzzle wuz the cutters. Fur not only did they decide, by the kinda work they did, what kinda shoe it'd be, but after they done their part a the work, the manufacturer'd know jest how much the shoe'd cost. Before that he'd woun't know how much material it'd cost him. He could always figger on the cost a labor ahead a time, but he coun't be sure about the cost a material 'till the cutter was through his work. All

Couldn't get scraps  
Jewish junk dealers bought up scraps  
Machines replace workers  
Machines make it easier  
Interdependence among workers  
Cutters were key part of the puzzle

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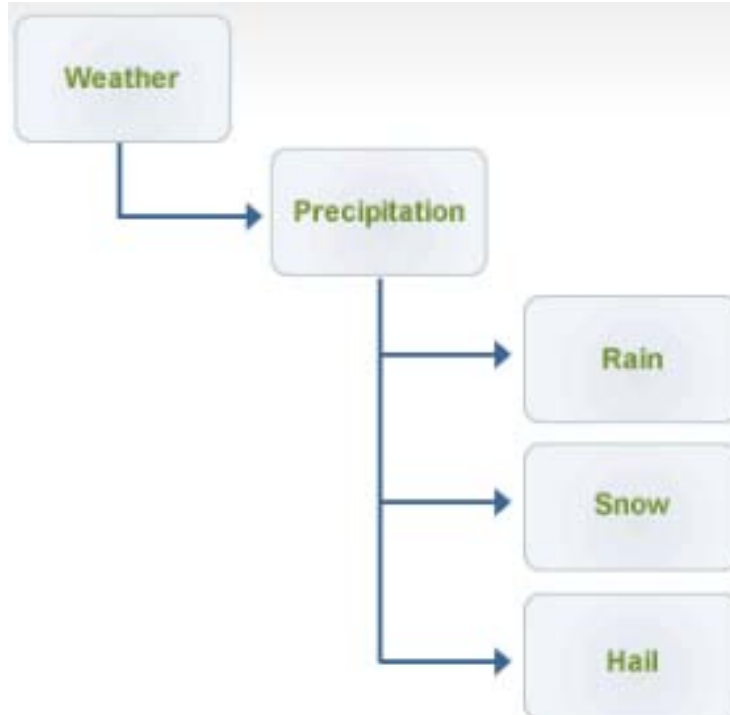
## 6. The First Stage

### Coding

There are a wide variety of approaches to creating codes. At one end of the spectrum, in the most purely deductive approaches, the analyst begins with a coding scheme based upon a theory or conceptual framework, and keeps to this scheme throughout the analysis. For example, in studying a particular evidence-based practice in mental health treatment, the analysis might be strictly focused on the elements of that practice. At the other end of the spectrum in the most purely inductive approaches the analyst begins with no codes, starts reading, and develops codes as he or she goes. In either case, a coding scheme can be more complex than a simple list of codes. Coding schemes can be hierarchically structured. For instance, you might have a “top level” code for Weather, a sub-code for the sub-concept of Precipitation, and sub-codes of Precipitation for Rain, Snow, Sleet, etc. Coding schemes can also be linked in non-hierarchical ways. For example, you may have a network of causal relationships among codes, as in a path model.



Figure 3: A Code Hierarchy



## 6. The First Stage

Strauss and Corbin (1998) present a “grounded theory” approach to code development, which is a strongly inductive approach. In this approach the analyst digs deep into the text, first identifying the concept represented by the statement, later classifying these concepts, identifying dimensions, and building theory.

In Strauss and Corbin’s (1998) example of conceptualization in “open coding,” the interviewer inquires about accessibility of drugs.

The respondent replies “You can get them anywhere,” which the analyst conceptualizes as “Easy Access.” The respondent continues, “You just talk to people,” which in turn is conceptualized as “Networking.” (p. 107.) And so on. In this way, a set of concepts in the data are identified. The authors go in great depth into the relationships among concepts, classifications, and categories, and into the inductive development of theory from qualitative data.

### Open Coding

Developing new codes as concepts are identified in the data.

For further reading on the development of codes, Luborsky (1994) provides another helpful and very practical discussion of the process of identifying phenomena in qualitative data. He distinguishes between the things expressed directly by the informant—the informant’s own views—and the patterns or analyses developed by the researcher in looking across multiple informants. In the former case, he offers a wide range of tactics for identifying themes in text.

## 6. The First Stage

### Using a Start List

Miles and Huberman (1994) offer perhaps the broadest range of tactics for “generating meaning” while coding text. They distinguish among descriptive, interpretive, and inferential codes:

- **Descriptive codes** capture what the respondent is saying
- **Interpretive codes** capture what the analyst thinks that means or is important about it
- **Inferential codes** identify broader patterns or relationships that the analyst identifies by looking at multiple segments of text, perhaps across respondents

In addition, Miles and Huberman describe the development of a “Start List” of codes, and this is highly recommended for a broad range of studies. It is a midway point between purely deductive and purely inductive approaches, with benefits of each.

Having a **start list**, that is, a basic framework of codes, at the beginning of analysis can help you keep from getting lost. It keeps you oriented to the basic purposes of your analysis, and helps avoid getting lost in creating conceptual categories that are distractions from the purposes of the study.

On the other hand, using the start list approach, you are still free to work in an inductive mode, discovering new themes/codes/concepts as you read and think, rearranging and even discarding the initial framework as need be. **The key thing here is to have a starting point, and the degree of flexibility allowed is determined by the purposes of your study.**

## 6. The First Stage

### Marking up the Text

Think about what you do when you are studying. As you read through a book or article, you may be highlighting interesting passages, making marginal notes, and writing more lengthy notes on a pad. In qualitative data analysis, analogs of all of these tactics are useful.

#### ***Coding***

Coding is very much like highlighting, but using a different color for each different concept you're keeping track of. Usually we do this by bracketing the text, and writing codes beside the brackets.

#### ***Marginal Remarks***

In addition, it is often desirable to annotate the text, adding notes that will show up every time we look at that particular passage. So, for example, we might wish to indicate that "He started crying here" or "This seems to contradict the statement in the paragraph above: check this out." Annotations or marginal remarks such as these are useful for thoughts you want to see when you come back to that page, but they are less useful for thoughts you want to be able to access on their own.

#### ***Memos***

For free-standing thoughts, or ones we know we want to come back to later, when studying we often use notes on a pad. In qualitative analysis, we write memos. These are more extended notes, sometimes a paragraph or two, sometimes several pages in length. They capture our developing thoughts about our methods, our cases, our concepts, our theories. Often memos turn into segments of our reports. It is an important practice to pause whenever an idea hits, and write until you have the whole thing recorded—it is too often the case that those flashes of insight do not last until we "get around" to sitting down and writing them out.

## 6. The First Stage



### Exercise 1: Shoe Machinery Exercise

In this exercise you will:

- 1) develop a coding scheme;
- 2) code a transcript;
- 3) review your coding; and
- 4) organize your coding scheme.

**Propositions:** As you go through the processes in this exercise, you will naturally begin to form propositions. These provide a starting point for the processes of drawing and verifying conclusions referred to earlier.

Once you start the exercise, read the transcript "Shoe Machinery Worker" to get a feel for what it's about.

This transcript is from the Works Progress Administration, American Life Histories: Manuscripts from the Federal Writers' Project, 1936-1940. It is part of a searchable, downloadable database of life histories at <http://lcweb2.loc.gov/wpaintro/wpahome.html>.

Continue...

#### Step 1 of 4: Develop Code List

Create a rough "start list" of codes, adding them to the Master List by typing them in the box at right, and clicking on the "Add" button.

Codes should correspond to the big conceptual categories you want to work with. You'll also want to set the list up so that it will accommodate more specific codes as you go.

#### Transcript

"I wish you could see, Mr. Lovett, the town where I lived in Italy. It was called Cartoceto. It was builded on the top of a high hill. All around was a stone wall. Once upon a time this wall protected the town from bandits, from pirates and other enemies.

"You have heard of Carthage? For many years Carthage and Rome were the great rivals. Sometimes Rome was badly beaten. Sometimes the Romans were successful. Finally Hannibal, he was the great general, was completely defeated. The Africans ran away. At Cartoceto, where I was born, they made their last stand. Behind the walls they fired arrows and spears at the Romans. For months they put up a great fight.

"Why should I not know history? In Italy I attended the good schools. In this country I have studied much.

"Thank you, Mr. Lovett. If I did not get a good education would I be the officer in your evening

#### Master List

Code #

Continue...

## Step 2 of 4: Assign Codes

Drag relevant codes to the box next to the appropriate paragraph. Work with the codes from your start list, and you can also allow more specific codes to emerge as they suggest themselves, adding them to the Master List as necessary. Try to get at least one code on each paragraph, but not more than 4.

**There are 18 paragraphs to code in this step before moving to step 3.**

### Paragraph 1

"I wish you could see, Mr. Lovett, the town where I lived in Italy. It was called Cartoceto. It was builded on the top of a high hill. All around was a stone wall. Once upon a time this wall protected the town from bandits, from pirates and other enemies.

### Apply Codes

Clear All

Skip to Step 3

Continue...

## Master List

### Step 3 of 4: Review Codes

Now assess your first-pass coding using the following questions:

- Did you code at the right level of specificity?
  - o If you have just a couple of codes, they are probably too general, and may lump together concepts which really should be discreet. Try breaking those codes down into subtopics.
  - o If you have lots of codes, with only one passage per code, your codes are probably too specific. That is, in giving each passage its own code, you really haven't determined the larger themes that they represent. See if you can cluster some of the codes to create conceptual categories.
- Are some of your codes subcategories of more general categories?
- Do some of your codes need to be split into subcategories?
- Are some of your codes really subcategories of other codes?

Transcript Paragraph	Codes
<p>"I wish you could see, Mr. Lovett, the town where I lived in Italy. It was called Cartoceto. It was builded on the top of a high hill. All around was a stone wall. Once upon a time this wall protected the town from bandits, from pirates and other enemies.</p>	
<p>"You have heard of Carthage? For many years Carthage and Rome were the great rivals. Sometimes Rome was badly beaten. Sometimes the Romans were successful. Finally Hannibal, he was the great general, was completely defeated. The Africans ran away. At Cartoceto, where I was born, they made their last stand. Behind the walls they fired arrows and spears at the Romans. For months they put up a great fight.</p>	
<p>"Why should I not know history? In Italy I attended</p>	

Print

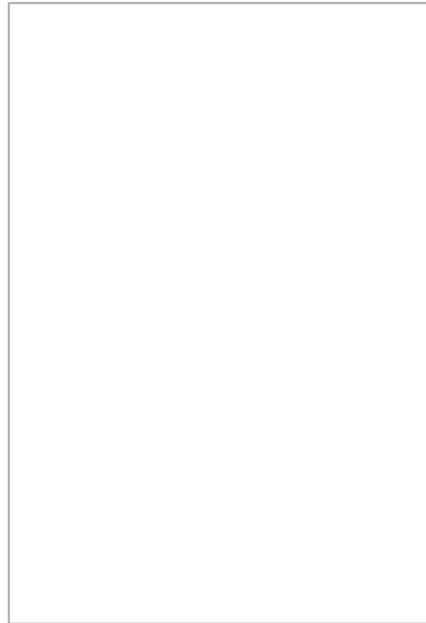
Continue...

#### Step 4 of 4: Organize Codes

Consider the revisions you identified in Step 3 and organize your codes hierarchically (i.e., Emotion>sad, happy, joyful) by dragging and dropping them in the order you prefer. This is an example of how you may organize codes. Qualitative software will generally allow you to devise hierarchies and links between codes, and delete or add codes.

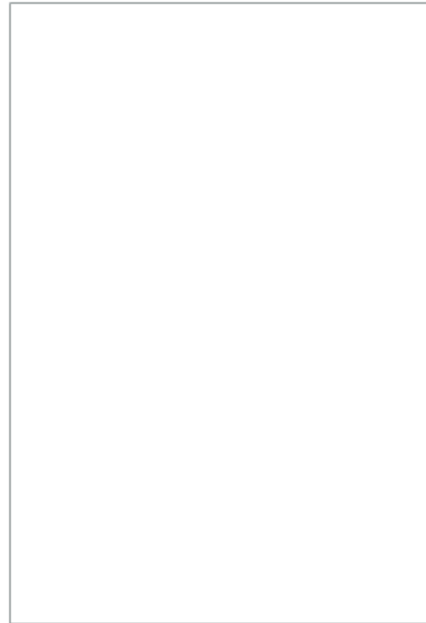
A final step in this process would be to recode your transcript based on your newly refined code list.

#### Master List



Print

#### Organized Codes



Restart

## 7. Drawing and Verifying Conclusions

The process of drawing conclusions begins early in the coding process. Even as you first begin reviewing and coding your data, you are beginning to form ideas about the important phenomena they indicate, and beginning to generate propositions about these phenomena, and the relationships among them. Once the data are coded the researcher will begin to pursue those early propositions, and to examine the data for other conclusions.

### Summarizing Themes

The first step here is often to examine the individual themes which have been identified. The researcher gathers together all of the text passages coded for a theme. Reading all of these passages together (while also referring back to their original contexts for accurate interpretation) can enable the researcher to better understand the theme. Often it becomes clear that there is more than one theme captured by the code, and it must be partitioned. At other times, after reading several themes it becomes clear that several should be combined, or one subsumed within another. Eventually, the researcher is able to write a **faithful representation of all the data on that theme**. Such a summary captures the common features of the reports of the different respondents, but avoids glossing over differences among them. It is important to illustrate each of these theme summaries with quotes. This allows the reader to assess the interpretation the analyst has made. Further, it is important to have a scheme for tracking respondents in these quotes—say with ID numbers, pseudonyms, or fictitious initials—so that the reader can see that you are not overly relying on a subset of respondents. This kind of use of quotes thus constitutes a fundamental tactic for insuring reliability in qualitative research.

This is a “next step” only conceptually. In practice, it is rare that you first do all your coding, then do all your conclusion drawing. Far more often, there is an iterative process of coding, exploring conclusions and explanations, coding further, testing conclusions, etc. More on this iterative process will be presented later.

## 7. Drawing and Verifying Conclusions

### Identifying Patterns and Relationships

As indicated earlier (Logic of qualitative research>Drawing conclusions) there are a broad range of ways to go about identifying patterns and relationships among variables and cases in qualitative research. There is no strict recipe for doing so. Rather, there are many methods and tactics to draw from. Yin (2008) describes a range of methods built on the metaphor of the case study, while Strauss and Corbin (1998) offer methods deriving from the grounded theory approach. Miles and Huberman (1994), as mentioned earlier, suggest a variety of tactics, including but not limited to:

- Noting patterns;
- Counting;
- Making metaphors;
- Clustering;
- Partitioning variables; and
- Building chains of evidence.

## 7. Drawing and Verifying Conclusions

### Building and Using Matrices

One of the most powerful tools for both drawing and verifying conclusions with qualitative data is the matrix display, or table. Several qualitative analysis approaches describe the use of matrices, including Strauss and Corbin (1998) in their treatment of grounded theory.

#### ***Descriptive and Explanatory Matrices***

Miles and Huberman (1994) provide probably the broadest and deepest set of methods available for using matrix displays in qualitative data analysis, and this discussion follows their approach. The central chapters of their book are devoted to the design, construction and use of matrices. Matrices can be designed to summarize a single case, or to compare cases. Further, matrices can be designed with a descriptive or exploratory intent on the one hand, or with a more explanatory or predictive intent on the other.

Descriptive matrices summarize a case or cases. For example, a within-case matrix might be constructed with time periods defining the columns, and different aspects of the experience of the respondent defining the rows. Entries in the cells would describe in short phrases each aspect of the respondent's experience at each time period. This sort of summary is extremely valuable for collecting together the analyst's conclusions about the respondent into a coherent picture, and facilitates the writing of a case summary. To consider a different sort of example, if the case were an intervention site, the rows of the matrix might represent different informants at the site, grouped by role, the columns a few key questions they were asked, and the cells brief summaries of their answers. This sort of descriptive matrix can be powerful for identifying key dynamics within the site, again facilitating write-up of a case summary. Finally, descriptive matrices are used to build explanatory displays later on. Tables 1-5 on the following page show examples of descriptive matrices.

#### Overview of matrices

The matrices presented on the following page are all adapted from the National Implementing Evidence-Based Practices Project. The project documented and evaluated the implementation of a series of Evidence-Based Practices (EBPs) in mental health facilities in states across the US. Each EBP had a structured and specific "toolkit" to assist with implementation, and a fixed set of measures of "fidelity"—that is, the degree to which the local facility or agency adhered to the

design and components of the EBP. A fundamental goal was to identify factors that would either facilitate or serve as barriers to fidelity and effectiveness, as well as strategies and approaches that either were or were not helpful.

## 7. Drawing and Verifying Conclusions

Tables 1-3 summarize the findings for a research site in a large cross-case research project (see tables for a brief explanation). Each of these three tables approaches description from a different direction. Compare the differences in the kinds of things you can learn depending upon how you approach organizing the data.

Table 4 organizes participant responses to one of the programs, component by component.

Table 5 is a different animal altogether: a *time-oriented matrix* summarizing the major phases of the project over time. (See Miles and Huberman for an extensive set of types and examples of matrices.)

Tables 1-7 Credit: National Implementing Evidence-Based Practices Project



### Table 1: Characteristics of the Agency Overall – Site 2

This descriptive matrix summarizes the essential characteristics of one of the agencies. Each row summarizes the data available for each topic.

Source	Topic	Data
A.1	Legal structure	Private nonprofit
A.2	Governance	Local board of directors (The Board includes professors, professionals, attorneys, family members, consumers, city administrator, state department workers, scientists, etc.)
A.4	Number of clinical sites	Two main sites. Services include: Services for Homeless and for Persons with Severe and Persistent Mental Illness (including an Afro-centric and Multi-cultural, Deal/HOH approach), Case Management, Community Treatment Teams, Mobile Psychiatric Outreach and Project Work (Employment Assistance); "Apothecare" Pharmacy; Residential Programs; General Information. Services at the 4th St. Location include: Chemical Dependency Outpatient Services; Criminal Justice Programs; HIV/AIDS Programs/ Older Adult Mental Health Services; GLBTQ Adult and Adolescent Programs/Services
A.5	Main setting type	Urban
A.6	Type of setting of implementing site #2	
A.7	Type of setting of implementing site #3	
A.8	Type of setting of implementing site #4	
A.9	Total annual operating budget of agency	\$16,747,936 for FY 2002
A.10	Number of consumers served by agency/year	6,000

A.11	Total hours of service by agency/year	141,046.30 units for FY 2002; about 1900-2000 units for SMD services. Outreach activities would account for an additional 1000 units, but may duplicate units already documented.
A.12	Number of full time equivalents (FTE) in agency	Agency has a total staff of 236 employees for FY 2002. Of those, 18 are contingent. FTEs for the agency are as follows: 1.0 - 187, .9 - 1, .8 - 3, .6 - 2, .5 - 26, .4 - 4, .3 - and below - 7



**Table 2: Characteristics of the SMI Program – Site 2**

In contrast to Table 1, this matrix summarizes the characteristics of the program rather than of the agency. What are the differences in what you can learn?

Source	Topic	Data
B.1	Definition of SMI	As per Clinical Director, using state MHA guidelines; Inclusion criteria were recently changed.
B.2.b	Number of consumers (SMI) served /year	2080 SMD clients served in FY 2002 about 30% were classified as high intensity; 30-35% classified as moderate intensity; about 40% low intensity/recovery
B.2.c	Total hours to (SMI) /year	81,443.9 - AOD: 3745.6; Crisis: 143.2; Assessment: 379.5; Med/Som: 11,868.7 - Ind. Couns: 1,465.7; Grp. Couns: 2,193.4; CSP Ind.: 45,916.9; CSP Grp: 675.1; Vocational: 9,971.9; Mental health/other: 5,083.9
B.2.d	Total FTE for SMI program/year	In SMD, there are 79 employees. FTEs for SMD area are as follows: 1.0 - 75, 2.0+ .75 - 1, 3.0+ .5-.3
B.3.c.1	Focus on professional	Yes

	guilds/Comments	
B.3.c.2	Segregation by profession/Comments	Yes/ They do tend to group, but more likely by jobs than by profession, although those often coincide.
B.3.c.3	Teams function in multidisciplinary fashion/Comments	Yes/ We rotate call, so teams must collaborate
B.3.c.4	Consumers/family members on paid staff/Comments	Consumers
B.3.c.5	Paid peer support specialists/Comments	Yes/ We developed a consumer clinical package and got it funded by a foundation. We try to move client to role of collaborators on their own treatment.
B.3.d	Allegiance to professional organizations (unions)/Comments	No



**Table 3: Quality Improvement Systems – Site 1**

This matrix summarizes the data on hand for various topics having to do with quality improvement.

Source	Topic	Data
B.6	Definition of SMI	As per Clinical Director, using state MHA guidelines; Inclusion criteria were recently changed.
B.7	Number of consumers (SMI) served /year	2080 SMD clients served in FY 2002 about 30% were classified as high intensity; 30-35% classified as moderate intensity; about 40% low intensity/recovery

B.8	Total hours to (SMI) /year	81,443.9 - AOD: 3745.6; Crisis: 143.2; Assessment: 379.5; Med/Som: 11,868.7 - Ind. Couns: 1,465.7; Grp. Couns: 2,193.4; CSP Ind.: 45,916.9; CSP Grp: 675.1; Vocational: 9,971.9; Mental health/other: 5,083.9
B.11.a	Total FTE for SMI program/year	In SMD, there are 79 employees. FTEs for SMD area are as follows: 1.0 - 75, 2.0+ .75 - 1, 3.0+ .5-.3
B.11.b	Focus on professional guilds/Comments	Yes
B.11.c	Segregation by profession/Comments	Yes/ They do tend to group, but more likely by jobs than by profession, although those often coincide.



**Table 4: Summary of Internet Survey**

This site summary gives a composite view of participants' assessments of the program, component by component.

Source		Data			
IRK Guide	Moderate		Guide used primarily as a training tool. Cat used the Guide help integrate EBP principles into practice. The resources in	Two respondents used the IRK 0 times, five reported using it <3 times.	Fewer, more concise handouts would be helpful.

			the Guide tied in well with the overall practice.		
Kickoff Introductory Power Point Presentation	Moderate to Very	Useful and easy to understand. Especially helpful in recognizing that outcomes are measured over longer periods of time.			
The Introductory Video	Moderate to Very	The personal testimony in the video was very effective.	Rated as Moderately useful. All respondents used the video at least once. Video was used to engage staff, consumers, local officials. Video was an effective way to convey a sense of hope.		
Practitioner's Written Practice Information Sheet	Moderate				

Skills training Power Point	Very	Respondents agreed that the PP was easy to understand, gave them more skills, and provided motivation to do practice.			
EBP Workbook	Moderate to Very	Respondents agreed that the Workbook was easy to understand, gave them more skills, and provided motivation to do practice.	Five staff used the Workbook beyond 2-3 times and 2 staff used it more than 6 times.		
EBP-Specific Training Video	Very	Respondents agreed that the Video was easy to understand, gave them more skills, and provided motivation to do practice. One respondent stated it helped to see what they had learned	Three respondents used the video and felt it was helpful after training. Used to look at motivational interviewing styles.		Could have had more interviews

		demonstrated in a clinical setting.			
Fidelity Measures for EBP	Moderate to Very	At least half of the respondents felt the measures were easy to understand, motivated them, were effective as guidelines and that the measures would be used in the workplace. One respondent felt that the measures were only a modified treatment plan and wasn't sure how they would be used.	One respondent used the scale at regular intervals. Scale also used to inform leadership team. One respondent stated it was used to generate change in practice.		
Outcome Measures	Very	Six of the ten respondents felt the information on outcome measures was helpful in all areas.	Chapter was encouraging and having a resource for outcomes is helpful. Outcome measures were collected at	Four respondents either did not read the chapter or did not use any of the information. Agency could	

			least 2-3 times.	not ID outcome measures for just DD clients.	
Cultural Competency	Moderate to Very	Majority of the ten respondents felt the information on cultural competency was helpful in all areas.	The information was a good reminder to keep cultural aspects in mind whenever relevant.	Five out of seven respondents did not read the chapter and most found the chapter only slightly effective.	



**Table 5: Project Timeline – Site 2**

This time-ordered matrix summarizes milestones and critical events for the key time periods of the project.

Milestones		Critical Events
<ul style="list-style-type: none"> <li>In early November, 2002, when another project site drops out, the agency agrees to participate.</li> <li>CCEO Clinical Director and CAT meet with administration to plan Steering Committee and intensive training to start immediately.</li> </ul>	<p><b>Pre-project</b></p>	
<ul style="list-style-type: none"> <li><b>Baseline Fidelity Site Visit, 11-20- 02</b></li> <li>Plan is to target Criminal Justice and Homeless Dual teams, i.e., the most acute population.</li> </ul>	<p><b>11- 02</b></p>	<ul style="list-style-type: none"> <li>Designated IDDT team and TL are selected vs. recruited.</li> <li>Local MH/AODA represented as not interested or knowledgeable about IDDT/EBPs.</li> </ul>
<ul style="list-style-type: none"> <li><b>IDDT Kickoff Event, 1-7-03</b></li> <li>First meeting of the steering committee planned for after kickoff.</li> <li>IRK intensive training underway but only two modules to be completed during January; senior management attends training with two teams and others.</li> <li>Agency sends 8 staff to off-site CCOE training on Motivational Interventions and 9 staff to 2-day family interventions workshop.</li> <li>CAT provides consultation on structure and functions of Steering Committee, emphasizes work on outcomes; first meeting scheduled for 2/28</li> </ul>	<p><b>1- 03</b></p>	<ul style="list-style-type: none"> <li>IRK training requiring more than 12 hours indicated in Toolkit.</li> <li>Challenges encountered with set-up of Steering Committee and CAT suggests smaller work group in addition.</li> <li>Agency stalling</li> </ul>

		<p>on convening SC; work on outcomes is delayed.</p> <ul style="list-style-type: none"> <li>CAT observes that PL and TL are overburdened and that the planning process is “fraying around the edges.”</li> </ul>
<ul style="list-style-type: none"> <li>Two Steering Committee sub-group meetings; plans for large group to meet quarterly and smaller group to meet monthly; focus on outcomes.</li> </ul>	<p><b>2- 03</b></p>	<ul style="list-style-type: none"> <li>Administration wants to use Clusters outcomes data and CAT consults against it.</li> <li>Administration presence in training is intimidating to staff.</li> </ul>

## 7. Drawing and Verifying Conclusions

Explanatory displays are used to find and/or to confirm, as the label suggests, explanations. Consider, for example, a matrix which arrays problems encountered in an intervention as the columns, and coping strategies used in the rows. In the cells, the analyst enters the sites which applied a given intervention to a give strategy. If the site entries in the cell are keyed to indicate, for example, level of success of the intervention, the analyst may then be to identify, confirm, or disconfirm important relationships between type of problem, type of coping strategy, and level of success.

Table 6 and 7 are examples of explanatory matrices, and come from the same project. They are, in fact, two different versions of the same matrix for different sites. They make it possible to look at the facilitators of and barriers to success that were encountered, along with the strategies and approaches to overcoming barriers that were employed, and assess the associated outcomes.



**Table 6: Dimensional Summary of Implementation Process-  
1<sup>st</sup> Version**

Site: 2		State: 2		EBP: IDDT
Phase	Facilitators	Strategies	Barriers	Approach to Barriers
<b>DIMENSION: ATTITUDE</b>				
<b>Prep</b>	Although most interviewed clearly articulate a philosophy that assumes integration of SA and MH treatments and a recovery approach, at baseline there are those who are not buying in. CEO is vocal advocate for best practices for most needy clients.	CEO had previously advocated for and implemented other best practices.	Assignment vs. recruiting of staff to implementation effort; Local MHA is "kind of ambivalent" and unsupportive.	Designated staff are expected to "select out" if they wish.
<b>Early Implementation through 6-mos.</b>	Team MD and RN are both very eager to be doing the model, and are fluent in stage-wise thinking at this point. They represent good reinforcement of the model across teams, and support the TL accordingly.		At 6 months, several veteran CMs on both teams are reluctant to adopt the model. Local MHA is "kind of ambivalent" and	CAT recommends applying stage-wise principles approach to staff. A majority of folks who "get it" at

			unsupportive.	their meetings goes a long way toward positively influencing the entire team meeting process.
<b>Implementation through 12-mos.</b>	Stage-wise approach to engagement/motivation with practitioner pays off as formerly reluctant staff buy in.	Stage-wise approach to engagement and training of staff leads to feelings of efficacy and optimism.	Local MHA is "kind of ambivalent" and unsupportive.	
<b>Sustaining: 12-24 mos.</b>			Local MHA is "kind of ambivalent" and unsupportive.	

Source: see Resources section for details regarding source for matrices.



Table 7: Dimensional Summary of Implementation Process – 2<sup>nd</sup> Version

Display #2 \*\*\* County MHC IDDT  
Dimensional Summary of Implementation Process

Dimension	Facilitators	Strategies	Barriers	Approach to Barriers	Net Trend	Dimension Summary
<b>Attitude</b>	Admin were consistent, vocal supporters of the IDDT EBP since its initial stages. As a rule, they conveyed an enthusiastic attitude about innovative projects at the agency,	<b>CAT, Admin, and PLs</b> set the tone for an agency-wide positive attitude toward the IDDT EBP, and they provided education and support for doing so to <b>practitioners, other staff, and consumers</b> . During the preparation stage,			This positive attitude was intense and present <b>throughout the 24-month time period.</b>	2

	and a commitment to make necessary changes to enhance services for consumers.	advocacy for the EBP was present in most meetings.				
		<b>CAT</b> provided education, training, and consultation in an attempt to improve this practitioner's attitude toward the IDDT EBP. In addition, she discussed the matter with the <b>PLs</b> when	One <b>practitioner</b> demonstrated a negative attitude about the IDDT EBP (this person showed negativity toward consumers, in general). She complained about consumers		By the <b>1 year mark</b> , this practitioner showed an increased understanding of the IDDT EBP, which improved her attitude toward it (as well as toward DD consumers). The strategy	2

		<p>the <b>practitioner's</b> reports and documentation showed a concerning pattern. The <b>PLs</b> addressed the matter through group and individual supervision by providing a consistent message to <b>practitioners</b> that the IDDT EBP principles would be followed.</p>	<p>using drugs in the supported housing units, and her documentation reflected that she did not believe in consumers' potential for recovery and the potential for the IDDT EBP to be helpful to them.;</p>		<p>had an intense effect all the way through to the <b>late sustaining phase</b>.</p>	
<p><b>Money</b></p>		<p>The <b>agency</b> did not hold back anything related to time and</p>			<p>This strategy was present from <b>early preparation</b></p>	<p>2</p>

		<p>funding to support the IDDT EBP. Both <b>Admin</b> and the <b>psychiatrist</b> donated their time for participation in trainings and meetings, caseloads were lowered to support the EBP, and time for training/study groups was allotted for the <b>practitioners</b>.</p>			<p><b>through late sustaining</b> and was intense and constant.</p>	
			<p><b>During the later months of the sustaining phase,</b> the</p>		<p>This barrier was <b>constant</b> and only mildly</p>	<p>0</p>

			<p>agency announced that they decided to stop applying for substance abuse funding from the state.</p> <p><b>Admin</b> relayed that they were often not reimbursed for much money after filling out an enormous amount of paperwork to apply for state funds.</p>		<p>intense. It occurred during late sustaining phase and there did not appear to be any effects upon the IDDT EBP.</p>	
<b>Responsibility</b>		<b>PL1</b> took more responsibility for sustaining			<b>PL1</b> took more responsibility for sustaining	2

		the EBP than <b>PL2</b> , and worked with practitioners to practice and enhance skills. <b>PL2</b> focused more on administrative tasks.			the EBP than <b>PL2</b> , and worked with practitioners to practice and enhance skills. <b>PL2</b> focused more on administrative tasks.	
<b>Leadership Skills</b>		<b>During the sustaining phase, PL1's</b> leadership role changed a bit, as she was able to shift other duties to allow for more time to be spent on the IDDT EBP. <b>PL1</b> carried out all the	<b>During the latter months of the sustaining phase, PL2</b> expressed that he believed that too much emphasis was being placed on practicing the IDDT EBP skills,	<b>CAT</b> attempted to educate <b>PL2</b> about the necessity of practicing skills and about making attendance mandatory. <b>PL1</b> continued to provide	It appeared as if the leadership skills of <b>Admin and PL2</b> were strong enough to counter any negative influence of <b>PL1's</b> dismissal of the need for	2

		<p>follow-up to the training, including assisting the practitioners with skill-building during group supervision. <b>PL1</b> provided leadership related to clinical skills, while <b>PL2</b> oversaw changes in documentation, eligibility, etc.</p>	<p>such as MI. This concerned <b>CAT</b>, who believed that regular practice was key to sustaining the IDDT EBP. However, PL1 did make the skill building portion of weekly team meetings optional attendance .</p>	<p>opportunities for practitioners to practice skills.</p>	<p>practice. This occurred during the <b>later part of the sustaining phase.</b></p>	
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Source: see Resources section for details regarding source for matrices.



## Exercise 2: Dimensional Summary

Review the two matrices available on this page. The different approaches taken by the two analysts have different advantages. Based on what you have read in this chapter, consider the key advantages of each approach. Below are several advantages. Select the advantage that best applies to each version of the Dimensional Summary.



Focuses on one dimension, shows complex pattern for that dimension



Allows looking across dimensions



Includes "net trend" column summarizing observations.



Broken down by "phase" of the project

Dimensional Summary	Advantages
Dimensional Summary of Implementation Process – version 1	
Dimensional Summary of Implementation Process – version 2	

## 7. Drawing and Verifying Conclusions

### Variable-Oriented vs. Process-Oriented Matrices

A further distinction offered by Miles and Huberman (1994) is between what they call “paradigmatic” and “syntagmatic” displays. Paradigmatic displays are variable-oriented (think: paradigm) while syntagmatic displays are process-oriented.

Paradigmatic displays focus on relationships among well-defined concepts. For example, they may array one variable against another to find clusters or causal relationships. Syntagmatic displays focus on following the events in a case over time. Miles and Huberman (1994) argue that you must combine the two modes for careful description and explanation.



### Exercise 3: Syntagmatic vs. Paradigmatic

Please review the [tables provided](#).

**Question:** Which of the tables here are syntagmatic, and which are paradigmatic?

**Table 1:** Characteristics of the agency overall - Site 2

 Syntagmatic Paradigmatic

**Table 2:** Characteristics of the SMI program - Site 2

 Syntagmatic Paradigmatic

**Table 3:** Quality Improvement Systems - Site 1

 Syntagmatic Paradigmatic

**Table 4:** Summary of Internet Survey

 Syntagmatic Paradigmatic

**Table 5:** Project Timeline - Site 2

 Syntagmatic Paradigmatic

**Table 6:** Dimensional Summary of Implementation Process - 1st Version

 Syntagmatic Paradigmatic

**Table 7:** Dimensional Summary of Implementation Process - 2nd Version

 Syntagmatic Paradigmatic

## 7. Drawing and Verifying Conclusions

### Designing Matrices

The Miles and Huberman (1994) volume is a treasure trove of examples of matrix types which the researcher can mine for solutions to specific analysis problems (for example, "I need to get an overview of what each of my respondents individually had to say about their experiences with loss," "I need to figure out whether there's a difference between the kinds of attributions made by the doctors, on the one hand, and by the nurses, on the other; I need to carefully inspect the data to see whether my conclusion that more confrontive interventions are associated with better short-term outcomes is really supported by the data; etc."). But they also give you guidelines for designing your own from scratch. The guidelines are presented as a series of decisions to be made.

Is the matrix to be:

- Descriptive, or Explanatory?
- Partially, or Well-ordered?
- (that is, is it just a list of categories, or are they ordered?)
- Time ordered?
- Categories of variables—What will they be?
- What will define the rows, columns?
- How many dimensions will there be?
- (you can get more than 2 dimensions on a piece of paper by nesting rows or columns, or by indicating information about a dimension in the content of the cells—e.g., low, med, high)
- Cell entries—will they be:
  - Quotes?
  - Summaries?
  - Explanations?
  - Ratings?
  - Symbols? (include a legend!)
  - Combinations of the above?
- Single-case vs. multi-case?

Whatever the matrix design, it is very good practice to show your design to colleagues, and encourage them to question and challenge your assumptions, and provide alternate ideas.

## 7. Drawing and Verifying Conclusions

### Presenting Findings from Matrices

It is critical to recognize that most analytic matrices built in qualitative studies are not intended for your readers. They are analytic tools; they help you get an overview, compare cases, look for relationships, confirm your propositions and conclusions. Occasionally, you may decide to make a more consumer-friendly version of one of your matrices and use it as an illustration in a report. But that is not the primary intent. They don't prove anything on their own, and they are not meant to demonstrate things to your audience. They are tools to help you organize your data, and your thinking about it.

#### Illustration: Interpreting Matrices

##### Illustration 1:

Review Table 4 and try writing yourself a memo analyzing it. In one or two pages, try to pull together what the respondents are saying about the components of the IRK toolkit into a coherent picture.

After you complete the memo, go back and look look through Table 4 again, this time with an eye out for *disconfirming evidence*. That is, is there anything in the matrix that argues *against* the case you've just made? (Hint: There probably is.)

Go back and revise your memo to account for the data you had missed.

## Illustration 2:

1. Review Table 7. Create a new version of this matrix using this handout but this time develop summaries for the cells. For example, the cell that reads: “One **practitioner** demonstrated a negative attitude about the IDDT EBP (this person showed negativity toward consumers, in general). She complained about consumers using drugs in the supported housing units, and her documentation reflected that she did not believe in consumers’ potential for recovery and the potential for the IDDT EBP to be helpful to them.”

Could become:

- One practitioner had a **negative attitude** to EBP
- Complained about consumers’ **drug use**
- Did not believe in consumer’s or EBP’s potential

You could alternatively write short summaries, or even create a system of symbols.

2. Review your matrix. Can you identify any patterns in the Net Trends? Any *explanations* in the data for the Net Trends? Write a brief memo recording your conclusions.
3. Review Table 7 and assess your memo:
  - a. Did you overreach? That is, do the more lengthy comments in the full matrix *really* support your conclusions?
  - b. Did you miss anything? That is, do the more lengthy comments tell you things your condensed one doesn’t?
  - c. Or, did you lose something in reducing it?
4. Revise your memo.

What are some of the potential advantages and disadvantages of reducing in this way? Can you think of a better way to reduce a matrix like this?

## 8. The Role of Computers

Fundamental to the analysis practices described in this chapter is the need to be able to organize the data.

To carry out the procedures described here, we need to be able to find our way through our data, whether by chronology, narrative structure, topic, case type, theme, or by some other kind of relationship between one piece of text and another.

We may need to be able to pull together all the pieces of text that have to do with a topic or theme. We may need to be able to see each utterance in its original context to know what it means. When confirming findings, we may need to be able to find the data to support a proposition, or we may go looking to see if there is disconfirming evidence to contradict it. When working with the often enormous piles of text generated in qualitative research, being careful, diligent, and thorough can be a tremendous challenge, both because of the volume of the data, and the complexity of the thought required to analyze it. For all of these tasks, computers can be a big help (e.g., Weitzman and Miles, 1995b; Weitzman, 1999a, 2000, 2004, 2006).

There are the obvious ways computers already help: we use them to write, search, store data, create tables and diagrams, edit pictures and audio and video, and so on. Software for qualitative data analysis (QDA software) allows the analyst to systematically index and organize (or code) qualitative data, and then to reliably and flexibly retrieve that data in many different ways (for a fuller discussion of the varieties of types of software, see: Weitzman and Miles, 1995; Weitzman, 1999a, 2006). For example, it can facilitate finding all the data the analyst has previously coded for a particular theme or conceptual category, and it can facilitate parsing these data into subgroups based on demographic or other categorical or quantitative variables. It can also find all the cases where a theme was not present, or where combinations of themes are present, and so on. With the use of Boolean operators, the analyst can construct queries of arbitrary complexity, and execute them nearly instantly. **The speed and consistency with which QDA software can carry out such operations make it far more feasible to regularly carry out the kinds of analyses discussed above.**

## 8. The Role of Computers

It is critical to remember that while software can provide tools to help you analyze qualitative data, it cannot do the analysis for you, not in the same sense in which a statistical package like SPSS, SAS or STATA can do, say, multiple regression. Many researchers have had the hope—for others it is a fear—that the computer could somehow read the text and decide what it all means. That is, generally speaking, not the case. Thus it is particularly important to emphasize that using software cannot be a substitute for learning data analysis methods: **The researcher must know what needs to be done and must do it. The software provides some tools to do it with.**

It is probably not the case that software makes initial coding go faster, and it may not always even be the case that projects get completed faster (Fielding and Lee, 1998; Mangabeira, Lee and Fielding, 2004). However, considering the sorts of operations described in this chapter, and in the discussion of particular types of software below, it is hard to imagine the researcher who can carry out those same functions as quickly by hand. This creates the opportunity for either more rapid production of results by the same methods that would have been employed by hand, or for the use of methods which would be too time-consuming without the assistance of software. For a more detailed discussion of hopes and fears, and the limits of what software can do, see Weitzman (2003).

## 9. Software

### Types and Functions of Software for QDA

This is a rough sorting of available software into types. There is naturally quite a bit of overlap among categories, with individual programs having functions that would seem to belong to more than one type. However, it is possible to focus on the “heart and soul” of a program: what it mainly is intended for. This categorization scheme was first presented in Weitzman and Miles (1995). Since then, the landscape has changed somewhat, both in terms of what programs do, and in terms of what kinds of programs qualitative researchers are using. Some of the categories, like “code-and-retrieve” software, are virtually empty at this point. Others, like “textbase managers,” appear to be rarely used by qualitative researchers. Most of the interest, and virtually all of the recent literature on the use of these programs, has focused on one category, “code-based theory builders.” Nonetheless, qualitative researchers often find themselves faced with unique challenges—unusual datasets, novel analytic needs—and a knowledge of the range of options remains useful. These categories are illustrated with examples of programs that fit them at the time of this writing:

- Text Retrievers;
- Textbase Managers;
- Code and Retrieve;
- Code-based Theory Builders; and
- Conceptual Network Builders.

See **Section 12. Resources** for a list of available links.

## 9. Software

The 5 main software family types are discussed in the following pages: text retrievers; textbase managers; code and retrieve; codebase theory builders; and conceptual network builders.

### Text Retrievers

Text retrievers specialize in finding all the instances of words and phrases in text, in one or several files. They typically also allow you to search for places where two or more words or phrases coincide within a specified distance (a number of words, sentences, pages, etc.), and allow you to sort the resulting passages into different output files and reports. Free, easy to use search programs available on the web, such as Google Desktop, do these basic things very well. Many of the programs qualitative researchers typically turn to, on the other hand, may do other things as well, such as content analysis functions like counting, displaying keywords in context or creating concordances (organized lists of all words and phrases in their contexts), or they may allow you to attach annotations or even variable values (for things like demographics or source information) to points in the text. Examples of text retrievers are Sonar Professional, and a variety of free (but hard to use) GREP tools available on the internet.

### Textbase Managers

Textbase managers are database programs specialized for storing text in more or less organized fashion. They are good at holding text, together with information about it, and allowing you to quickly organize and sort your data in a variety of ways, and retrieve it according to different criteria. There are programs—some free, like Zotero—that specialize in storing web-based material. Some are better suited to highly structured data that can be organized into “records” (that is, specific cases) and “fields” (variables—information that appears for each case), while others easily manage “free-form” text. They may allow you to define fields in the fixed manner of a traditional database such as Microsoft Access® or FileMaker Pro®, or they may allow significantly more flexibility, for example, allowing different records to have different field structures. Their search operations may be as good as, or sometimes even better than those of some text retrievers. Examples of textbase managers are askSam and TEXTBASE GAMMA.

### Code and Retrieve

Code-and-retrieve is the dominant paradigm for qualitative analysis software, but at this point most programs with code-and-retrieve capability have evolved to the more sophisticated code-

based theory builder category discussed next. These programs are often developed by qualitative researchers specifically for the purpose of qualitative data analysis. As a baseline, the programs in this category have specialized in allowing the researcher to apply category tags (codes) to passages of text, and later retrieve and display the text according to the researcher's coding. These programs have at least some search capacity, allowing you to search either for codes or words and phrases in the text. They may have a capacity to store memos. Even the weakest of these programs represented a quantum leap forward from the old scissors-and-paper approach, being more systematic, more thorough, less likely to miss things, more flexible, and much, much faster. Examples of code-and-retrieve programs were the earlier versions of The Ethnograph, HyperQual2, Kwalitan, QUALPRO, and Martin. Today, we occasionally see free tools made available on the web that fit this category.

## 9. Software

### Code-based Theory Builders

Code-based theory builders today appear to attract most of the qualitative researchers who employ software for their analyses. Most of these programs are also based on a code-and-retrieve model, but they go beyond the functions of code-and-retrieve programs. They do not, nor would you want them to, build theory for you. Rather, they have special features or routines that go beyond those of code-and-retrieve programs in supporting your theory-building efforts. For example, they may allow you to represent relations among codes, build higher-order classifications and categories, or formulate and test theoretical propositions about the data. For the most part, these programs allow you to create hierarchical trees of codes, but some, notably Atlas/ti and HyperRESEARCH, allow for non-hierarchical networks as well. They may have more powerful memoing features (allowing you, for example, to categorize or code your memos), or more sophisticated search-and-retrieval functions than did the earlier code-and-retrieve programs. They may have extended and sophisticated hyperlinking features, allowing you to link segments of text together, or to create links among segments of text, graphics, photos, video, audio, web sites and more. They may also offer capabilities for "system closure," allowing you to feed results of your analyses (such as search results, or memos) back into the system as data. One program, QUALRUS, uses artificial intelligence techniques to suggest coding.

#### Programs in this category

Examples of code-based theory builders are AFTER, AnSWR, AQUAD, ATLAS/ti, C-I-SAID, HyperRESEARCH, MAXqda, NVivo, QCA, fs/QCA, QUALRUS, and The Ethnograph. Three of these programs, AQUAD, QCA, and fs/QCA support cross-case configural analysis (Ragin, 1987), QCA being dedicated wholly to this method and not having any text-coding capabilities, and fs/QCA supporting Ragin's fuzzy-set extension of this methodology (Ragin, 2000).

#### ***Numbers in, numbers out***

Increasingly, code-based theory builders support the integration of quantitative and qualitative data. It is important to distinguish here between "numbers in" capabilities, and "numbers out" capabilities. With regard to *numbers in* approaches, some programs have strong facilities for applying quantitative or categorical variables to qualitative datasets, allowing the analyst to associate demographics, test scores, or survey results, for example, with the cases in their qualitative data. In the best implementations, you can easily import whole spreadsheets of such variables into the qualitative analysis package, and flexibly and easily examine subsets of cases based on combinations of these variables. For example, you might want to compare the occurrence of some qualitative theme you have identified in different demographic categories. *Numbers out* capabilities, on the other hand, allow the analyst to generate quantitative data based on their qualitative work, and export it for further analysis in spreadsheets or statistical packages. The best implementations here allow you not only to generate numbers based on frequency of coding, but also to use coding for developing scores, flexibly generate frequencies of co-occurrence of codes either on text passages or within documents, and give you good control over the parameters of the matrices of numbers generated.

### ***Teamwork***

Code-based theory builders are supporting teamwork with increasing flexibility. Many programs will now at least allow you to lump together coding work done on different copies of a dataset (perhaps by different coders) into one new dataset. More sophisticated merge functions allow you to track team members' work: who wrote which memo, who used which code on which passage of text, and so on, allowing not only more control over the merge, but also facilitating collaboration, and particularly discussions of differences in coding. Some programs will allow the generation of statistics assessing consistency of coding, or inter-coder reliability, and it is important to pay attention to the fact that different programs use quite different statistical models for this.

### ***Multimedia***

Multimedia capabilities have become for many researchers a significant issue in software choice. There are now several programs in the code-based theory builder category that allow you to use audio and video, as well as text, as data: AFTER, ATLAS/ti, AQUAD, C-I-SAID, HyperRESEARCH, InterClipper, NVivo, TAMS Analyzer, and Transana all allow you to code and annotate audio and/or video files, and search and retrieve from them, in ways quite similar to the ways they let you manipulate text. In these programs, you can play a media file (audio or video), mark the

beginning and ending points of segments, and then treat those segments much like segments of text.

Some of these programs, including Atlas/ti, HyperRESEARCH, InterClipper, TAMS Analyzer, and Transana, include built-in or add-on transcription modules. With these, you can play your media files, type the transcripts, and have the program maintain links between the media and corresponding text.

## 9. Software

### Conceptual Network Builders

These programs emphasize the creation and analysis of network displays. Some of them are focused on allowing you to create network drawings: graphic representations of the relationships among concepts. Examples of these are Inspiration, Mindjet, and Visio. Others are focused on the analysis of cognitive or semantic networks, for example, the program MECA. Still others offer some combination of the two approaches, for example, SemNet, Personal Brain, and Decision Explorer. Finally, ATLAS/ti, a program also listed under code-based theory builders, also has a fine graphical network builder connected to the analytic work you do with your text and codes, while others, like MAXqda and NVivo, offer an integrated drawing module which does not manipulate underlying relationships.

### Summary

In concluding this discussion of the five main software family types, it is important to emphasize that functions often cross type boundaries. For example, askSam can be used to code and retrieve, and has an excellent text search facility. ATLAS/ti, HyperRESEARCH, NVivo, and MAXqda allow you to edit graphical representations of relationships among codes, although among these, only ATLAS/ti and HyperRESEARCH allow you to work with and manipulate the actual relationships through editing the drawing. You can still see the actual relationships among codes in a hierarchical “explorer” with expandable and collapsible branches in most programs. Atlas/ti, NVivo, The Ethnograph and MAXqda each have a system for attaching variable values (text, date, numeric, etc.) to text files and/or cases. The implication: do not decide too early which family you want to choose from. Instead, stay focused on the functions you need.

## 10. Choosing QDA Software

There is no one best software program for analyzing qualitative data. Furthermore, there is no one best program for a particular type of research or analytic method. Researchers will sometimes ask “what’s the best program for a study of health services,” or “what’s the best program for doing grounded theory,” or “what’s the best program for analyzing focus groups.” None of these questions has a good answer. Instead, choice needs to be approached based on the structure of the data, the specific things the analyst will want to do as part of the analysis, and the needs of the researcher around issues like ease-of-use, cost, time available, collaboration, and so on.

Four broad questions, along with two cut-across issues, can be asked that should guide the researcher to such a choice (Weitzman and Miles, 1995a; Weitzman and Miles, 1995b, Weitzman, 2003). These guidelines for choice have seen wide use in practice since their original formulation, and have proven to be effective for guiding researchers to appropriate choices. They are presented here only in outline. For fuller discussions of these choice issues, see, for example, Weitzman, 1999a or Weitzman, 2003.

Specifically, there are four key questions to ask and answer as you move toward choosing one or more software packages:

1. What kind of computer user am I?
2. Am I choosing for one project or the next few years?
3. What kind of project(s) and database(s) will I be working on?
4. What kind of analyses am I planning to do?

In addition to these four key questions, there are two cut-across issues to bear in mind:

- How important is it to you to maintain a sense of “closeness” to your data?
- What are your financial constraints when buying software, and the hardware it needs to run on?

With these basic issues clear, you will be able to look at specific programs in a more active, deliberate way, seeing what does or does not meet your needs.

## 10. Choosing QDA Software



### Exercise 4: Choosing QDA Software

Review the following worksheet considering a project you have done or are planning. Record your answers and make notes about implications (be brief, character field limited). Once you have filled out the worksheet, you can print it using the "print" function in the upper right hand corner of the screen.

**Click on the exercise preview below to see the full exercise:**

Issue	Answer	Implications / Notes
What Kind of a Computer User Am I?		
Level 1 Level 2 Level 3 Level 4	Level 1	
Am I Choosing for One Project or the Next Few Years?		
One Project vs. Next Few Years	One Project	

Based on your answers, identify the candidate program that would best suit the needs of this project. Click on the categories below to return to the section of the chapter where each are discussed in detail.

- Text Retrievers
- Textbase Managers
- Code and Retrieve
- Code-based Theory Builders
- Conceptual Network Builders

For example, if you are working on a complex evaluation study, with a combination of structured interviews, focus groups, and case studies, you will need strong tools for tracking cases through different documents. You might find good support for this in a program's code structures, or through the use of speaker identifiers that track individuals throughout the database.

## 11. Summary

This overview of the qualitative data analysis process has followed, in general terms, the outline first presented here in Figure 1. Here is a slightly different summary of the process, which some readers may find more helpful.

The first step is ***coding the data***. But don't be misled by the phrase "the first step." Coding should begin before all the data is collected, and will usually be returned to for more refinement as analysis proceeds and ideas develop. In fact, none of the following "steps" are strictly sequential.

Next, the analyst will want to start ***summarizing themes***. In order to do this, it is often important to *partition the dataset*, for example to be able to look for variation in the theme across different demographics, different outcome groups, etc. Further, the analyst will often need to get different sorts of overviews of the data, for example by counting the numbers of cases that fall into different categories, building matrix displays, and so on.

In addition to summarizing themes, the analyst will often want to ***summarize cases***. Again, descriptive matrices can be extremely helpful here.

With both the cases and the major themes summarized, the researcher will usually proceed to ***looking for patterns and relationships***. There are several different ways to find them. First, and perhaps most important, is *noticing them as you read*. In addition, you can do *clustering*, whether *by case* or *by variable*. And further, you can build all sorts of matrices to identify patterns and relationships.

Finally, it is vital if the study is going to be reliable and credible, that you go back and ***verify your conclusions***. There are a range of strategies here, including *triangulating* across data sources or data types, searching for *negative evidence*, checking for *representativeness*, checking the *meaning of outliers*, and so on. Again, matrices are indispensable tools.

Careful application of the techniques discussed here can both help the researcher stay focused and on-track, and help to ensure that the findings produced are sound and persuasive.

## 12. Resources

### Exemplary Qualitative Researchers

#### **Matthew B. Miles and A. Michael Huberman**

The authors of the seminal, *Qualitative Data Analysis*, Miles and Huberman were also prolific researchers, both separately and together. Their work is excellent, and illustrates the methods described in their famous methods text.

#### **Harry F. Wolcott**

Wolcott has written numerous excellent books on qualitative research methods, and has been a prolific researcher as well. His ethnographies and other research studies illustrate the methods he explains in his methods books.

#### **Robert S. Weiss**

Weiss is the author of the excellent book, *Learning From Strangers*, 1994, a qualitative methods text that focuses on interviewing. His numerous interview studies are an excellent source of examples of clear and compelling qualitative interview research.

#### **Raymond M. Lee**

A methodologist as well as qualitative researcher, Lee has made a particular specialty of doing research on sensitive topics.

### Tables 1-7 Credit:

Reprinted with permission from the National Implementing Evidence-Based Practices Project. I would like to thank my colleague, Greg McHugo, at the Dartmouth Psychiatric Research Center for helping to identify and providing the site reports from which these displays are drawn.

Further information about the project can be found in:

Torrey, W.C., Lynde, D.W., & Gorman, P. (2005). Promoting the implementation of practices that are supported by research: The national implementing evidence-based practice project. *Child and Adolescent Psychiatric Clinics of North America*, 14, 297-306.

McHugo, G.M., Drake, R.E., Whitley, R., Bond, G.R., Campbell, K., Rapp, C.A., Goldman, H.H., Lutz, W., & Finnerty, M. (2007). Fidelity outcomes in the national implementing evidence-based practices project. *Psychiatric Services*, 58, 1279-1284.

## 12. Resources

### Software Program Links

AnSWR

AQUAD

askSam

Atlas/ti

C-I-SAID

Decision Explorer

The Ethnograph

fs/QCA

Google Desktop

HyperRESEARCH

InterClipper

Kwalitan

MAXqda

NVivo

Personal Brain

QCA

QUALRUS

SemNet

Sonar Professional

SuperHyperQual

TAMS Analyzer

TextBase Gamma

Transana

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## 14. Author Biography

**Eben A. Weitzman, PhD** is a social and organizational psychologist specializing in the resolution of conflict. He is an Associate Professor in the Graduate Programs in Dispute Resolution, and in the Public Policy Ph.D. Program, both at the University of Massachusetts Boston. He leads the conflict resolution work of the Service Employees International Union's (SEIU) Institute For Change. His work focuses on conflict within and between groups, with emphases on organizational conflict, cross-cultural conflict, and intergroup relations.

Since 1989, Dr. Weitzman has been doing conflict resolution, organizational development, and dispute resolution systems design with a wide variety of individuals and organizations in both the public and private sectors. His clients have included organizations in health care, organized labor, education, government, law enforcement, social services, business, and the courts. From 1989-2000, he was a trainer, consultant, and research associate at the International Center for Cooperation and Conflict Resolution at Columbia University. He has been a senior technical consultant to The Mediation Group since 2000, and became Director of TMG's organizational consulting practice in 2008.

Dr. Weitzman is also a research methodologist. In 1995, he co-authored one of the first texts on computer assisted qualitative data analysis with the late Mathew Miles, and continues to write and teach about qualitative research methods for use in a wide range of areas including health care services and public policy development. He has served as Reviews Editor for the journal *Field Methods*, has consulted on numerous large qualitative research studies in health care and human services, and has served as a Visiting Lecturer in the Summer Institute in Survey Research Techniques at the Survey Research Center of the Institute for Social Research, University of Michigan since 1997.