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Theme identification is one of the most fundamental tasks in qualitative research. It also is one of the most mysterious. Explicit descriptions of theme discovery are rarely found in articles and reports, and when they are, they are often relegated to appendices or footnotes. Techniques are shared among small groups of social scientists, but sharing is impeded by disciplinary or epistemological boundaries. The techniques described here are drawn from across epistemological and disciplinary boundaries. They include both observational and manipulative techniques and range from quick word counts to laborious, in-depth, line-by-line scrutiny. Techniques are compared on six dimensions: (1) appropriateness for data types, (2) required labor, (3) required expertise, (4) stage of analysis, (5) number and types of themes to be generated, and (6) issues of reliability and validity.

Keywords: *theme identification; qualitative analysis; text analysis; open coding; qualitative research methods*

Analyzing text involves several tasks: (1) discovering themes and subthemes, (2) winnowing themes to a manageable few (i.e., deciding which themes are important in any project), (3) building hierarchies of themes or code books, and (4) linking themes into theoretical models.

We focus here on the first task: discovering themes and subthemes in texts—and in other qualitative data, like images or artifacts, for that matter.[1] We outline a dozen techniques, drawn from across the social sciences and from different theoretical perspectives. The techniques range from simple word counts that can be done by a computer to labor-intensive, line-by-line analyses that, so far, only humans can do.

Each technique has advantages and disadvantages. Some methods are more suited to rich, complex narratives, while others are more appropriate for short responses to open-ended questions. Some require more labor and expertise on behalf of the investigator, others less.

Making explicit the techniques we use for discovering themes in qualitative data is important for three reasons. First, discovering themes is the basis

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of much social science research. Without thematic categories, investigators have nothing to describe, nothing to compare, and nothing to explain. If researchers fail to identify important categories during the exploratory phase of their research, what is to be said of later descriptive and confirmatory phases?

Second, being explicit about how we establish themes allows consumers of qualitative research (including those who fund it) to assess our methodological choices.

Third, qualitative researchers need an explicit and jargon-free vocabulary to communicate with each other across disciplines and across epistemological positions. As we see it, theme discovery is practiced by avowed positivists and interpretivists alike. In fact, some of the techniques we describe are drawn from the interpretivist tradition, while others reflect the efforts of positivists who analyze qualitative data. We see nothing wrong with this. All the techniques we describe can help researchers see their data in a new light. Each has its advantages and disadvantages.

We rarely see descriptions (even in footnotes or appendices) of how researchers came to discover the themes they report in their articles. The techniques we use for finding themes are, of course, shared within invisible colleges, but wider sharing is impeded by disciplinary or epistemological boundaries. “Many researchers,” said Renata Tesch (1990:115), “read only certain authors and remain quite ignorant of analysis purposes and procedures different from the ones their favorite methodological writers describe.” More than a decade later, little appears to have changed.

WHAT IS A THEME?

This problem has a long history. Seventy years ago, Thompson ([1932-1936] 1993) created an index of folktale motifs that filled six volumes. Anthropologist Morris Opler (1945) saw the identification of themes as a key step in analyzing cultures. “In every culture,” he said,

> are found a limited number of dynamic affirmations, called themes, which control behavior or stimulate activity. The activities, prohibitions of activities, or references which result from the acceptance of a theme are its expressions. . . . The expressions of a theme, of course, aid us in discovering it. (pp. 198-99)

Opler (1945) established three principles for thematic analysis. First, he observed that themes are only visible (and thus discoverable) through the manifestation of expressions in data. And conversely, expressions are meaningless without some reference to themes.

Second, Opler (1945) noted that some expressions of a theme are obvious and culturally agreed on, while others are subtler, symbolic, and even idiosyncratic.

Third, Opler (1945) observed that cultural systems comprise sets of interrelated themes. The importance of any theme, he said, is related to (1) how often it appears, (2) how pervasive it is across different types of cultural ideas and practices, (3) how people react when the theme is violated, and (4) the degree to which the number, force, and variety of a theme's expression is controlled by specific contexts.

Today, social scientists still talk about the linkage between themes and their expressions but use different terms to do so. Grounded theorists talk about "categories" (Glaser and Strauss 1967), "codes" (Miles and Huberman 1994), or "labels" (Dey 1993:96). Opler's (1945) "expressions" are called "incidents" (Glaser and Strauss 1967), "segments" (Tesch 1990), "thematic units" (Krippendorf 1980), "data-bits" (Dey 1993), and "chunks" (Miles and Huberman 1994). Lincoln and Guba (1985) referred to expressions as "units" (p. 345). Strauss and Corbin (1990) called them "concepts."

For Strauss and Corbin (1990), the links between expressions and themes are "conceptual labels placed on discrete happenings, events, and other instances of phenomena." Themes, or categories, are the classification of more discrete concepts. "This classification is discovered when concepts are compared one against another and appear to pertain to a similar phenomenon. Thus, the concepts are grouped together under a higher order, more abstract concept called a category" (p. 61).

Here, we follow Agar's (1979, 1980) lead and remain faithful to Opler's (1945) terminology. To us, the terms "theme" and "expression" more naturally connote the fundamental concepts we are tying to describe. In everyday language, we talk about themes that appear in texts, paintings, and movies and refer to particular instances as expressions of anger and evil. In selecting one set of terms over others, we surely ignore subtle differences, but the basic ideas are just as useful under many glosses.

HOW DO YOU KNOW A THEME WHEN YOU SEE ONE?

To us, themes are abstract (and often fuzzy) constructs that link not only expressions found in texts but also expressions found in images, sounds, and objects. You know you have found a theme when you can answer the question, What is this expression an example of? Themes come in all shapes and sizes. Some themes are broad and sweeping constructs that link many different kinds of expressions. Other themes are more focused and link very specific kinds of expressions. When we describe themes as the conceptual linking of expressions, it is clear that there are many ways in which expressions can be linked to abstract constructs.

WHERE DO THEMES COME FROM?

Themes come both from the data (an inductive approach) and from the investigator's prior theoretical understanding of the phenomenon under study (an a priori approach). A priori themes come from the characteristics of the phenomenon being studied; from already agreed on professional definitions found in literature reviews; from local, commonsense constructs; and from researchers' values, theoretical orientations, and personal experiences (Bulmer 1979; Strauss 1987; Maxwell 1996). Strauss and Corbin (1990:41–47) called this theoretical sensitivity. Investigators' decisions about what topics to cover and how best to query informants about those topics are a rich source of a priori themes (Dey 1993:98). In fact, the first pass at generating themes often comes from the questions in an interview protocol (Coffey and Atkinson 1996:34). Unlike pure literature reviews, these themes are partly empirical.

Mostly, though, themes are induced from empirical data—from texts, images, and sounds. Even with a fixed set of open-ended questions, one cannot anticipate all the themes that arise before analyzing the data (Dey 1993:97–98). The act of discovering themes is what grounded theorists call open coding and what classic content analysts call qualitative analysis (Berelson 1952) or latent coding (Shapiro and Markoff 1997).

There are many variations on these methods, and individual researchers have different recipes for arriving at the preliminary set of themes (Tesch 1990:91). We next describe eight observational techniques—things to look for in texts—and four manipulative techniques—ways of processing texts. These twelve techniques are not exhaustive and are often combined in practice.

SCRUTINY TECHNIQUES—THINGS TO LOOK FOR

Looking for themes in written material typically involves pawing through texts and marking them up with different colored pens. Sandelowski (1995:373) observed that analysis of texts begins with proofreading the material and simply underlining key phrases "because they make some as yet inchoate sense." For those who tape their interviews, the process of identifying themes probably begins with the act of transcribing the tapes. Bogdan and Biklen (1982:165) suggested reading over the text at least twice. Whether the data come in the format of video, audio, or written documents, handling them is always helpful for finding themes. Here is what researchers look for.

Repetitions

Repetition is one of the easiest ways to identify themes. Some of the most obvious themes in a corpus of data are those "topics that occur and reoccur" (Bogdan and Taylor 1975:83) or are "recurring regularities" (Guba 1978:53). "Anyone who has listened to long stretches of talk," said D'Andrade (1991), "knows how frequently people circle through the same network of ideas" (p. 287). Claudia Strauss (1992), for example, did several in-depth interviews with Tony, a retired blue-collar worker in Connecticut, and found that Tony repeatedly referred to ideas associated with greed, money, businessmen, siblings, and "being different." Strauss concluded that these ideas were important themes in Tony's life. She displayed the relationships among these ideas by writing the concepts on a piece of paper and connecting them with lines to Tony's verbatim expressions, much as researchers today do with text analysis software. The more the same concept occurs in a text, the more likely it is a theme. How many repetitions are enough to constitute an important theme, however, is an open question and one only the investigator can decide.

Indigenous Typologies or Categories

Another way to find themes is to look for local terms that may sound unfamiliar or are used in unfamiliar ways. Patton (1990:306, 393–400) referred to these as "indigenous categories" and contrasted them with "analyst-constructed typologies." Grounded theorists refer to the process of identifying local terms as in vivo coding (Strauss 1987:28; Strauss and Corbin 1990:61–74). Ethnographers call this the search for typologies or classification schemes (Bogdan and Taylor 1975:83) or cultural domains (Spradley 1979:107–19).

Spradley (1972) recorded conversations among tramps at informal gatherings, meals, and card games. As the men talked to each other about their experiences, they made many references to making a flop. Spradley searched through his recorded material and notes looking for verbatim statements made by informants about this topic. He found that he could categorize most statements into subthemes such as kinds of flops, ways to make flops, ways to make your own flop, kinds of people who bother you when you flop, ways to make a bed, and kinds of beds. Spradley then returned to his informants and sought additional information from them on each of the subthemes. For other examples of coding for indigenous categories, see Becker's (1993) description of medical students' use of the word "crock" and Agar's (1973) description of drug addicts' understandings of what it means to shoot up.

Metaphors and Analogies

In pioneering work, Lakoff and Johnson (1980) observed that people often represent their thoughts, behaviors, and experiences with analogies and metaphors. Analysis, then, becomes the search for metaphors in rhetoric and deducing the schemas or underlying themes that might produce those metaphors (D'Andrade 1995; Strauss and Quinn 1997).

Naomi Quinn (1996) analyzed hundreds of hours of interviews to discover fundamental themes underlying American marriages and to understand how these themes are tied together. She found that people talk about their surprise at the breakup of a marriage by saying that they thought the couple's marriage was "like the Rock of Gibraltar" or that they thought the marriage had been "nailed in cement." People use these metaphors because they assume that their listeners know that cement and the Rock of Gibraltar are things that last forever.

Quinn (1996) reported that the hundreds of metaphors in her corpus of texts fit into eight linked classes that she labeled lastingness, sharedness, compatibility, mutual benefit, difficulty, effort, success (or failure), and risk of failure. For example, when informants said of someone's marriage that "it was put together pretty good" or was a "lifetime proposition," Quinn saw these metaphors as exemplars of the expectation of lastingness in marriage.

Other examples of the search for cultural schemas in texts include Holland's (1985) study of the reasoning that Americans apply to interpersonal problems, Kempton's (1987) study of ordinary Americans' theories of home heat control, and Strauss's (1997) study of what chemical plant workers and their neighbors think about the free-enterprise system.

Transitions

Naturally occurring shifts in content may be markers of themes. In written texts, new paragraphs may indicate shifts in topics. In speech, pauses, changes in voice tone, or the presence of particular phrases may indicate transitions. Agar (1983) examined transcripts of arguments presented by independent truckers at public hearings of the Interstate Commerce Commission. He noticed that each speech was divided into topical sections that were often demarcated by metaphors. In semistructured interviews, investigators steer the conversation from one topic to another, creating transitions, while in two-party and multiparty natural speech, transitions occur continually. Analysts of conversation and discourse examine features such as turn taking and speaker interruptions to identify these transitions. (For an overview, see Silverman 1993:114–43.)

Similarities and Differences

What Glaser and Strauss (1967:101–16) called the "constant comparison method" involves searching for similarities and differences by making systematic comparisons across units of data. Typically, grounded theorists begin with a line-by-line analysis, asking, What is this sentence about? and How is it similar to or different from the preceding or following statements? This keeps the researcher focused on the data rather than on theoretical flights of fancy (Glaser 1978:56–72; Charmaz 1990, 2000; Strauss and Corbin 1990:84–95).

Another comparative method involves taking pairs of expressions—from the same informant or from different informants—and asking, How is one expression different from or similar to the other? The abstract similarities and differences that this question generates are themes. If a particular theme is present in both expressions, then the next question to ask is, Is there any difference, in degree or kind, in which the theme is articulated in both of the expressions? Degrees of strength in themes may lead to the naming of subthemes. Suppose an investigator compares two video clips and finds that both express the theme of anxiety. On careful scrutiny, the researcher notices that the two instances of anxiety are both weak, but one is expressed verbally and the other through subtle hand gestures. The investigator codes these as two new subthemes.

Researchers also compare pairs of whole texts, asking, How is this text different from the preceding text? and What kinds of things are mentioned in both? They ask hypothetical questions such as, What if the informant who produced this text had been a woman instead of a man? and How similar is this text to my own experience? Bogdan and Biklen (1982:153) recommended reading through passages of text and asking, "What does this remind me of?" Just as a good journalist would do, investigators compare answers to questions across people, space, and time. (For more formal techniques of identifying similarities and differences among segments of text, see the discussion below on cutting and sorting.)

Linguistic Connectors

Another approach is to look carefully for words and phrases such as "because," "since," and "as a result," which often indicate causal relations. Words and phrases such as "if" or "then," "rather than," and "instead of" often signify conditional relations. The phrase "is a" is often associated with taxonomic categories, as in "a lion is a kind of cat." Time-oriented relationships are expressed with words such as "before," "after," "then," and "next." Typically, negative characteristics occur less often than do positive ones. Simply searching for the words "not," "no," "none," or the prefix "non-" (and its allomorphs, "un-," "in-," "il-," "im-," etc.) may be a quick way to identify some themes. Investigators can discover themes by searching for such groups of words and looking to see what kinds of things the words connect.

What other kinds of relationships might be of interest? Casagrande and Hale (1967) suggested looking for attributes (e.g., X is Y), contingencies (e.g., if X, then Y), functions (e.g., X is a means of affecting Y), spatial orientations (e.g., X is close to Y), operational definitions (e.g., X is a tool for doing Y), examples (e.g., X is an instance of Y), comparisons (e.g., X resembles Y), class inclusions (X is a member of class Y), synonyms (e.g., X is equivalent to Y), antonyms (e.g., X is the negation of Y), provenience (e.g., X is the source of Y), and circularity (e.g., X is defined as X). (For lists of other kinds of relationships that may be useful for identifying themes, see Lindsay and Norman 1972; Burton and Kirk 1980:271; and Werner and Schoepfle 1987.)

Metaphors, transitions, and connectors are all part of a native speaker's ability to grasp meaning in a text. By making these features more explicit, we sharpen our ability to find themes.

Missing Data

The next scrutiny-based approach works in reverse from typical theme-identification techniques. Instead of asking, What is here? we can ask, What is missing? Researchers have long recognized that much can be learned from qualitative data by what is not mentioned. Bogdan and Taylor (1975) suggested being "alert to topics that your subjects either intentionally or unintentionally avoid" (p. 82).

For instance, women who have strong religious convictions may fail to mention abortion during discussions of birth control. In power-laden interviews, silence may be tied to implicit or explicit domination (Gal 1991). In a study of birth planning in China, Greenhalgh (1994) reported that she could not ask direct questions about resistance to government policy but that respondents "made strategic use of silence to protest aspects of the policy they did not like" (p. 9). Obviously, themes that are discovered in this manner need to be carefully scrutinized to ensure that investigators are not finding only what they are looking for.

In fact, lacunae in texts may indicate primal cultural assumptions. Spradley (1979:57–58) observed that when people tell stories, they leave out information that "everyone knows." He called this process abbreviating. The statement "John was broke because it was the end of the month" requires a great deal of cultural understanding. It requires knowing that there is absolutely no causal relationship between financial solvency and dates, that people are often paid at the end of the month, and that people sometimes spend all their money before getting their next paycheck. Price (1987) suggested looking for missing information by translating people's narratives into the worldview of a different audience. When she finds herself filling in the gaps, she knows she has found fundamental themes.

Searching for missing information is not easy. People may not trust the interviewer, may not wish to speak when others are present, or may not understand the investigator's questions. Distinguishing between when informants are unwilling to discuss a topic and when they assume the investigator already knows about the topic requires a lot of familiarity with the subject matter.

A variant on the missing data technique is to scrutinize any expressions that are not already associated with a theme (Ryan 1999). This means reading a text over and over. On the first reading, salient themes are clearly visible and can be quickly and readily marked with highlighters. In the next stage, the researcher searches for themes in the data that remain unmarked. This tactic—marking obvious themes early and quickly—forces the search for new and less obvious themes in the second pass.

Theory-Related Material

In addition to identifying indigenous themes—themes that characterize the experience of informants—researchers are interested in understanding how qualitative data illuminate questions of importance to social science. Spradley (1979:199–201) suggested searching interviews for evidence of social conflict, cultural contradictions, informal methods of social control, things that people do in managing impersonal social relationships, methods by which people acquire and maintain achieved and ascribed status, and information about how people solve problems. Bogdan and Biklen (1982:156–62) suggested examining the setting and context, the perspectives of the informants, and informants' ways of thinking about people, objects, processes, activities, events, and relationships. Strauss and Corbin (1990:158–75) urged investigators to be more sensitive to conditions, actions/interactions, and consequences of a phenomenon and to order these conditions and consequences into theories. “Moving across substantive areas,” said Charmaz (1990), “fosters developing conceptual power, depth, and comprehensiveness” (p. 1163).

There is a trade-off, of course, between bringing a lot of prior theorizing to the theme-identification effort and going at it fresh. Prior theorizing, as Charmaz (1990) said, can inhibit the forming of fresh ideas and the making of surprising connections. And by examining the data from a more theoretical perspective, researchers must be careful not to find only what they are looking for. Assiduous theory avoidance, on the other hand, brings the risk of not making the connection between data and important research questions.

The eight techniques described above can all be used with pencil and paper. Once you have a feel for the themes and the relations among them, we see no reason to struggle bravely on without a computer. Of course, a computer is required from the onset if the project involves hundreds of interviews, or if it is part of a multisite, multi-investigator effort. Even then, there is no substitute for following hunches and intuitions in looking for themes to code in texts (Dey 1993).

Next, we describe four techniques that require more physical or computer-based manipulation of the text itself.

PROCESSING TECHNIQUES

Some techniques are informal—spreading texts out on the floor, tacking bunches of them to a bulletin board, and sorting them into different file folders—while others require special software to count words or display word-word co-occurrences.

Cutting and Sorting

After the initial pawing and marking of text, cutting and sorting involves identifying quotes or expressions that seem somehow important and then arranging the quotes/expressions into piles of things that go together. Lincoln and Guba (1985:347–51) offered a detailed description of the cutting and sorting technique. Their method of constant comparison is much like the pile-sorting task used extensively in cognitive research (e.g., Weller and Romney 1988).

There are many variations on this technique. We cut out each quote (making sure to maintain some of the context in which it occurred) and paste the material on a small index card. On the back of each card, we write down the quote’s reference—who said it and where it appeared in the text. Then we lay out the quotes randomly on a big table and sort them into piles of similar quotes. Then we name each pile. These are the themes.

Clearly, there are many ways to sort the piles. Splitters, who maximize the differences between passages, are likely to generate more fine-grained themes. Lumpers, who minimize the differences, are likely to identify more overarching or metathemes. As the first exploratory step in the data analysis, investigators are most concerned with identifying as wide a range of themes as possible. In later steps, they will need to address the issue of which themes are the most important and worthy of further analysis.

In another variation, the principal investigator on a large project might ask several team members to sort the quotes into named piles independently. This is likely to generate a longer list of possible themes than would be produced by a group discussion. And if the people sorting the quotes are unaware of whom the quotes came from, this is an unbiased way of comparing themes across different groups.

In really large projects, investigators might have pairs of team members sort the quotes together and decide on the names for the piles. Ryan (1995) has found it particularly helpful to audiotape the conversations that occur when pairs of people perform pile-sorting tasks. The conversations often provide important insights into the underlying criteria and themes people use to sort items.

Barkin, Ryan, and Gelberg (1999) provided yet another variation. They interviewed clinicians, community leaders, and parents about what physicians could do and did to prevent violence among youth. These were long, complex interviews, so Barkin, Ryan, and Gelberg broke the coding process into two steps. They started with three major themes that they developed from theory. The principal investigator went through the transcripts and cut out all the quotes that pertained to each of the major themes. Then, four other coders independently sorted the quotes from each major theme into piles.

For each major theme, Barkin, Ryan, and Gelberg (1999) converted the pile sort data into a quote-by-quote similarity matrix. The numbers in the cells, which ranged from 0 to 4, indicated the number of coders who had placed the quotes in the same pile. The researchers analyzed each matrix with multidimensional scaling (MDS) and cluster analysis. The MDS displayed the quotes in a map, where pairs of quotes that were sorted into the same pile by all four coders appeared closer together than did pairs of quotes that were never placed together. The cluster analysis identified groups of quotes shared across coders. Barkin, Ryan, and Gelberg used these results to identify subthemes. (See Patterson, Bettini, and Nussbaum 1993 for another example.)

Jehn and Doucet (1997) used a similar approach but skipped the first steps of cutting the data into individual expressions. They asked seventy-six U.S. managers who had worked in Sino-American joint ventures to describe recent interpersonal conflicts with business partners. Each person described two conflicts: one with a same-culture manager and another with a different-culture manger. The descriptions were usually short paragraphs. From these 152 texts, Jehn and Doucet identified the 30 intracultural and the 30 intercultural scenarios that they felt were the most clear and pithy. They recruited fifty more expatriate managers to assess the similarities (on a five-point scale) of 60–120 randomly selected pairs of scenarios. When combined across informants, the managers' judgments produced two aggregate, scenario-by-scenario similarity matrices—one for the intracultural conflicts and one for the intercultural conflicts. Jehn and Doucet analyzed each with MDS.

Jehn and Doucet (1997) found they needed four dimensions in the MDS to explain the intercultural data. They interpreted these dimensions as (1) open versus resistant to change, (2) situational causes versus individual traits, (3) high- versus low-resolution potential based on trust, and (4) high- versus low-resolution potential based on patience. In the scaling of the intracultural similarity data, they identified four different dimensions: (1) high versus low cooperation, (2) high versus low confrontation, (3) problem solving versus accepting, and (4) resolved versus ongoing.

The Jehn-Doucet technique for finding themes is quite novel. Unlike other investigators, they chose not to break up their textual data into smaller expressions or quotes. Furthermore, they asked fifty expert informants, rather than one or two members of the research team, to sort the data. They did not have sorters identify themes but simply asked them to evaluate how similar pairs of responses were to each other. They then used the results of MDS to interpret the larger, overarching themes.

Word Lists and Key Words in Context (KWIC)

Word lists and the KWIC technique draw on a simple observation: If you want to understand what people are talking about, look closely at the words they use. To generate word lists, researchers first identify all the unique words in a text and then count the number of times each occurs. Computer programs perform this task effortlessly.

Ryan and Weisner (1996) told fathers and mothers of adolescents, "Describe your children. In your own words, just tell us about them." Ryan and Weisner transcribed the verbatim responses and produced a list of all the unique words (not counting 125 common English words, including mostly prepositions, articles, and conjunctions). Ryan and Weisner counted the number of times each unique word was used by mothers and by fathers. They found that mothers were more likely than fathers to use words such as “friends,” “creative,” “time,” and “honest”; fathers were more likely than were mothers to use words such as “school,” “good,” “lack,” “student,” “enjoys,” “independent,” and “extremely.” The words suggested that parents were concerned with themes related to their children’s independence and to their children’s moral, artistic, social, athletic, and academic characteristics. Ryan and Weisner used this information as clues for themes that they would use later in actually coding the texts.

Word-counting techniques produce what Tesch (1990:139) called data condensation or data distillation, which helps researchers concentrate on the core of what might otherwise be a welter of confusing data. But concentrated data such as word lists and counts take words out of their original context. A KWIC approach addresses this problem. In this technique, researchers identify key words or phrases and then systematically search the corpus of text to find all instances of each key word or phrase. Each time they find an instance, they make a copy of it and its immediate context. Themes get identified by physically sorting the examples into piles of similar meaning.

Word-based techniques are fast and are an efficient way to start looking for themes, particularly in the early stages of research. Word lists and KWIC techniques can, of course, be combined and are particularly helpful when used along with ethnographic sources of information.

Word Co-Occurrence

This approach, also known as collocation, comes from linguistics and semantic network analysis and is based on the idea that a word’s meaning is related to the concepts to which it is connected. As early as 1959, Charles Osgood (1959) created word co-occurrence matrices and applied factor analysis and dimensional plotting to describe the relation of major themes to one another. The development of computers has made the construction and analysis of co-occurrence matrices much easier and has stimulated the development of this field (Danowski 1982, 1993; Barnett and Danowski 1992).

Jang and Barnett (1994) examined whether a national culture—U.S. or Japanese—was discernible in the annual letters to stockholders of CEOs in U.S. and Japanese corporations. Jang and Barnett selected thirty-five *Fortune* 500 companies, including eighteen U.S. and seventeen Japanese firms, matched by their type of business. For example, Ford was matched with Honda, Xerox with Canon, and so on. All of these firms are traded on the New

York Stock Exchange, and each year, stockholders receive an annual message from the CEO or president of these companies. (Japanese firms that trade on the New York Exchange send the annual letters in English to their U.S. stockholders.)

Jang and Barnett (1994) read through the 1992 annual letters to shareholders and (ignoring a list of common words such as "the," "because," "if," and so on) isolated ninety-four words that occurred at least eight times across the corpus of thirty-five letters. This produced a 94 (word) × 35 (company) matrix, where the cells contained a number from 0 to 25, 25 being the largest number of times any word ever occurred in one of the letters.

Next, Jang and Barnett (1994) created a 35 (company) × 35 (company) similarity matrix, based on the co-occurrence of words in their letters. In this case, they used the correlation coefficient to measure similarity among companies. They could have used a number of other measures, including first dichotomizing the original matrix based on whether the word was mentioned and then calculating the percentage of times that each company used the same words. It is unclear to what degree such choices affect outcomes, and this is clearly an area that needs further research.

Next, Jang and Barnett (1994) analyzed the company-by-company matrix with MDS and found that the companies divided into two clearly distinct styles of corporate reporting to stockholders, one American and one Japanese. Next, Jang and Barnett asked, "Which words were important in distinguishing the groups, and what were their relationships to the two groups?"

Discriminant analysis indicated that twenty-three words had a significant effect on differentiating between the groups, so Jang and Barnett (1994) used correspondence analysis to analyze the 35 (company) × 23 (word) matrix. Correspondence analysis clusters row and column items simultaneously. In this case, then, the analysis showed clusters of words and clusters of companies. The analysis showed that thirteen words were close to the American group and were tightly clustered together: "board," "chief," "leadership," "president," "officer," "major," "position," "financial," "improved," "good," "success," "competitive," and "customer." To Jang and Barnett, these words represented two themes: financial information and organizational structure.

Six words were close to the Japanese companies: "income," "effort," "economy," "new," "development," and "quality." To Jang and Barnett (1994), these words represented organizational operations and reflected Japanese concern for the development of new quality products in order to compete in the American business environment. The remaining four words ("company," "marketplace," "people," and "us") fell between the American and Japanese clusters. Jang and Barnett felt that these words represented a more neutral category and did not consider them a theme.

For other examples of how word co-occurrences can be used to identify themes, see Kirchler's (1992) examination of business obituaries, Danowski's (1982) analysis of Internet-based conferences, Nolan and Ryan's (2000) analysis of students' descriptions of horror films, and Schnegg and Bernard's (1996) analysis of German students' reasons for studying anthropology. What is so appealing about word-by-word co-occurrence matrices is that they are produced by computer programs and there is no coder bias introduced other than to determine which words are examined. (See Borgatti 1992 and Doerfel and Barnett 1996 for computer programs that produce word-by-word co-occurrence matrices.)

There is, of course, no guarantee that any analysis of a word co-occurrence matrix will be meaningful, and it is notoriously easy to read pattern (and thus meaning) into any set of items.

Metacoding

Metacoding examines the relationship among a priori themes to discover potentially new themes and overarching metathemes. The technique requires a fixed set of data units (paragraphs, whole texts, pictures, etc.) and a fixed set of a priori themes. For each data unit, the investigator asks which themes are present and, possibly, the direction and valence of each theme. The data are recorded in a unit-by-theme matrix. This matrix can then be analyzed statistically. Factor analysis, for example, indicates the degree to which themes coalesce along a limited number of dimensions. Correspondence analysis, cluster analysis, or MDS show graphically how units and themes are distributed along dimensions and into groups or clusters.

This technique tends to produce a limited number of large metathemes. Jehn and Doucet (1996, 1997) used metacoding in their analysis of intracultural and intercultural conflicts. First, two coders read the 152 conflict scenarios (76 intracultural and 76 intercultural) and evaluated those scenarios (on a five-point scale) for twenty-seven different themes they had identified from the literature on conflict.[2] This produced two 76×27 scenario-by-theme profile matrices—one for the intracultural conflicts and one for the intercultural conflicts. The first three factors from the intercultural matrix reflect (1) interpersonal animosity and hostility, (2) aggravation, and (3) the volatile nature of the conflict. The first two factors from the intracultural matrix reflect (1) hatred and animosity with a volatile nature and (2) conflicts conducted calmly with little verbal intensity.

Themes like these are often not readily apparent, even after a careful and exhaustive scrutinizing of the text. Because metacoding involves analyzing fixed units of texts for a set of a priori themes, it works best when applied to short, descriptive texts of one or two paragraphs.

SELECTING AMONG TECHNIQUES

Given the variety of methods available for coding texts, the obvious question is, When are the various techniques most appropriate? Clearly, there is no one right way to find themes, but some techniques are more effective under some conditions than others. Below, we evaluate the techniques on five dimensions: (1) kind of data types, (2) required expertise, (3) required labor, (4) number and types of themes to be generated, and (5) issues of reliability and validity.

Kind of Data

Qualitative researchers work with many kinds of data—textual and nontextual, verbatim and nonverbatim, long and short. Although all the techniques we have described are appropriate for discovering themes in some kinds of textual data, only half are useful for nontextual data. For pictures, sounds, and objects, investigators are limited to looking for repetitions, similarities and differences, missing data, and theory-related material and to using sorting or metacoding techniques.

In writing field notes, the researcher acts as a kind of theme filter, choosing (often subconsciously) what data are important to record and what data are not. In this sense, producing field notes is a process of identifying themes. This inherent filtering process poses a particular set of problems for analyzing field notes. When applying techniques that use informant-by-variable matrices, researchers need to remember that patterns discovered in such data may come from informants as well as from investigators' recording biases.

With the exception of metacoding, all twelve techniques can be applied to rich narrative data. As texts become shorter and less complex, looking for transitions, metaphors, and linguistic connectors becomes less efficient. Discovering themes by looking for what is missing is inappropriate for very short responses to open-ended questions because it is hard to say whether missing data represent a new theme or are the result of the data elicitation technique. Though not impossible, it is inefficient to look for theory-related material in short answers, so we do not recommend metacoding for this kind of data.

Expertise

Not all techniques are available to all researchers. One needs to be truly fluent in the language of the text to use techniques that rely on metaphors, linguistic connectors, and indigenous typologies or that require spotting subtle nuances such as missing data. Researchers who are not fluent in the language should rely on cutting and sorting and on the search for repetitions, transitions, similarities and differences, and etic categories (theory-related material). Word lists and co-occurrences, as well as metacoding, also require less language competence and so are easier to apply.

Investigators who plan to use word co-occurrence or metacoding need to know how to manipulate matrices and how to use methods for exploring and visualizing data—methods such as MDS, cluster analysis, factor analysis, and correspondence analysis. Those without these skills should use the scrutiny techniques, such as looking for repetitions, similarities and differences, indigenous typologies, metaphors, transitions, or linguistic connectors, and the process techniques, such as cutting and sorting, word lists, and KWIC, which do not require skills in handling matrix analysis.

Figure 1 offers suggestions on how to select among the various theme-identification techniques. Clearly, looking for repetitions and similarities and differences as well as cutting and sorting techniques are by far the most versatile techniques for discovering themes. Each can be applied to any type of qualitative data. Not surprisingly, it is these techniques that are most often described in texts about qualitative methods.

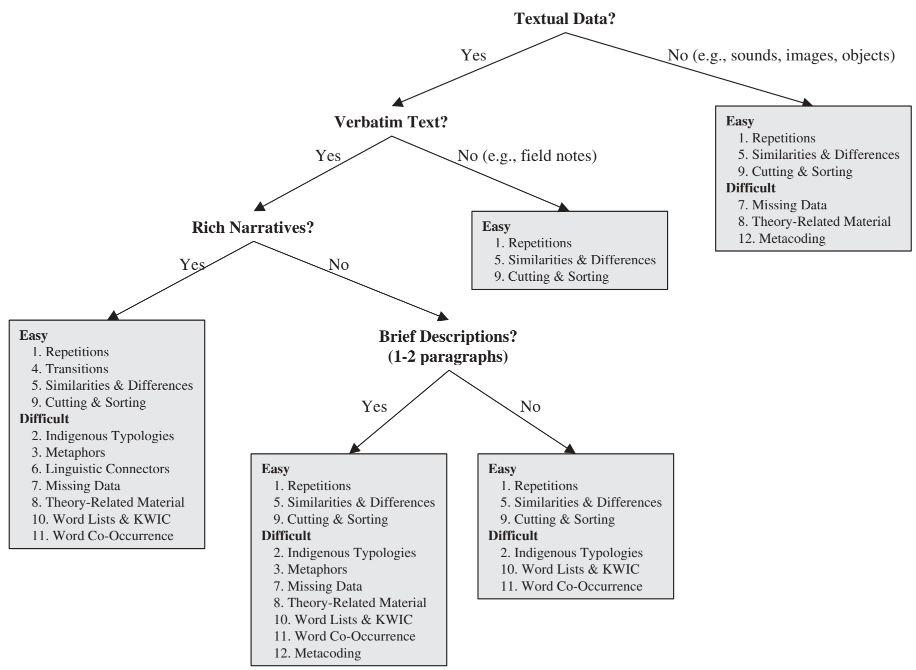
Labor

A generation ago, scrutiny-based techniques required less effort and resources than did process techniques. Today, computers have made counting words and co-occurrences of words much easier. Software also has made it easier to analyze larger corpora of texts.

Still, some of the scrutiny-based techniques (searching for repetitions, indigenous typologies, metaphors, transitions, and linguistic connectors) are best done by eyeballing, and this can be quite time consuming.

Of all the techniques, we find that using software to generate a common word list is an efficient way to start looking for themes. (Use packages like TACT, ANTHROPAC, or Code-A-Text to generate frequency counts of key words.[3]) A careful look at a word frequency list and perhaps some quick pile sorts are often enough to identify quite a few themes. Word co-occurrence and metacoding require more work and produce fewer themes, but they are excellent for discovering big themes hidden within the details and nuances of the texts.

FIGURE 1
Selecting among Theme-Identification Techniques



NOTE: KWIC = key words in context.

Number and Kinds of Themes

In theme discovery, more is better. It is not that all themes are equally important. Investigators must eventually decide which themes are most salient and how themes are related to each other. But unless themes are first discovered, none of this additional analysis can take place.

We know of no research comparing the number of themes that each technique generates, but our experience suggests that there are differences. Looking for repetitions, similarities and differences, and transitions and linguistic connectors that occur frequently in qualitative data will likely produce more themes than will looking for indigenous metaphors and indigenous categories that occur less frequently. Of all the scrutiny techniques, searching for theory-related material or for missing data will likely produce the least number of new themes. Of the process techniques, we find that cutting and sorting and word lists yield an intermediate number of themes, while word co-occurrence and metacoding produce only a few metathemes. If the primary goal is to discover as many themes as possible, then the best strategy is to apply several techniques.

Cutting and sorting is the most versatile technique. By sorting expressions into piles at different levels of abstraction, investigators can identify themes, subthemes, and metathemes. Searching for indigenous typologies and combining word lists and KWIC is particularly useful for identifying subthemes. In contrast, techniques that analyze aggregated data such as word co-occurrences and metacoding are particularly good at identifying more abstract metathemes.

Reliability and Validity

Theme identification does not produce a unique solution. As Dey (1993) noted, "there is no single set of categories [themes] waiting to be discovered. There are as many ways of 'seeing' the data as one can invent" (pp. 110–11). Jehn and Doucet (1996, 1997) used three different discovery techniques on the same set of data, and each produced a different set of themes. All three emically induced theme sets have some intuitive appeal, and all three yield analytic results that are useful. Jehn and Doucet might have used any of the other of the techniques we describe to discover even more themes.

How do investigators know if the themes they have identified are valid? There is no ultimate demonstration of validity, but we can maximize clarity and agreement and make validity more, rather than less, likely.[4] First, theme identification involves judgments on the part of the investigator. If these judgments are made explicit and clear, then readers can argue with the researcher's conclusions (Agar 1980:45). This is one of our motivations for outlining in detail the techniques investigators use.

Second, we see validity as hinging on the agreement across coders, methods, investigations, and researchers. Intercoder reliability refers to the degree to which coders agree with each other about how themes are to be applied to qualitative data. Reliability is important in that it indicates that coders are measuring the same thing. Strong intercoder agreement also suggests that the concept is not just a figment of the investigator's imagination and adds to the likelihood that a theme is also valid (Sandelowski 1995). Agreement across techniques gives us further confidence that we have identified appropriate themes in the same way that finding similar themes across multiple investigations does.

Bernard (1994) argued that ultimately, the validity of a concept depends on the utility of the device that measures it and the collective judgment of the scientific community that a construct and its measure are valid. "In the end," he said, "we are left to deal with the effects of our judgments, which is just as it should be. Valid measurement makes valid data, but validity itself depends on the collective opinion of researchers" (p. 43). Denzin (1970) assigned even greater significance to the role of the research community in establishing validity. "Rules for establishing a sound sample, a reliable test, or a valid scale," he said, "are only symbolic—they have no meaning other than that given by the community of scientists" (p. 106).

Patton (1990:468) referred to such an agreement among investigators as "triangulation through multiple analysts." It is what makes Lincoln and Guba's (1985) team approach to sorting and naming piles of expressions so appealing. Agreement need not be limited to members of the core research team. Recall that Jehn and Doucet (1997) asked local experts to sort word lists into thematic categories, and Barkin, Ryan, and Gelberg (1999) had both experts and novices sort quotes into piles. The more agreement among team members, the more confidence we have in themes being valid.

Some investigators also recommend that respondents be given the opportunity to examine and comment on themes and categories (e.g., Lincoln and Guba 1985:351; Patton 1990:468–69). This is appropriate when one of the goals of research is to identify and apply themes that are recognized or used by the people whom one studies, but this is not always possible. The discovery of new ideas derived from a more theoretical approach may involve the application of etic rather than emic themes—that is, understandings held by outsiders rather than those held by insiders. In such cases, researchers would not expect their findings necessarily to correspond to ideas and beliefs held by study participants.

FURTHER RESEARCH

We still have much to learn about finding themes. Further research is needed in five broad areas:

1. How reliable is each technique? To what degree do the same coders find similar themes when performing the task at different points in time? To what degree do different coders find the same themes on the same data sets?
2. How do identification techniques compare when applied to the same data sets? For example, do some techniques systematically produce significantly more themes or subthemes than others? And to what extent do the different techniques produce overlapping or similar themes? Jehn and Doucet (1996, 1997) have already provided a model for addressing such questions that can now be applied to other techniques as well.
3. How do identification techniques compare when applied to different data sets? How much of an effect does the size and complexity of the qualitative data corpus have on the number, kind, and organization of themes that coders identify?
4. To what extent is theme identification dependent on the number and expertise of coders? For instance, under what conditions can we expect novices to find the same number and kinds of themes as novices? And to what extent does increasing or decreasing the number of coders affect the size and composition of themes?
5. Finally, to what extent can we develop automated procedures for finding themes? Can we create word- and grammar-based algorithms to identify themes that mirror the processes used and the themes found by human coders?

Only by addressing such issues directly will we be able to explicitly justify our methodological choices.

NOTES

1. For thorough overviews of linking themes to specific expressions, see Carey, Morgan, and Oxtoby (1996). For suggestions about how to describe themes, see Miles and Huberman (1994) and Ryan and Bernard (2000). For building thematic hierarchies and code books, we recommend Dey (1993), Carey, Morgan, and Oxtoby (1996), and MacQueen et al. (1998). For identifying "important" themes and linking them to theoretical models, Strauss and Corbin (1990), Dey (1993), and Miles and Huberman (1994) are quite helpful.

2. To ensure interrater reliability, the two raters coded thirty-five scenarios in common. The final rating used in these thirty-five common scenarios was the agreement reached when the raters met together to discuss discrepancies. Rater 1 coded seventy scenarios, rater 2 coded forty scenarios, and they coded thirty-five scenarios in common (70 + 40 + 35 = 152).

3. TACT(CHASS), ANTHROPAC (Analytic Technologies), and Code-A-Text (Cartwright) are software packages that have the capacity to convert free-flowing texts into word-by-document matrices. TACT is a powerful DOS program created by the University of Toronto and

available free on the Web at http://www.chass.utoronto.ca/cch/tact.html. Code-A-Text is distributed in the United States by Scolari, Sage Publications. ANTHROPAC is created and distributed by Analytic Technologies, Inc., 11 Ohlin Lane, Harvard, MA 01451; phone: (978) 456-7372; fax: (978) 456-7373; e-mail: sales@analytictech.com; Web: www.analytictech.com.

4. For reviews of key issues related to reliability and validity, see Campbell (1957), Campbell and Stanley (1963), Cook and Campbell (1979); Guba (1981), Guba and Lincoln (1982); Lincoln and Guba (1985), Fielding and Fielding (1986), Kirk and Miller (1986), Hammersley (1992), and Denzin (1997).

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