

4

Structuring the Statements

To someone who has thought much, every new idea he hears or reads, immediately appears as a chain.

—Friedrich Nietzsche

At this point in the process, before structuring begins, the following have been created:

- A specific focus to accomplish the desired outcome of the study
- A group of participants who may be representative of specific relevant populations, or individuals who have the required knowledge to inform the study
- A list of around 100 comments, observations, or ideas that are directly related to the purpose of the study

Structuring builds on these elements and involves two separate but equally important conceptual tasks. First, participants provide their perceptions of the similarities between statements. Second, in most concept mapping projects, they also rate each statement on some dimension by answering the rating focus question for each idea. These two tasks constitute the structuring of the conceptual domain. In addition, in order to enable subgroup analyses of this structuring information, participants also contribute basic demographic or organizational information.

This chapter describes how to manage the structuring tasks in a concept mapping project. At the end of the chapter, we will also present several alternative methods for structuring the data. Figure 4.1 presents an overview flow-chart of the steps involved in the structuring process.

This process includes the following core steps:

- *Plan the Structuring Activity.* Arranging facilities, logistics, and materials for sorting and rating activities
- *Introduction and Agendas.* Providing a project update and overview of session activities to participating stakeholders
- *Sort Statements.* Facilitating the sorting of statements into individual groupings by participants, and preserving these results for later coding and analysis
- *Rate Statements.* Facilitating the rating of each statement by participants

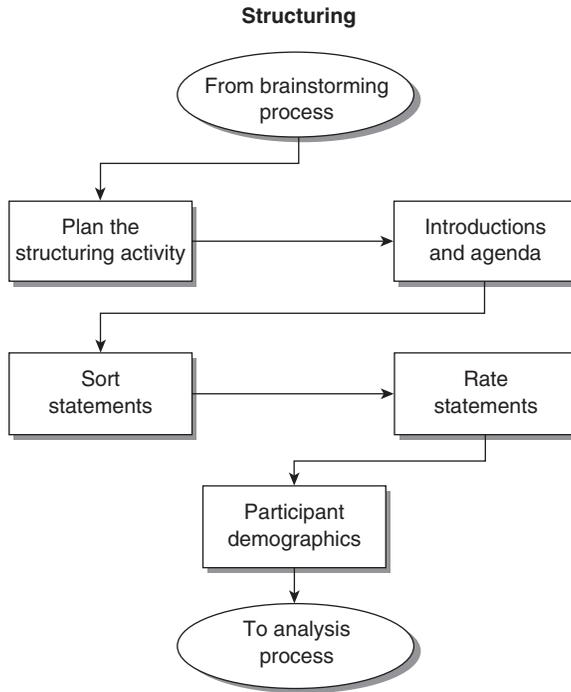


Figure 4.1 A Flowchart for Conducting a Structuring Session

- *Participant Demographics or Organizational Characteristics.* Tracking participant information such as organizational affiliation, type of stakeholder, or geographic region for later use in pattern matching analysis or comparing concept mapping results

The result of this process is the raw data needed to execute a concept mapping analysis and generate concept maps, pattern matching, and go-zone displays of results. As a result, careful attention at this phase of the process is perhaps the most important aspect of creating high-value results for involved stakeholders.

Depending on the needs of the project, the facilitator will help the initiator choose between two possible approaches for structuring the statements:

- Hold on-site meetings in which stakeholders sort and/or rate the statements. This approach is best suited to specific organizations or groups of stakeholders within a single geographic location, as well as event-based meetings such as a conference or committee meeting.

- Invite people to sort and rate statements, using a Web-based interface or other technology-supported method, in much the same manner as the initial brainstorming step. This approach works best with large or geographically distributed groups of stakeholders.

First, we will look at issues in managing an on-site structuring session, and then examine the specifics of managing a remote structuring effort.

PLAN THE STRUCTURING ACTIVITY

The basic ingredients for planning a successful structuring session are communication, method selection, materials development, site preparation, and the meeting plan. Table 4.1 provides a simple checklist to help prepare for the structuring session.

As always, the facilitator is responsible for assuring that the participants are aware of the logistics (location, time, etc.) and agenda of the session. Communication in advance of the session is usually drafted and coordinated with the client or initiator to make sure that the tone, content, and instructions are clear and appropriate for the audience.

At the initial negotiations for the concept mapping process, the facilitator and initiators should agree about which methods they will use to obtain the sorting and rating information. Usually, this is accomplished with card sorting and a rating questionnaire (as previously described), but several alternatives, which we discuss at the end of the chapter, are also available.

All of the relevant materials, including an agenda, statement decks, rating questionnaires, demographics forms, and overall instructions, should be ready well in advance of the meeting. To help make the sorting task more useful, the facilitator will randomize the statements before creating the statement sets, so that “like” ideas generated during the brainstorming session are no longer necessarily near each other in the packet of ideas. If the facilitator is responsible for producing the materials, he or she may provide them at the meeting. If the initiator or client group is to provide them, the facilitator will confirm their availability before the meeting and have backup masters, at least, of all needed materials.

The setting should be checked to make sure that it is appropriate and comfortable for the participants. If the participants are going to sort cards, it is especially important to ensure that there is enough table space for them to work comfortably because that activity requires square footage per person. Supplies like pencils, rubber bands, and so on should be on hand, and a photocopier should be nearby in the event of emergencies.

Table 4.1
A Checklist for Preparing for the On-Site Structuring Session

<i>Task</i>	<i>Person Assigned</i>	<i>Completion Date</i>
<p><i>Advance Notice</i></p> <ul style="list-style-type: none"> Send invitation or announcement to all participants Send follow-up reminder (by e-mail, phone, or mail) Send short (1 page) project update to participants <p><i>Materials</i></p> <ul style="list-style-type: none"> Session agenda packet with participant instructions Card decks of randomly ordered statements (following statement reduction where appropriate) Sort recording sheet Rating questionnaire Demographics questionnaire <p><i>Setup</i></p> <ul style="list-style-type: none"> Comfortable seating where all can see and participate Adequate lighting and sound Card sorting instructions posted and clearly visible Sufficient table space for card sorting Rating focus statement posted and clearly visible <p><i>Dry Run</i></p> <ul style="list-style-type: none"> Timed work plan for the session, with assigned speakers and content “Pilot-testing” of rating prompt 		

The facilitator will develop a meeting plan—an outline of the sequence of steps for the session and of what will be said at each step. The agenda will serve as the outline for the meeting plan, and the initiator (or meeting host if different from the initiator) and the facilitator will develop the sequence of activities and area of responsibility each might have for the meeting's success.

INTRODUCTION AND AGENDAS

The facilitator and initiator will have agreed in advance about the best way to open the session; on occasion, the initiator welcomes participants, reintroduces the facilitator, and sets the tone and expected outcomes for the session. He or she may decide instead simply to turn it over to the facilitator to lay the groundwork. As with virtually all elements of a concept mapping process, it all depends on the need, the audience, and the desired outcome for that activity. The facilitator is usually responsible for presenting the agenda and fielding any questions the group may have. Time management is very important in all sessions with participants; respect for the value of their time is balanced with the need to ensure understanding of what has gone on before and what will take place in the present, as well as time to ask questions. The session may include, if necessary, a brief orientation for the participants about the concept mapping process and the current task.

SORT STATEMENTS

At this stage of the process, the participants are ready to sort the statements into groupings. The facilitator provides instructions for this sorting process, oversees the execution of it, and ensures that the results of the sorting are recorded.

Sorting things into piles of similar items is a most common human activity; it helps to organize complexity in one's context. The grouping, or sorting, of disparate statements or ideas into piles helps identify a stakeholder's view of the interrelationships of the ideas. In this methodology, we refer to this as a "sorting" task, because we ask the participants to sort the cards into piles or groups, and because that terminology is consistent with the research literature (see Block [1961] on Q-sort, Rosenberg & Kim [1975], on unstructured card sorting, Weller & Romney [1988] on the pile sort, and Cataldo [1970] or

Coxon [1999] on sorting generally). Over the course of the last 18 years or so, the term has become widely accepted and understood as meaning the arrangement of items into sets of like ideas, rather than an ordering or ranking of statements for relative value.

Instructions for Statement Card Sorting and Results Recording

The facilitator might use the introduction to this activity to move into the present and draw the group's attention to the next logical task: the sorting and recording. Before the statement decks are handed out, the facilitator uses the written instructions he or she has provided as a tool to make sure that the participants understand the instructions, allotting time for questions and clarification. The card decks are then distributed and the participants are given time to do the sorting. The amount of time it takes to do the sorting varies considerably from person to person. With approximately 100 statements, participants may require anywhere from 20 to 50 minutes (or more, on occasion) to group the statements. A short break outside the meeting room should be allowed for those who finish ahead so that others won't be distracted.

For the sorting task, each of the generated statements and its unique statement identification number are printed on a separate card, and each participant receives the complete set of cards. The facilitator then instructs each person to sort, or group, the cards into piles "in a way that makes sense to you." Three major restrictions are applied here:

- All statements cannot be put into a single pile.
- All statements cannot be put into their own separate piles (although *some* statements may be grouped by themselves).
- Each statement can be placed in only one pile (i.e., a statement can't be placed in two piles at the same time).

The first two restrictions are included because if a person puts all items into one pile, or every one into its own, they are supplying no information about the *interrelationships* among the statements. The last restriction is like a forced-choice response format on a questionnaire—although a statement may sensibly be grouped in more than one pile, the participant is forced to decide where it is "best" located. Excepting these conditions, people may group the cards in any way that makes sense to them. Often the participants perceive that there may be several different ways to group the cards, all of which make sense. To address this, we have either instructed participants to select the

“most sensible” arrangement or, in some studies, had each participant sort the cards several times.

Record Statement Sorting Results

Each participant has a unique set of data as the result of his or her sort activity. Some may have many groups of ideas that represent unique concepts for the participant, and others may have sorted ideas into only four or five groups. After completing that step, each participant records the results of his or her work on a sort recording sheet, which is provided with the statement cards (see Figure 4.2) The form can be very simple, and participants are instructed to review the contents of each grouping, pile by pile, and come up with a “placeholder” name for that grouping. The participant writes the name of the first group he or she is considering, then lists the statements in that group *by identifying number*, with commas or slash separators between each unique identifying number. The participant then goes on to the next pile and conducts the same process, until all groupings are represented by the title and a line of numbers that represent the related statements. This technique has the advantage of requiring less work on the part of the facilitators in data entry of results, although legibility and completeness are occasional problems.

If for some reason it is impossible to have the participants record their sorting results, the facilitator may collect the raw data, i.e., the statement cards kept separated into the groupings that the participant made. Perhaps the simplest way to keep the piles separate is to place rubber bands around the card decks after cross-laying the card piles. This can be difficult, so care must be taken. In some projects, we have labeled the decks with the name of the participant or an ID number, so that we might later compute subgroup maps. If no subgroup analyses are anticipated, no identification is necessary.

RATE STATEMENTS

For the next step of the process, the participants normally rate the statements on the basis of the specified rating focus prompt. This step is not necessary for the generation of the basic point and cluster concept maps—however, these rating values are, of course, a required and integral part of rating-based displays such as pattern matches and go-zones. The facilitator will once again provide instructions for this process, oversee the execution of it, and ensure that its results are recorded.

SORT RECORDING SHEET
NOTE: Return this sheet in the envelope provided.
NAME: _____
<p>This sheet is to be used for Task 1, Step 2—Recording the Results. Specific directions for recording your sorts are included in the Instructions for Task 1—Sorting and Recording. Remember that you do not have to have as many piles as there are boxes on this Sheet. The space is provided to allow for variability among participants in the way they group the items. The first box (Example Stack) is filled out to serve as a guide for you.</p>
<p>Example Stack Title or Main Topic: Program Management</p> <p>Record here the identifying number of each item in this stack, separating the ID numbers with commas.</p> <p style="text-align: center; padding: 5px 0;">1, 4, 29, 43, 12</p>
<p>Stack Title or Main Topic: _____</p> <p>Record here the identifying number of each item in this stack, separating the ID numbers with commas.</p>
<p>Stack Title or Main Topic: _____</p> <p>Record here the identifying number of each item in this stack, separating the ID numbers with commas.</p>

Figure 4.2 Excerpt of a Sort Recording Sheet for Participant Statement Sorting

Rating Instructions and the Rating of Statements

Once the cards have been sorted, collected, and recorded, the rating instructions can be given. Each participant receives a rating sheet upon which he or she will rate each of the statements, according to the instruction provided by the rating focus described in Chapter 2. The rating focus statement and rating scale should be clearly visible at all times. If possible, these can be included in the written instructions at the top of the rating questionnaire. Figure 4.3 shows a sample rating sheet.

There is a sound theoretical reason for conducting the sorting of items *before* assigning the ratings. The sorting task encourages the participants to

RATING SHEET						
MENTAL HEALTH PLANNING PROJECT						
Focus Prompt						
<i>Generate statements which describe services which our agency does or might provide.</i>						
Rate each statement on a 1 to 5 scale where 1 = Relatively Unimportant;						
2 = Somewhat Important; 3 = Moderately Important; 4 = Very Important;						
5 = Extremely Important						
					#	Statement
1	2	3	4	5	(1)	Marriage counseling
1	2	3	4	5	(2)	Evaluation services—testing for courts, Dept. of Human Services, school systems
1	2	3	4	5	(3)	Hypnosis/relaxation
1	2	3	4	5	(4)	Sexual abuse services
1	2	3	4	5	(5)	Prevention/education workshops for community
1	2	3	4	5	(6)	Crisis treatment
1	2	3	4	5	(7)	Behavioral medicine—techniques to treat pain, eating disorders, phobias
1	2	3	4	5	(8)	Employee assistance programs
1	2	3	4	5	(9)	Outpatient services for the elderly
1	2	3	4	5	(10)	Outpatient services for the divorced
1	2	3	4	5	(11)	Outpatient services for offenders

Figure 4.3 Excerpt of a Rating Sheet for Participant Statement Rating

attend to the semantic similarities between statements, regardless of how each participant might feel about the importance or priority of each statement. The rating task explicitly addresses each participant's perception of an item's importance or other relevant value qualifier. These are generally more emotionally charged units of judgment that are usually subject to a wider range of views. If the rating task is done first, it is likely that it will influence how the participants sort the cards, because they will already have formed a mental set that addresses the rating focus. In this case, they would be likely to sort their top-priority items together, their low-priority items together, and so on, negating semantically meaningful similarities among the items.

The rating is usually a Likert-type response scale (e.g., ratings between 1 and 5 or between 1 and 7), which indicates some quantity to be associated with each statement. This can take the form of subjective rating values such as importance, feasibility, priority, effort, or some other expected outcome. They also can take the form of any other kind of value associated with each statement, such as its estimated cost. More than one rating can be conducted in a single concept mapping project, and that is often desirable. If the goal of the mapping is to provide a basis for operational planning, the participants might be asked to rate each statement (i.e., action or activity) for how much priority it should be given *and* for the level of resources it will require.

There is a tendency for participants to fall into a “response set” when performing ratings. For instance, if a priority rating is requested, many persons will resist assigning low priorities for a statement. After all, if a statement was brainstormed, it must have *some* priority. Although this may be true in an absolute sense, it is usually better to encourage the participants to make a *relative* judgment instead. They might be encouraged to do this with an instruction like the following:

Before doing your ratings, quickly scan the entire list of statements to try to get an idea of which ones are of highest and lowest priority within the set. Then, when you rate the statements, try to use the *full range* of rating values (e.g., 1 to 5).

This kind of instruction encourages participants to do a better job of determining the *relative* values of the statements.

PARTICIPANT DEMOGRAPHICS

In addition to collecting sorting and rating information, most concept mapping studies collect specified demographic or organizational information from participants, to allow for subsequent analysis of results based on these demographic criteria. For example, this demographic information can be used to analyze how clusters of ideas are rated by managers compared to staff members, or by service providers compared to consumers. Examples of demographic data include the following:

- Type of organization
- Tenure within current organization
- Level of responsibility (manager, staff, board member, etc.)
- Geographic location
- Degree of specialization

IMPORTANCE RATING FORM DEMOGRAPHICS

NOTE: Before you can complete the ratings, please answer the following questions.

NAME: _____

1. What participant category best describes your current position?

_____ Public health agency

_____ Private mental health

_____ Community/advocacy group

_____ Other

2. How long have you been in your current position?

_____ years _____ months

Figure 4.4 Sample Participant Demographics Form

Figure 4.4 shows a sample sheet for collecting demographic data.

Because these data are inherently tied in with rating results for analysis purposes, they are normally collected at the same time as the rating data, generally as a sheet attached to the rating questionnaire.¹

To avoid privacy concerns, participants should be reassured, both verbally and on the demographic information form itself, that their responses to these demographic questions will not be used to identify them personally. During the analysis phase, this information will be used to compute results, such as cluster rating maps and pattern matching, where ratings can be compared between specific demographic subgroups identified on the questionnaire.

REMOTE STRUCTURING

Just as the participants can contribute to brainstorming remotely, as discussed in the previous chapter, participants can also sort and rate statements remotely using a communications or technology tool. Many situations can make an on-site process unfeasible, such as large groups whose members are geographically dispersed, or situations in which budgets, travel issues, or conflicting

schedules create difficulties. Using technology (like an Internet program or e-mail) or independent participant communication (like fax or phone) can diminish this problem.

Sorting and rating activities are particularly well suited to remote implementation, because they are inherently solitary activities—participants sort and rate according to their own views and opinions of the aggregated set of ideas, so, strictly speaking, interaction with others is not necessary. But the same concerns about response rates exist here as they do for remote brainstorming. A remote structuring activity requires, in many cases, even more careful planning and participant follow-up than on-site activities. The time allotted for sorting and rating is often weeks rather than hours or days, to enable remote participants to complete the tasks when they can. The initiators and the facilitator should also have realistic expectations that not all participants will respond to the degree they would to an on-site meeting.

Strategies for remote structuring activities can include any of the following:

- *Web-Based Input.* Participants visit a Web page specifically designed to facilitate sorting and rating of the statement set and submit their results electronically together with participant demographic information. Figures 4.5 and 4.6 show examples of sample input screens for remote Web-based sorting and rating, taken from the Concept Global program.
- *Electronic Mail.* Participants can submit sorting, rating, and demographic results directly via electronic mail to a specified address using an electronic document format similar to that shown for the paper documents above.
- *Fax.* Participants can submit hardcopies of structuring forms via facsimile to a designated fax number.
- *Mail.* Participants can submit structuring forms on paper to a designated mailing address.

Because fax, e-mail, and mail participation basically applies the same process as on-site structuring—e.g., paper-based forms that are then forwarded to the facilitator—we concentrate here on Internet-based approaches to structuring.

The logistics for remote structuring sessions are very similar to the process described in Chapter 3 for remote brainstorming, including determining project responsibilities, defining the timeframe and communications infrastructure, inviting and tracking participants, following up with participants who have not responded, and gathering the results. At the conclusion of the process, results can once again be gathered and processed in much the same manner as a live structuring session. Only Web-based input enables the facilitator to import the data directly from the input collection point into a software program for analysis. The others require the same level of data input as the on-site data.

STRUCTURING THE STATEMENTS

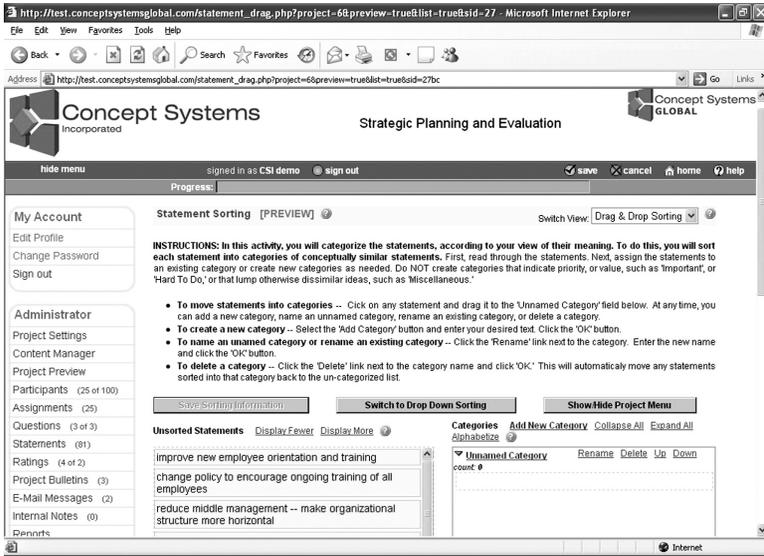


Figure 4.5 Web-Based Statement Sorting Form

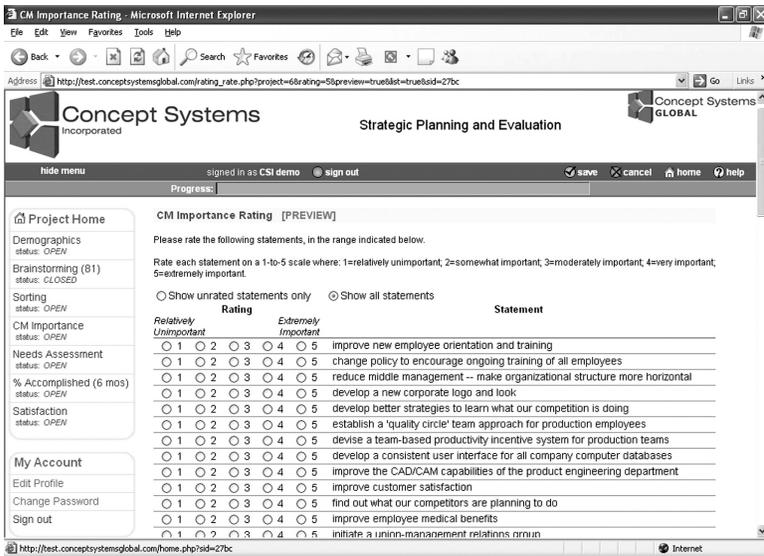


Figure 4.6 Web-Based Statement Rating Form

ALTERNATIVE METHODS FOR STRUCTURING

As mentioned earlier, the typical way to structure the statements is to use an unstructured card sorting procedure. Participants easily understand the process, and it takes little time to group a large number of statements. There are, of course, other ways to structure the conceptual domain (Coxon, 1999; Trochim & Linton, 1986; Weller & Romney, 1988).

Variations on Card Sorting

The unstructured sorting method described above is the normative and fundamental approach typically used in concept mapping, but there are other variations documented in the literature, several of which we describe briefly.

Constrained Sorting

One option is to instruct participants to sort the cards into a fixed number of piles. Constrained sorting is usually done to counteract the tendencies of some participants to “lump” (use relatively few piles) and some to “split” (use relatively many piles). But, in comparisons of the constrained and unconstrained sorting procedures, there does not appear to be evidence that any great difference results (Burton, 1975).

Open-Choice Sorting

A second variation is to allow participants to group any single statement simultaneously into two or more piles. In this case, the data would be coded as described earlier, with statements in multiple piles being treated as though they were in each pile (Steffle, Reich, & McClaran-Steffle, 1971).

Tree Sorting

Some variations of the tree sort are useful for concept mapping (Weller & Romney, 1988). In a top-down sort, participants begin by dividing the statement cards into two piles. They then divide these two piles into two more, yielding four piles. This continues until each pile contains only one or two statements. In a bottom-up sort, participants begin by combining the two statements that are most similar into a pile. At each successive stage, they combine either two statements, a statement and a current pile, or two piles, until all statements are grouped together (Fillenbaum & Rappaport, 1971). These methods are appropriate only if it is reasonable to assume that a hierarchical structure is appropriate for the concepts at hand. Furthermore, the top-down approach does not yield data that can be easily aggregated into a single group

similarity matrix. In this case, one would have to construct a similarity matrix for each participant and use an individual difference scaling (INDSCAL) model (Davison, 1983; Kruskal & Wish, 1978) for multidimensional scaling across individuals.

The Method of Triads

In the triadic method (Weller & Romney, 1988), all statements are grouped into all possible combinations of three. The participant is asked to indicate which of the three is most different from the others. The data are coded much the same way as in the sorting method described earlier. For each triad of statements (i.e., set of three), the pair not judged to be different is considered similar and a 1 is coded for that pair in the similarity matrix. Here, however, because each pair will turn up in more than one triad, the values in each (pair-wise) cell are summed to yield the similarity for that pair. The method of triads is not feasible when the number of statements is large, so its use in concept mapping is limited.

Ranking and Rating for Similarity

Both of these approaches could be used for concept mapping by requiring the participants to either rank or rate the statements with respect to their similarity to some overarching concept or concepts. The facilitator must clearly define the rating described here as completely different from other ratings, such as for priority or importance, as described earlier. Here, ratings are judged solely to estimate the degree of similarity between statements, not their value with respect to some judgment dimension. In general, if either of these methods is used, multiple rankings or ratings would be desired, each with respect to a different concept. The results would then be aggregated within and then across participants. For instance, if each statement is rated on a 1–5 scale with respect to how similar it is to some target concept, the results would be coded into an $N \times N$ similarity matrix by coding items that have the same rating as being most similar, those with rating values one apart being coded as next most similar, and so on. For a 1–5 rating scale, the similarity matrix would have values ranging from 0 to 4 for each rating for each participant. Ranked data would be coded in a similar way—items that are close in rank would be considered more similar, and the similarity value for any pair would be the absolute value of the difference between their ranks. In both of these approaches, the major problem is in deciding how many rankings or ratings should be done, and what concepts should be used as the focus. However, the potential value of these alternatives is in their capability for yielding data to produce both individual and group concept maps, so ranking and rating methods should be considered when these are desired.

Outlining

An outline is a structure that implies similarities between entries, and could potentially be used for the structuring step. Participants could be given a set of statements and asked to organize them into an outline form with headings and subheadings. To code the outline into a similarity matrix, the facilitator presents some rules. In general, the rules maintain that all items under one subheading are coded as more similar than items under a different subheading. In a preliminary investigation of this approach (Cooksy, 1989), several different sets of rules or algorithms were examined, and some were found to be better than others. The major difficulty involves considering whether the ordering of headings and subheadings implies anything about similarity. For instance, for all headings at the same level of indentation, should two headings that are closer to each other be judged as more similar than headings that are farther apart? The potentially exciting aspect of outlining is that we might be able to automate the coding of outlines into a similarity matrix, and consequently would be able to compute an individual's concept map directly from the outline. Given the plethora of computerized outlining programs available, this would make it possible to move automatically from the hierarchical outline to a relational map. This would yield individual concept maps that then would require aggregation to create a multiparticipant conceptual framework. More work needs to be done along these lines (Cooksy, 1989) before we can be confident in the sensibility of any algorithms for outlining.

None of the sorting approaches provides enough information to enable one to compute maps for a single participant. If this is desired, and sorting procedures are used, each participant needs to group the cards multiple times. Dumont (1989) found that maps could be computed for participants who grouped the cards at least five times. For fewer sorts, the multidimensional scaling algorithm was sometimes incalculable. If individual maps are desired and multiple groupings are not feasible, another approach such as tree sorting (described earlier) might be used.

SUMMARY

The structuring process involves the collection of similarity and rating data about the set of statements, along with participant demographic information, employing either an on-site meeting or a remote process that is generally conducted on-line. Typically, we use an unstructured card sorting of the statements to obtain information about their similarities and a rating of importance, priority, or other relevant dimensions for the rating information. There are also

many alternative methods for obtaining the similarity information (including constrained sorting, tree sorting, ranking, rating, and outlining), some of which provide data that enable both individual and group concept mapping.

NOTE

1. Based on experience, demographic information is generally used only in connection with rating data and not concept maps themselves because group differences in how similarity among items is perceived is often of less interest than differences in ratings. The implication of this in practice is that if we intend to combine all sorts in computing the map, it is not necessary, except for descriptive purposes, to collect demographics on participants who only sort. Similarly, in designs where different groups sort and rate, this may mean that only raters are given the demographics.

EXERCISES

In these exercises, you should use one of the sets of statements that you generated in the exercises in the previous chapter, or you should generate a new set before proceeding. The purpose of these exercises is to acquaint you with several methods for structuring the set of statements and with appropriate coding procedures.

1. Let's begin by doing the traditional unstructured sorting of the set of statements. Write each statement onto a separate card or slip of paper and number them in the order they were generated. Now, take the set of statements and group the statements into piles in a way that makes sense to you. Remember that you are sorting similar items into the same pile.
2. Now, have several of your friends pile the set of items. For each of them, record their piling results. Discuss the following:
 - a. How did you feel when you piled the statements? Did you have trouble at times deciding which pile a statement should go in? How did you resolve the difficulty and make a decision?
 - b. How similar were the groupings that different people did? Which pairs of items were put together by the most people? Do these seem to be the most similar pairs in the set of statements?
 - c. Did different people experience similar difficulties in placing certain statements? Did they resolve these in the same ways? How are these decisions related to the conceptual meanings of these statements?
 - d. Were there any difficulties in managing the sorting task? Did participants readily understand the instructions? How long did the process take for different participants? How would you improve the process in the future?
3. Try one or more of the following variations on the basic sorting procedure to become familiar with how they feel:
 - a. The unstructured sorting procedure with a fixed number of piles. You might want to try two groupings—one into relatively few piles, and one into many piles.
 - b. The unstructured sorting procedure allowing any statement to be in more than one pile at a time.
 - c. The top-down sort, in which you first divide all of the statements into two piles. Now divide each of the piles into two more. Repeat this process until there are only two or three statements in each pile.

- d. The bottom-up sort, which is just the opposite. First, pick the two statements that are most similar and place them together in a pile. Next, decide on the next highest similarity—it could be between two entirely new statements or between a statement and the existing cluster. Continue this process—at each stage combining either two statements, a statement and an existing pile, or two piles—until you have all of the statements into two or three piles.
- e. For any of the variations above, what are their advantages and disadvantages over the traditional unstructured sorting method? Which of them take longer than others? Does the sorting task take longer? Can you think of any ways to streamline any of these methods to make them more efficient?

