Reproduced from: Qualitative Analysis For So[illegible]cientists
By Anselm L. Strauss
Cambridge University Press

3 Codes and coding

Coding is the most difficult operation for inexperienced researchers to understand and to master, as noted earlier. Even when understood theoretically, the actual procedures are still baffling for some people, despite watching an instructor or some other experienced researcher do the coding. What is needed, apparently, are examples of coding steps, and visualizations of actual codes. Finally, considerable practice at coding is requisite. The materials in this chapter are designed to help that learning process.[1]

But first recollect that coding: (1) both follows upon and leads to generative questions; (2) fractures the data, thus freeing the researcher from description and forcing interpretation to higher levels of abstraction; (3) is the pivotal operation for moving toward the discovery of a core category or categories; and so (4) moves toward ultimate integration of the entire analysis; as well as (5) yields the desired conceptual density

[1] There are several misconceptions of the grounded theory approach to qualitative analysis which hopefully will be partly, at least, laid to rest by a reading of this book, and especially this chapter. I say "misconceptions" rather than criticisms, for the former rest on inaccurate readings of previous writing on grounded theory. These misconceptions include that the approach: (1) is totally inductive and (2) does not verify findings. In Miles and Huberman (1984, p. 57) there is also a misunderstanding about grounded theory technology. The materials in my book, written before their publication appeared, run directly counter to some of their remarks, that: the grounded theory approach "has a lot going for it. Data get well molded to the codes that represent them, and we get more of a code-in-use flavor than the generic-code-for-many-uses generated by a prefabricated start list . . . . The tradeoff here is that earlier segments may have different codes than later ones. [They may, in part, of course.] Or to avoid this *everything* may have to be recoded once a more empirically sculpted scheme emerges. [No.] This means more overall coding time, and longer uncertainty about the coherence of the coding frame. [Probably, but deliberate, in part.] And there is another risk: The danger of finding *too* much coherence in the data during recoding of earlier segments – retrospective hindsight is at work. [Not at all. The technology attempts to maximize true coherence, not spurious coherence.]" Miles and Huberman also maintain (pp. 63–64) that coding is not much fun, contrasting it with other aspects of the research, like data collection or memo writing. This simply does not apply to the grounded theory style of coding – hard work, yes; boring, no. However, they offer some excellent rules of thumb for coders (pp. 64–9), some of which pertain even to our style of coding. I recommend also looking at their entire discussion of coding procedures.

(i.e., relationships among the codes and the development of each) (Glaser 1978, pp. 55–82).

To supplement that summary statement, readers should examine again the sections on codes and coding in Chapter 1, and this should be done *before* studying the materials given below. These consist of several illustrations. The first will illustrate getting off the ground with *open coding*, by presenting what a research seminar of beginning students did with a fragment of interview data. Next, there is an instance of open coding done with a section of a fieldnote, showing how the initial open coding is done step by step by an experienced analyst. This is followed by a discussion of *axial* coding illustrated by a set of coding notes done by the same analyst on the same fieldnote. Next, a coding session on other data from the same research project is reproduced, with the associated lines from the fieldnote included. To the coding items specific commentaries have been added, to underline *how* such coding proceeds and *what* the codes look like when written. Next there is a discussion of *selective* coding, using the materials of the first illustration. This is followed by a set of coding notes, and commentaries on them, drawn from another research project. The next section elaborates on coding procedures for linking structural and interactional aspects in one's theory. This is not really a separate species of coding, but analysts sometimes do not learn how to code specifically for those aspects of their phenomena. The chapter closes with a few useful rules of thumb for coding.

Besides these materials, there are throughout this book many instances of the coding features exemplified and discussed here. You will see there, and here also, many instances of generative questions leading to coding; of line-by-line or paragraph-by-paragraph eliciting of categories, and queries about them; of discovering in vivo categories as well as the provisional labeling of sociological categories; of relationships drawn between categories; and of relationships between a category and its conditions, consequences, and the strategies and interactions associated with it. (Later chapters address the issue of how to integrate those codes, including into sucessive integrative diagrams.) Particular instances of coding can place emphasis on various of those items.

Initial steps in open coding: a seminal session

Here is an instance taken from the first coding session of a research seminar. The students were told to scan the following lines, taken from an interview with a disabled young man.

Once I'm in the shower, I'm pretty much on my own. I've got a wire chair that I use in the shower and a grab bar over the shower and I stand up, hanging onto the bar. I sort of walk over to the shower and sit down in the chair. I have a chair just on the edge of the shower, like on the lip, so when I sit down and get straightened around in the seat, then my attendant will sort of lift up my legs and push me all the way back against the wall. Once I'm there, the knobs for the hot and cold water are right in front of me. When I'm going to take a shower, I usually have my attendant get the towels and stuff ready before I even get my clothes off, and warm up the water a little bit. But once it gets warm enough for me to stand it, then I have the shower turned off. That way when I get in, it's at a point where I can adjust it to where I want it, rather than going in and having it just be totally cold (Lifchez and Winslow 1979).

The students were next asked what they saw in these data. They came up with some quite good observations – which are the equivalent of *themes* seen in the materials. In fact, many researchers do this kind of theme analysis; for instance, finding themes reflected in interviews with unemployed workers. Theme analysis tends to remain at the level of very careful journalism. Not surprisingly, many researchers read the morning newspapers with this kind of sharp, theme-oriented eye, but because they are only reading newspapers, they do not bother to carry their analyses further.

However, to continue with the seminar example: The instructor's next tactic was to have the students read the first sentence of the interview again, but then concentrate on the first word in it. "What can 'once' mean?" A student answered: "The man felt independent once he was finally in the shower." Then where else would he feel independent once he was there? The answers included: in bed and in a wheelchair. "Where would he then *not* feel independent?" The students gave answers to that, too. Then: "What *else* could 'once' mean?" Someone pointed out that "once" was a condition for the next step in the man's activity. Another followed up, suggesting this meant the end of one phase and the beginning of a new one. The instructor agreed, then asked the class to consider a "far-out" comparison – such as a sprinter entering competition for the first time, who might recollect that, "Once I was set to go off with the gun, I forgot all about the months of grueling training." So the class explored the differences and similarities between the two cases concerning their respective pre-once phases. They talked about rates of movement through the phase, amount of pre-planning, and other dimensions. "Once" also suggested to someone that it might refer to the amount of effort put into getting to the "once." The instructor remarked that comparisons to other instances might suggest readiness to begin a new phase, as when coaches read cues in the people

whom they are coaching of "now ready to move on." He asked what this might suggest about preparations for and readiness to get into the shower by the disabled man.

Only then was the class allowed to move along to thinking minutely about, raising questions about, giving provisional answers to, and making comparisons around the next word in the interview. This was the phrase "I'm." An hour went by in this fashion, as the class covered only "Once, I'm . . . ," the first two words in the first sentence of this interview fragment.

So, in this seminar session the participants can be seen focusing their efforts toward quickly stepping up from the data, as they develop analytic abstractions that are nevertheless grounded on close inspection of the data. The analytic operations included word-by-word inspection, the generating of theoretical questions and possible answers to them (hypotheses), the use of stimulating internal and external comparisons, and the exploration of similarities and differences. Before the session was over, the participants had discovered an in vivo code (I'm pretty much *on my own*). And they had rendered explicit some of the conditions, interactions, tactics, and consequences that were implicit in the respondent's words.

If one does not code industriously in some such fashion as this, these paradigm elements will tend to be left implicit or at least unsystematically linked with the phenomena under study. Also, the variations in why consequences differ, strategies differ, interactions differ will be underplayed in the analysis. So, in reading the cases below, it is important to focus not merely on the naming of categories and their supporting data, but on how, in the coding process, these categories are related through an active search for the specific and variable conditions, consequences, etc. (In fact, a good exercise for beginning researchers is to ask, after a coding session, what they have done in their coding, in terms of these paradigm items. And another is to take an in vivo code – like, "I'm pretty much on my own," and ask about its different meanings in different contexts, so as to focus more sharply on what it might mean in the particular context in which it has actually been used.)

Open, axial, and selective coding

A fieldnote taken from a study of medical technology and medical work, discussions of which will appear from time to time in this book, will be used to illustrate the processes of open and axial coding. Afterward, another set of field observational data will be used to illustrate selective coding.

Open coding

The portion of the first fieldnote reproduced below records some observations done on a cardiac recovery unit, where patients are brought immediately after cardiac surgery. They are intensively monitored and cared for on a one-to-one, nurse-to-patient basis. The nurses are abetted by occasional visits of house physicians and, less frequently, by visits of surgeons. During the first postsurgical hours, patients are likely to be unconscious or barely sentient. Each is hooked up to numerous pieces of equipment, vital for survival or for monitoring their bodies. In one fieldnote, a young but highly skilled nurse is described as working on, around, and with a barely sentient patient. The observer was focused on details of her work with the equipment in relation to her patient care, and so reports exclusively on that.

These field observational data have been specially coded for this book in order to illustrate coding procedures as they occur during the first days of a research project. While this coding was actually done long after the project's close, so that the observer and analyst (Anselm Strauss) knew more about those materials than ordinarily a researcher might know, analytically speaking, nevertheless, the coding processes and techniques would be the same as if he had done it early in the research project. It is recommended that you first scan the entire fieldnote, then study the coding discussion and commentary that follow.

I watched Nurse T. working today for about an hour with a patient who was only four hours post-op. In general the work was mixed. She changed the blood transfusion bag. She milked it down, and took out an air bubble. Later she changed it again; later, got the bottle part filled through mechanical motion. She milked the urine tube once. She took a temperature. She put a drug injection into the tube leading to the patient's neck. She added potassium solution to the nonautomated IV. But, all the while, she had in focus (though not necessarily glancing directly at) the TV which registered EKG and blood pressure readings. Once, she punched the computer button to get the fifteen-minute readout on cardiac functioning. And once she milked the infection-purifier tube leading from the patient's belly. And periodically she marked down both readings and some of what she had done. Once the patient stirred, as she was touching his arm: She said quite nicely then that she was about to give him an injection that would relax him. He indicated that he heard. Another time, she noticed him stirring and switched off the light above his head, saying

to him, "That's better isn't it?" At one point, she assessed that blood pressure was not dropping rapidly enough, and told the resident, suggesting they should do something.

After the analyst had scanned this fieldnote, he focused on the first five lines, pertaining only to the blood transfusion equipment and what the nurse did in relation to it. His analysis took him several minutes. Then he wrote the following lines, elaborating his brief notes, underlining those words which especially but not exclusively struck his attention. The analysis begins with the first line: "She changed the blood transfusion bag." His explanatory comments in brackets briefly indicate what is happening analytically.

"She *changed* . . . ." This is a *task* [a category, drawn from common experience].

"*She* changed . . . ." She is doing the task by herself. This apparently does not require any immediate division of labor [a category drawn from technical literature]. However, there is a division of labor involved in supplying the blood, an issue I will put aside for later consideration [raising a general query about that category].

" . . . *blood transfusion bag*." "Blood transfusion" tells us that this piece of equipment, the bag and its holder, requires *supplies* [a category]. Again, a fascinating issue, about which I can ask questions in a moment.

Let's look now at the "*changed*," qua task. What are its properties, or what questions can I ask about its properties? It is visible to others [the dimension here being visible–invisible]. It seems like a simple task. So it probably does not take much skill. It's a task that follows another (replace one bag with another). It seems routine. It doesn't take long to do. Is it boring or just routine? It's not a strenuous task either. And it certainly doesn't seem challenging. How often must she do this in her day's work? That is, how often does it take for the blood to get transfused into the patient? Or, perhaps, how much time is allowed to elapse before new blood is actually transfused to the patient between each bag? Or does that depend on her assessment of the patient's condition? What would happen if they temporarily ran out of the bags of blood? [Implication of safety of the patient, which will be looked at later.] I would hypothesize that if there is no immediate danger, then replacing it would have low salience. But if there were potential danger for certain kinds of patients, then there would even be organizational mechanisms for preventing even a temporary lack of blood bags. Well, I could go on with this focus on the task, but enough!

Back to the division-of-labor issue now. Since the patient is virtually nonsentient, the nurse gets no help from him when changing the blood bag. It is a nonworking relationship – she is working on or for but not together with him. This means also that he cannot interfere with her work. He can't complain either, to her or anyone else, that he doesn't like what she's done or how she's done it [implicit comparisons]. I know that some patients object to getting blood transfers, especially nowadays, when they might be anxious about contamination of the blood [explicit comparison, with condition and consequence specified; also touching explicitly again on the supplies issue].

As for that issue: To begin with, there must be supplies for the equipment or it *is* no equipment, of no use whatever. Let's call it *equipment supplies* [category]. But those are very different supplies than for other equipment I have seen around the hospital. Thinking comparatively about those will tell quickly about the special properties of this particular equipment supply, as well as raise questions about those supplies in general. Well, there are machines that use plastic tubing, which when it gets old must be replaced. Blood is a natural supply, not artificial – but the sources of both are somewhere? Where? [I will think about sources later.] Plastic tubing and blood are also replaceable. Blood costs more. Automobiles need gas supplies, but you have to go to a station for it, while blood supplies are brought to the user. What about storage of blood? Where on the ward or in the hospital is it stored? How long is it safe to store? And so on.

Blood transfusion also yields supplies for the patient. It is replacing a loss of blood. But that leads me to see there's a *body–equipment connection* here. This raises various questions. Ease of making the connection? Skill it takes? And more of the dimensions, like, amount of time to do it, duration in the body? Need to monitor it [another categ ry]? Potential hazard to patient? Discomfort to patient in doing it, or keeping the connection to the body? This patient is immobile, but could he walk around with this equipment if need be, as with intravenous liquid drip bags that I have seen? Blood transfusion connections are internal, not like electrocardiograph (EKG) connections, which incidentally won't allow the patient to move an inch – besides, they tend to fall off anyhow. Could that have important implications for our research considerations?

Body invasion is involved in making the transfusion connection, unlike many other body–equipment connections. Incidentally, with ordinary intravenous connections (IVCs) for liquid feeding, I recollect they put in a kind of semipermanent "lock" in the arm so that the IV equipment can be hooked and unhooked through it at will. Is this done with blood transfusions? One hypothesis then might be that the longer the lock remains in, the more likely an infection around the insertion point. Who monitors that possibility? I'd predict that sometimes the monitor overlooks the beginnings of an infection, so if the patient discovers it then there is consequent anger and complaint.

If now I think about the sources of blood supply, then I draw on experiential knowledge, though perhaps I should look further into that issue. For instance, this is a pooled supply contributed to by many people, and stored probably in some sort of central storage place. They screen people as suppliers, which is similar to getting relatively pure oil or gas, I guess. Is this a commercial process or governmental (public health)? In general, I should get data on the source of blood supplies. Well, let's look at the next sentence in this fieldnote.

"She *milked it down*, and *took out an air bubble*." Milked and took out: The verbs reflect mini-tasks, done in immediate sequence [property]. They follow two others, taking down a depleted bag and replacing it with a full one. So I was watching a sequence of mini-tasks, with more to come. Aren't all the things that she's doing with the transfusion equipment a task cluster [category]? Milking down and taking out a bubble aren't done for aesthetics but surely because of potential danger – a bubble in a vein is bad business. So now we have the issue of clinical safety

pertains to something I'll call *clinical safety work.* I need to look into both safety work and other types of work. [Generative questions, since both categories turn out later to be central to the study, and the latter becomes a core category.] Theoretically sample, with safety work done with drugs and other equipment in the hospital. For instance, with some equipment there is no potential danger at all (EKGs), but with others there is. So, observe and interview about this, including some that are potentially very dangerous, which the air bubble in the blood can be. Or where its potential is of low probability if carefully monitored, or of high probability if done too frequently, like x-rays. By looking at such theoretical samples I can begin to open up the issue of clinical safety, including how danger is *prevented, assessed, monitored,* and *rectified* if there has been an error [categories and subtypes of safety work]. Questions can be asked about these, such as how is potential danger assessed, what are the grounds? How is safety actually monitored: by eye, ear, or by equipment, like blood pressure equipment and stethoscopes? What is the relation to monitoring of assessing? How are the mistakes made in monitoring rectified? Who does it? Is there a division of labor in all of this? In the air bubble instance, if she makes a mistake, would she notice? How? By what signs? How soon? Maybe I'd better ask if anyone ever made a mistake and did not stop a bubble, and if so, what happened then.

"*Later it changed again.* Later she got the bottle part *filled through a mechanical motion.*" All that comes to mind with these new sentences is that this task *is* repeated, within the hour. So she is engaged not only in a repeated task but a *series of tasks* [category], repeating the whole series at intervals – *a repeated series* [another category], that seems to occur, in fact, about every twenty minutes. So I won't work on these sentences further, but move on.

"*She milked the urine tube once.*" This is the next task in the series. Well, I will put off questions until later about repeated series of tasks.

"*She took a temperature.*" Now she is *body monitoring.* Not necessarily monitoring for safety, but for state or progression of the illness itself. Some equipment is for monitoring – such as blood pressure equipment, sonoscopes, x-rays. But body monitoring has to do with location on the illness trajectory [this will be the other core catetory], and the properties of monitoring surely include: repeated, varying degrees of skill called for, and clinical hazard.

In the above coding process, one can see categories and subcategories being noted and labeled, and a few connections among them suggested. A variety of questions are asked, some probably truly generative in terms of the future of the study. Also, comparisons are made and thought about that further the more direct itemization of category properties. Theoretical samples are implicitly or explicitly touched on. A few conditions and consequences are touched on also, but not especially pursued. A couple of explicit hypotheses are hazarded but many more are left implicit in terms of discussions of their implied conditions and consequences. Strategies are not noted, but interactions concerning what the nurse "does to" the patient are. Some necessary

data are also flagged. Both the observational data and the analyst's experiential data (personal, research, and technical) are used at various junctures. Note also the kinds of choices that the analyst can make: To dimensionalize. To make comparisons. To follow through with a topic – or to put off thinking about that until later. To write memos immediately, or later, on these initial codes and on lines of thought suggested by the coding session.

It cannot be emphasized too much that, at such an early stage of open coding, the analyst has many options which can be followed in the same coding session or in succeeding ones. The inexperienced analyst is likely to be somewhat anxious about what option is "the best." The *rule of thumb* here is: Don't worry, almost any option will yield useful results. Typically, for instance, in a research seminar the class will face the following options after an hour's open coding: (1) to follow through on one or more of several comparisons already touched on, (2) to return to the actual data again to do more microscopic coding, (3) to follow up on something suggested by an operational diagram that has sketched out relationships among the categories discussed so far, (4) to further relate some of those categories, (5) to code specifically any of the categories in terms of the coding paradigm.

One question that might be raised about this kind of fine-grained, microscopic coding is whether it requires collecting data through tape recordings and videotapes. The answer is, definitely not. As we have said before, one can code microscopically on researcher notes from interviews, field observations, and other documents including published material. One uses tape recorders and videotapes when the research aims require very great accuracy of wording and gesturing of and by the people observed. Whether the analysis is microscopic or not on this kind of data depends completely on what the researcher wishes to use this material for.

It is especially important to understand that these initial open-coding sessions have a "springboard" function. The analyst does not remain totally bound within the domain of *these* data, but quickly jumps off to wonder or speculate or hypothesize about data, and phenomena, at least a little removed from the immediate phenomenon. In the example, we see an experienced researcher focusing from the outset on task, division of labor, equipment, supplies – but already suggesting the larger issues of those matters, rather than restricting himself to this particular working situation. He does this by using his technical knowledge and theoretical sensitivity (e.g., division of labor), his experiential knowledge, and his research knowledge (supplies for equipment). He also jumps

off from the immediate situation by thinking of comparisons. Some are made within the same domain (medical work, medical equipment) but others are made much further out (see Chapter 1, Part 2 for comparisons). Both types of comparisons help to broaden the scope of analysis. Researchers who are inexperienced in how initial open coding can spring quickly off the data – while yet firmly rooted in it – tend to keep their analyses too limited in scope, intent as they are to crack the shell of this specific set of data so as to get at its analytic kernel.

They also sometimes have considerable anxiety about whether their coding is only reflecting their biases, rather than what is "in" the data. Their anxiety is understandable, but they need have no fear; for the codes are only provisional and later coding sessions either will or will not sustain their usefulness. What is needed is time and a bit of patience.

Axial coding

Among the most important choices to be made during even these early sessions is to code more intensively and concertedly around single categories. By doing this, the analyst begins to build up a dense texture of relationships around the "axis" of the category being focused upon. This is done, first, by laying out properties of the category, mainly by explicitly or implicitly dimensionalizing it (this task is visible to others, requires little skill, seems routine). Second, the analyst hypothesizes about and increasingly can specify varieties of conditions and consequences, interactions, strategies, and consequences (the coding paradigm) that are associated with the appearance of the phenomenon referenced by the category. Third, the latter becomes increasingly related to other categories. For instance, monitoring for clinical safety might be related to other subtypes of safety work: (1) rectification (of monitoring mistakes), and (2) assessment of the degree of potential hazard, under what probable conditions (setting the stage then for monitoring activities). This relating of categories and subcategories is done in terms of monitoring being a condition, strategy, interaction, and consequence (e.g., when a patient is assessed as being at great hazard, then intensive monitoring is called for). Axial coding around tasks and task clusters had actually led the researcher originally to collect the data recorded in the fieldnote just coded.

Among the categories briefly discussed above was the monitoring of clinical safety. If the researcher were to have done further initial open

monitoring through comparative analysis: for instance, the monitoring of increased skill done by a teacher of her students; or the experimental monitoring done by engineers for the limits of tensile strength of a new metal wire. Alternatively, the researcher could have made closer-in comparisons, thinking only of different kinds of clinical safety monitoring: for instance, monitoring the body reactions of a patient on a dialysis machine or undergoing various potentially hazardous medical procedures like an angiogram probe of the heart. Or the researcher could have made an even closer-in comparison of different subtypes of safety work: namely, assessing, and the rectifying of monitoring errors.

But if the researcher chooses to move directly into axial coding, he or she would focus on the specific kind of safety monitoring that seems associated with *this* set of data. Then either close-in or further-out comparisons could be used to further the immediate analysis. In such coding, the analyst must exert great discipline to stay concertedly on target, not allowing diversionary coding temptations to interfere with this specific and highly directed coding. Any other coding or ideas that come to mind should be noted briefly, but on a separate piece of paper for later consideration – not now!

To illustrate axial coding, an instance done around the category of monitoring will be presented next. The coding session and its products are reproduced as typed by the analyst for a team research project. To each coding item, a short explanation of what is transpiring in the analysis is appended in brackets. The relevant observations from the fieldnotes are also included, in quotation. There is a further commentary at the end of this section.

The coding items were done by the principal investigator of a project on medical technology's impact on hospitalized care. He was coding the first three fieldnotes written by a teammate, who had observed on a cardiac care unit, about eighteen months into the project, after several other kinds of units had been studied. The category of monitoring had by now been perceived by the researchers as repeatedly salient "in the data," hence important for its analysis.

Monitoring Items (off BS's cardiac care unit (CCU) fieldnotes, of Jan. 19, 23, 28)

Machine monitoring the procedural work Jan. 28, p.4: "She showed me the tiny plastic bulb attached to the catheter into the heart. The little bulb is there to move the tip of the catheter . . . . When they insert the catheter they take an x-ray so they can tell if it is properly situated" [naming a subcategory of monitoring, with supporting quoted data].

Monitoring the monitor, p.5: Charge nurse checking with her nurses, "No

Monitoring by visual norm, p.5: Notebook with EKG patterns, so "can compare with if in doubt." That is, doesn't have to understand meaning of wave patterns, just know when they look awry; *lower-order knowledgeability* criteria for monitoring by EKG personnel. "The screens above the patient, which are constantly threading out wave patterns, all have patterns that look completely different. How does she know what is normal for the area being monitored, so that she can tell if the pattern is deviating? Margaret showed me a little notebook she carries in her pocket into which she has drawn a series of typical wave patterns she can 'compare with if in doubt' " [monitoring means; data quote; related to another category: lower-order criteria].

Sentimental work monitoring, Jan. 28, p.6: Checking up on a very sick patient even during dinner; deeply involved with him. (See also Jan. 26, p.4.) " 'God! You get so you can't go to dinner without worrying about whether your patient is being properly looked after. You keep runing back to check up!' Back at Gary's bedside a technician was working on him trying to get a blood sample, but without much success. Margaret appeared suddenly and leaped to the bedside of this nonsentient patient. She said that she would try to get the blood later. I'm having dinner now. Apparently she just came back to check up on Gary, the way Judith and the respiratory therapist had said it happens when one is deeply involved in caring for a patient" [naming a subcategory of monitoring; data quote; reference to other data].

Constant (virtually continuous) monitoring (BS's term, Jan. 26, p.7): On the CCU; in the ICN recovery room, too. Even when attention is away, when they think it's going OK, they have at least *peripheral attention*, and so can snap back instantly when aural or visual signs bring them alertly to attention. "Nothing, according to them, is more boring than scanning, but the scanners cannot be left unwatched at any time. Somebody always has to sit there – watching, watching . . . . Constant observation is what it is all about" [monitoring dimension: continuous–discontinuous; related to another category – peripheral attention; all resting on observed data].

Monitoring patients' behavior, Jan. 26, p.10: BS is referring here to the behavior of a *patient's undoing the staff's work*, wittingly or unwittingly. This fieldnote is replete with interaction of nurses seeking the patients' understanding and *cooperation when sentient*. BS notes that patient's behavior (clearly) can be an attempt to do what ordinarily one does for oneself (moving a leg, rubbing an eyelid), but which now is deemed injurious to do – either mustn't do oneself, but staff will do, or must not be done at all, especially taking the mask off, etc. "Another woman was being scolded by a passing respiratory therapist. She had taken her mask off. 'You should have oxygen ALL the TIME!' he said severely. The patient put back the mask. So, note: These staff people are busy monitoring not only the machines, but the behavior of the patients. Patients can do work, but can also undo the work of the staff. Eliciting their understanding and cooperation seems to be an ongoing task" [condition for effective monitoring; strategies for countering countercondition; condition for that occurring; observational data].

Monitoring trajectory reversibility, progress, off-course potential are *three things* which CCU is monitoring on those machines. On course – off course – reversed. And *a fourth – immediate action reversibility* (go save!) [four dimensions of monitoring category summarized after reading this far in the fieldnotes].

Aural monitoring complexities, Jan. 19, p.5 esp.: Say there are six machines and six different patients within earshot (including a nurse's own patient and own machine). The nurse has to be tuned in to all of those – either *peripherally or focally*. Each machine has its own noise pattern, and each patient his or her own pattern: She studies the resulting pattern, that is, the combined patterns created by unique machine and unique patient. That is something like $6 \times 6 = 36$? "I comment that I am surprised that the unit is so quiet and calm. Nora reacts with surprise. Although it is not an especially busy day, she 'hears' it differently than I do. To her, it is very noisy. It turns out that she is constantly doing aural monitoring. She knows the sound of every respirator and is immediately alert to any change. If there are six different machines, and five different patients on each, she learns to hear the various patterns: The machine has its own pattern and each patient has his or her own pattern, and she audits the resulting pattern which is the combined pattern of unique machines and unique patients. It seems almost incredible – an exaggerated boast! But I'm inclined, at least for now, to believe her. No wonder she perceives the unit as 'very noisy' " [conditions for difficulty in monitoring along aural dimension; related to structural condition of machine noise pattern × patient pattern; again related to peripheral–focal category].

Alarm adding to complexity, Jan. 19, p.8: The *perpetual false alarms* have to be separated out from the *true alarms*. "I asked her what's the worst thing about this unit. 'It's the noise,' she says. The noises really bother her: the sigh of the respirators and the everlasting alarms! For example, this week they had a patient whose condition exceeded the alarm level. There wasn't anything they could do about it, either by altering his condition or adjusting the alarm level, so they were stuck with that everlasting beeping. They HAD to respond, even when sure it was nothing they could deal with, because there was the off chance that the patient could have coughed and dislodged his tubes and therefore really be in need of help" [distinction between categories: true and false alarms; the latter as condition, re difficulty of monitoring].

Monitoring the patient's comfort needs, Jan. 26, p.3: But also, *patients monitor their own comfort needs* but, being in this instance unable to act themselves to satisfy them, they must *inform the nurse* of their monitoring . . . . She may or may not act to satisfy them, depending on various conditions: detrimental to trajectory, press of immediate work, etc. . . . When deemed detrimental to trajectory, then we see negotiation, attempts at persuasion, etc.; eventually, staff sometimes coerce to prevent (scolding, "put that mask back on") or correct. See bottom of p.4 for scolding, pleading, etc. "Elevated back into former position, patient began fussing again. 'Bear with us, John!' she pleaded. 'I know you don't like the tube, but we're not taking it out until tomorrow. Do you want to write something?' John indicated he did, and she pulled a pad of paper and a pencil out. In response to his feeble scribbling, she told him again that he can't have water until the tube comes out, that he doesn't need to urinate, even if it feels as if he does because 'there's a tube in your bladder that draws the urine out.' This sort of strange dialogue went on and on. She remained amazingly patient with him . . . . 'Are you cold? Do you need to cough?' The poor guy was obviously terribly uncomfortable. Among the things he had to negotiate was getting an itchy eyelid rubbed. It took several tries for her to get that right –

a real game of charades. His arms, spread out at his sides and supposed to be held still in that position, were a mess: terrible contusions. He had a catheter in his heart, a tube in his throat, a tube in his bladder, several IVs [a category – comfort needs, and both patient and nurse monitoring in relation to that, and the relation to interaction – informing – to the first two; plus consequences of his action, and conditions for that; plus strategies under conditions deemed detrimental to trajectory – which is the CORE CATEGORY of the research project].

In the code notes given above as well as those in the next pages, note the techniques that facilitate quick scanning and sorting later in the research project. These include heading the code item with a label naming the category or categories, and subcategories; in the coding, note whether they are new or old ones. Related categories may also be underlined in the text: often they occur to the analyst while typing the note. Sometimes the relevant lines of the interview or other document are referenced by page, or the data may be included in the text either in précis form or as a direct quote. Sometimes analysts draw on data so well known to themselves or their teammates that they do not directly reference to specific data. Note, too, that in the above coding notes, the coding sometimes brings out new categories without relating them to previously discovered ones; but sometimes a connection is made or suggested. Sometimes, too, the researcher's attention is drawn, in the lines or phrases that are being studied, to what they suggest about strategies or consequences or conditions in relation to each other and to the categories and subcategories. (The very last code item above illustrates that point very well.)

In this research project on medical technology and medical work, its two core categories turned out to be: types of work and trajectory. In the coding session reproduced above, one can see how monitoring begins to become related analytically to various other kinds of medical work: safety, comfort, machine, sentimental. Those linkages are made more numerous and increasingly complex, especially through further axial coding that focuses on one or another category. The same is true if monitoring in relation to the other core category, trajectory. How? By relating monitoring to subcategories of trajectory, such as: types of trajectory (problematic, routine), trajectory projection (visualization of illness course and varieties of tasks to be done in controlling it), trajectory scheme (immediate task clusters to be done), trajectory decisions and decision points, and trajectory phases.

Selective coding

All of this occurs before (and sometimes, considerably before) the researcher has decided which category is (or categories are) central to the research project. When they are decided upon, however, then the researcher moves into selective coding, when all other subordinate categories and subcategories become *systematically* linked with the core. In other words, although some of these links had already been established, now the search for them, and their coding, are done concertedly.

So, now imagine that some months have passed since the initial analysis of the data bearing on the cardiac recovery nurse's work, and that additional data had been collected and axially coded, also that two probable core categories (illness trajectory and work types) had emerged. How would the researcher do the selective coding, relating the new codes to the core categories further than had already been done through axial coding? Here are a very few of his thoughts and operations.

"In this fieldnote there are the following types of work: (1) *Equipment work* – here, tasks done *with* the equipment, not on the equipment itself, like its maintenance. (2) *Clinical safety work*, of course, but not other kinds of safety work, as in terms of staff or environmental safety (How do these subtypes of safety work relate to each other?) (3) *Body work* with the patient; much of it with or in relation to equipment; the equipment work here is a condition for getting that portion of body work done. Other body work is done without equipment, so there are at least two subtypes, though I know that already. (4) But the monitoring is giving information. Call that *information work*. Equipment work is a condition for the subtypes of information work when information can't be read by eye or ear alone. But she is gathering lots of information by sense modalities. So, again, subtype information work, each depending on different sets of conditions. She has to do equipment work like punching the computer button to get readouts on cardiac function. Her *recording* of the readouts, and of other activities as well, is a subtype of information work. This, in turn, is related to her accountability to her superiors in a short chain of command, leading from head nurse to staff physicians to surgeon. (5) *Comfort work* – relaxing the patient with an injection, and switching off the light; this relates to sequencing the tasks of other kinds of work, for comfort tasks are slipped in somewhere. Possibly comfort tasks are less salient for her, given the grave importance of the other work here? (6) Each of those actions, but especially switching off the light, can also be construed as *composure*

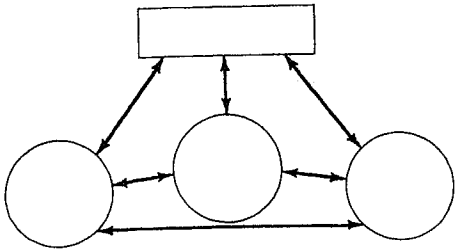

Figure 3. Selective coding and core category.

work, done to enhance this semisentient patient's sense of security. But composure work is a subtype of *sentimental work*, a complex type, as I already know. With the patient still in potential danger, and with all these other types of work taking priority, it is remarkable that she takes any time, however little, to do composure and comfort work! Is it because she is kindly or because of nursing philosophy? I would hypothesize that it is often because of the latter. However, she is remarkably unhurried in doing her tasks, which is a necessary condition for doing these lesser-priority tasks – assuming she defines them so."

Note that in this coding session the main effort was to fairly exhaustively itemize and relate these subcategories of the core category (work type). The session might have stopped there, to be resumed later with a consideration of comparisons with other data, some already coded, of course. For example, this body work could be compared in terms of the coding paradigm – for conditions, strategies, interactions, consequences – against the body work done in other situations: x-ray, telling the patients to move their body positions, or doing it for them; transporting the bodies to and from the radiology department – that is, transport work, a subtype of body work.

Alternatively, the next selective coding session might have focused more on relating previous axial codes around what now are seen as subtypes of the core category. For example, what variations in body work relate to what variations of equipment work? Comfort work? Composure work? And, in fact, in later phases of selective coding, Figure 3 best illustrates what goes on, for *clusters of analysis* are being related to the core category (or categories), as well as to each other. The circles in the diagram stand for clusters, and the rectangle, for the core category.

A relatively late, but not the latest, phase of selective coding will be illustrated below with yet another set of codes. Their presentation is designed not so much to show the process of selective coding (yet,

something of how it is done will be evident) as its products. Here again, as in the earlier example of monitoring, the coding will be linking categories and subcategories, but more systematically now around a core category of pain management. The analysis is of data drawn from an earlier project on pain management (Fagerhaugh and Strauss 1977). The coding notes were written by the same investigator, Anselm Strauss, as those above. They were done over several days, about six months after the project's inception, and after a number of important related categories had been isolated and data relevant to them collected (through theoretical sampling) and analyzed. These included pain relief, pain minimization, pain expression, expression control, pain assessment, pain ideologies, negligence accusations, incompetence accusations, and balancing pain relief or minimization against other considerations. Some of those categories appear in the codes below. Note, as in the above materials on monitoring, the usual underlinings, occasional quoted material, and the frequent explicit relating of strategies, conditions, consequences, interactions to the category under discussion, and also the occasional research directives. However, here the relating of multiple categories – including to the core category – is considerably more complex now than in the case analyses presented earlier.

Patient tactic of handling expression versus minimizing pain (AS), June 30, 1975: On the obstetrics ward, we don't hear patients talking about their own techniques of minimizing pain, as elsewhere. What we get is tactics for handling pain expression. There is no *pain career*, so they can't develop tactics for minimizing. Compare with postoperative or back pains, etc. [Condition for tactic; condition is related to category, minimizing, concerning absence of the phenomenon; condition named: no pain career, and condition for that noted, too.]

Tertiary pain and tactics for minimizing (S), Feb. 20, p.9: Burn patient at home, all kinds of pain caused by burn itself, or secondary pain from skin graft, but from daily activities: Because of pain in moving her shoulder and elbows, she couldn't groom her hair and had difficulty putting on certain clothes. Soreness around neck meant she could only wear clothes with low necklines. Extreme tenderness of burned area of arm meant she could tolerate only short-sleeved dresses, but she was concerned about the ugly scars then upsetting others (i.e., *reactions to pain-related symptom*). A friend gave her clothes without sleeves and fixed some of her clothes so she could dress with minimum pain. *Minimizing pain agent*? [New subcategory, tertiary pain; related to another phenomenon, minimizing pain, previously noted, coded, and partly analyzed; tactic related to both.]

Staff balancing pain relief and maximization versus main job (M's CCU), March 2, p.5: *Inflicted pain*: Removal of intubation tube on cardiac patient for post-op coughing adds to the pain which is ongoing and will be increased by coughing. Some nurses find if they sedate or medicate just prior to tube removal, they will have problems of coughing, so they hold off and let the patient experience

increased pain; also, *awareness if closed*, since the patient usually doesn't know this. [Major category, balancing, related to another, inflicted pain; and to nurses' tactic; also, the latter related to another category, closed awareness, as condition for doing it successfully; relations also with "main job" – that is, the core category of pain management.]

Patient's ideology and nurse helplessness – pain control: In one of C's fieldnotes, a nurse speaks of being or feeling so helpless because she can't help with labor pains – the patient won't let her because of her natural childbirth ideology. That's different than just being helpless in the face of pain you can't control, for this is actually controllable but the patient's ideology prevents the nurse from doing so, and so it is frustrating to her [consequence of phenomena, pain ideology; distinction drawn between this consequence and another type of consequence easily confused with it; also related to another category, control of pain].

Expression control by staff – main job (C's notes), April 2, p.2: A frank nurse says she moves in to lessen patients' expression; says other do, too, but we should check this out. She does this because "I think if she makes noise others will think I'm not caring for her – staff and patients, that is. Also, if I let her go on, someone will only come over and try to quiet her," meaning also that she will be viewed as incompetent. So, *expression control* is seen as part of her own main job. But another reason, sometimes, is that a patient gets so hysterical (she says) that they can't be calmed down; so they are stopped before that point – that is, before the *expression peak*. Also, expression in the last stage of childbirth will cause the laboring mother to push down before she should: *timing*, again, of the main *trajectory* [category, and conditions for related tactic concerning pain expression of patient and also pain control by the nurse].

Flooding pain and fateful options; balancing; pain relief: As in the case of Mrs. Abel, choosing between flooding pain and an operation that might lead to death; same with C's lady, who chooses amputation rather than endure her pain, although told it may not work. Fateful, irrevocable choices in the attempt to *relieve* or *minimize* pain, at least . . . . We have to ask about the processes that lead to the final decision. And, what are the consequences of making that decision? And Mrs. Abel? Other people's reactions are both part of the process sometimes and a consequence of choice. Parents may make the choice for a child, or kin may be involved in patients' choices (i.e., *option agents*) [category, balancing, related to pain control subcategories of relief and minimization; research questions about balancing; coining of term for another category, option agent].

Reverse control of expression (C), June 2, p.8: "There is a fourteen-year-old arthritic who is such a stoic that the staff has been trying to get her to express her pain. Finally, the psychiatrist talked to her and her family; found out her mother and grandmother are both in wheelchairs, one from polio and the other from rheumatoid arthritis. She had been taught to bear pain, and he has instructed staff not to interfere with family patterns." (C is quoting a doctor of physical medicine from that ward.) By *reverse control* I mean the staff is attempting to get the patient to express *more*, rather than the usual less expression. But then the psychiatrist discovers "why," and warns staff off their efforts [new subcategory, reverse control, amplifying previous incompletely dimensionalized

category of pain expression; condition for subphenomenon, as well as for its alteration].

Regimen pain – conditions for increase (C), June 4, p.6: "We don't always have the patient's pain in mind. Sometimes we are sick of the patient, and we don't always have the patience of Job." That is: Focus on the *main job* of pain management, plus *negative mutual biographies* with that particular patient [inflicted pain category, related to two conditions, main job and previous bad experiences with patient].

Relief and pain messengers: There is the phenomenon of aides and nurses acting as pain messengers (researchers, too!) to get the staff there to relieve patients' pains. This is different from *legitimating pain*, so as to get relief by someone else. Under some conditions, there are no messengers handy – such conditions being pretty obvious (e.g., patient is alone) – or others won't carry the message because they don't believe the complaint, or are too busy. Also, the phenomenon of the light flashing or the buzzer buzzing, which is the patient's way of *acting as his or her own messenger*. Note that the legitimation problem crosscuts the problem of getting a message to relieve, but is not identical. Also, a nurse, sans legitimate order for medication, in turn has to act as a secondary messenger only to the physician: She can't give the medication unless that has already been okayed [new category, pain messenger, in relation to another, pain relief; distinguished pain messenger from legitimating agents – two types of agents; conditions where no messenger agents; conditions for patient being own agent; condition for relieving agent rather than messenger agent, as related to category, legitimation].

Inflicted pain and negligence, negligence accusations; awareness context: Burn patient, who warns staff she is allergic to a given drug; then, after some days, it causes painful blistering, since they persist in using it. So they have, through negligence, actually inflicted pain (whatever the condition for that "negligence"). More important for us is that she knows the cause of this inflicted pain, and so can make her accusations stick with the staff. Sometimes, however, there can be *closed awareness*, so the staff knows its negligence, no doubt, but the patient does not – and so cannot accuse them. Or, under still other conditions, the patient can be suspicious, but they deny negligence and the patient cannot prove it (*suspicion awareness*) [category, negligence accusations, and condition for it; condition for awareness or not, or maybe; successful consequence of the action; condition for staff's answering tactic].

Pain assessment conditions – linked reputations (C), Feb. 7, p.4: See how patients are typecast from the moment of arrival just by being one of this particular doctor's patients; especially if they seem true to type. Then you see the staff using a *discounting assessment*: "Oh, they had some pain, but it was psychosomatic, they were using it. The kind who don't want to get well, who hold off having sexual relations with their husbands, or use it not to go somewhere they don't want to go." (The head nurse): "The nurses hated them. They would groan, 'not another psychiatric patient' or count how many there are on the ward." The nurses had a psychiatric scale, patients getting points depending on how many qualifications for the type they filled: aggressive, demanding, dyed hair, etc.; consequence: The head nurse claimed the reason for high staff turnover was the preponderance of this type of patient on the ortho ward (but check

whether she said this, really) [condition; new subcategory, discounting assessment, and conditions and consequences of latter].

Discounting assessment, conditions (C), Feb. 7, pp.5–6: Placebos – patient on physical therapy unit (not exercising when has an option to go home on weekends); orthopedic patients (loving to talk about their pain); ortho patient responding with; "That's great!" to ultrasonic treatment (which physical therapist thinks is a placebo); and the psychologist (rehab case, Jan. 29, p.5), whose testing showed that a patient was "monumentally dependent, exhibiting an exaggerated inability to do things"; so his assessment was that she saw this as "a chance to use her disability." All of this is, of course, related to the patient's failure to *legitimate*, and nonrecognition of the necessity to legitimate [several conditions re category].

Pain ideology; main job; illness and social trajectories (S), Feb. 9, p.2: Dialysis transplant staff have a pain-alleviation ideology that is very much interactionally oriented (reducing patients' anxieties, using comfort measures, etc.). The psychosocial sensitivity of staff is quite outstanding. Another way of putting this is to say that part of the staff's main job, as they conceive of it (compare with the burn unit!) is the alleviation of pain – it has high priority. Among other things, because anxiety increases probability of transplant rejects and other complications. Another way of putting it is that the *social trajectory* concerns of patients are also to some extent in the purview of the staff, and its job: because those concerns can affect the *illness trajectory* adversely . . . . Concerning failure on illness trajectory: Two patients who had vague complaints of discomfort were managed by back rubs, talking with them, etc. Later, they were discovered to have very advanced infections which fulminated into septicemia; so, wrong *relief measures* and *misreading the pain indicators* (p.8) [relating multiple concepts plus relating two subcategories].

Controlling pain expression and interactional disturbance; awareness closed: Colitis patients sometimes have to control public expression of their pain, or they upset people around them. They have to keep the awareness context closed (just as do heart patients who have angina, or people will rush over to help them or get upset). . . . In fact, colitis people (who may simultaneously have to clean themselves up) who route themselves to public restrooms have to be careful of expressions of pain, which will bring people rushing over, which will then interfere with the main task of handling wastes: They will only complicate your problems, get in the way. NOTE: keep an eye on *interactional disturbance*, for this is likely to be relevant category also [relating four categories; a research directive also].

These codes illustrate selective coding because they all relate to the core category of pain management. It can be seen in the analysis that the codes (categories and subcategories, too) densely relate to each other, many of those relationships being brought out above in conditional, consequential, interactional, and strategical terms: and all of that related to the core category of pain management – whether it be relief, minimization, or prevention. So one can sense in these codes a considerable degree of cumulative integration taking place, even though the project is only six months along. (Integration is further discussed and exemplified in two later chapters.)

These codes also exemplify the list of coding functions noted on the first page of this chapter; though the raising of generative questions has not been especially prominent, except in the coding of the cardiac recovery nurse's work. Remember, however, that after some coding the analyst will write theoretical memos, both to summarize some of those codes and to include research questions raised by the codes. It is worth adding that although codes may be handwritten on the margins of the document being analyzed (and probably most qualitative researchers do that), they tend to be far less detailed and less easily sorted than the typed alternative. Also, nowadays, with the increasing use of computer retrieval, the typed version is much more efficient on the usual masses of data collected by qualitative researchers (Conrad and Reinharz 1985).

Utilizing codes in writing for publication

How do codes get incorporated into the final drafts of manuscripts written for publication? To show this, here are a few paragraphs about monitoring work, taken from many more pages on monitoring, in *The Social Organization of Medical Work* (Strauss et al. 1985). Recollect that the core categories in this study were "trajectory" and "work types." So, in the publication, monitoring should be related not only to other categories but to these core categories. Of course, there are various ways to do this in discursive presentations, but here is one way:

> Monitoring is a term much heard in today's hospital, but given the various contexts in which personnel use it a thoughtful listener can be confused about exactly to what it refers. Attempting to avoid the analytic tangle inherent in their use of the term, we begin this section by noting the various types of monitoring involved in highly skilled work done with high-risk premature infants. . . .
>
> Now if we ask what kinds of monitoring are going on, the answer typically must take into account the following – aside from any monitoring of the mechanical functioning of the equipment itself . . . . she is monitoring both the machine's information and the child's temperature, recording all that information, and acting in accordance with her interpretations of information . . . . the nurse is monitoring the equipment, also the equipment in relation to physiological functioning, plus the information given by the meter . . . .
>
> A fourth type of monitoring is the paying of close and almost continuous attention to signs yielded by the infant's body and behavior: movement, skin color, temperature, respiratory rate, and the like – this reading being done by

eye, ear, and touch . . . . A fifth type of monitoring might be termed "second order" – exemplified by the physician or head nurse who listens to or reads the nurses' reports of *their* monitoring: That is, the latter monitoring is closer in to the machine and body functioning; while second-order monitoring is more distant, being laid on top of the other . . . . Just to keep the empirical record straight, not all monitoring may be of equal importance, for that depends on trajectory phase and the infant's immediate condition – hence decisions are being made about how frequently to monitor what, with what degree of alertness, and so on.

All of this monitoring, including by or with machines, is designed to keep the staff abreast of one or more of several things: Let us call them *dimensions*. First, there is the monitoring of trajectory stabilization or change, whether negatively or positively, and how much change has occurred. An important aspect of that is "present condition," meaning precise location on the trajectory. Second, if the negative changes are drastic then clinical safety is at stake, and that is being monitored, especially for high-risk trajectories or during dangerous phases. Third, there may be monitoring along at least two other dimensions, neither strictly medical although each may greatly affect the medical course: one pertains to the patient's comfort (for instance, does the machine cause undue discomfort); another pertains to the patient's "psychology" as affected by the machine and its operations. In fact, each of those dimensions may take precedence over strictly medical monitoring during some moments or even entire days of the patient's hospitalization.

Different trajectories call for different totalities (or arcs) of work, including monitoring work, the implicated tasks varying according to phase of the trajectory. Therefore, depending on trajectory and phase, different machinery will be utilized, whether for therapeutic or monitoring purposes. What makes the staff's work both variable and potentially further complicated are the many properties of the machine–body monitoring itself. A listing will immediately suggest why this is so. These properties include:

frequency of monitoring
duration of monitoring
intensity of monitoring
number of items (including body and body systems) being monitored
number of dimensions being monitored
clarity or ambiguity of signs being monitored
degree of discrimination required in sign interpretation
number and kinds of sense modalities involved in monitoring
sequential or simultaneous monitoring of the signs.

Typical monitoring in ICUs, cardiac units, and dialysis units is then contrasted with additional theoretical points as well as with vivid illustration, all in relation to the previous points and to different types of work and trajectories.

One other actor in the monitoring drama, the patient, should not be overlooked. Machine-wise patients, familiar with equipment from their repeated [illegible] monitoring chores and usually require no

urging to do them. They know the machines and they also know the vagaries of their own bodies better than anyone: And that combination can make them valuable partners in the monitoring work. However, that combination makes them impatient or critical of staff members' monitoring work when perceived as incompetent or negligent (we saw instances of this in the preceding chapter). By contrast, patients new to their diseases or to particular equipment may require persuasion to engage in some measure of monitoring by staff, who wish thereby to either share the work or increase the clinical safety. Nurses will quite literally size up patients in accordance with their probable trustworthiness to do, and learn to do, this monitoring. Those who are deemed too sick, unintelligent, or unmotivated to monitor themselves are likely to be placed in rooms closer to the nursing station. Teaching the patients how to monitor themselves is usually done on the wing, rather than through formal instruction. Of course some kinds of monitoring, like reading cardiac waves which dance across the screen, require too much medical sophistication for most patients to monitor even if they had the requisite energy and motivation.

To return to the personnel's work: An immense amount of transmission of information yielded by their monitoring is characteristic of any section in the hospital where monitoring goes on. The transmission takes the form of verbal or written reports, or both . . . . Transmission of information laterally and upward is, then, a major industry engaged in by nurses, technicians, residents, attending physicians; and, for the machines themselves, additionally: bioengineers, safety personnel, and various other calibrators, maintainers, and regulators of equipment . . . .

All this transmitting of monitoring information is, ideally, in the service of allowing the physicians to make informed interpretations bearing on patients' trajectories: location, movement, and relationship with past medical interventions. Future courses of medical action – options perceived and chosen – depend primarily on these interpretations, pyramided atop the information gathered by technicians, nurses, residents, and the personnel of specialized labs. At the bedside-operational level, transmission of monitoring information, as from nurse to head nurse or to a resident or attending physician, may result in decisions bearing immediately on a patient's safety, comfort, or anxiety. It is analytically useful to make a distinction between these two levels of information transmittal . . . .

For those who do the operational monitoring, there are consequences too: perhaps principally boredom, excitement, and stress . . . . By contrast, monitoring is challenging and rewarding under a variety of conditions: when the worker is first learning how to monitor, or is learning about a new machine; when the trajectory phase is at high risk and so the monitoring is vital; when the monitoring indicates that a worsening trajectory is reversing itself and the monitoring is indicating good news or has contributed to it; when the monitoring itself challenges craft or professional abilities (including when those are associated with ideologies that emphasize the importance of monitoring, as with comfort or psychological dimensions; or as with the physician's joy in his "sixth sense," composed in part of craft and part of ideologically based satisfaction); also when monitoring tasks are varied because the trajectories worked on are varied, hence the monitoring agent is somewhat in the situation of an orchestral

musician confronted by contemporary music – difficult but interesting – rather than playing the same old music.

But whether boring, exciting, or stressful, monitoring in the service of trajectory work is a very large and important aspect of all medical production work. Increasingly, visibly and dramatically, nowadays, it involves the monitoring of body-related machines.

Now that you have read or scanned the above material, it should be useful, later, to compare the original code items for monitoring with the final written version. The earlier codes do not usually get incorporated as such – sometimes the later ones do – but the ideas and the relationships specified may find their way into the published write-up.

Coding for structural and interactional relationships

This section illustrates briefly the initial steps in linking larger structural conditions with the interactions among actors, and between them and their institutional settings, who and which appear quite directly or are reflected in the interviews and fieldnotes. Often in contemporary qualitative research the emphasis on interactions (and on immediately contextual aspects in relation to interactions) is so strong that it overwhelms or prevents attention to the larger structural conditions. Yet all of that, as noted earlier, needs to enter the analysis. Minimizing or leaving out structural conditions, whether more immediately contextual or "further away" (or, as some social scientists say, the *macroscopic* or *structural*) short-circuits the explanation. Doing the reverse, overemphasizing structural conditions, does not do justice to the rich interactional data that put life and a sense of immediacy (or as some say, *reality*) into the analysis.

How to bring both into conjunction involves thinking *both* structurally and interactionally. One can examine and collect data about the structural conditions. One can examine and collect data about events, actors, interactions, and processes. Eventually, however, the grounded theory researcher must engage in coding that results in the detailed codes connecting *specific* conditions with *specific* interactions, strategies, and consequences. When examining the data bearing on the structural conditions, a researcher must ask: "But what difference do these structural things make for interaction and interactants?" When examining the more interactional type of data, the researcher must ask: "But what helps to account for these phenomena, including not only the more immediate structural conditions but the larger, macro ones?" It

is understandable that making such linkages takes much time and thought – using directed data collection through theoretical sampling – and that the associated skills also take time to develop.

The examples of codes reproduced above reflect the making of connections between the interactional realm and various close-in *contextual* conditions, such as the properties of a hospital, a hospital ward, or a medical machine. The examples do not make explicit, however, the comparable relationships with *larger structural* conditions. But to continue with the instance of coding for the impact of medical technology on medical work: Eventually the researchers on that project explicitly and in detailed ways linked the personnel's work with and interaction around medical machines with various structural conditions flowing from the properties of the health industry, the equipment industry, the populations using the hospitals, the health occupations, professional careers, the explosion of medical knowledge and technology, the government's role in health care, and the contemporary social movements that are affecting that care.

Examples of coding for larger structural conditions and interactional consequences (mediated almost always through more immediately contextual structural conditions) included coding for such matters as those following: Government regulations bearing on safety are interpreted by hospital safety departments to staff people working on the wards, but much of their interpretation must be proffered diplomatically and in an advisory capacity because the safety departments have little power over how the wards are run or how medical and nursing care are given, or indeed over how machines are utilized. For equipment that utilizes nuclear materials, the advisory role tends, however, to become also a more closely monitoring one. Or, again: Because medical equipment must ultimately be tested at clinical sites, there has grown up a relatively close relationship between the sales representatives of equipment companies and the users of new equipment or new models. The users frequently report back about "bugs" in the equipment and may even make suggestions for improving certain of its features. This linkage between users and manufacturers is increased by the fact that much equipment is invented by medical researchers working at the frontier of their particular practicing specialties and basing their innovations on the latest specialty knowledge. Many of the equipment companies are relatively small, producing for specialized types of medical care. Coding of interview and field observational data brings out these kinds of relationships between structure and interaction, because both tend to appear in the data (either they just do, or the researcher collects specific

data bearing on suspected connections – if possible, utilizing theoretical sampling to direct the data collection).

Analysts also code for any impact from the interactional level on the contextual and larger structural levels: For example, safety department representatives funnel advice back to governmental safety regulators, indeed sometimes they are nationally known experts themselves; and we have already remarked on hospital staffs, physicians, nurses, and the bioengineers, all being requested or taking it on themselves to affect details in the manufacture of specific medical machines.

Rather than give specific codes as examples, we have elected to discuss the general procedure of coding for what seems to many researchers rather disparate levels of analysis. Grounded theorists do not think of structure as something "up there" and as more or less fully determining of interactions. Nor do they assume that given structural conditions, whether economic or political or sociological (the latter would include class, gender, occupation, capitalism, etc.) must necessarily be relevant to the interactional/processual phenomena under study. Rather, the researcher must search for *relevant* structural conditions, which means they must be *linked as specifically* as possible with the interactional/processual. The structural conditions can be at any level – whether more immediately contextual (like the institution in which people are working or living) or more obviously macroscopic (the class system, type or state of the economy, and government legislation).

The *rule of thumb* for the researcher is to be alert for what in the collected data bears on the more microscopic as well as the more structural. For both levels, the researcher should also be developing categories, following the usual coding paradigm. Analysis should relate those categories (as always). And, as always, the emerging analysis should guide the further data collection, through theoretical sampling, as it bears on the hypothesized relationships among the major categories being developed throughout the course of the research.

Otherwise the researcher ends up with a choice of the following options: first, either a structural study or an interactional study; and second, a bit of one and a lot of the other. If the second choice is made, the connections between both levels will tend to be nonspecific. Metaphorically speaking, either the macro forms a backdrop for the *real* drama, or the backdrop becomes the drama and a few puppets go through rather unreal, undramatic sets of gestures. Sociological monographs are replete with examples of these choices and their

Proper coding can surmount the dilemma represented by these choices and still allow the analyst to put more weight – because of personal interest, substantive knowledge, research skills, or contingencies affecting the research project – either on the macro- *or* the microanalysis. In any event, proper coding within either level will make for more effective theory about phenomena at that level. Thus, one can study negotiation among nations without looking at the minute details of the negotiative interaction among them, rather than making a study of one or two specific negotiations, in standard case study style. The focus can, instead, be upon nations interacting through their respective political or economic institutions, their political maneuvering, their negotiative representatives, etc. On the other hand, if researchers choose or are forced to study interaction and/or process, they should still be systematically searching for and analyzing structural conditions that are more immediately contextual, even if they eschew detailed pursuit of the more macroscopic ones.

Rules of thumb

One last note: The examples of codings and the commentaries on them in this chapter can suggest, by a slight bit of imagination, several rules of thumb concerning coding procedures. These include:

1. Do not merely précis the phrases of a document, but discover genuine categories and name them, at least provisionally.
2. Relate those categories as specifically and variably as possible to their conditions, consequences, strategies, interactions: That is, follow the coding paradigm.
3. Relate categories to subcategories, all to each other: that is, make a systematically dense analysis.
4. Do all that on the basis of specific data, and frequently reference them by page, quote, or précis right into the code note itself.
5. Underline, for ease of scanning and sorting later.
6. Once the core category or categories are suspected or decided upon, then be certain to relate all categories and subcategories to that core, as well as to each other: That is, open coding moves through axial into selective coding. In this way, integration of the individual bits of analysis increasingly can take place.
7. Later, the totally or relatively unrelated minor categories, with their associated hypotheses, can be discarded as more or less irrelevant (albeit often interesting, as such) to the integrated analytic product; either that, or the researcher must attempt to specifically relate them to the major core of his or her analysis.