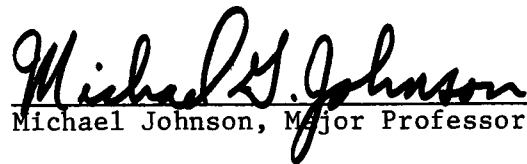


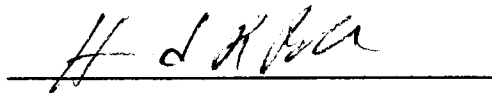
To the Graduate Council:

I am submitting herewith a dissertation written by Peter Joseph Lazzara entitled "Foundations for a Method for Knowledge Acquisition." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.


Michael Johnson, Major Professor

We have read this dissertation
and recommend its acceptance:







Accepted for the Council:


Vice Provost
and Dean of The Graduate School

FOUNDATIONS FOR A METHOD FOR KNOWLEDGE ANALYSIS

A Dissertation

Presented for the

Doctor of Philosophy Degree

The University of Tennessee, Knoxville

Peter Joseph Lazzara

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ABSTRACT

This thesis develops and justifies a method for acquiring expert knowledge and representing this knowledge as sets of practical arguments. The methodology involves an iterative analysis, wherein prior interview analysis cycles provide data for and guide subsequent interview analysis cycles. Argument structures derived from self report protocols are analyzed and hidden premises of those arguments are derived from those argument analyses. Subsequent analyses are structured by treating the hidden premises of the practical arguments as hypotheses to be confirmed. Over the course of repeated cycles the knowledge base and rule structure expands thereby increasing the constraint on the interpretation of data from subsequent interview analysis cycles.

Data was collected in two interviews with a clinical psychologist. The two interviews were subjected to a complete analysis. The second interview was structured by hypotheses formulated on the basis of data derived from the first interview. A selection of argument structures, complete with hidden premises, were then represented in the formalism of the predicate calculus.

Upon analysis of the two interview transcripts and the rule structures generated by the application of the methodology to them it has been shown that the method successfully locates hidden premises in such a way that these premises can be used to generate, in a subsequent interview, a more detailed and constrained representation of the rule structures of an expert.

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CHAPTER 1

INTRODUCTION

A current concern in Artificial Intelligence is the problem of representing common sense reasoning. How one accesses this knowledge is a major concern of this paper. This concern arises out of a movement in the field directed toward an attempt to model problem solving by experts in natural settings. It has become increasingly apparent that such problems are not typically solved with a small number of powerful heuristics but are, rather, knowledge driven. This means that a large knowledge base is necessary to implement models of problem solving that address "real world" problems. A methodological problem has arisen which concerns the "extraction" of this background knowledge from the problem solver, a difficult task in the light of the largely tacit nature of this knowledge. The present analysis describes the development of a method that is designed for the extraction of this knowledge. The method comprises an interview-analysis technique based on ideas developed by Colazzai (1978) and Harre and Secord (1972).

This method will be shown to generate a set of implicit reasoning structures that are derived from an analysis of a problem solving interview. These inferred structures, to be referred to as practical arguments, will then be treated as sets of hypotheses that will form the basis of a second round of interviewing. This second round of interviewing will have the purpose of confirming or disconfirming the reasoning structures that were generated in the initial interview phase. It

will be shown that the structures that are generated through an analysis of the phase one interview, when commented upon by the interviewee in the second round interview, will generate increasingly detailed reflections by the interviewee. It will be shown that these subsequent reflections by the interviewee add detailed support to the person's prior reasoning. It is assumed here that if a person reasons the way one does in giving an account of one's actions, the implicit or unspoken assumptions that support that reasoning can be inferred by an analysis of the internal logic of that person's account. These implicit structures can be used to generate a model of the person's reasoning that has the potential to be put in an executable form on a computer; that is, it can be coded as a computer program.

The method was devised in an attempt to meet a need for a principled way to generate knowledge structures of expert reasoners. The method will be shown to be mechanizable in the sense that the method contains unambiguous rules for deriving the structure of the reasoning of a problem solver. The method is based on the assumption that the hidden premises in accounts can represent the tacit knowledge of a practitioner. It will also be shown that the method is principled in the sense that it provides a standard or set of criteria for generating a model of the person's reasoning which conforms to the way that the problem solver views the problem rather than in terms of the analyst's beliefs about how the problem ought to be structured.

Representing Knowledge

Applied Artificial Intelligence research represents an attempt to capture and automate the invariants of human problem solving methods. One domain of this research is that of the "expert system," or "production rule system." An expert system is typically employed in an attempt to capture for computational purposes the procedural and factual knowledge of some area of expertise. The present analysis addresses some of the problems presented by the subtasks of extracting, describing, and representing such procedural and factual knowledge.

To represent the behavior of the expert sufficient knowledge of the facts of the domain must be obtained to enable an analyst to interpret those behaviors that are relevant to the construction of the system. This is so because any action that the expert takes will be formulated by the expert in terms of the meaning that the expert attributes to the situation; therefore, without access to these meanings, an interpretation can only be imposed on the meaning of a given behavior. Yet, if we do that we are merely offering our ideas about what the expert is doing rather than describing what the expert intends to be doing. This is the essence of the problem (of which the above are subproblems) posed here: how can the actions of an expert be understood such that a representation of those behaviors can serve as a basis for deriving rule structures of the form used by the expert, and by systems modeled on this expertise? Before this problem can be addressed, a descriptive language must be selected that is sufficiently rich to permit an analyst to represent those actions which are of potential interest in the expert's

observable behavior. A descriptive language that would facilitate this would allow descriptions to be generated from which rule structures can be derived.

The knowledge encoded in expert systems is typically represented as sets of rules of the form,

if (some set of conditions is satisfied)
 then (do some actions).

Where sets of rules of this type are complete programs they are called "production systems." Such a system can be viewed as dynamic rather than static, since knowledge is not represented simply as a set of facts that can be looked up but, more importantly, as a capacity to act.

An ideal expert system does not react rigidly to a problem situation but should be able to make reasoned judgments about possible courses of action in varying contexts within the system's domain. Some expert systems (actually very few) have the capacity to "learn" in the sense that they can keep track of the solution paths that are explored and can add, delete, and/or modify rules to optimize successful paths and eliminate unsuccessful ones. The capacity to keep track of solution paths permits the expert system to report the reasoning it engaged in to solve a problem.

The construction of an expert system typically involves the collaboration of a "knowledge engineer" and an expert in the target domain. The expert is usually asked to "think out loud" about a problem, or is interviewed and observed solving problems, or is subjected to a combination of these general methods. The object of the collaboration is to

derive both a data base of the information the expert uses for problem solving and a representation of the rules that respond to and operate upon this information.

Historical Context

The following remarks should serve to put the research described in this paper in an historical context. Much of the early work in Artificial Intelligence was concerned with finding a small body of simple but powerful reasoning techniques that would be general enough to be applied in almost any problem domain. Perhaps the most famous example is the General Problem Solver (GPS) developed by Newell, Shaw, and Simon (1960). GPS, and systems which followed, were reasonably successful in their intended domains. When they were applied outside of these (generally limited) domains to broader, less well-defined problems they proved to be relatively unsuccessful. This was particularly disturbing in the view of the expressed goal that AI should lead to a broad conceptual psychological model of "intelligence." The problems that such approaches faced can be discussed in terms of two general kinds of difficulties: (1) the problem of context; and (2) the problem of the problem. The problem of context is evident, for example, in the linguistic domain and is made apparent by the fact that a great deal of world knowledge is needed to disambiguate natural language sentences. As Haugland (1981) puts it,

Bar-Hillel pointed out that disambiguating "The box was in the pen" requires common-sense knowledge about boxes and pens. He had in mind knowledge of typical sizes, which would ordinarily decide between the alternatives "playpen" and

"fountain pen." In a similar vein, it takes common sense to determine the antecedent of the pronoun in: "I left my raincoat in the bathtub, because it was still wet. More subtly, common sense informs our appreciation of the final verb of: "Though her blouse draped stylishly, her pants seemed painted on."

Straightforward questioning immediately exposes any misunderstanding: Was the bathtub wet? Was there paint on her pants? And the issue isn't just academic; a system designed to translate natural languages must be able to answer such questions. For instance, the correct and incorrect readings of our three examples have different translations in both French and German--so the system has to choose. What's so daunting about this, from the designer's point of view, is that one never knows which little fact is going to be relevant next--which common-sense tidbit will make the next disambiguation "obvious." In effect, the whole of common sense is potentially relevant at any point. (p. 621)

Which facts will be relevant or not relevant, either in the context of a machine translation from one language to another, or in the context of a problem solver's determination of the facts that are relevant to the solution of a problem cannot be determined "ahead of time" without delimiting the domain of inquiry; that is, without artificially restricting the domain to a microworld. Also, since any fact might be relevant at any time, how the facts are represented and stored becomes a major problem. Because GPS relies on a small set of powerful rules, it rapidly "breaks down" in the face of the complexity presented by open structured and context-dependent problems. As problem complexity increases, so does the need for an ever more comprehensive data base of information that is constituted by world knowledge. The primary problem then becomes the organization of knowledge in a data base and the retrieval of relevant knowledge from it.

When a problem solver faces an "ill defined" problem, that is, one which requires the active participation of the problem solver for its

specification, he must determine both what will count as a solution and which elements will constitute the problem space. The problem of problem construction is logically prior to the solution phase of problem solving, and is referred to by Schon (1983) as the "problem of the problem." Typically, for that class of approaches referred to as formalist, it is the programmer who first formulates the problem such that it will be amenable to GPS methods. In fact, research using this method does not address ways in which problem construction might be handled computationally, if it could be so handled at all. To explore this issue, the concept of a formal system will be developed in the following section.

Formal Systems

According to Haugland (1981) a formal system (1) is entirely self-contained, (2) is one in which every relevant feature is perfectly definite, and (3) outputs moves that are finitely checkable. The only entities that are relevant to the generation of an output are the tokens, positions, and moves of the system to the extent that they are relevant to the application of the rules of the system. A "perfectly definite" feature of a formal system (e.g., the set of rules of chess) is one for which there are fully specifiable methods for checking legality. Further, a check for legality can be done in a finite number of steps.

We say that a problem is well defined if the context is fixed so that, when the context is determinate, there is a sense in which there is no problem of context. For example, consider a game such as chess from the point of view of its being a formal system in the sense described above. A feature of the game that is relevant to its being a formal system is the position of a piece relative to other pieces on the board, while, say, the color of a piece is irrelevant to a move being legal or not. The context of the game, that is, the situation in which the tokens are embedded, is irrelevant to whether a move "makes sense," i.e., is legal. The context is "fixed" in this manner and the problem of what counts as a legal move is well defined. Within the bounds of a problem so defined, the intentions of the problem solver are typically taken to be irrelevant to an understanding of the moves he makes. On the other hand, the intention of an agent does make a difference to what action a given behavior will be taken as being an instance of in ordinary human interaction. This is a point elaborated by Anscombe (1958), namely that any given behavior can have an indefinite number of features and therefore could count as an instance of an indefinite number of different actions depending upon the description that the action "falls under." For example, if I open a window so that the room might be cooler it can be said that, under one description I (intentionally) "cooled off the room" when I opened the window. If there were another person in the room I could also be said to have engaged in an action describable as "freezing out the person in the room." Making the person in the room feel cold might not have been done intentionally, since

under the description "opening the window" that action was not intended to make the person cold. Making the person cold was an unintended side effect. In effect, there was one behavior but there is a potentially indefinite number of actions engaged in, any one of which might be attributed to me depending upon how the behavior is characterized, with such a characterization itself depending upon how my intentions are construed.

To elaborate this point a bit more, a move in a chess game, when understood in formal terms, is fixed because there is prior agreement about what counts as a move and how it is to be formulated. In a real world interpersonal context (and in the creative "fringes" of the hard sciences) the intentions attributed to the actor matter in the interpretation of a move. This logical fact about actions suggests the very difficult problem of interpreting an action in terms of the common sense knowledge which each of us has to one degree or another but which is largely tacit, that is, knowledge that is not normally reflected upon. For example: if one makes the judgment that I probably did not intend to freeze the other occupant in the room, one would probably do so on the basis of general knowledge which one possesses about the kinds of things I might or might not intend in situations like this as well as knowledge about, perhaps, some relevant rules of etiquette. One conclusion which follows from this is that if we are interested in understanding actions which are based on "common sense" we must have access to knowledge that is both tacit and intentional.

On the other hand, the knowledge involved in solving a well defined problem (such as the "Towers of Hanoi"), may also be partially tacit, but the interpretation of the moves made in the solution of the problem would necessarily be unambiguous because the problem is formally specifiable. The Tower of Hanoi was an early favorite of cognitive science researchers just because it was amenable to formal solutions in the sense described above (Newell, Shaw, & Simon, 1963). As in the game of chess, each move in the Tower of Hanoi "game" is finitely checkable--and perfectly definite. Which behaviors count as moves, and what those moves are, are not subject to interpretation except in terms of the formal specifications of the system of the rules of the puzzle. Treating the problem solving behavior of a subject in terms of an interaction with a formally specifiable situation is convenient for the purposes of a computational or formal approach to modeling general intelligence. Under these assumptions, the moves the problem solver makes can be treated as an "output" of "internal processes" which generated them and which are then accounted for in terms of computational models that are assumed to be constitutive of "mind." This is the essence of the formalist approach (Fodor, 1975). These assumptions will be explored further below.

Because it is well defined, the Towers of Hanoi is not a "real world" or "everyday" problem. By this is meant that it is not typical of those kinds of ill-defined problems such as are most often encountered in ordinary daily contexts. The problem of real world problems is that often what counts as a problem is ill defined and consequently,

what counts as a move is ill defined. As Wiggins (1978) puts it,

No theory, if it is to recapitulate or reconstruct practical reasoning even as well as mathematical logic recapitulates or reconstructs the actual experience of conducting or exploring deductive argument, can treat the concerns which an agent brings to any situation as forming a closed, complete, consistent [i.e., formal, P.L.] system. For it is of the essence of these concerns to make competing and inconsistent claims. This is a mark not of human irrationality but of human rationality in the face of the plurality of human goods. (p. 38)

While speaking of a decision theoretic account of games, he also points out that,

A man usually asks himself "what shall I do?" not with a view to maximizing anything, but only in response to some historically determinate circumstance. This will make particular and contingent demands on his moral or practical perception, but the relevant features of the situation may not all jump to the eye. To see what they are, to prompt the imagination to play upon the question and let it activate in reflection and thought experiment whatever concerns and passions it should activate, may require a high order of situational appreciation. (p. 38)

Situations are not normally marked ahead of time with references to the human concerns to which they might be relevant. It is not the case that we simply fail to see the proper elements with sufficient clarity. In such a case the elements which indicate to us what the problem is are defined. That is, the problem is not really one that is ill defined in the relevant sense. The only valid way to determine what counts as a problem for the expert and what counts as a move for the expert is one which is relative to the interpretation we get from the expert in the first place. So for example, if the expert says, "this is what the problem involves," then we must take "this" as a starting point. When, after reviewing a complex case, an expert lawyer delineates how the case

is to be approached, there is a certain sense in which the "problem" as he delineates it does not exist independently of how he now construes the "facts." This is not to say that what the expert calls the problem is subjective. Lawyer A says that some action counts as an assault and is therefore a problem, while B maintains that under a different interpretation of the "same facts" the action was not an assault and that there is no problem. In fact, a trial is just such a litigation about contexts. It is a battle over which interpretation of "objective" facts will carry the day. In certain instances, the very "existence" of certain facts will be in question; consequently the form of the problem may evolve together with its contextual interpretation.

To reiterate, a well-defined problem could be given to an expert and a great deal learned about his methods from observing his approach to developing a solution. One problem associated with the general goal of deriving expertise in this way is that of extracting rules in those cases for which the problem is well defined. A deeper problem involves accessing the expertise that underlies the expert's ability to define a problem space in the presence of the ambiguity of a real world event. This aspect becomes ever more relevant as Artificial Intelligence is applied to the world outside the laboratory.

In ordinary life, well defined problems do not in general appear ready made. The "problem of the problem" is that of understanding how to define a problem in terms of what is merely an obstruction or difficulty in "going on." The "problem of the problem" is the ongoing defining and redefining, by the expert, of those aspects of a situation

that are taken to be "parts" of the problem as the expert perceives it. It is easy to see how in many situations, for example in a courtroom, it would require an expert to see that some event represents a problem. In such an interpersonal context we find that the relevant context (i.e., background assumptions and personal knowledge) consists of elements that must be represented and understood before the "problem" can be understood.

Contextualist Approaches

The problems associated with modeling real world behavior have moved some researchers (Winograd, 1980) away from formal models of the type currently dominant in psychology and toward models which could reasonably be termed "contextualist." Mainstream cognitive theorists (Pylyshin, 1980, Fodor, 1975) have been concerned with what Dennett (1975) refers to as the "design level" of cognitive processes; a level at which cognitive processes are characterized in formal terms. As Fodor (1982) explains,

Insofar as we think of mental processes as computational (hence as formal operations defined on representations) it will be natural to take the mind to be, *inter alia*, a kind of computer. That is, we will think of the mind as carrying out whatever symbol manipulations are constitutive of the hypothesized computational processes. To a first approximation, we may thus construe mental operations as pretty directly analogous to those of a Turing machine. (p. 313)

The formalist position yields theories about the underlying computational processes that would have to be common to any kind of thinking. Thus, it involves the search for an answer to questions about what kinds of mechanisms must be present for there to be any kind of intelligent

activity at all. These processes would be completely general to all human thinking and would therefore be considered "universal."

For the contextualist, on the other hand, the knowledge structures of interest are not universal. Rather they are structures built up from the specific experience of practitioners in a given area of expertise. Such structures might best be thought of as lying on a reflected/unreflected continuum. Reflected knowledge is knowledge which is in principle accessible to conscious awareness. Reflection itself is a conscious process so that knowledge which could be reflected upon, but which is not at a given moment, is unreflected knowledge. Such knowledge structures, i.e., those we refer to as being on the reflected/unreflected continuum, can also be characterized as "sedimented." That is, for any given knowledge structure, there was a time in the developmental history of the person when that knowledge was the object of reflective striving for mastery; after practice such knowledge exists at a "deeper" level of sedimentation in consciousness and hence would be relatively difficult to reflect upon. Highly automated skills have components which are deeply "sedimented." Those components which one takes for granted would require more reflection to make them verbalizable than those skill components which are in the early stages of mastery. So, for example, I am typing this paper and paying no attention to my operational knowledge about the placement of the keys. This knowledge is unreflected or tacit. There was a time, though, when such knowledge was the object of focused, conscious attention, at which time we would refer to it as relatively less sedimented and highly reflected knowledge. From a

formalist point of view, one assumes that there are underlying cognitive mechanisms which have evolved to form the basis for any capacity that one might display (such as my typing skill) and that these mechanisms are in some sense "knowledge structures" but because these mechanisms actually are presupposed by the account of knowledge structures given here, it is not logically possible they they could ever have been the object of conscious attention; they are assumed by formalists to be the support for consciousness itself. These "assumed" structures are generally viewed as being formal, in the sense described above and are both in nature and in principle inaccessible to conscious reflection. According to Harre and Secord (1972), gaining access to unreflected knowledge structures may not be as problematical as first appears to be the case.

In the search for a methodology consistent with the contextualist approach, Harre and Secord maintain that self reports "should be taken seriously as reports of data relevant to phenomena that really exist and which are relevant to the explanation of behavior" (Harre & Secord, 1972, p. 7). For example, I might imagine the construction of a desk, attempting different design solutions using "mental imagery" and, if asked how I came up with the design chosen, might respond with a description of the content of my images at successive stages of the "construction" process. This ability to reflect on one's own "thought processes" is no more problematic a concept than that of my showing a series of pictures I drew by hand, each drawing offering a record of a

step in the design attempt. If I am asked how I imagined it, that is, how did I create the image, I could only reply that "I just did it."

According to the formalist theorists mentioned above, the design level is that level of "mechanism" that is responsible for supporting one's imaginative design endeavors. Furthermore, this level is in principle, inaccessible, in that I can't say how I generate images. On the other hand, both the content of what one imagines, and the knowledge structures that are sedimented below the content of what I imagined are in principle accessible to reflection. So, for example, one might be interested in how a person was able, without preliminary, to design a desk in his imagination without having to do it on paper. The reflected component is what the person was thinking about and the unreflected component includes relevant aspects of the task that could have been but were not reflected upon during the task. Those components that were not reflected upon are those aspects which are usually taken for granted by a person who tells us "what they did." This tacit component could provide a basis for inferences about what kind of experiences were instrumental in the development of the particular ability at hand. The unreflected or "sedimented" component would therefore be of very great interest, and how one accesses this knowledge is the major concern of this paper.

CHAPTER 2

THE PROBLEM OF THE PROBLEM

Artificial Intelligence (AI) can be interpreted as being a search for a general theory of intelligence, and there are two schools of thought among AI researchers concerning what sort of theory AI can produce. Some hold the opinion that a computer program might, under specified circumstances, stand for a psychological explanation of behavior. Also within the field is the contrasting view that AI is not a psychological theory, and that it is therefore unimportant whether a program behave internally like a human thinker. Work in the field would be evaluated from different standpoints depending on whether one sees AI as a kind of psychological theory or as a matter of "knowledge engineering." The following discussion will delve more deeply into the issues discussed in Chapter 1.

As was pointed out above, early work in AI limited the domains in which research was carried out to highly structured, tractable problems. It was believed that it would be most profitable to search for a small set of general structures that could be applied to a broad range of problems. Since that time, there has been a major shift from a concern with well defined problems to a focus on ill-defined problems. The emphasis has changed from a search for global rules to an elaboration of the "situation"; that is, the role of personal experience and detailed domain knowledge. More generally, the movement away from well defined problems introduced into AI research what Schon (1983) calls "the problem of the problem." To illustrate the concept, in the following

passage Schon describes the generation of a problem space by an architect (Quist) as he works on a design problem presented by a student (Petra):

Each move is a local experiment which contributes to the global experiment of reframing the problem. Some moves are resisted (the shapes cannot be made to fit the contours), while others generate new phenomena. As Quist reelects on the unexpected consequences and implications of his moves, he listens to the situation's back talk, forming new appreciations which guide his further moves. . . . Thus the global experiment in reframing the problem is also a reelective conversation with the situation in which Quist comes to appreciate and then to develop the implications of a new whole idea. . . . Out of his reframing of Petra's problem, Quist derives a problem he can solve and a coherent organization of materials from which he can make something that he likes. (pp. 94-95)

The problem of the problem is how to create a well defined problem from one that is ill defined. Quist takes what is merely an obstruction--in this case, an inability on the part of the student to bring about a coherent structural design for a set of proposed school buildings on a hillside--and he fashions a well formed problem out of the obstruction. Throughout his "conversation" with the situation, he brings about well defined units that can be manipulated in such a way as to realize the goals that are evolving out of the dialogue. Going through the process of working with an ill-defined problem until a clear solution is apparent is therefore a kind of problem solving, although perhaps of a different order or on a different level of abstraction than the "problem solving" understood as solving predefined problems. Defining a problem is an integral part of the problem solving process. It is the contention here that such a process requires a radically different methodology for mapping the procedures and methods of experts who

"create problems" than methods that are currently available in the area of "problem solving."

In the following section, a general definition of problem solving will be reviewed. Following this, the early work on "General Problem Solver" (GPS) (Newell, Shaw, & Simon, 1958) will be reviewed, mainly that part dealing with the way it solved problems and the difficulties encountered as the approach was generalized. This early work is exemplary because the problems encountered are typical of much of the later work on problem solving. The next major section brings the historical review up to date with a review of Winograd's (1980) discussion and criticism of his own important early work on semantic information processing. Winograd's current work will be found to represent a sign of a possible trend in AI away from formal to contextualist approaches. The last major section will review the background to the interview and analysis technique developed in this paper.

Cognitive Stimulation

Newell, Shaw, and Simon (1963) describe GPS in the following terms:

This is a case study in problem-solving, representing part of a program of research on complex information-processing systems. We have specified a system for finding proofs of theorems in elementary symbolic logic, and by programming a computer to these specifications, have obtained empirical data on the problem-solving process in elementary logic. The program is called the Logic Theory Machine; it was devised to learn how it is possible to solve difficult problems playing chess or understanding the meaning of English prose.

The research reported here is aimed at understanding the complex processes (heuristics) that are effective in problem-solving. Hence, we are not interested in methods that guarantee solutions, but which require vast amounts of computation. Rather, we wish to understand how a mathematician, for example, is able to prove a theorem even though he does not know when he starts how, or if, he is going to succeed. (p. 109)

The basic GPS methodology involves presenting the subject with a problem and asking that the problem be solved "out loud" as he works through the problem. The session is recorded and the resultant protocol is analyzed for the heuristics that the subject used to solve the problem. Note that, in accord with the marks of a formal system as outlined above, a problem such as the Tower of Hanoi is a formal one in the following sense: (1) every relevant feature (the size of the disks and the three pins) are perfectly definite, (2) all that matters to the solution of the problem are those elements (the color of the disks is irrelevant), and (3) there are a finite number of steps required for checking the validity of a move.

In the context of a formalizable problem such as this one, a computable solution is possible such that a computer program can be written that uses the "same" methods to solve the problem as did the human. The program then, amounts to a model of the person's problem solving process since it is assumed that the steps the subject takes are the "outputs" of an underlying mechanism where the computer program that generates these same steps is a model of those same underlying mechanisms. When presented with relatively simple problems GPS proceeds in terms of a straightforward application of rules to the problem domain in a trial and error fashion.

With increasing problem complexity, however, it turns out that various constraints operate which make the process of selection of pathways increasingly important and GPS becomes less successful. As Minsky (1969) puts it,

The simplest problems, e.g., playing tic-tac-toe or proving the very simplest theorems of logic, can be solved by simple recursive application of all the available transformations to all the situations that occur, dealing with sub-problems in the order of their generation. This becomes impractical in more complex problems as the search space grows larger and each trial becomes more expensive in time and effort. One can no longer afford a policy of simply leaving one unsuccessful attempt to go on to another. For, each attempt on a difficult problem will involve so much effort that one must be quite sure that, whatever the outcome, the effort will not be wasted entirely. One must become selective to the point that no trial is made without a compelling reason. (p. 94)

Associated with the problem of complexity is the problem of generalizing such a computational approach to ill defined problem domains. If we consider the expert Quist again, it would seem that a great deal is going on that is simply not addressed by such a formalist approach, namely, the process whereby the expert determines which elements are important and which elements are not, an issue that did not arise in the Tower of Hanoi problem. To determine which features of a problem space are relevant the expert relies on a large fund of knowledge of the domain, that is, "common sense." The need to determine the structure of this body of knowledge and how it is used contrasts sharply with the requirements and implications of those problem domains which are most amenable to the formalist approach.

The important question here for psychological theory concerns the ontological status of the so called "underlying mechanisms." If these mechanisms are computational (i.e., formally specifiable) then certain kinds of methodologies compatible with such assumptions follow. These methods are quite different from methods that are consistent with the

view that such mechanisms are not strictly formalizable. If "formalizable" is taken to mean rule governed and if thinking is, at base, a kind of calculation, then the formalist position would be fruitful as a psychological theory. The important question is: just what do people do in real life situations? Do they in fact solve problems algorithmically? In the next section it will be shown that experts are able to interactively structure problems in ways that cannot be spelled out in terms of a priori rules of formation. If we assume that there is a preliminary structuring of any problem, then we must also presume levels of skill in problem conception. The question resolves into one of whether the computer can be programmed to recognize the essential from the inessential elements in a problem space out of which a well defined problem is articulated. Even given the dubious assumption that the process can be formalized (made completely explicit) there must be, at least, a preliminary conceptual and phenomenological investigation of what is occurring during this phase so that we know at least what it is that the expert is doing. That is, we need to know what the X is in the second half of the schema, "How could any system (with features A, B, C, . . .) possibly accomplish X?" (Dennett, 1978, p. 111). Note especially that in the Tower of Hanoi problem we know ahead of time what will have to count as doing X.

Winograd and the Formalist Contextualist Switch

In a recent paper Winograd criticized the general assumptions currently dominating the AI field. His focus was his own support re-

search on language carried out in the early 70s. In his paper he specifies those assumptions about language understanding models which he feels are erroneous:

1. Sentences in a natural language correspond to facts about the world.

2. It is possible to create a formal representation system such that (a) for any relevant fact about the world there is a corresponding structure in the representation system; (b) there is a systematic way of correlating sentences in natural language with the structure in the representation system that correspond to the same facts about the world; and (c) systematic formal operations can be specified that operate on the representation structures to do "reasoning." Given structures corresponding to facts about the world, these operations will generate structures corresponding to other facts, without introducing falsehoods. (pp. 210-211)

Winograd goes on to reject the notion expressed in these premises; that is, that human problem solving can be completely formalized. He discusses shortcomings of the model in its internal structure, in terms of its ability to deal with word definition, and with natural reasoning.

In the formalist model, the "internal structure" of a speaker's model of the world is represented by "facts" about the world. The smaller and less complex that world (e.g., a "blocks world") the easier it is to represent the elements of that world in an unambiguous way.

Winograd (1974) uses the following text to illustrate this concept: "Tommy had just been given a new set of blocks. He was opening the box when he saw Jimmy coming in." He goes on to comment,

There is no mention of what is in the box--no clue as to what box it is at all. But a person reading the text makes the immediate assumption that it is the box which contains the set of blocks. We can do this because we know that new items often come in boxes, and that opening the box is a usual thing to do. Most important, we assume that we are receiving a connected message. There is no reason why the box has to be

connected with the blocks, but if it weren't, it couldn't be mentioned without further introduction. (p. 215)

It is a formalist assumption that what is true in a model is what is true in that particular world. Obviously, things become much more difficult when the model that is being constructed is a model of a speaker/hearer's model of the world. In other words, the model of the speaker/hearer must be constituted by a great deal of "common sense," tacit knowledge, usually taken for granted or, in the terms used here, "unreflected" knowledge utilized by the speaker/hearer in the process of reasoning about the meaning of the text. It appears that there is no principled way a priori to delimit the number of facts needed for a general understanding of text per se. The only current answer is to delimit the "world" being talked about so that the microworld itself provides the constraints on the number and types of facts that are necessary to understand text about that world. It is clear that as the limits of the world expand, the number of facts rapidly increases as does the depth of sedimentation of those facts.

Borrowing an example from Winograd, consider the utterance "There's an animal over there in the bushes." He explains:

If the hearer looks over and sees a dog in the bushes, and finds out that the speaker knew it was a dog, he or she will feel that the statement was inappropriate, and might say "If you knew it was a dog, why didn't you say so?." On the other hand, the statement "There's a dog over there in the bushes" is perfectly appropriate even if both the speaker and hearer know that it is a beagle, and the utterance would be fine for a dog if it were a response to something like "There are no animals anywhere around here." (p. 218)

For the hearer who would object that the statement was inappropriate, it might be supposed that if the speaker knows it is a dog, the hearer

would wonder why the speaker did not simply say exactly what was in the bushes. The conversational rule here might be something like "when referring be as specific as your knowledge allows" or something of the sort. The point here is that there is some kind of tacit assumption operating to make the utterance odd given the circumstances of the utterance. The violation of this tacit rule makes the listener want to ask what the speaker is trying to say. The meaning of the utterance is supplied, in part, by the answer to that question. For the previous example, communication partially breaks down because the answer to the question is not provided due to the violation. The listener wants to know more, since more (or less) was implied. Whereas a formal compositional semantics is concerned with the relation between an utterance and the "objective" world to which the utterance refers, a contextualist model of a speaker/ hearer must incorporate the process of coming to understand the other's model of the world.

Winograd's ongoing work represents an approach that is designed to address what is here termed the problem of the problem. For example, in the following quote, he points out that the problem setting process is important in the context of business management:

The view of management as problem solving suffers from the same problems of background and context as those arising in the study of language. In looking at the role of manager as optimizing some value by choosing among some alternatives for action, we are in the same position as in looking at the understanding of a word as choosing among a set of formal definitions. The hard part is understanding how the alternatives relevant to a given context came into being. (p. 237)

What Winograd calls the "problem of context and background assumptions" is what has been termed the "problem of the problem." That is, for the business manager, the standard risk model is formal and mathematical. Such a model is only appropriate for problems that are already formulated, so adhering to a formal model avoids the prior issue of how the problem was formulated in the first place. Does the manager simply optimize a given set of alternatives? It may appear so, even to the manager, but somewhere in the problem path those options had to have been created by someone. The definition of a problem is the process of creating possible solutions, and this is a different process than choosing a solution path from a clearly defined set of alternatives. To move beyond a "microworlds" approach, the focus must be set on the role of the problem solver in the generation of the problem space as well as on the ongoing interaction between the problem as formulated and new versions of it that are generated during this phase. Formal models completely miss this aspect of problem solving because formal models require well defined problems.

Language plays a major role in the process whereby a problem solver generates the context in which a problem will be solved. As has been pointed out, a "problem" can be characterized as a function of this ongoing linguistic interaction of the participants who are sustaining the problem. The problem space is a context which is generated by an ongoing pattern of agreement in concept and judgment among the community of persons who are concerned with the problem that is generated. On

whatever level of community one focuses, there is an ongoing background of agreement in concept and judgement which determines what is problematic and what is not. These background assumptions are not fixed and determinate but are constantly subject to revision and reinterpretation. It is just because they are not determinant that the assumptions cannot be translated into a context free set of rules. Rather a different approach to a conceptualization of "rules" is required. The same processes that generate an algorithm to solve a well defined problem (once it is well defined) are those that (recursively) generated the well defined problem out of an ill defined logical space. As Winograd puts it:

We cannot look to simple notions of truth and deduction (for problem definition). For example, the "energy crisis" was not created by specific acts of the oil companies, the Arabs, or the American consumer, but by those with the power to create consensus (agreement in judgment) who looked at a long-term situation and determined it to be a crisis. The relevant question is not whether it is "true" or "false" that there is a crisis, but what commitments are entailed by the speech acts that created it. (p. 237)

The fundamental argument here is that social reality is indeterminate. What is "real" or "true" about it is only relative to a given community; i.e., a given set of commitments, most of which are tacit. In "everyday reality," that is, social reality as opposed to the artificial realities of the laboratory, purpose and context determine the solutions that are appropriate to solving a problem in the same way that that they determine the meaning of words in a sentence. To understand a spoken sentence, we must grasp more than the facts about the world that

are the referents for the sentence. Similarly, if we wish to understand how a person solves a problem we must begin with an understanding of the background assumptions (i.e., intentions, beliefs, etc.) that structure the problem context for that person. In the case of the expert, say, a lawyer, how he solves a problem is a function of the meanings he attaches to the situation he is in. The expert is an expert just because he "sees" things about the situation that the novice does not. Perception, in this sense, is knowledge driven. The expert's solution path is constrained by how the context structures his perception of the situation. At the same time, his perception is attuned to invariants in the situation that are not perceptible to the novice simply because the novice lacks the requisite experience. The teacher-student relation in a context where practice is what is being transmitted involves, not the transmission of purely factual information, but rather a kind of "pointing out" by the teacher of those aspects of the situation that are relevant. This kind of transfer of expertise is not logic-based but perception based. It is not a matter of formally deducing facts from premises but of the teacher attuning the student's perceptions through an orientation towards the relevant features of a given situation. At the same time, these perceptual structures are relevant or irrelevant because of the context they are in. A formalization of such a process would necessarily have to follow from a context free set of features of the situation in terms in which one could unambiguously specify what is relevant to solving the problem at hand. But if what is problematic is a

function of the context, and the expert (e.g., a lawyer) can determine the context at any given time on the basis of his power to establish a consensus, then there can be no context-free list of features by which one could algorithmically generate a solution to a problem. On the other hand, problem creation is something that involves "reasoning" since the product of the process is rational. As Winograd (1980) puts it:

In looking at any significant sample of natural language, it becomes quickly apparent that only a small amount of human "reasoning" fits the mold of deductive logic. One is often presented with a fragmentary description of some object or situation, and on the basis of knowledge of what is "typical" jumps to a number of conclusions that are not justifiable as logical deductions, and may at times be false. Most (formal systems of problem solving) have been based on a notion of deduction that does not account for this style of reasoning. (p. 219).

Again, what is "typical" in a context (i.e., what is relevant to solving a problem) is a matter of judgment and trained perception. The expert operates on the basis of partial evidence, and does not rely on unambiguous rules (at any level) because he is reciprocally involved in generating (and regenerating) the very problem he is solving. In the courtroom, what is at stake is what frame or context to put around the "facts." The power of the expert is the power of winning a consensus in such a way that his version of the facts, the context he puts around the facts, is more compelling than that of his opponent. The net effect is that what appears to everyone as "fact" is now "obvious." The legal arena is paradigmatic of many ordinary encounters, in which the "strong" personality plays a pivotal role in determining the immediate social reality in an encounter.

This point of view has at least three advantages in terms of a methodology for describing expert reasoning:

1. The focus of the method is on the consensus making power of the expert analyzed at the level of interpersonal interaction. Given this focus, the analysis shifts away from finished products towards behavior interpreted in terms of the meaning, for the expert, of the context out of which he is generating the problem.

2. Since the expert is the person who determines what is "real" in the sense described above, if one wishes to understand expert reasoning, structure cannot be imposed on that reasoning "from the outside." This is because there is no outside (absolute) vantage point from which to interpret expert actions in the problem generating domain. Once the expert's structuralization processes are mapped, generalizations might be drawn on the basis of similarities across problems--but only after the structure is developed from this "inside" perspective.

3. From this standpoint, with the emphasis on the context or unstated background assumptions, we are in a position to explicate the unique structure that necessarily comprises any problem situation.

An important preliminary for the method proposed here is to choose an appropriate level of description for characterizing the problem solving of the expert so construed. Winograd (1980), following Searle (1970) and Austin (1962), recommends the "speech act" as the unit of analysis. This is the view that speech is a kind of doing as opposed merely the transmission of information. It also has the advantage that

it shifts attention from a strictly formal analysis of meaning to the intentionality of the speaker. The domain that is being characterized is not the internal "mental" process but the domain of the interaction between two people in a conversation. Speech acts involve much more than literal meaning or the sum of the definitions of the individual words in a sentence. This wider view of meaning takes into account what one conversationalist takes to be the intention of the other, and this necessarily involves us in an analysis of background assumptions shared by this (micro) community. From this standpoint, meaning then is seen as a complex interaction between (1) the overall text of the conversation, (2) the content of the conversation, (3) the intentions of the speakers, and (4) the assumptions or model that each conversationalist has of the other (Winograd, 1980).

This complex is the social reality that is created and sustained in the conversation. When something problematic arises, possible solutions can be a function of an ongoing negotiation. If social reality is relative to the background assumptions of the members of the community then that reality is both created and sustained in the interaction between members. Meaning is an ongoing creation. What gives the illusion of stability, that certain things are the way "they are supposed to be," is the fact that perception is structured by unreflected assumptions. These assumptions are the background that stabilizes perception and which makes it appear "absolute." Assumptions stay tacit until there is a breakdown in communication. When there is a breakdown, the intentions

of the speakers become a matter of concern to the participants. If action is viewed as purposive behavior then a person's intentions represent the goals that the person is trying to realize through that behavior. In the narrower realm of problem solving, an understanding of a person's intentions is an understanding of his representation of the problem. A methodological implication of this is this simple point: if you want to understand what a person is doing, and why, ask him (Harre & Secord, 1973).

Any given behavior can be given an indefinite number of descriptions. A verbal report can, under the proper circumstances, be a description of how the person intends the behavior to be taken. A self description is one in which the person himself is declaring how he wishes to be understood and is necessarily part of the larger description of the context the person is in. The self description entails a description of the context which is given "from the inside." By asserting that a given description holds, the person is providing a context within which the parties can negotiate an understanding that will lead to a resolution of the problem. The person generates a context. That context is either acceptable or not, negotiable or not. This stage of the resolution of communication breakdown corresponds to the setting of the problem, the creation of the problem space, or as we have termed it, the problem of the problem.

Reasoning as Problem Solving

Reasoning can be seen as a species of problem solving (Angel, 1964). Reasoning as problem solving can be carried out in the traditional deductive mode or it can be carried out "informally." Informal reasoning plays a crucial role in solving everyday problems, i.e., those we have referred to as "ill defined." This distinction between formal and informal reasoning is basic to the method proposed herein because it is reasoning carried out in natural settings that is analyzed by the method.

Informal arguments can be seen as having a structure albeit one which is usually complex. This complexity raises problems of judgment regarding the validity of such arguments. In traditional logical arguments, all that is relevant to a judgment about syllogisms is that the syllogism be truth preserving. This truth-preserving feature depends on the conclusion of a syllogism following from the premises in a rule-governed way. For reasons to be explored in the next chapter, the premises of an informal argument must be analyzed from another point of view than in terms of their formal structure. A pragmatic analysis for example, would be concerned with such things as the felicity of the premises, or their "rationality."

In natural settings ordinary arguments are often offered as the basis for judging the sensibility, appropriateness, or logic of a certain behavior. As was pointed out, in conversations or interviews the structure of such arguments is usually complex; however there are

methods for evaluating and criteria for judging the merits of informal arguments (Nolt, 1983).

According to Von Wright (1963) the structure of an ordinary argument is composed of the "common sense" elements; beliefs, wants, norms, and intentions. Arguments that are offered for judging behavior are constituted by these elements, especially when a person is asked to "talk about" an approach to a problem. Such accounts can be said to conform to a "grammar of intentionality" (Coulter, 1980).

A concern with the structure of a persons intentionality forms the basis of Harre and Secord's (1973) proposal that theory and research in the study of social reality should concern "self-directed and self-monitored behavior . . . the prototype of behavior in ordinary living" (p. 9). Self monitored behavior is self reflective behavior. When a person gives an account of their action, either to another person for whom that behavior was problematic, or for an "interviewer" interested in problem solving, the person is engaging in self-monitoring, according to these authors. They further claim that an explanation of behavior lies in the identification of "generative mechanisms." These mechanisms "drive" behavior via a "self-direction according to the meaning ascribed to the situation" (p. 6). If these generative mechanisms are a function of the meaning of a situation for that person, it follows that one very direct way of accessing these meanings is by gathering first-person accounts of that person's behavior. An analysis of such reports ought to put us in a position to discover the structure of the relevant beliefs, wants, and intentions. The structure of this network of

beliefs, wants and intentions is what comprises the persons "generative mechanism." In the next section I give a preliminary description of a methodology for uncovering and describing this generative mechanism.

CHAPTER 3

STRUCTURE OF A METHODOLOGY

In previous sections the formalist position has been criticized for having "predefined phenomena"; that is, for constructing models of intelligence on the basis of data generated by a methodology which is only open to a restricted range of phenomena. The consequences of this approach is that an essential aspect of expertise is excluded; namely, problem formation. It is the contention here that it is with problem formation that most or all of the work which constitutes expertise occurs. An expert will do routine tasks expertly but what is most difficult to represent in expertise is not the routine but how the expert creates and recreates the problem being worked on. When the problem becomes determinant as a result of the process of problem formation or reaches a point where it can be seen to have a solution, we can say that it has emerged from a subject-relative (or subjective) phase into an objective phase. It is only at this point that one can begin a formalization of the domain. The work that brings the problem out of subjectivity is practical, hence the importance of practical reasoning as an object of study in itself.

In contrast to the mainstream formalist approach, phenomenological psychology has as a basic assumption that data, or better, "phenomena," should at first be approached without the presupposition of a formal theoretical apparatus. The notion of looking at the data or phenomena itself is straightforward. It simply means that the psychologist

should, at early stages of data collection, attempt to use as theory free a language as possible when engaging in an analysis of the constitution of the subject's experience. This entails interview techniques that are effective in getting the person to attend to the phenomena in a way that is consistent with this general constraint.

The study of expertise provides just such a domain--the psychologist requires of the expert a "direct" reflection upon his experience. At the beginning stages the description should be restricted to the data. For example, given "This person is exhibiting compulsive behavior" we should want a description of the actual behavior that is being attended to by the expert; or, "This is the way this ought to be done" we should want a description of what the subject sees himself. An expert is presented, in his experience, with a particular phenomena he perceives at a relatively high level of abstraction. The interviewer, as nonexpert, will want him to break the abstractive connections and move to a level of direct and simple relations at first, so that the higher level relations may be reconstructed out of the expert's reflection on his experience at the lower levels.

An investigation which has no presuppositions about phenomena is impossible; to understand the concept, we have to introduce the notion of levels of presupposition. One can, at the start make a rough distinction between the categorical assumptions implicit in ordinary language with a theoretically motivated description of phenomena on a more abstract level. One can describe an object as "a red book" or as a "red stimulus on my retina." The second description is at the level of

abstract relations and presupposes those at the more direct levels. The injunction to attend to the phenomenon itself allows the analyst to work systematically from lower to higher levels. Even the first description is not completely presuppositionless; hence, the acknowledgement that a completely presuppositionless analysis is not possible. The injunction that we attempt to attain an analysis that has no theoretical presuppositions raises what is called a hermeneutic paradox of interpretation.

But there is a contradiction here. How can a text be understood, when the condition for its understanding is already to have understood what it is about? The answer is that somehow, by a dialectical process, a partial understanding is used to understand still further, like using pieces of a puzzle to figure out what is missing . . . A certain pre-understanding of the subject is necessary or no communication will happen, yet that understanding must be altered in the act of understanding. (Winograd, 1980, pp. 223-224)

Without some initial definitions of relevant behaviors and without categories of action that are taken to be meaningful in a given context of experience how does one isolate for study those actions that are relevant to the expert's domain? At the same time, we wish to conform to the restriction of imposing categories to the outside. We need to understand the internal structure of the phenomena but we also need an initial understanding of categories inherent in the phenomena. The problem is analogous to the development of a dictionary of an alien culture. The anthropologist begins formulating a translation manual on the basis of an informant's pointing--i.e., correlating gestures with objects. The danger of imposition or preformulated assumption is obvious here as is the nature of the hermeneutic paradox. The "solution" to the paradox is to be found in the so-called hermeneutic circle of

interpretation. Very roughly, an initial description of a phenomenon present to a subject in a given domain is given, where every effort is made to restrict the description to the phenomena in form and content. That is, the data is not represented abstractly--an effort which would presuppose abstract categories that may be external to the phenomena. The attempt at analysis without presupposition is formulated in terms of five hermeneutic rules (Ihde, 1979).

Hermeneutics (from the Greek *hermeneuo*) means to interpret explain, to make clear. The science of hermeneutics has its origin in biblical interpretation and translation. Hermeneutics has, in recent years, been broadened to include the study of the interpretation of action on analogy with a text, i.e., to the study of "text analogs" (Taylor, 1971). Roughly, a text analog would be a sequence of actions or action-products to which we can ascribe meaning on the basis of an assumption of rationality (Dennett, 1983; Gauld & Shotter, 1977). Any organism can have its behavior interpreted as if that behavior was a function of the intentionality of the organism. We would say, on analogy with the authoring of a text, that the sequence of actions was "authored" by the organism. Such action would be interpreted as intentional under some description (see the discussion of Anscombe above).

Human action, on this model, is behavior to which a meaning can be attributed by virtue of the actor having intentions, beliefs, wants, and desires. The idea here is that one treats action as a kind of text and hermeneutics in this broad sense as a science of the interpretation of the meaning of action given in terms of the intentionality of the actor.

An act has meaning if it is conceptually related to some context (i.e., another act, entity, or event) for the actor or for some observer. The meaning of an act is to be found in the relation between the behavior and its context; there is no meaning that can be given (nor perhaps even any sense to the notion of) a behavior without some context. There is an internal or conceptual relation between the behavior and the context that gives the action the meaning that it has.

An external relation would be a causal one, the cause and effect are external to each other and can thus be analyzed independently. For example, a light stimulus analyzed in terms of light waves and a blink response analyzed as a physical reflex.

The components of an internal relation cannot be analyzed independently. The raised hand under the description "bid at an auction" gives meaning to the action which is the context that reciprocally determines the meaning of the raised hand. To ask for an interpretation of the meaning of the raised hand is to ask about the act of bidding, that is, to ask about the purpose or intention of the act in terms of the wider context of the auction.

An explanation of this sort is an hermeneutic explanation, not a causal explanation. The relevant distinction has to do with reason giving explanations on the one hand and causal explanations on the other (Von Wright, 1971). On analogy with the explanation of the meaning of a text in terms of the intention of the author of a text, we ascribe a complex or structure of beliefs, wants and intentions to some actor on the basis of our beliefs about his or her intentions, where the behavior

needs elucidation in terms of those intentions. A phenomenological reduction is meant to provide a solution to the paradox of presuppositionless interpretation. The phenomenological reduction involves a temporary setting aside of one's assumptions about the meaning of a phenomena as reported by a subject. Where there is a verbal report, we do not immediately assume we understand the full meaning and further, we actively question the meaning that first seems most intuitive. The aim of the reduction is to arrive at an interpretation of some action or series of actions--the interpretation being the intentional interpretation, the description under which the action falls from the actor's point of view. The process is interpretive and thusly hermeneutic. The phenomenological reduction can be expressed in terms of five hermeneutic rules as given in Ihde (1979). The rules are (1) attend to what is given, (2) describe, don't explain, (3) horizontalize the phenomena, (4) seek out the structural invariants in the phenomena, and (5) correlate the poles of the intentional relation on the basis of the structural analysis. The five rules are constraints on the inquiry. Each rule corresponds with a specific stage of data analysis as set forth in the next chapter.

Rule 1 specifies the field of phenomena, rules 2 and 3 specify what and how the phenomena are to be focused on, rule 4 is concerned with the constitution of meaning in the experience of the subject and rule 5 enjoins us to correlate the structures found in rule 4 with the world of the subject as that world is experienced by the subject. As a preliminary to a detailed exposition of the methodology, I show how the rules

act as constraints on the investigation and constitutive analysis of the expert experience.

Given the first rule, that we attend to what is given, an interviewer must be sensitive to a distinction between a description by the expert of what he actually does do on the one hand and what he believes ought to be done on the other. This mixing of levels is often manifested by experts who give "textbook" descriptions of the task domain. Interviewees have a tendency to describe how a problem ought to be solved rather than engage in a detailed description of what they would do to solve a problem. This tendency is closely related to problems that arise from a disregard for another distinction underlying rule 2 between a description of one's reasoning which is constituted by explanation or a justification for individual steps in the problem solution and a general explanation that includes causes. The interviewer should be sensitive to attempts by the interviewee to give such meta-accounts of explanations of reasonings.

The third rule posits that we "horizontalize" phenomena. A causal theoretical explanation goes behind the data as it appears. Judgements which are excluded are those which posit some phenomena as more "real" than others. To return to the architect Quist cited in Chapter 1, the point was made that the design is a product of a dialog with a situation. Various features of the environment become important or unimportant as the parameters of the design change during the evolution of the expert's conception of the situation. In a sense, then, there is no one

unique situation whose components can be analyzed as problematic independent of the expert's concept of the situation. There is no set of features which are the "real" situation and which have a priority in an account of the expert's action. To understand such a transactional problem solving enterprise, the psychologist must tentatively horizontalize all the phenomena in order not to prejudice the descriptive accumulation of data.

The fourth level of the phenomenological analysis works towards the constitution, out of the data generated by the first three rules, of structures that are essential to that data--the structure of the subject's experience as represented (or revealed), in our case, by argument structures. These structures are themes that "explain" the expert's behavior by allowing us to see it as falling under some intentional interpretation.

Hermeneutic-phenomenological methodology rests on the assumption that a person is an intentional system, that is, the person can have his behavior understood in terms of intentions, beliefs, and wants. This system would have internal relations that are such that they can be represented, in a given circumstance, by a structure of practical arguments. Whatever the features of such a system are that do not vary across situations would be the structural invariants essential to those structures. The invariants or essential properties of the expert's intentional structure would be those structures that constitute his/her expertise. It is proposed in the next chapter that practical arguments be used to derive hidden premises and serve as a basis for representing

the internal structure of an intentional system. The premises of such arguments are rules for conduct. The rules along with the relevant beliefs, wants and intentions form the knowledge structures which are the object of codification in an expert system. There are two distinct advantages to this approach. One is that the reduction provides clear constraints on an analysis that must take the first person point of view. The second advantage is that there is a potential for a mechanization of the rule acquisition process. These points will be elaborated on below.

The expert is a limiting case which illustrates the paradox of interpretation and which demonstrates the necessity for hermeneutic rules of interpretation; given the paradox how can one determine, from the outside, whether any given element in the fringe of the expert's domain, as posited by the expert, is sufficient prior to a full constructive analysis of the expert's intentional structure, viz, the problem space. The expert is expert insofar as he is determining what counts as real in his domain of expertise. All phenomena when they are described without presupposition are on the same level of analysis. No one description is given priority qua explanation, no one phenomena is put in a privileged position as explanatory or as "standing behind" the phenomena present to the subject. Phenomena are horizontally placed in the conceptual space posited by the first two rules.

To understand the thrust of rule 5 it is necessary to understand the phenomenological concept of Intentionality. The concept of intentionality in phenomenology, and philosophy in general has a broader

meaning than the concept of intention understood as purposiveness. To quote Dennett (1983):

Intentionality is aboutness. Some things are about other things: a belief can be about icebergs, but an iceberg is not about anything; an idea can be about the number 7, but the number 7 is not about anything; a book or a film can be about Paris, but Paris is not about anything. Philosophers have long been concerned with the analysis of the phenomenon of intentionality, which has seemed to many to be a fundamental feature of mental states and events. It should be clear that this use of "intentionality" and "intentional" is a technical use, and should not be confused with the more familiar sense of doing something deliberately or on purpose. Hopes and fears, for instance, are not things we do, not intentional acts in the latter, familiar sense, but they are intentional phenomena in the technical sense, for they are about or of something . . . The term was coined by the Scholastics in the Middle Ages, and derives from the Latin verb intendo, meaning to point (at) or aim (at) or extend (toward). Phenomena with intentionality point outside themselves, in effect, to something else: whatever they are of or about. (p. 344)

The phenomenological position concerning Intentionality as formulated originally by Husserl (1960) is elaborated beyond the notion that intentionality is aboutness and posits further that consciousness is invariantly intentional. Husserl defines consciousness in terms of the intentional relation with the aphorism "consciousness is always consciousness of." To elaborate, in Ihde's (1979) reading of Husserl, he notes that:

A correlation rule implies a correlation of something with something. Given a field of (possible) experience, the question is first, what is to be correlated with what and second, how the correlation is to be interpreted. In traditional philosophies, a distinction is usually made between object and the subject that knows the object. Husserl transformed this distinction into a correlation of what is experienced with its mode of being experienced. He termed the correlation itself "intentionality." He held that such a correlation was, in fact, invariant to experience and that

this correlation could be thought of as directed. All experience is experience of _____. This is to say, all experiencing implies something that is experienced, but within this general concept of experience, two poles can be differentiated descriptively. (p. 42)

To adopt an "intentional stance" towards an organism is to "attempt to characterize, predict and explain their behavior by using intentional idioms such as 'beliefs' and 'wants' a practice which presupposes the rationality of the organism" (Dennett, 1983). Intentional idioms exhibit a logical property termed (by Quine, 1960) referential opacity. An idiom is referentially opaque if it fails a test of substitution. Take "Oedipus wants to marry Jocasta" where "wants" is the intentional idiom, and "to marry Jocasta" is replaced by "to marry his mother." The first is true, the second false. Whereas, "The woman sitting next to Oedipus is Jocasta" remains true when the substitution is "is his mother." The first context is "opaque," the second, "transparent." As Dennett (1983) puts it, in elaboration of the significance of the character of intentional idioms:

Burgess fears that the creature rustling in the bush is a python and suppose that in fact the creature in the bush is Robert Seyfarth. We will not want to draw the conclusion that Burgess fears that Robert Seyfarth is a python. Well, in one sense we do, you say, and in one sense we also want to insist that, oddly enough, King George was wondering whether Scott was Scott (as in "King George was wondering if Scott was the author of Waverly"). But that's not how he put it to himself--and that's not how Burgess conceived of the creature in the bush either--that is, as Seyfarth. It's the sense of conceiving as, seeing as, thinking of as that the intentional idioms focus on. (p. 345)

It is the intentional characterization of behavior, i.e., the opaque construal of the expert's behavior that distinguishes the expert's way

of looking at phenomena from the nonexperts. The "intentional stance" focuses the analyst's attention on a characterization of environmental properties that the expert is responding to in terms of how the expert sees or conceives of them. After these properties are located they can be given an objective (independently specifiable) description, but the initial work is done not within causal analysis, but within an hermeneutic one.

This brings us to the crux of the paradox of interpretation. If Oedipus sees that woman as Jocasta and later comes to see that woman as his mother then Oedipus will in all probability (assuming Oedipus' rationality) come to act differently toward that woman, as in fact he did. If A is an expert psychiatrist, then A will see B's behavior as exhibiting certain characteristic structural properties to which A is said to be "attuned." If we do not horizontalize our beliefs about A's description of B then we might easily make false assumptions about the importance of a given behavior. We cannot begin with any arbitrary descriptive system but rather one that is consistent with the psychiatrist's. We have a starting point in our intentional interpretation of the psychiatrist's behavior--our partial understanding constituted by common language use. The hermeneutic approach prescribes the hermeneutic rules for just such an analysis--we must "bootstrap" our translation manual up to a level that allows consistent translations of the text analog generated by the expert by giving partial descriptions that implicate a larger structure which is used as an hypothetical base for testing further intentional descriptions. The structural analysis

provides a description of the knowledge base that the expert brings to a problem space but a complete analysis only occurs in the context of rule 5. At this stage, we correlate the poles of the intentional relation by attempting to characterize the environmental variables that specify what the expert is responding to. As Fowler and Turvey (1978) put it:

The claim we wish to make is that a superordinate system, one that encompasses the actor, his actions, and the environmental support for his actions, is the minimal system whose observation will permit an adequate explanation of the regulation and acquisition of skilled performance. To anticipate, this minimal system will be referred to as an "event." From the perspective of this system, coordination is a relation defined over the actor and the environment, and control is the exclusive prerogative of neither. . . . What should be the level of description for this minimal system? Putatively the theorist who aims to explain the acquisition and performance of skilled activities should select a level of description that is compatible with an actor's self-descriptions and descriptions of the environment. The theorist should select a grain-size of vocabulary that, in reference to skilled activity, includes those entities and functions that are regulated by actors and those entities and functions that are regulative of actors. (p. 7)

The emphasis here is on skilled perception with two poles of an intentional relation in need of explication--the person in terms of the knowledge structure brought by the person to the transaction at one pole and the structure of the "environmental support" that is selected by the activity of the expert. These poles are logically inseparable in that they mutually imply each other--the poles constitute the intentional relationship. At the final stage of the analysis there is the task of specifying the structure of the intentional relation by giving an analysis of the niche in which the expert is ensconced.

The methodology developed in the next four chapters has its origins in a study by Colaizzi (1978). His study was designed to uncover the structure of experiential changes that occur to persons who read books that have a perspective-changing impact. In this study, he interviewed students who had read a book that had had such an impact. The person was asked to describe the experience. The transcript of the interview was subjected to what Colaizzi calls a "reduction." To put it simply, a reduction is a search for themes that run through or repeat themselves in the transcript. This search for themes is recursive. Each level of thematic structure is itself analyzed for themes. At a given level then, the themes that are found are thematic with respect to the context of themes at that level. In other words, thematic structures evolve out of the constraints generated by themes at a given level of analysis.

Taking the lead from this work and that of Von Wright on practical arguments, the method here goes more deeply into the structure of a self report. Self reports concerning past events will have thematic structures. In solving problems and in the process of describing the reasons for any given action the interviewee will be giving practical arguments. The thematic structures that are "reduced" out of the data are argument structures that represent the essence of a person's reasoning with regard to some action. The argument structures are analyzed in terms of the schema of a "practical argument" as discussed by Von Wright (1963) and Anscombe (1958). Practical arguments will be discussed in depth in Chapter 4.

CHAPTER 4

INTRODUCTION TO METHODOLOGY

This chapter describes a method of protocol analysis which I refer to as a "reduction." By reduction I mean, a textual analysis that takes the form of a search for thematic structures which are uncovered through a systematic varying of the basic analytical units of the text, i.e., the intended interpretations. The text is reduced to thematic structures which take the form of argument structures. The reduction moves through several stages of analysis, beginning with a new protocol transcript and ending with a succinct and integrated description of the subject's problem solving process and rationale. The upshot of a reduction is an elimination of redundancy and tangential information and a reorganization of the data so it can be easily analyzed for argument structures.

The reduction has four stages. In the first stage, the transcript is segmented into intended ideas which are listed individually and numbered. In the second stage each intended interpretation is placed into one of the following logical (grammatical) categories: law, norm, intention, want, and belief. This list of categorized intended interpretations is the data base from which the material for the third and fourth stages of the reduction is drawn. The third stage is a simple schematic representation of the subject's problem solving steps. This representation takes the form of a flow chart with process elements which are derived from the category of intentions. For the fourth

stage, the reduction to this point provides a database that is used in the construction of tree diagrams of practical arguments. These tree structures allow for a rigorous treatment of practical arguments (as defined below) such that hidden premises in the argument can be deduced.

The basic structure of the method can be represented as an interview-analyze cycle. After an initial interview and analysis, subsequent interviews are guided by findings arising from the prior analysis cycle. Briefly, there is a preliminary interview which is analyzed and patterns of reasoning and rule structures are derived from this analysis. These patterns are used as a basis for inferring "hidden" premises in argument schemas underlying the speaker's protocol. Each subsequent interview directs the inquiry toward further reflection within areas relevant to those hidden premises that had been uncovered in the first analysis.

This chapter describes data analysis. The first section gives the rationale for the unit of analysis, which is referred to as an "intended idea." The next section describes how the basic unit of analysis or intended idea is used, namely as the basis for an interview and analysis technique that will elicit information about hidden premises in argument structures. The last section details the category system for taxonomizing "intended" ideas so that they can be used in the structural analysis used to uncover hidden premises. The analysis of argument structures is discussed in the following chapter.

Intended Idea

In ordinary conversation a distinction can be made between a literal interpretation of an utterance and the meaning intended by the

speaker. Ambiguous references are a case in point. A listener is faced with the task of interpreting a given utterance at the level of the idea, whereas, in written communication, the distance between surface and intent is much closer than is found in conversation; one can usually equate sentences with intended ideas. In verbal messages, "sentences," as such, are often not the obvious units which they are in written communication. This is so because people use speech not only to communicate, but also to formulate their ideas "as they go along" with the consequence that the intended idea often will not be expressed adequately. Witness how conversation is normally filled with false starts, parenthetical references and unfinished sentences.

Among the many factors influencing the way a listener interprets the meaning of a speaker's utterance are aspects such as intonation, facial expressions, referential gestures (pointing), and background assumptions or general knowledge of the world which a speaker brings to a conversation. The relevant background assumptions, for example, in an indexical statement like: "He is wearing a blue jacket," would include the knowledge of who "he" is. In other words, if the conversation preceding this utterance had been about the speaker's son then the fact that the word "he" in the sentence referred to the son would be assumed or "presupposed" by all parties to the conversation.

The distinction between the intended idea and the literal (surface) meaning of a sentence can be clarified if we first understand the difference between a sentence and the propositional content of the

sentence. In logic the term proposition is used to designate what a sentence says about the world. This designation is called the propositional content of the sentence and it is understood to be either true or false, since the proposition a sentence expresses is what is verified when we fix the truth value of that sentence. That there is a difference between a sentence and the proposition that the sentence represents can be seen by observing that one sentence can have more than one propositional content. This is evident in the previous example: "He's wearing a blue jacket," which, when used to refer to a woman's child, has a different propositional content than when the same sentence is used to refer to the same woman's husband. It's also possible for different sentences to express one and the same proposition. For example, "It's Monday today" uttered on Monday expresses the same proposition as "It was Monday yesterday" uttered on a Tuesday (Clark & Clark, 1977).

As we can see from the first example, that is, one sentence with two possible propositional contents, we need, on the basis of contextual information, to infer which propositional content was intended. The distinction between the intended interpretation and the sentence which carries that intended interpretation generally parallels the logical distinction between a proposition and the sentence that expresses that proposition. A given utterance might have more than one interpretation just as it might have more than one propositional content. For example, the following sentence can have a minimum of three different interpretations, simply by varying the intonation. In the communication, "John

drove to the store," we can vary the intended interpretation by varying the word in the sentence that is stressed by the speaker. One interpretation would be, "It was John that went to the store, not Bill;" another, "John drove he didn't walk," and the third intended interpretation, "John went to the store, not the office," and so on. Depending on the context, we have a different idea that the speaker is trying to give his listeners. Notice that the interpretation that it was John, not Bill, that went to the store is not a propositional content of the sentence rather it would be an implication of the sentence in the appropriate circumstances; e.g., someone asking "Was it Bill that went to the store?" The implication is what the speaker wants the listener to understand, the idea he wants him to have. He accomplishes this intention by stressing the word "John."

There may be unintended side effects of a given utterance. The speaker might not be aware of those effects, in which case, he might not be the best source of information about the possible meanings of the utterance. The speaker may also have unreflected motivations which may play a causal role in the production of the utterance and, here again, the speaker might not be able to provide objective information about the full meaning of an utterance. However, the speaker is necessarily the only person who can give us the intended interpretation of his utterance. An analysis of the data which attempts to minimize the imposition of any form of "outside" interpretation of the data, must respect this essential logical fact about verbal reports concerning intended

interpretations. Since we are interested in analyzing a transcript of spoken conversation, we must rely on evidence brought in from the context to decide which possible meaning the speaker intended in order to decide on the sentential structure. Because it is not always clear from the literal meaning of the utterance what the intent is, and because it is often difficult to decide exactly where one sentence starts and another stops, the problem of the analyst is to segment the verbal record, given the fact that people do not generally speak in well-formed sentences.

Many or most utterances (derived after eliminating false starts, etc.) can be easily parsed into intended interpretations. When there is ambiguity or unclear reference we need to derive the intended interpretation of an utterance from contextual analysis of the protocol. By contextual analysis I simply mean that we use the general information contained in the transcript (the context) to help us decide what a person might have meant by some statement when that statement is not altogether clear or when it has more than one possible interpretation.

The purpose of isolating intended interpretations is so that the underlying arguments can be constructed out of the data of the transcript. Rather than asking the interviewee what rule is being used in a given case, the interviewee is asked to give reasons for specific actions. It is assumed that if the reasoning is probed deeply enough the interviewee will either use the rule as a justification or will provide sufficient argument structure so that the rules can be deduced. Not asking the interviewee directly about rules avoids getting

"textbook" reasoning. The propositions that are deduced are the hidden premises of the arguments. I equate "hidden premise" with "background assumption." The search for background assumptions is accomplished by deducing hidden premises in what are called practical arguments.

A practical argument is a verbalization of practical reasoning which is reasoning about what to do (Anscombe, 1978). For example; I want a car, in order to get a car I need money, I shall get money. Practical reasoning is what we engage in when deliberating (when we do deliberate) what to do. A practical argument is often given when we wish to explain our actions, in which case we would be giving an account. A practical argument can be prospective or retrospective such as when we either explain what we will do or what we have done. In an interview about someone's problem solving, verbalizations are derived from the transcript, and these are cast in the form of retrospective practical arguments.

The schematic representation of the practical argument is a representation of the person's verbal behavior, not a description of the persons "thought processes." The level of description of the interviewee's verbal behavior is cast at that of the action; behaviors or operations that can be described in intentional terms, that is, in terms of the person's beliefs, wants, desires, and intentions. Dennett (1983) refers to this vocabulary as the "intentional idiom." The intentional idiom is the language used when one gives reasons for things that one has done or plans for things to be done by one. When a person gives a reason or justification for something he does, he is giving an account. In giving reasons for actions we refer to such things as our beliefs

about the world, our purposes or intentions, the wants we have and the rules of conduct we abide by at any given time. The intentional idiom comprises what Dennett (1978) calls "folk psychology." He says:

Roughly, folk psychology has it that beliefs are information-bearing states of people that arise from perception (including perception of communication) which, together with appropriately related desires lead (perhaps via intervening decisions or intentions) to intelligent action (including communication) . . . as many philosophers have observed, a feature of folk psychology that sets it apart from both folk physics and the academic physical sciences is the fact that explanations of actions citing beliefs and desires normally not only describe the provenance of the actions, but at the same time defend them as reasonable under the circumstances. They are reason-giving explanations, which make an ineliminable allusion to the rationality of the agent. Primarily for this reason, but also because of the pattern of strengths and weaknesses just described, I suggest that folk psychology might best be viewed as a rationalist calculus of interpretation and prediction--an idealizing, abstract, instrumentalistic interpretation-method that has evolved because it works, and works because we have evolved. (p. 8)

Just as all human social conduct is rule governed, accounting practices also are rule governed. The rule governedness or structure of accounting practices is somewhat like the rules of grammar, and it is finding the structure of such rules that is the object of this methodology. Because the use of such so-called "mental" constructs is not uncontroversial in psychology and because the concept of an intention is central to this vocabulary, a brief characterization will deal, follow that with intentions.

I will follow Hunter (1978) who uses what he calls a game model for characterizing the utterance of an intention. On this model, the utterance of an intention can be best understood on analogy with a move in a game. Representing an intention as a move in a game is useful for the

purpose of structuring the data in a self report protocol. Such protocols are essentially extended practical arguments that posit hypothetical intentions and justify them in practical terms (i.e., with beliefs and rules, etc.). A retrospective account of steps to a problem solution is a justification of actions that were engaged in intentionally. "I went to the store" describes an action which a person did on purpose. The intention, at the time, was to go to the store. When a person declares an intention, such an utterance can be understood as either strictly information bearing or in terms of its being a "speech act." The utterance of an intention, understood as being a kind of action can be analyzed in terms of the metaphor of a move in a game. In a problem solving account, each intention that is related to the problem solving goal is a "move" toward that end. This approach to speech acts and action in general is in the domain of what Winograd (1982) calls the interactional mode. He says:

This domain has been explored under the rubric of speech acts. The work of Austin (1962) and Searle (1969) has shown that utterances can be understood as acts rather than as representations. In giving a command or making a promise, a person is not uttering a sentence whose meaning lies in whether it does or does not correspond truthfully to the world. The speaker is entering into an interaction pattern, playing a certain role, committing both speaker and hearer to future actions, some linguistic and others not. In this domain the relevant question about an utterance is "What is the speaker doing?" Understanding is connected with the ability to recognize what the speaker is doing and to participate in the appropriate pattern of actions. . . . An essential thing about speech acts is that they always occur in a social context, with a background implied by that context. If I find out tomorrow that the meeting has been moved to Katmandu and don't show up, I can justifiably argue with you that I haven't broken my promise. What I really meant was "Assuming it is held as scheduled. . . ." On the other hand, if the meeting

is moved to an adjacent room, and I know it but don't show up, you are justified in arguing that I have broken my promise, and that the "Katmandu excuse" doesn't apply. This kind of argumentation can be pursued back and forth indefinitely, and forms a part of the network of potential actions related to a promise. The legal system provides a regular mechanism for exactly this kind of interaction. (p. 230)

This approach also provides a framework that allows the analyst to ask such questions as "What are the rules of the game in general?" and "What are the strategic and tactical moves that the player himself makes and why?" If a person is solving a problem then each action toward the solution is a move and can be expressed as an intention. In a game, there are rules that tell us what behaviors count as moves. Using the game metaphor, the utterance of an intention is treated as a move that is regulated by the rules that the problem solver is using. The task of interview analysis is to determine which protocol contents are relevant to the game that the interviewee is "playing."

Such a characterization in terms of a game brings the actor's model of the situation into the foreground insofar as the interviewee presents the problem in terms of how he represents it to himself. Where the task is that of determining the rules used by the expert, it is essential that a representation of the meanings that the expert is responding to be developed. Such meanings are found in the interaction between objective events and the knowledge in terms of which the expert interprets those events. On this account, the meaning that the event has for the expert is a function of this interaction. The importance of the actors point of view arises from the need to derive the meaning that the event has for the expert.

Such a characterization in terms of the actor's point of view is a representation of the actor's representation and it is this representation or knowledge base that is modeled in the production system. To summarize, the rules of the expert's "game" are the most general framework for exploring expertise. The rules of the game form the background knowledge against which any individual move makes sense. Given this level of representation as the starting point, the analysis then becomes more fine grained and looks at the expert's strategies and tactics. In saying what he will do and why, or in saying what the significance of some move is, certain assumptions will have to be made explicit.

Making these assumptions explicit presupposes that we understand at least the game that the expert is playing. We have to know enough about the area of expertise itself in order to have a starting point for the interpretation since we must be able to generate all reasonable interpretations for any given speech act or behavior that are relevant to the expert's area of expertise.

Intentional Interpretations

A preliminary decision about the intended interpretation is called a paraphrase. The sentence paraphrases are then used as a basis for segmenting the utterance so as to unambiguously represent that interpretation. The analysis adheres to the following rule for paraphrasing: In case of relative ambiguity a paraphrase which necessarily alters the wording of an utterance must be supportable (in principle) by evidence about the speaker's intentions derived from the overall context.

Listing Intentional Interpretations

The following convention is adhered to in listing intended interpretations. First, list the number of the intended interpretation, then the code (to be discussed below) and finally the intended interpretation itself. The rule for paraphrasing is that the paraphrase must duplicate the original utterance as much as possible in structure and content. This means that one must try to preserve, as much as possible, the wording used by the interviewee. Most of the changes that are made are structural, such as (1) conjunctions are separated into intended interpretations, (2) incomplete ideas are completed on the basis of contextual references, (3) false starts are eliminated, and (4) embedded sentences are extracted from their context and paraphrased as separate intended interpretations.

Categorizing Intended Interpretations

In the second stage of the reduction the intended interpretations are categorized, using categories derived from the ordinary language of the "intentional idiom." Some of the most significant terms in the grammar of accounts are those of law, norm, intention, want, and belief. The process of coding is essentially one of the successive application of the definitions for each code to each intended interpretation in the above ordering. The analyst starts with "law" and proceeds to compare an intended interpretation with the definition of each term in the ordering. When an intended interpretation is found to fit the definition at

a given point the decision process ends and the intended interpretation is assigned to that category. The first node is the decision whether an intended interpretation is a law, followed in turn as one goes down the decision ordering by "norm," "intention," "want," and finally, "belief." The decision ordering process provides us with a means of subjecting each intended interpretation to a series of tests which match the intended interpretation against the criterion at that level of the ordering. Decision ordering is necessary because there is a sense in which most utterances are "beliefs." In order that all utterances not be put into the category of belief, the decision ordering prevents this by forcing the rater to consider what kind of belief an utterance comprises.

Law. The first category is law, by which is meant any intended interpretation which makes mention of an observed repetitive environmental pattern. The category as so defined is sufficiently broad to cover behavioral regularities that seem to informants as being "lawful," e.g., "Every time I talk to him we fight." A strictly empirical law on the other hand, is a generalization from an observed physical regularity.

People often express or make reference to physical regularities or causal patterns in the course of explaining or justifying their actions. We therefore code any statement which mentions either a physical regularity or a repetitive environmental pattern a "law." The concern here is not with whether the regularity that is mentioned is a true law of

nature. This is because we are dealing with (for the most part) ordinary conversations and accounting practices, not scientific discourse. For example, if someone says that, "All mules are stubborn" he/she is expressing a physical generality which has the form of a "law" and would therefore be coded as "law."

Norm. The next category is "norm." As the term is used here, "norm" is a logical or societal regularity. It is the result of convention and is thus to be distinguished from a law of nature which is a nonconventional environmental regularity. For the purposes here, the category "norm" will include both laws of state and laws of logic as well as two subcategories of regulative norms, these being rules, technical norms, and hypothetical norms, to be covered below.

Rules. The first major category of norms are rules such as those which constitute a game. According to Von Wright (1963), rules have the following features:

. . . (1) rules determine the moves in a game such as when one says that the rules of a game constitute that game; (2) rules tell us (when we wish to understand a game) those moves which are correct or permitted; and (3) we understand by (2) therefore, those moves that are prohibited as well as moves which in certain circumstances are the only moves possible and hence, obligatory. (p. 112)

Hypothetical and technical norms are generalized conditional intentions. Since they are more general than simple intentions, they are considered normative for a given individual. An analysis of hypothetical and technical norms is dependent on an understanding of the conditional intention which, when stated in a general form, can become either a technical or hypothetical norm.

A statement which declares an intention is one which informs a listener that the speaker is committed or is committing himself to some course of action. So, the statement, "I'm going to the store" is an "intention." It informs the listeners that the speaker is committed to the attainment of an end which is aimed at by purposeful behavior, namely "going to the store." The intention names a goal, or state of affairs wanted, which is simply, "being at the store." Notice that this intention has no conditions on it, and is therefore simple. An intention may have a condition though, as in the slightly more complex statement, "If my car starts, then I am going to the store." The form of this statement is that of a conditional, or hypothetical. That is, it follows the general form of If X is the case then do Y. The antecedent of the conditional is "X," which is, "if my car starts." This part of the conditional is the condition which must be fulfilled in order for the consequent "Y" to take place. The antecedent is sometimes referred to as an enabling condition. "Y" is, in this example, the intention, "I am going to the store." The statement is called a conditional intention because while it has the same function as a simple intention, that of informing the listener about one's future course of action, it is complicated by there being a prior enabling condition. The intention will only be fulfilled if the antecedent comes about. Specific conditional intentions, as opposed to general conditional intentions (discussed immediately below), are species of intentions. They are discussed here in order to introduce the concept of a general conditional intention which is a kind of norm.

Conditional intentions may take a general or "normative" form, which is, Whenever X is the case, then do Y. Furthermore, according to Von Wright (1963), there are two kinds of general or normative conditional intentions. These are (1) technical norms and (2) hypothetical norms. Technical norms and hypothetical norms have the same form, however, they differ in the kind of condition that is mentioned in the antecedent, i.e., in "X." The antecedent to a technical norm always mentions a "want," that is, something that is wanted, needed, or desired by the speaker. An example would be, "Whenever I want to relax, I work on my car." The want that is mentioned is "to relax." This is the antecedent "X" in the general form, "Whenever X is the case, then do Y." The consequence of the conditional is an intention, specifically, the intention to "work on my car."

The antecedent of a hypothetical norm can be any state of affairs other than a "want." Again, this is the only difference between these two types of norm. So for example, a hypothetical norm (i.e., general conditional intention) might be the sentence, "Whenever my car won't start, I fix it myself." The speaker is stating a general intention which has a general condition. We might say that the statement is "timeless." It makes no reference to any specific time but rather to a general dispositional tendency of the speaker.

Intention. The next category is that of "intention," which expresses a plan of action; a design that guides an action toward some goal object. The sentence category "intention" is to be distinguished from

the philosophical term Intentionality (c.f. Dennett above). A sentence that is categorized as an intention mentions a want but also indicates that one intends one's behavior to be interpreted as being directed towards attaining the object, event or state of affairs wanted. Sentences such as, "I am going to the store," or "I will do it tomorrow" are straightforward intentional statements. The first sentence might be the interviewee informing the interviewer of the next step in the problem solving process, one which has yet to be accomplished.

An intention may be simple, as in the above example, or complex as in, "I am going to the store if my car will start." This statement is categorized as a conditional intention; in a conditional intention the action being considered is only probable. That is, it will only occur if the condition (in the above example that the car starts) turns out to be the case.

Want. The next category is "want." The category of want is very closely related, conceptually, to that of intention. This is because all intentions refer to a want. However, we reserve the category want for those utterances that name a thing wanted without at the same time expressing an intention to achieve that thing. A want is like an intention, but the person who expresses the a sentence that is categorized as a "want" is identifying a possible goal while leaving out what he intends to do about the goal. I can reasonably say that I want something but have no intention of trying to get it. An adolescent day dream about an expensive sports car is an example of a want which would generally have no real intention attached to it.

Beliefs. Beliefs comprise the last category and are essentially opinions. In the context of acquiring expert knowledge from a practitioner in some domain, the category of "belief" would constitute those facts that the expert believes to be true about the world. The collection of "beliefs" then, would constitute the knowledge base of the expert being represented. "Facts" then are justified true beliefs. For the purposes of categorizing the sentences that constitute an argument structure, beliefs function like facts.

CHAPTER 5

STRUCTURAL ANALYSIS

At this point in the analysis, a transcript that has been subjected to all of the elements of the method discussed in Chapter 4 provides the analyst with the following: (1) a defined problem space, (2) a set of identified and categorized manipulatable argument elements, and (3) a roughly organized set of argument structures. To summarize, the problem space is the boundary of the problem as defined by the interviewee. The data which are manipulated are the intended interpretations which have been derived from the protocol and which have been categorized. Finally, accounts or explanations of actions have been isolated so that they can be subjected to the structural analysis. First it will be necessary to explicate the concept of a practical argument and its relation to a formal syllogism. Two points about practical arguments will be addressed: (1) practical arguments as found in conversation are usually enthemematic, and (2) practical arguments are usually complex. Finally will be discussed the specifics of a method of argument analysis for accounts. It will be shown how the argument analysis generates hidden premises that constitute the role rule model for the interviewee.

Practical Inference

An account given in the form of a practical argument is taken here to be a first person description of reasons for, or reasonings leading to, some action. A practical argument or practical reasoning, is

reasoning which leads to a conclusion which can be either an action, an intention, or a statement of an "ought" (e.g., "I ought to do X"). An example of one type of practical inference is:

I want that car.

If I get money I can get the car.

(I will get money.)

The first premise mentions a want. The second shows the means to the end which is desired and the conclusion is a declaration of intention. Another type of practical inference is one which involves, roughly, reasoning about the "right thing to do." For example:

It is right to give a lady one's seat.

This lady is without a seat.

I ought to give this lady my seat.

Here, a fact is subsumed under a general principle about something that is generally good to do. Syllogisms which are practical in the above sense are objects of study, by philosophers, who investigate the logical properties of such arguments. In a discussion of the logical properties of practical arguments, Anscombe (1978) points out that the conclusion of a practical syllogism, as Aristotle conceived of it, is an action. One example she provides is:

Vitamin X is good for all men over 60.

Pigs' tripes are full of vitamin X.

I'm a man over 60.

Here's some pigs' tripes.

(I eat.)

For Aristotle the conclusion is "said" in the mind of the person who contemplates these premises, whereupon some action such as the eating of pigs' tripes ensues. The conclusion here is a verbalization of the action presumably taken and is indicated by a parenthesis. Reasoning as it is ordinarily studied in philosophy is reasoning that leads to the truth of a proposition, whereas practical reasoning does not. Anscombe (1978) points out that practical reasoning is a "form of calculation what to do" and that it is "essentially concerned with 'what is capable of coming out variably'." This means that there is no logical necessity involved in the relation between the premises and the conclusion of a practical argument; the man might not eat the tripes and not be called illogical, perhaps he simply wasn't hungry. The argument can turn out "variously," whereas the conclusion of a valid formal syllogism cannot turn out "variously" but has a logically necessary conclusion.

The point of all this is that even though nothing follows necessarily from a practical argument this is still reasoning, though as Anscombe puts it, "it is clear that this is another type of reasoning than reasoning from premises to a conclusion which they prove" (p. 36). She further points out that Aristotle cast his examples of practical syllogisms as closely as possible to the form of the syllogism, whereas it is quite legitimate to think of reasoning which doesn't accord with the syllogism as still being "practical." All of this is convenient as a starting point in an investigation of accounts. Accounts describe deliberations which culminate or have culminated in action and it is helpful to have a schema of explanation to formulate preliminary ideas

about how to organize and understand the form of such data. Note especially that this is not a "logician" rendering of accounting practices--even less is it a logicist rendering of private mental events. It is first and foremost an attempt to make sense of a certain kind of social activity--explaining one's action. The concern here is not primarily with the logical properties of practical syllogisms, though such studies can provide an important preliminary to an empirical investigation by providing an analysis of the concepts involved, but rather with how persons, in the course of explaining actions that they have taken (or are about to engage in), use practical reasoning in natural settings to explain their actions.

With regard to the first point about practical arguments, that they are enthymematic, in natural settings a person will often not give a complete argument; that is, an argument with all relevant premises made explicit. An argument which has unstated premises is called enthymematic. For example, if someone says, "I wanted to cut down on my heating bills so I decided to buy more insulation," one inference that we would be justified in making is that the speaker felt that his present insulation was inadequate to some degree. This assumption can be put into the form of a practical syllogism in conjunction with the original account as follows:

I want to reduce my heating bills.

Inadequate insulation caused my high heating bills.

I will buy insulation.

The first intended interpretation expresses a want, that is, to cut heating bills. This is the first "premise." The second premise, which we inferred, asserts a causal relation between poor insulation and high heating bills. The conclusion of the practical inference is the intention to buy insulation. What we have done with the original statement is break it down into its intended component interpretations in order to make the grounds for the conclusion explicit. A major issue of this section is to establish a rationale which justifies deduction of hidden premise(s) in an enthemematic argument on basis of surrounding context.

The second point, concerning the complexity of practical arguments, is that arguments in an "ordinary" conversation (as opposed say, to a carefully constructed speech) have various argument threads dispersed throughout the fabric of the conversation, often "out of order." The task of the analyst is that of bringing these threads together so that an argument can be analyzed as a coherent whole, without violating the original intent of the speaker. When the argument is isolated, it is possible, using the methods described below, to derive the unstated premises. In order to isolate arguments, the analyst identifies the main conclusions of each argument in the conversation and distinguishes reasons for those conclusions from each other and from extraneous reasons. When the argument structure is explicated, the structure of the argument and the context in general provides constraints on the possible reasons that were unspoken but which, in a sense, must be there for the argument to be reasonable.

Enthememes

In order to get clear about enthememes, it is useful to examine such arguments as they occur formally, that is, as syllogisms.

The major premise in a syllogism is usually some kind of generalization. So, for example, we may find (or construct) a syllogism with a law or rule as the major premise. For example, "All men are mortal" is called a universal generalization, that is, a generalization about all men. A minor premise such as "Socrates is a man," is a factual statement which is an instance of the universal generalization. If we were given only these two statements we would say that the conclusion is obvious. This is because there is a sense in which the conclusion is "in" the two premises. The conclusion "Socrates is a mortal" is so clearly implied that one feels that it need not even be said. Indeed, in ordinary conversation, someone making the point might reasonably offer only part of the complete argument. They might say something like "Socrates was a man so he was mortal" or perhaps, "All men are mortal so Socrates was also." In the first case we notice that the major premise was omitted and that in the second case the minor premise was omitted. We might also notice that in either case they seem not to be needed at all.

It is also possible to leave a conclusion unstated. This might be done for example, when the speaker wants the listener to come to the conclusion on his own. So someone might say, "Socrates was a man and men are mortal so" One sees the "whole" argument quite well

without these parts because they are such common assumptions. In order to make an argument structure explicit, so that hidden premises can be explicated, it is necessary to diagram the arguments. I will discuss a method of diagramming in the next section.

Argument Analysis

In an analysis of an argument found in a problem solving interview, it is necessary to make explicit any part of an argument that has been left unstated. In this method the argument is first represented as a tree diagram (not an upside down tree as is conventional). The root node is the conclusion of the argument. Reasons that support the conclusion are represented as branch nodes. The method follows one given by Nolt (1984).

Nolt defines an argument as "a sequence of declarative sentences, one of which is to be evidentially supported by the others" (p. 2). This is a sufficiently broad definition to provide freedom from the restrictive schema of the formal syllogism. This freedom is necessary because of the nature of the data, which are arguments that have a complex structure. As was pointed out, practical arguments do not normally argue to the truth of a proposition but rather are given as grounds for justification of some intentional behavior. Nolt provides a method of argument analysis designed primarily for demonstrative arguments (i.e., ones arguing to the truth of a proposition), but his methods can also be applied to practical arguments given informally. Where the aims of one interested in practical arguments might diverge from one interested in

informal demonstrative arguments is in the evaluation of the "strength" of an argument. One would probably not think in terms of "strength" when evaluating practical arguments but rather in terms of something like reasonableness or justifiability. This issue becomes important when the basis upon which one can justify the addition of hidden premises in arguments will be.

On the methods proposed by Nolt (1984) for informal argument analysis, the development of a "tree" diagram of an argument follows these conventions:

- (i) Number the intentional interpretations that constitute a given argument.
- (ii) Diagram the argument, using the numbers to represent corresponding statements, plus signs and lines to join premises used in a single inference, and arrows to represent intended evidential support. (p. 25)

When the argument is diagrammed the hidden premises are explicated in the following way. In the context of the overall method proposed here, hidden premises are formulated on the basis of four criteria (as proposed by Nolt; see below) during the first round of an interview analysis cycle and they are treated as hypotheses about rules and beliefs held by the interviewee. They are then used by the analyst to structure subsequent interview analysis cycles. Nolt's four criteria are:

- (1) Add only statements which the author would have intended to be taken for granted.
- (2) Add premises only if they strengthen the reasoning.
- (3) Do not add premises which merely embody a stated inference.
- (4) If several different sets of premises satisfy criteria (1)-(3), add the premise or set of premises which make the argument strongest. (p. 101)

What is the justification for these criteria? In ordinary social interaction a principle of charity seems to normally apply, that is, we give each other the benefit of doubt when the speaker does not supply a premise which is necessary for our understanding an account. A friend says "I want a car, I'm going to get money." An expected response on my part might be "What kind are you going to get," an unexpected reply "Why do you want money." One begins with the assumption that the speaker is rational, that there is a reasonable connection between his wanting a car and going to get money, and on that basis one fills in the "hidden" premise; in order to get the car I must get money. In fact the premise is so obvious, given the principle of charity, it is plausible that there is no "filling in" of premises on the listeners part at all--one sees right off what the speaker intends. As Nolt (1984) explains:

Knowing that some arguments have missing premises presents us with a problem" How can we decide which seemingly fallacious inferences are genuinely fallacious and which are really rational but lacking a premise or two? The answer, I'm afraid, is that we must try to divine the author's thoughts. An argument, after all, is its author's creation. If it contains more than is actually stated, that is because the author would have expected the unstated parts to be taken for granted and thus did not verbalize them. Therefore, the only way to know for sure whether an argument is genuinely fallacious or merely incomplete is to ask the author what he or she had in mind. (p. 99)

In a conversation, a "reasonable" argument is one that makes sense, and has sufficient justification. As Anscombe pointed out, except in a case where there is a universalized major premise (e.g., One must always give a lady one's seat), no action follows necessarily from reasons for actions which are thought of or offered as justifications. We cannot

therefore apply the same standards to a practical argument as we can to a demonstrative argument (i.e., one which is judged in terms of validity in the sense of the conclusion preserving the truth value of the premises). At the same time it is clear that a practical argument in such a form is "reasoning," and a person who offers an account can be subject to judgements about his "rationality." Such an assumption of rationality forms the basis for considering what premises can be added to an enthemematic account. This leaves us, though, with the problem of explicating the concept of a "rational" argument in terms other than formal validity. Consider the argument:

This person is depressed.

I must rule out physical causes.

(I will send her to a physician.)

The conclusion of a practical argument is supposed to be an action. The conclusion here is a verbalization of the action and so is in parentheses, indicating that this is a verbalization. The conclusion, being an action, is neither true nor false, only propositions are true or false. Being an action, this conclusion does not follow necessarily from the premises in the argument as stated. The argument, as a whole, is reasonable in the sense in which we would say that the speaker had good reasons for the action. On the other hand, consider the deductive argument:

All things made of cheese taste good.

The moon is made of cheese.

The moon tastes good.

This argument is formally valid (truth preserving) but it has a false premise and so leads to an unacceptable conclusion. We would be tempted to say the argument was not reasonable, even though it is valid. Deductive validity cannot therefore be the only criterion for an argument being considered. The connection between the premises and conclusion of a deductive argument is one of entailment which is all that matters when such an argument is formally evaluated. On the other hand, the connection between the reasons and action in a practical argument is to be found in extralogical considerations such as those which Dennett (1981) proposes. He explains that in a folk psychological "rationalist calculus of interpretation and prediction . . . reason giving explanations (make) an ineliminable allusion to the rationality of the agent" (p. 8). He points out that we make intentional ascriptions according to the following (rough) principles:

- (1) A system's beliefs are those it ought to have, given its perceptual capacities, its epistemic needs, and its biography.
- (2) A system's desires are those it ought to have, given its biological needs and the most practicable means of satisfying them.
- (3) A system's behavior will consist of those acts that it would be rational for an agent with those beliefs and desires to perform. (p. 9)

A narrow conception of "reasonable" is that the action has a good reason as a basis while a broad sense might be that it merely has a reason and a reason is a belief, rule, want, etc., that the system "ought to have, given its perceptual capacities, its epistemic needs and its biography," to quote Dennett again. The latter is an extralogical consideration. A judgment of reasonableness then, goes beyond the

formal properties of an argument and takes the content and context of the argument into consideration. When we decide if a person's reasons make sense of the person's actions, we do so in terms of some sort of estimation about the person's presumed beliefs, wants, and desires. This presupposes that we understand or know enough about the person's knowledge base and role/rule structure to evaluate the reasons. To put it another way, to judge whether an action was reasonable we might, following Dennett's principles, consider whether the action was one which a rational system would do given the beliefs, wants and desires the system ought to have.

The purpose here is not to judge the reasonableness of any particular action, but to determine on what basis we might attribute a hidden premise to a person given an enthematic practical argument. In other words, we are not concerned here with evaluating the arguments that are diagrammed but only with a attempt to represent them in such a way that, on reading the argument with hidden premises, an interviewee would assent to the hidden premise. What is being established is a basis for inferring those premises. That basis seems to be "reasonableness," a concept which is based on an idealized notion of rationality. We idealize by saying, if the person were rational the premise would be such and such, given the context.

The principle of charity is an idealization, but when faced with enigmatic episodes, it is an idealization in which we seem to often engage when making attributions to an other. For example, in the account,

I want a car.

I am going to get money.

there is no explicit connection made between the want and the intention--it is inferred. We infer the premise on the basis of the assumption that there is a rational connection and proceed from there. A study of reasoning in this broad sense, i.e., one which takes extralogical considerations into account, can also, as we shall see below, accommodate references to feelings if we exploit the extra-logical connection between reasons and actions.

Discussions of "rationality" are often associated with attempts to "mechanize" reasoning, to the exclusion of "feelings." It is the view here that this does not need to be the case. In practical reasoning we often come upon statements, in justifications, that make reference to feelings. Feeling avowals also enter the interview technique presented here insofar as it is useful to ask an interviewee in a problem solving interview how he or she felt about some event.

Feelings or emotions are usually thought to be somehow in opposition to "clear thinking." We sometimes say that emotions should not influence our decisions or that emotional appeals work against a clear perception of the logic of an argument. There is a common view that "thinking" and "feeling" are in different spheres, emotions being "bodily" and thinking being "mental" and one is against the other.

In ordinary conversation though, we often make reference to beliefs by expressing a feeling, as in: "I felt it was a bad move on his part." The speaker might as easily have said "I believe it was" A

feeling self attribution is not necessarily serving a referential function and may not be referential at all. For example the statement, "I have a bad feeling about this place," can in certain circumstances mean, "Lets get out of here." An important question about feeling avowals is how often we are only or primarily reporting a feeling state--making a feeling avowal--whose function is to convey the information that such and such a feeling exists. In order to examine the question of what part reference to feelings play in practical arguments it might be profitable to examine the uses of feeling avowals to see if a range of uses can be established. Such an undertaking is, of course, beyond the scope of this chapter; however, in the following I would like to show that feeling avowals can, in fact, figure into a rational argument.

A feeling avowal which is referential can be a reason for an action but may not figure into a calculation, as in, "I am sick so I will not go." This is not a calculation what to do. Neither is, "He hit me, so I (will) hit him." On the other hand, the argument:

I feel sorry for him.

under the description, "he looks like he needs help," in conjunction with

In order to help I should give money.

(I will give money.)

is a calculation what to do. "I feel sorry . . ." functions as a belief; that is, this might be its intentional interpretation. If "I feel sorry . . ." is intended as an expression alluding to a belief, the analyst would need to determine this description of the utterance from

the context and from knowledge about the speaker. In the former examples, the connection between the reason and action is one of "mere desire" (Anscombe, 1958), whereas the calculation can be evaluated as reasoning, subject to the extralogical criteria for an arguments being rational.

CHAPTER 6

INTERVIEW ANALYSIS

This chapter contains an analysis of two transcripts of an interview with a clinical psychologist. The transcripts for the interviews are contained in Appendixes A and B. The purpose of this section is to demonstrate how one does the interview analysis technique. The analysis will conform to the guidelines set out in Chapter 4. The transcript will be subjected to a reduction of the interviewer's responses to a series of arguments that will be analyzed for hidden premises. The hidden premises are taken to be a representation of the tacit knowledge that the interviewee used in solving the problem that the interview is about.

The subject of the interview is a sixteen year old female client whose presenting problem was depression. It was found that she had been subjected to sexual abuse by her stepfather. The interview concerns the initial phase of the therapy program and centers on the various hypotheses entertained by the therapist beginning with the first stages of the therapy, up to and including the point where the abuse was discovered.

The analysis demonstrates: (1) the interview technique, as embodied in the interview transcript, (2) the segmenting of the transcript into intended interpretations, (3) the categorization of the intended interpretations, (4) the diagramming of the informal and practical arguments, and (6) the deduction of hidden premises where necessary.

Method

The analysis will conform to the following analysis steps.

1. Each action that the interviewee described herself as having taken is identified and then ordered in terms of its actual sequence of occurrence. This can be seen in the list of intended interpretations at the beginning of the analysis below.

2. For each consecutive action, all statements made by the interviewee that serve as justifications for that action step are extracted from the interview transcript, categorized and then paraphrased if that statement is not a complete sentence. For each group, the argument is identified as the BASE ARGUMENT. This is the argument as it is without the hidden premises made explicit. The BASE ARGUMENT demonstrates how each set of intended interpretations (c.f. Chapte 4) should be grouped together with the action step, or "intention" that they justify.

3. Following each BASE ARGUMENT there is a discussion that describes how or why the rules that are inferred can be justified. Each discussion attempts to answer the questions, "Why is this rule the hidden premise?," and/or "How was this rule arrived at as the hidden premise?"

4. For each group, the hidden premises are determined and the argument is presented and called the FINAL ARGUMENT.

These steps will be represented with the following format:

1. The section of the transcript that contains the argument will be displayed. In each case this is labeled TRANSCRIPT.

2. The argument structure with coded, paraphrased intended interpretations will be displayed. The statements categorized as "intentions" are in parentheses at the end of each argument. This argument structure will be called the BASE ARGUMENT.

3. The full argument with the hidden premises that were inferred by the analyst will be displayed. This will be called the FINAL ARGUMENT.

3. The discussion of possible questions that can be asked in a second interview, on the basis of the inferred hidden premises, will follow the first interview analysis and serve as an introduction to the second interview analysis.

Appendix A contains the full transcript of the interview with the therapist. Appendix B contains the diagrams of the analyzed arguments. The following section contains the analysis of the first interview.

TRANSCRIPT

I: What were some of your hypotheses?

C: Well, at the very beginning, my first thoughts were that it might be physically caused, that's the first thing you look at . . . so I referred her to a physician for a checkup and he came back and said that she was healthy, but she wouldn't allow him to do any blood work . . . she has a phobia about needles . . . and she wouldn't let him draw blood . . . so there still was some possible doubt . . . you know, about her health, but I felt relatively secure that it wasn't physical at that point.

BASE ARGUMENT

- A. 1. A physical cause is the first thing you look at. (rule)
 2. (The depression) might be physically caused. (belief)
 3 (I referred her to a physician for a checkup.) (intention)

DISCUSSION

For the therapist referring the client to a physician is a reasonable move given that one should check out physical causes first and given that the cause of the depression might be physical. A rule is needed to make the argument complete. The rule should cover such a case and implicate a move that the therapist should take, given the circumstances. Rule A1-3 accomplishes this.

FINAL ARGUMENT

- A1. 1. A physical cause is the first thing you look at. (rule)
 2. (The depression) might be physically caused. (belief)
 3. One should have a physician rule out suspected physical causes.
 (rule)
 4. (I referred her to a physician for a checkup.) (intention)

DISCUSSION

The inferred premise A1-3 is a rule, i.e., a general guide to conduct. This norm specifies an action to be taken, namely "consult a physician" given a circumstance, here, the rule, to check out physical

causes. The enabling conditions that trigger the rule in this situation are (at least),

1. If there is a cause to believe depression is physical.
2. If no other determinations have been made.

TRANSCRIPT

I: At that time did you have any hypotheses about what might be causing it?

C: Well, I referred her to the physician specifically to check for Premenstrual Syndrome because that can cause depression the whole month, you know, during the whole month of the cycle, which is basically continuous depression . . . and her age, you know, was right for that to be possibly going on . . . she was 14 at the time.

BASE ARGUMENT

- B.
1. PMS can cause depression for a whole month. (law)
 2. Her age was right for (PMS) to be possibly going on. (law)
 3. PMS is a physical cause of depression. (law)
 4. (I referred her to a physician to specifically check for PMS.)
(intention)

DISCUSSION

Given PMS as a possibility, it would have to be a significant enough possibility to require a physician, hence we make the presumption that it had a significant probability for the therapist because she did send the client to the physician (proposition B-4). Given a significant probability, and given the act of sending her to the doctor, we need a

rule that would be prescriptive under such circumstances, hence rule B-7.

FULL ARGUMENT

- Bl. 1. PMS can cause depression for a whole month. (law)
2. PMS would appear as continuous depression. (law)
3. Her age was right for (PMS) to be possibly going on. (law)
4. There was no significant evidence against PMS. (belief)
5. Therefore PMS as a physical cause of her depression had a significant degree of probability. (belief)
6. PMS is a physical cause of depression. (law)
7. One should have a physician rule out suspected physical causes.
(norm)
8. (I referred her to a physician to specifically check for PMS.)
(intention)

TRANSCRIPT

- I: So the very first thing that you started to concern yourself about, and this is before the mother started talking about possible problems with the father, was physical.
- C: Because so many forms of depression could be caused by physical problems . . . you have to rule those out before you can, you know, go anywhere . . . so those were ruled out . . . then I started talking with the mother and the next thing that I thought might be the problem was the fact that Angie had too much responsibility for the other children and she had to care . . . she had to take care of them and baby sit them all the time . . . she never got to go out or do anything.

BASE ARGUMENT

- C. 1. So many forms of depression could be caused by physical problems. (law)
2. One should not begin psychotherapy if it is precluded as a cure. (norm)
3. One should not begin psychotherapy for depression caused by physical problems. (norm)
4. (You have to rule out physical problems before you can begin therapy.) (technical norm)

DISCUSSION

C-4 implies that the therapist would rule out physical causes before beginning therapy. From this, we derive the rule C1-3. Since we know that PMS is a physical cause of depression, and we have presumed the rule C1-3, that is, that we can't begin therapy until physical causes are ruled out, we derive the "law" or as it is defined in Chapter 4, the "physical regularity," C1-2.

FULL ARGUMENT

- C1. 1. So many forms of depression could be caused by physical problems. (law)
2. A physically caused depression would preclude psychotherapy as a cure. (law)
3. One should not begin psychotherapy if it is precluded as a cure. (rule)

4. One should not begin psychotherapy for depression caused by physical problems. (rule)
5. (You have to rule out physical problems before you can begin therapy.) (technical norm)

DISCUSSION

This is an argument for the truth of a technical norm. The specific norm C3 is central to the argument embodied in A and B. That is, this is a justification for a justification. What is illustrated here is how the interviewer can probe reasons for reasons. There is no real limit to the depth of the probing, just the relevance to the problem as a whole. By probing for reasons that justify other reasons, one moves in the direction of ever more general norms and rules, but always ones which are grounded in some specific action.

A technical norm has the form, in order to do X, one must do Y. This norm would be, in order to begin therapy, one must rule out physical causes first. In the original, the word "because" is a premise indicator and it is therefore the reason for the technical norm. C1-1 posits an environmental regularity, that depression (and by implication, this depression) might be physically caused. Given such an interpretation of this situation, the therapist is faced with the fact that the therapy cannot go forward if there is a physical cause. Assuming (again) that one wants to go ahead with the therapy, one arrives at the technical norm C1-5 which serves to justify sending the patient for a physical examination.

TRANSCRIPT

- I: So the very first thing that you started to concern yourself about, and this is before the mother started talking about possible problems with the father, was physical.
- C: Because so many forms of depression could be caused by physical problems . . . you have to rule those out before you can, you know, go anywhere . . . so those were ruled out . . . then I started talking with the mother and the next thing that I thought might be the problem was the fact that Jane had too much responsibility for the other children and she had to care . . . she had to take care of them and baby sit them all the time . . . she never got to go out or do anything.

BASE ARGUMENT

- D. 1. Jane had to take care of (the children) and baby sit them all the time. (belief)
2. (Jane had too much responsibility for the other children.) (belief)

DISCUSSION

Argument D requires some kind of general psychological principle under which the belief D-1 would have to fall for the inference to carry through to the conclusion D-2. One way of putting this is as it is phrased in D1-3. Such a premise obviously requires elucidation since we have no way of knowing, on the basis of what is given, how much "too much" is.

FULL ARGUMENT

- D1. 1. Jane had to take care of (the children) and baby sit them all the time. (belief)
2. Jane was an adolescent. (belief)
3. Any amount of responsibility that keeps an adolescent from time to herself is too much responsibility. (norm)
4. (Jane had too much responsibility for the other children.) (belief)

This is an argument for the truth of the belief that Jane had too much responsibility. Responsibility is a relative term and is therefore a matter of judgment, presumably of the type the therapist is expert at, for a situation like this. The therapist is offering an instance of the excessive responsibility which she sees the client as having, and at the same time points out that the client's reports about the amount of responsibility is not exaggerated.

TRANSCRIPT

- I: Why were you "just talking"?
- C: Well, I was trying to get her to communicate with me about anything . . . trying during the first month or month and a half at least I was just trying to establish a relationship.
- I: Is that typical?
- C: Well, it goes a lot faster with some kids, but, you know, Angie didn't want to talk about anything and she was so depressed that she had very little energy to look at her own behavior and to analyze anything . . . she just didn't have the energy for it.

I: Why did you feel that that was the best thing to do in her case?

C: It was the only thing I could do . . . I mean, unless I could get her talking to me, I couldn't go anywhere, and when she first came in she wasn't . . . she wouldn't talk to me at all . . . she would just sit and cry.

BASE ARGUMENT

- E. 1. I want to establish a relationship with Jane. (want)
2. Unless I could get her to talk to me I couldn't get any where.
(belief)
3. (I talked to Jane.) (intention)

DISCUSSION

Given the therapist's "want" to establish a relationship, which is a justification for "just talking," the argument as it stands needs a rule that would cover such a circumstance for it to be a complete practical argument. The technical norm E1-5 was inferred so that the argument would have such a complete justification. The basic structure is, "I want to establish a relationship, to do that I need to talk, therefore I will talk."

FULL ARGUMENT

- E1. 1. I want to establish a relationship with Jane. (want)
2. Unless I could get her to talk to me I couldn't get any where.
(belief)
3. Jane was uncommunicative. (want)

4. I had to get to communicate with me. (want)
5. The best way to get someone to communicate is to try to talk to them. (technical norm)
6. (I talked to Jane.) (intention)

This is a practical argument since the conclusion is an intention. The argument is a justification for a particular approach to dealing with the problem which was that Jane would not talk about her real problem, the sexual abuse. Any movement near the topic of her relation to her father either made her avoid the topic by talking about something else or made her cry.

While it is clear that "talking about anything" might help establish a relationship, the implied technical norm El-5 makes implicit reference to a behavioral regularity or "law," i.e., talking will help establish a relationship. The use of such a "law" is not necessarily typical as a therapeutic approach. This argument analysis method makes explicit the particular lawfulness that is being exploited here and allows the interviewer to approach the issue with the therapist in the follow-up interview, treating this implicit "law" as an hypothesis about the therapist's intentions which can then be explored in further sessions.

TRANSCRIPT

- I: So . . . let's see if I understand this . . . you checked out the physical, talked to the mother, then talked to Angie . . . Angie tells you that she has a lot of responsibilities and basically lets you know that the way she sees her responsibilities is also the way the mother sees

Angie's responsibilities, so Angie, in that sense, isn't deluded about how much work she has . . . what does that lead you to conclude about Angie in general?

- C: Well, I guess I saw her at that point as being honest and unselfish, basically, and that she probably had some good reasons for being as depressed as she was, although I didn't . . . I really sensed that what she was telling me wasn't all there was . . . I mean, she wouldn't be that depressed about the situation as she described it . . . she understood it too well.

BASE ARGUMENT

- F. 1. Jane understood the situation too well for the situation to depress her that much. (belief)
2. She would not have been that depressed about the situation as she described it. (belief)

DISCUSSION

This argument is demonstrative not practical (c.f. the discussion of practical arguments in Chapter 5) and as such it needs a covering law to allow the inference from F-1 to F-2. The "law" F1-2 would explain the inference as it is stated since what seems to be implied by the stated premise and conclusion (F-1 and F-2) is that there is more going on with Jane than what she has brought out at this point. It follows from this "law" that if she had reasonable insight into the causes of the depression she would not be as severely depressed. She seemed to understand her familial situation and its problems well enough and yet was still quite depressed. It follows from this that there is reason to believe that there is more to the problem than is apparent, hence the inferred "law" F1-2.

FULL ARGUMENT

- Fl. 1. Jane understood the situation too well for the situation to depress her that much. (belief)
2. Depth of depression is an inverse function of insight into the depression. (law)
3. She would not have been that depressed about the situation as she described it. (belief)

DISCUSSION

The therapist can apparently "sense" a relation between something like "depth" of a depression and the "depressiveness" of the client's situation. By using the stated assumptions to expose the hidden premises, the interviewer/analyst is forced to clarify as much as possible the intended interpretation. This will in turn, provide very specific constraints on the next round of interviewing. In this case, the analyst would determine first if this interpretation is accurate and then determine if the implications of the interpretations are warrantable by or acceptable to the interviewee. One would want to know if the therapist meant to imply such a correlation between "insight" and "depth" of depression.

TRANSCRIPT

I: What did you think about that at the time?

C: Well, at first I wasn't sure what to think because I'd been seeing . . . it's complicated here by the fact that I

had been seeing the brother for a long time, so I already knew some things about the father and what he was like . . . and in the past he had been very explosive and kind of violent with the family . . . and so at first I thought that maybe she was afraid of him because of him being very strict and emotional.

BASE ARGUMENT

- G. 1. I already knew in the past the father had been very explosive and kind of violent with the family in the past. (belief)
2. (I thought that maybe she was afraid of him because of him being very strict and emotional.) (belief)

FULL ARGUMENT

- G1. 1. I already knew in the past the father had been very explosive and kind of violent with the family in the past. (belief)
2. What she told me does not account for all the depression. (belief)
3. Excessive emotionality in a parent might cause depression and fear. (belief)
4. (I thought that maybe she was afraid of him because of him being very strict and emotional.) (belief)

This demonstrative argument is either inductive or fallacious since one can imagine a situation where a father is excessively emotional and "kind of violent" but where the child is not afraid of these conditions; perhaps nothing ever really comes of the father's emotionality. The hidden premise, G1-3, only posits a probable cause in keeping with the

generally hypothetical quality of the therapist's reasoning in this segment. However, the character of the violence and emotionality, coupled with the excessive responsibility might have been sufficient to cause the depression. In isolation the argument is at best inductive; however, in terms of the prior statements the argument's strength increases as these other considerations are taken into account.

TRANSCRIPT

I: What did you do next?

C: Well, by this time I had a pretty good idea of all the restrictions that the father was placing on Angie in terms of her social life and I had a pretty good idea of how he was undermining the mother's authority in the home . . . he's a truck driver, so he was gone on the road a lot . . . and so I demanded a meeting with him to try to get a better sense of what was going on.

I: Could you tell me more about why you wanted this meeting?

C: Well, I don't know . . . I don't think . . . I'd talked to him maybe once or twice before this, just when he'd come along to pick up David, the younger brother, from the therapy session, a group therapy session that he was in . . . so I'd never really talked to the man before and didn't know him at all and I felt at this point since he was having such an influence on what was happening that I needed to meet him and draw my own conclusions about him instead of going on third party information.

BASE ARGUMENT

- H.
1. I'd talked to him briefly maybe once or twice. (belief)
 2. By this time I had a pretty good idea of all the restrictions that the father was placing on Jane in terms of her social life. (belief)
 3. I (should have) met with him. (intention)

DISCUSSION

What is essential to this argument if it is to be complete is to have a rule that would allow the inference from the need to meet the father to the intention to do so. In this argument there are actually two factual premises lines, one being reasoning from the assumption that the therapist did not know the father and so needed to talk to him to get to know him. The second line of reasoning is from the factual premise that the therapist needed to know what other factors might be influencing Jane's problem, so that the therapist needed to meet with him so as to get those possible factors (hence H1-6).

FULL ARGUMENT

- H1. 1. I'd talked to him briefly maybe once or twice. (belief)
2. One can't get to know someone from just a few brief conversations. (law)
3. I didn't really know the man. (belief)
4. By this time I had a pretty good idea of all the restrictions that the father was placing on Jane in terms of her social life. (belief)
5. I needed to know about major factors influencing Jane's problem. (want)
6. In order to get to know someone one must converse with them personally. (technical norm)
7. To converse personally, people need to meet. (belief)
8. I (should have) met with him. (intention)

DISCUSSION

In general the therapist is searching for data (beyond what Jane has described) that might account for the depression, since what Jane has described does not adequately account for the depth of the depression. Perhaps the fathers "restrictiveness" and "overemotionality" had a reasonable explanation from the father's point of view. This would suggest a reinterpretation of the behaviors that fall under those descriptions, i.e., perhaps Jane actually provoked what were justified parental scoldings. In this case, the emphasis would shift towards helping Jane change some unacceptable behavior of her own.

The therapist is engaged in evaluating accounts, in this case an account by the father that might justify his actions. This information would, in turn, provide information for evaluating Jane's accounts. A competence that the therapist has as an expert is that of evaluating an account in terms of how well it justifies the account giver's actions. Accounts of how other accounts are evaluated is an element in the expert's competence that is explored in a study of expertise. The hidden premise I4 which is a technical norm which is triggered in the therapist by a need to gather accounts.

TRANSCRIPT

I: What did you do with that dream?

C: Well, nothing overtly with her . . . I did not want to negate . . . I wasn't ready to challenge her consciously with the incestual implications of the material she was giving me.

I: Why not?

C: Because I didn't think she could handle it emotionally and I didn't think she was ready to face it . . . she was only becoming . . . she was . . . I think what she was doing during that period was preparing herself to come forward with it . . . she was terrified of sharing that information with anybody because one of the things that's typical in sexual abuse in children is that they're always threatened by the adult that if they ever tell, that they'll be horribly punished in some way.

BASE ARGUMENT

- I. 1. I did not think Jane could handle (facing the issue of abuse) emotionally. (belief)
2. I think what she was doing was preparing herself to come forward with it. (belief)
3. I (did not) challenge her consciously with this issue. (intention)

DISCUSSION

The givens here are that Jane could not handle the issues on an emotional level and that the therapist thought Jane was preparing herself to come forward with the issue. These are the therapist's justifications for not challenging Jane on a conscious level with the dream material. The base argument requires a rule that would cover such a situation and allow the inference that the therapist ought not to challenge Jane consciously with the dream material. 11-4 accomplishes this.

FULL ARGUMENT

11. 1. I did not think Jane could handle (facing the issue of abuse) emotionally. (belief)
2. I didn't think she was ready to face it. (belief)
3. I think what she was doing was preparing herself to come forward with it. (belief)
4. When I think someone is preparing to face an issue but not yet ready to face it or handle it, I do not at that time challenge them consciously with it. (hypothetical norm)
5. I (did not) challenge her consciously with this issue. (intention)

DISCUSSION

Jane was terrified and so could not handle talking about the experience. This is so because, by implication, being terrified prevents discussion. The analyst must determine how terrified she is and whether the fear was the kind that would prevent her from talking. We know that, in fact, the fear was just the sort which one would expect to cause Jane to be reluctant to discuss the issue--she was afraid of the retribution which was, from Jane's point of view, highly likely, namely that the father would punish her for telling anyone what was happening. So there are caveats associated with J4 just as there are with most all of the normative hidden premises.

On the assumption that Jane was not ready, was terrified and was preparing herself to tell the therapist what was happening, the therapist did not challenge Jane with the implications of the dream.

TRANSCRIPT

I: So basically what happened then?

C: Then the next event was when she . . . well, she gave me this dream and several others that I told you I wrote down the week before I found . . . that she told me about the abuse . . . the following week she came in with her best friend and said her best friend wanted to meet me and so I talked with her for a few minutes and then I had my session with Angie and I felt that night, and I don't remember exactly why, that Angie was going to tell me, you know, that night . . . what was going on with her father and she didn't . . . and she left the session and apparently that night she told her girlfriend what was going on with her father and the girlfriend immediately went to Angie's mother and told the mother who immediately told me and I instructed the mother of my obligations and her obligations legally and she made the call to the Department of Human Services the following day and reported it.

I: What did you do next?

C: Well, I had Angie come in specifically to have . . . to confront her about the information and to make sure that she expressed to me . . . she hadn't told anybody but the girlfriend . . . nobody had heard this from Angie except the girlfriend and so forth . . . so I had Angie come in and the girlfriend come in the following day and had Angie tell me what she had told her girlfriend.

I: Why did you do that?

C: Because at that point I figured that she had gone that far to tell the girlfriend she was ready for help and wanted help and the only way that she was going to get that help was to begin to talk about what was happening . . . and I felt that once she came up with enough courage to say it out loud once, that we all had to move very quickly and support her before she got scared and refused to go any further.

BASE ARGUMENT

- J. 1. She had gone so far as to tell a friend (about the abuse.)
(belief)
2. (She wanted and was ready for help.) (belief)
3. I felt that once she came up with enough courage to (talk about the abuse) once, that we all had to move very quickly and support her before she got scared and refused to go any further.
4. (I moved quickly to help her). (Intention)

DISCUSSION

At this point Jane has told a friend and the therapist believes Jane is ready for help. She believes she should now move quickly. Given that the therapist now moved quickly to help Jane, the inferred rule is K1-5.

FULL ARGUMENT

- J1. 1. She had gone so far as to tell a friend (about the abuse.)
(belief)
2. She was terrified of the incest. (belief)
3. Telling something frightening indicates desire and readiness for help. (law)
4. (She wanted and was ready for help.) (belief)
5. When a patient is ready for help, one should move quickly to do so. (hypothetical norm)

6. The only way that Jane was going to get help was to begin to talk about what was happening. (belief)
7. I was the one to talk to for help. (belief)
8. She needed to talk to me about what was happening. (belief)
9. I felt that once she came up with enough courage to (talk about the abuse) once, that we all had to move very quickly and support her before she got scared and refused to go any further.
10. (I moved quickly to help her). (Intention)

Second Argument Analysis

BASE ARGUMENT

- AA.
1. Jane was so emotionally out of control at that time that she seemed unable to control her crying. (belief)
 2. I wanted to get an opinion from someone who had a different perspective, by nature of training, than I did. (want)
 3. I wanted the physician to look at the whole picture, not just what I specifically referred Jane for. (want)
 4. (I referred her to a physician for a checkup.) (intention)

DISCUSSION

In this argument, the therapist provides a more comprehensive justification for sending Jane to the doctor. We learn that the depression was quite severe, enough so that the therapist felt that another opinion was warranted, not just merely that this is typically the first

thing one should do. Given this, a new rule is inferred, that one should have a physician checkup on severe emotional depression (AA1-4).

FULL ARGUMENT

- AA1. 1. Jane was so emotionally out of control at that time that she seemed unable to control her crying. (belief)
2. I wanted to get an opinion from someone who had a different perspective, by nature of training, than I did. (want)
3. I wanted the physician to look at the whole picture, not just what I specifically referred Jane for. (want)
4. One should have a physician checkup on severe emotional depression. (rule)
5. (I referred her to a physician for a checkup). (intention)

BASE ARGUMENT

- BB. 1. I wanted to be able to do something right away that would lessen the amount of pain she was in. (want)
2. In a lot of cases, having a physician verify that you're all right is comforting to people. (law)
3. I wanted a concrete reason for the referral that would make sense to both the mother and the daughter. (want)
4. I wanted to give them another way of looking at what was happening to Jane. (want)
5. It was really important for Jane as well as for Jane's mother to get some sense that there was something that could be done about this problem. (belief)

6. I wanted them to quickly feel as though there was something they could do to help figure out what the problem was. (want)
7. (I referred her to a physician specifically to check for PMS).
(intention)

DISCUSSION

In this argument set, the interviewee provides the technical norm, BB1-2. The hidden premise BB1-4 allows a connection between the rule and the intention to send Jane specifically to check for PMS. The new element here, with regard to the first interview, is the focus on the family dynamics. This elaboration on the original argument (B1) describes the therapist's concern that the family as a whole have a focus for the anxiety that Jane's depression was causing.

FULL ARGUMENT

- BB1. 1. I wanted to be able to do something right away that would lessen the amount of pain she was in. (want)
2. If one has a physician verify that the patient is all right one can comfort the patient. (technical norm)
 3. I wanted a concrete reason for the referral that would make sense to both the mother and the daughter. (want)
 4. Sending Jane to a doctor to check for PMS would give the family a concrete reason for referring Jane. (belief)
 5. I wanted to give them another way of looking at what was happening to Jane. (want)

6. It was really important for Jane as well as for Jane's mother to get some sense that there was something that could be done about this problem. (belief)
7. I wanted them to quickly feel as though there was something they could do to help figure out what the problem was. (want)
8. (I referred her to a physician to specifically check for PMS). (intention)

DISCUSSION

In the first round FULL ARGUMENT B1, one inference to a hidden premise was that there was no significant evidence against PMS. In questioning the interviewee about this inference, it turns out not only that there was a good deal of evidence against PMS but that the interviewee had a more comprehensive set of reasons for sending Jane to the physician, and that, in effect, sending Jane to the physician was a kind of ruse. The arguments against PMS were given as follows:

1. It might be a week or so during the month's time when she might be more normal. (belief)
2. It was a sudden onset of symptomatology. (belief)
3. You really would expect the symptoms to appear more steadily over time. (belief)

The depression didn't seem to necessarily coincide with her menstrual cycle either. (belief) There was some probability of PMS but that probability was somewhat lower than that implied by the reasoning in the first interview.

The next argument, CC, is complete as it stands and so is labeled as a FULL ARGUMENT.

FULL ARGUMENT

- CC1. 1. This mother had a strong sense of helplessness. (belief)
2. Jane did not have any privacy or free time to think about herself or do the kinds of things adolescents do as they are growing up. (belief)
3. Instead of being allowed to be a child, Jane was really playing the role and had the kind of responsibilities normally ascribed to the mother in the family. (belief)
4. Even if the responsibility Jane was given were appropriate to her age and ability level it's possible to have too little time to accomplish the developmental tasks she needed to be working on at her age. (belief)
5. (Jane's responsibility was inappropriate for a girl her age.) (belief)

DISCUSSION

The inference being tested here is D1-3, that any amount of responsibility that keeps an adolescent from time to herself is too much responsibility. The therapist qualifies the original inference by pointing out that it is the quality of the responsibility that was creating the tension, not so much the quantity, though that was certainly a factor. More importantly though was that the responsibility that Jane had

was a function of the overall family dynamics that put Jane into the position of a "mother," in effect, a replacement for the real mother, who was a "helpless" figure. These factors, as they were perceived by the therapist, led her to begin to formulate a picture of a family situation that had concrete implications for the hypothesis that Jane was being sexually abused by the father.

The conclusion in the original argument D-4 should be modified to reflect this emphasis on the quality of the responsibility to be something like (Jane's responsibility was inappropriate for a girl her age.) Again, the argument is complete as it stands and so is labeled FULL ARGUMENT.

BASE ARGUMENT

- DD. 1. Jane was so upset at the beginning of treatment that she wasn't capable of reasoning or getting any distance from her feelings. (belief)
2. Jane could not begin to describe, talk about, extract or objectify her feelings in any way. (belief)
3. The tone, body language and environment you provide leads the child to feel they can trust you. (law)
4. (I talked to her in order to soothe her in the way you would soothe a child who is crying or hysterical.) (intention)

DISCUSSION

This argument only needs the assumption that the therapist wanted to soothe Jane so that there could be some communication on the level of

the reasons for the depression. The hidden premise then is simply "I wanted to soothe Jane." The second interview delved more deeply into the structure of the therapist's perception of Jane's emotional state thusly giving the analyst access to a more complete reasoning structure concerning the intention to "just talk to Jane" (first round interview, E-1).

FULL ARGUMENT

- DD1. 1. Jane was so upset at the beginning of treatment that she wasn't capable of reasoning or getting any distance from her feelings. (belief)
2. I wanted to soothe Jane. (want)
3. Jane could not begin to describe, talk about, extract or objectify her feelings in any way. (belief)
4. The tone, body language, and environment you provide leads the child to feel they can trust you. (law)
5. I talked to her in order to soothe her in the way you would soothe a child who is crying or hysterical. (intention)

BASE ARGUMENT

- EE. 1. An adolescent doesn't have as much ability to cover up things as an adult has. (belief)
2. If the depression were a result of feeling angry at her restrictions and limitations at home, then talking about those things with a receptive person would have lessened the

depression and more anger would have been displayed about her situation. (belief)

DISCUSSION

The interviewer is probing the validity of the inferred "law" F1-2, from the first round interview, that "depth of depression is an inverse function of the insight into the depression." The interviewee's reply is that such a "law" is qualified but that it did form the basis of her reasoning about Jane's continuing depression, which was ongoing in spite of discussions about those responsibilities with the therapist. In effect, because the depression continued in the face of discussions about Jane's responsibility in the home, the therapist was led to the conclusion that there was more to the depression than was superficially apparent. According to this argument, Jane, being an adolescent, did not have the ability to cover up her thoughts and feelings. Jane was expressing her feelings about her responsibility in the home but was still depressed. This last premise is mentioned in a different context later in the interview but is relevant to the current argument and so can be justifiably "imported" into the argument and is not, then, a hidden premise. The belief EE-2 could be generalized to a psychological principle or "law" (environmental regularity, c.f., Chapter 4), that "if depression is the result of feeling angry then expressing that anger with a receptive person will lessen that depression." All of these together imply the "law" F1-2 which is what the interviewer asked to be justified and is therefore the conclusion of the argument.

FULL ARGUMENT

1. Jane was presenting the information like any ordinary adolescent griping about the family rules and restrictions. (belief)
2. An adolescent doesn't have as much ability to cover up things as an adult has. (belief)
3. If the depression were a result of feeling angry at her restrictions and limitations at home, then talking about those things with a receptive person would have lessened the depression and more anger would have been displayed about her situation. (belief)
4. (Depth of depression is an inverse function of insight into the depression.) (law)

BASE ARGUMENT

1. Father was demanding social behavior that was inappropriate to her age and grade placement. (belief)
2. The demands of the father were a tip-off that Jane's relationship with her father was out of balance. (belief)
3. I was kind of startled that the father would have such a strong reaction to what would seem like normal activities. (belief)
4. I was interested in my startle response. (belief)
5. My own response led me to think more seriously about what Jane was saying. (belief)
6. (I decided to find out more about Jane's relationship with him to decide if the relationship was abnormal. (intention)

DISCUSSION

This argument is an elaboration on the therapist's decision to meet with the father. We learn more here about the kinds of restrictions that the father put on Jane and that the therapist felt that these restrictions were unusual and "startling." This goes beyond the first interview since it is clear from the current argument that the therapist had some definite suspicions at this point about the abuse. Most of the arguments in this section are more complete than those of the first interview, the current argument only needing the rule FF1-5. Given that the "restrictions put on Jane were startling," and given that the inferred premise, "I always check out unusual responses that I have," is correct it follows that one for whom that rule is true ought to meet with the father "in order to check out the startle response." The conclusion then is reasonable given the premises.

FULL ARGUMENT

- FF1. 1. Father was demanding social behavior that was inappropriate to her age and grade placement. (belief)
2. The demands of the father were a tip-off that Jane's relationship with her father was out of balance. (belief)
3. I was kind of startled that the father would have such a strong reaction to what would seem like normal activities. (belief)
4. I was interested in my startle response. (belief)
5. I always check out any interesting or unusual emotional reactions that I have about my clients. (rule)

6. My own response led me think more seriously about what Jane was saying. (belief)
7. (I decided to find out more about Jane's relationship with him to decide if the relationship was abnormal.) (intention)

BASE ARGUMENT

- GG. 1. The father had not been physically violent with any of the family members. (belief)
2. The father had been physically violent outside of the home. (belief)
3. I think all the family members perceived him as possibly becoming violent with them if he were pushed too far. (belief)
4. Jane was afraid to assert herself in the family for fear of being physically punished. (belief)

DISCUSSION

This argument is a response to a probe about the validity of the belief that excessive emotionality might cause depression or fear (first round interview, G1-3). The conclusion of the argument is a rephrasing by the interviewee of the inferred premise that is being probed. The argument is complete as it stands.

BASE ARGUMENT

- HH. 1. The father was emotionally immature. (belief)
2. He was impulsive. (belief)

3. He felt he did not have to abide by the rules. (belief)
4. He didn't like women. (belief)
5. He was basically very narcissistic and insensitive to the needs of others. (belief)
6. He blamed others for his problems. (belief)
7. The picture I had gotten from the daughter (Jane) and the mother and then from meeting the father was of a textbook description of a child abuser and his family.
8. I began to search vigorously for evidence that Jane was being abused. (intention)

DISCUSSION

This argument was in response to questioning about how the therapist's meeting with the father led her to feel that she had strong confirmation for the hypothesis that he might be a child abuser. The argument describes personality features that he had and shows that these features imply that he did, indeed, fit the profile of an abuser. A tacit assumption that would take the argument from the belief that he did fit the profile, to the conclusion of the practical argument that one ought to pursue further evidence, might be phrased as "one ought to do everything one can to fully confirm an hypothesis that has serious implications for ones client." This would then be the rule that would guide conduct, given the set of circumstances covered by such a rule.

FULL ARGUMENT

HH1. 1. The father was emotionally immature. (belief)

2. He was impulsive. (belief)
3. He felt he did not have to abide by the rules. (belief)
4. He didn't like women. (belief)
5. He was basically very narcissistic and insensitive to the needs of others. (belief)
6. He blamed others for his problems. (belief)
7. The picture I had gotten from the daughter (Jane) and the mother and then from meeting the father was of a textbook description of a child abuser and his family.
8. One ought to do everything one can to confirm hypotheses that have serious implications for ones clients. (rule)
9. I began to search vigorously for evidence that Jane was being abused. (intention)

BASE ARGUMENT

- II. 1. It's always preferable for the person to uncover the difficulty on their own rather than have it forced before they are ready to deal with the information. (rule)
2. There could be (damaging) ramifications from (exposing the implications of the dream material) (belief)
3. I was cautious not to make any suggestions to the client. (intention)

DISCUSSION

This argument is the result of a question about the first round interview hidden premise II-4, that one ought not challenge someone

consciously with an issue that they are not ready to face. The therapist's response was that one ought to let the person discover it on their own, since there could be dangerous ramifications if done too early. This does not explain what those ramifications are, thus providing principled grounds for probing the issue further. The justification for the rule was itself embedded in a practical argument with the conclusion being the intention that the therapist had to be cautious in making any suggestions to the client about that material. This argument, then, allows an inference to a belief, that Jane would become very disturbed emotionally if she were presented with the dream material. This belief is fully supported by the first round interview argument I and by the follow up question.

FULL ARGUMENT

- III. 1. It's always preferable for the person to uncover the difficulty on their own rather than have it forced before they are ready to deal with the information. (rule)
2. There could be (damaging) ramifications from (exposing the implications of the dream material). (belief)
3. Jane would become very disturbed emotionally if she were presented with the dream material at this point. (belief)
4. I was cautious not to make any suggestions to the client. (intention)

BASE ARGUMENT

- JJ. 1. Jane was very fragile emotionally. (belief)
2. Jane had probably never had a trusting and safe relationship with an adult. (belief)
3. Jane was beginning to have those feelings in her relationship with me. (belief)
4. It would be very damaging to suddenly, in her mind, accuse her of something she wasn't ready to say out loud or to accept. (belief)
5. When Jane finally admitted to herself and decided she wanted help in stopping the abuse it would be a traumatic period for her. (belief)
6. It was more important that my relationship remain one of trust. (belief)
7. If I pushed the issue, I might have pushed her further from it rather than helping her towards it. (belief)
8. I wanted to be there for Jane when she finally decided to face up to it and go through it. (want)
9. (I did not challenge her consciously with this issue.) (intention)

DISCUSSION

This argument is essentially an elaboration of the previous one which gives additional support for the premise that one ought not present material prematurely.

FULL ARGUMENT

- JJ1. 1. Jane was very fragile emotionally. (belief)
2. Jane had probably never had a trusting and safe relationship with an adult. (belief)
3. Jane was beginning to have those feelings in her relationship with me. (belief)
4. It would be very damaging to suddenly, in her mind, accuse her of something she wasn't ready to say out loud or to accept. (belief)
5. When Jane finally admitted to herself and decided she wanted help in stopping the abuse it would be a traumatic period for her. (belief)
6. It was more important that my relationship remain one of trust. (belief)
7. If I pushed the issue, I might have pushed her further from it rather than helping her towards it. (belief)
8. I wanted to be there for Jane when she finally decided to face up to it and go through it. (want)
9. When I think someone is preparing to face an issue but not yet ready to face it or handle it, I do not at that time challenge them consciously with it.
10. (I did not challenge her consciously with this issue.) (intention)

BASE ARGUMENT

- KK. 1. Jane knew enough about the topic from the friend she confided in to know what the consequences would be, it would have to be reported to the proper authorities and it would mean some public attention. (belief)
2. Jane felt comfortable telling her girlfriend because she knew her friend would tell her mother and her mother would tell me. (belief)
3. Jane knew an adult had to be told. (belief)
4. Jane was relieved when the abuse was finally revealed. (belief)
5. If I was going to continue therapy with Jane it was critical she share with me her statement about the abuse. (belief)
6. The only way to resolve deep psychological problems is to examine them. (law)
7. This was my best opportunity to get it while it was fresh. (belief)
8. I wanted to be one of the first people to hear Jane's statement. (want)

DISCUSSION

This argument defends the premise that "the only way that Jane was going to get help was to begin to talk to someone about the problem." The argument is defended in the context of the intention that the therapist had to be one of the first people to hear Jane's statement. KK-4,

that Jane knew someone had to be told, is a subconclusion, the evidence being that she knew it had to be reported to the authorities, and that she knew that her girlfriend would tell an adult. That she knew someone had to be told and that she was relieved implies the hidden premise that Jane knew that she would have to tell someone in order to get help. Given that the therapist inferred that Jane knew the consequences and from the fact that the only way to resolve the problem is to examine it (KK-6), and given that the therapist felt she had to get it "while it was fresh," it follows that the therapist must be one of the first people to hear it from Jane. The belief that the therapist has that she must be one of the first persons to hear it from Jane is justified in the next argument.

FULL ARGUMENT

- KK1. 1. Jane knew enough about the topic from the friend she confided in to know what the consequences would be, it would have to be reported to the proper authorities and it would mean some public attention. (belief)
2. Jane felt comfortable telling her girlfriend because she knew her friend would tell her mother and her mother would tell me. (belief)
3. Jane knew an adult had to be told. (belief)
4. Jane knew that she would have to tell someone in order to get help. (belief)
5. Jane knew that she had to deal with the problem. (belief)

6. Jane was relieved when the abuse was finally revealed. (belief)
7. If I was going to continue therapy with Jane it was critical she share with me her statement about the abuse. (belief)
8. The only way to resolve deep psychological problems is to examine them. (law)
9. This was my best opportunity to get it while it was fresh. (belief)
10. I wanted to be one of the first people to hear Jane's statement. (want)

BASE ARGUMENT

- LL. 1. As the story was told there would be less and less emotion behind it. (belief)
2. I wanted to have access to that emotional material. (want)

DISCUSSION

The question asked of the therapist here was to explain the decision to be one of the first persons to whom Jane told. The reason stated is that as the story was told there would be less and less emotion behind it. It follows from this as a hidden premise that the rule holds that one must have access to emotional material to help someone with a problem. Given that rule it follows that the therapist must make sure that she is one of the first persons told, hence, conclusion LL-1.

FULL ARGUMENT

- LL1. 1. As the story was told there would be less and less emotion behind it. (belief)
2. One must have access to emotional material to help someone with a problem. (rule)
3. I wanted to have access to that emotional material. (want)

Data Comparison

The purpose of this section is to illustrate the increase, across the two interviews, in the detail and complexity of the model of the interviewee that is being constructed. For the first round, interview questions were designed to give a general picture of the steps that the interviewee took in solving the problem. These steps are represented as intentions. The reasons for a given step were grouped together with the corresponding intention in the form of an argument. The argument was analyzed for hidden premises. The hidden premises were used as probes for the second round interview. The purpose of the first and second analysis was to show how the analysis is to be conducted and how hidden premises are derived.

First round interview questions seek first to establish the general sequence of steps taken by the interviewee. The questions asked in relation to these steps are (1) "mirroring," which is paraphrasing the response and asking if it is a correct paraphrase, (2) a request for more detail, or (3) some kind of a request for the reasoning that led to

the given intention. The second round interview focuses more narrowly on probes concerning the hidden premises found in the prior protocol analysis, though any of the above question types would be appropriate, especially if other steps, left out of the first interview, are related to the interviewer.

In this section, a comparison is made between each first round argument and the corresponding second round argument that resulted from the hidden premise probe. The format of this illustration has a first round base argument, the hidden premise that was used as a probe in the second round, the second round base argument, and a discussion for all of the arguments. The main point I wish to make here is that the interview method is principled. This means that the interview probes are based on material presented by the subject, not on the personal inclinations and biases of the interviewer. The interview is structured by the internal structure of the interviewee's experience. Each probe, since it is based on a hidden premise or on a request for clarification, is grounded in the data as it is given by the interviewee, therefore being in accord with the phenomenological principle given in Chapter 4.

Following the comparative analysis of the first and second argument structures is a list of rules, represented in such a way as to demonstrate how argument structures might be represented prior to being coded into programming language. As was pointed out in Chapter 1, the syntactical structure for code in the programming language OPS has a set of conditions that are followed by an action or actions that occur if the conditions are true. As a demonstration of this stage of analysis,

which occurs just prior to actual coding in a programming language, these "productions," as the if-then rules are called, are meant only to illustrate one possible way in which some of the following arguments might be partially coded.

ANALYSIS

FIRST ROUND

1. A physical cause is the first thing you look at. (rule)
2. (The depression) might be physically caused. (belief)
3. (I referred her to a physician for a checkup.) (intention)

DISCUSSION

The first two questions asked in the second round interview, concerned the issue of the physical nature of the problem as it appeared to the interviewee. The interviewee was asked to elaborate on the emotional condition of the client as she appeared to the interviewee. In the following second round argument, the interviewee gives a clearer more detailed description of the apparent condition of the client, which leads to the interviewee relating some more fundamental concerns than that of merely wanting to exclude the possibility of PMS.

SECOND ROUND

1. Jane was so emotionally out of control at that time that she seemed unable to control her crying. (belief)

2. I wanted to get an opinion from someone who had a different perspective, by nature of training, than I did. (want)
3. I wanted the physician to look at the whole picture, not just what I specifically referred Jane for. (want)
4. (I referred her to a physician for a checkup). (intention)

FIRST ROUND

1. PMS can cause depression for a whole month. (law)
2. Her age was right for (PMS) to be possibly going on. (law)
3. PMS is a physical cause of depression. (law)
4. (I referred her to a physician to specifically check for PMS.)
(intention)

DISCUSSION

Elements of the following argument were a result of a request for an elaboration on the description of Jane as "emotionally out of control." This seemed to the interviewer to be a major and new elaboration and that it had immediate relevance to the interviewee's decision to send the client to the doctor. This argument also has elements that are the result of a probe of the hidden premise from the above argument, that "PMS would appear as continuous depression."

SECOND ROUND

1. I wanted to be able to do something right away that would lessen the amount of pain she was in. (want)

2. I wanted a concrete reason for the referral that would make sense to both the mother and the daughter. (want)
3. I wanted to give them another way of looking at what was happening to Jane. (want)
4. It was really important for Jane as well as for Jane's mother to get some sense that there was something that could be done about this problem. (belief)
5. I wanted them to quickly feel as though there was something they could do to help figure out what the problem was. (want)
6. (I referred her to a physician to specifically check for PMS.) (intention)

FIRST ROUND

1. Jane had to take care of (the children) and baby sit them all the time. (belief)
2. (Jane had too much responsibility for the other children.) (belief)

The hidden premise probe derived from the above argument is "any amount of responsibility that keeps an adolescent from time to herself is too much responsibility." This premise is obviously vague; the primary intent of the probe is to give the interviewee a point of reflection that will allow a more complete analysis of her reasoning. The probe led this interviewee to a discussion of the quality of the responsibility being more important to the therapeutic decision making than

was the quantity of the responsibility. For the interviewee, the kind of responsibility had distinct implications for the hypothesis that the family situation was not unlike the pattern seen in typical cases of sexual abuse.

SECOND ROUND

1. This mother had a strong sense of helplessness. (belief)
2. Jane did not have any privacy or free time to think about herself or do the kinds of things adolescents do as they are growing up. (belief)
3. Instead of being allowed to be a child, Jane was really playing the role and had the kind of responsibilities normally ascribed to the mother in the family. (belief)
4. (Jane's responsibility was inappropriate for a girl her age.) (belief)

FIRST ROUND

1. I want to establish a relationship with Jane. (want)
2. Unless I could get her to talk to me I couldn't get any where. (belief)
3. (I talked to Jane.) (intention)

In the first round argument above, the interviewee indicated that she did not attempt any direct intervention. The probe here was merely for an elaboration on the decision to talk rather than intervene directly.

SECOND ROUND

1. Jane was so upset at the beginning of treatment that she wasn't capable of reasoning or getting any distance from her feelings. (belief)
2. (I wanted to soothe Jane) the way you would soothe a child who is hysterical. (want)
3. Jane could not begin to describe, talk about, extract or objectify her feelings in any way. (belief)
4. The tone, body language and environment you provide leads the child to feel they can trust you. (law)
5. (I talked to her in order to soothe her in the way you would soothe a child who is crying or hysterical.) (intention)

FIRST ROUND

1. Jane understood the situation too well for the (excessive responsibility) to depress her that much. (belief)
2. She would not have been that depressed about the situation as she described it. (belief)

DISCUSSION

The hidden premise probed here is that "depth of depression is a function of insight into the depression." The question is whether what the client has revealed up to this point can account for the depression.

This is a significant point because, at that time, the interviewee had only vague suspicions about the abuse and evidence was building that more was involved than was being spoken about. The following argument, then, is a justification for the hidden premise that was derived from the above argument. That premise is the conclusion of the following argument since that is what is being justified. Both the argument below and the one following it concern the issue of possible sources of the depression, specifically the relation between the suspicion that more was going on than was apparent on the one hand, and Jane's relation with the father on the other hand. Since the interviewee could not account for the depression in terms of the client's responsibilities at home, she was led to more closely investigate the role of the father.

SECOND ROUND

1. Jane was presenting the information like any ordinary adolescent griping about the family rules and restrictions. (belief)
2. An adolescent doesn't have as much ability to cover up things as an adult has. (belief)
3. If the depression were a result of feeling angry at her restrictions and limitations at home, then talking about those things with a receptive person would have lessened the depression and more anger would have been displayed about her situation. (belief)
4. (Depth of depression is a function of insight into the depression.) (law)

SECOND ROUND

1. Father was demanding social behavior that was inappropriate to her age and grade placement. (belief)
2. The demands of the father were a tip-off that Jane's relationship with her father was out of balance. (belief)
3. I was kind of startled that the father would have such a strong reaction to what would seem like normal activities. (belief)
4. I was interested in my startle response. (belief)
5. My own response led me to think more seriously about what Jane was saying. (belief)
6. (I talk to the father.) (intention)

FIRST ROUND

1. I already knew in the past the father had been very explosive and kind of violent with the family in the past. (belief)
2. (I thought that maybe she was afraid of him because of him being very strict and emotional.) (belief)

DISCUSSION

From the first round interview it was learned that the father was "explosive and kind of violent" but it was not clear what form this took and what relation it had to the interviewee's thinking. The probe used here was the hidden premise that excessive emotionality in a parent like that might cause the depression and fear.

SECOND ROUND

1. The father had not been physically violent with any of the family members. (belief)
2. The father had been physically violent outside of the home. (belief)
3. I think all the family members perceived him as possibly becoming violent with them if he were pushed too far. (belief)
4. Jane was afraid to assert herself in the family for fear of being physically punished. (belief)

FIRST ROUND

1. I'd talked to him briefly maybe once or twice. (belief)
2. By this time I had a pretty good idea of all the restrictions that the father was placing on Jane in terms of her social life. (belief)
3. (I met with the father.) (intention)

DISCUSSION

The probe for the following argument was simply that the interviewee relate her impressions of the father. Questions of this type, into the perceptions of the situation to which the interviewee is responding, allow an analysis of the properties of a situation that make those properties salient in terms of the purposes of the interviewee.

SECOND ROUND

1. The father was emotionally immature. (belief)
2. He was impulsive. (belief)
3. He felt he did not have to abide by the rules. (belief)
4. He didn't like women. (belief)
5. He was basically very narcissistic and insensitive to the needs of others. (belief)
6. He blamed others for his problems. (belief)
7. The picture I had gotten from the daughter (Jane) and the mother and then from meeting the father was of a textbook description of a child abuser and his family.
8. I began to search vigorously for evidence that Jane was being abused. (intention)

FIRST ROUND

1. I did not think Jane could handle (facing the issue of abuse) emotionally. (belief)
2. I think what she was doing was preparing herself to come forward with it. (belief)
3. I (did not) challenge her consciously with this issue. (intention)

DISCUSSION

The probe that elicited the following two arguments was "whenever I think one is preparing for something like that (to come forward with the truth) I don't challenge them consciously."

SECOND ROUND

1. It's always preferable for the person to uncover the difficulty on their own rather than have it forced before they are ready to deal with the information. (rule)
2. There could be (damaging) ramifications from (exposing the implications of the dream material). (belief)
3. I was cautious not to make any suggestions to the client. (intention)

For the following argument, the interviewer asked that the interviewee explain more specifically how the rule that one should not present dream material prematurely applied, given Jane's state at the time.

SECOND ROUND

1. Jane was very fragile emotionally. (belief)
2. Jane was beginning to have (feelings of trust) in her relationship with me. (belief)
3. It would be very damaging to suddenly, in her mind, accuse her of something she wasn't ready to say out loud or to accept. (belief)

4. When Jane finally admitted to herself and decided she wanted help in stopping the abuse it would be a traumatic period for her. (belief)
5. It was more important that my relationship remain one of trust. (belief)
6. If I pushed the issue, I might have pushed her further from it rather than helping her towards it. (belief)
7. I wanted to be there for Jane when she finally decided to face up to it and go through it. (want)
8. (I did not challenge her consciously with this issue.) (intention)

FIRST ROUND

1. She had gone so far as to tell a friend (about the abuse). (belief)
2. She wanted and was ready for help. (belief)
3. I felt that once she came up with enough courage to (talk about the abuse) once, that we all had to move very quickly and support her before she got scared. (want)
4. (I moved quickly to help her.) (intention)

DISCUSSION

The probe for the following argument was the hidden premise that "telling someone something frightening" indicates a desire and readiness for change.

SECOND ROUND

1. Jane knew enough about the topic from the friend she confided in to know what the consequences would be, it would have to be reported to the proper authorities and it would mean some public attention. (belief)
2. Jane felt comfortable telling her girlfriend because she knew her friend would tell her mother and her mother would tell me. (belief)
3. Jane knew an adult had to be told. (belief)
4. If I was going to continue therapy with Jane it was critical she share with me her statement about the abuse. (belief)
5. The only way to resolve deep psychological problems is to examine them. (law)
6. This was my best opportunity to get it while it was fresh. (belief)
7. I wanted to be one of the first people to hear Jane's statement. (want)

DISCUSSION

The intent here was that the interviewee explain more about why she wanted to be the first one to hear from Jane about the problem.

SECOND ROUND

1. As the story was told there would be less and less emotion behind it. (belief)

2. I wanted to have access to that emotional material. (want)

It is clear from the above comparisons of first and second round arguments that the second round is more complex. This complexity takes the form of an increase in elaboration on the first round arguments and considerable new insight on the problem solving involved in the case. To reiterate, the purpose of the methodological rules is to constrain the process of elaboration on the part of the interviewee. The course of the second interview is directed by the hidden premises that were uncovered in the first. A third (or more) subsequent interview could be based on the analysis of the second round.

The rules, beliefs, etc, uncovered in subsequent interviews are continually subject to revision and elaboration. The refinement of the intended interpretations can be paralleled by their encoding in a propositional notation as demonstrated in the following section.

Pseudo-Code

The following section demonstrates how the rules that were derived by this method can be represented in a form that would provide an intermediate stage between ordinary prose style and one close to what would be required for a computer program. For the development of an expert system the intended interpretations would have to be represented by a notation that would make them more amenable to coding as rules that could actually be run on a computer. To exemplify what would be a bridge between the last stage of a protocol analysis, as demonstrated above, and a computer program, some of the above rules have been encoded using a notation suggested by Miller and Johnson-Laird (1976).

A short diversion into an explanation of the structure and purpose of an expert system will be helpful as a background for this demonstration.

Expert systems have shown that a computer program is able to generate reasoning that is analogous to expert reasoning. This has been accomplished in several domains such as medical diagnosis and chemical analysis of mass spectrometry. Among the many examples of expert systems listed by Feigenbaum and McCorduck (1983) are DENDRAL which "interprets data produced by mass spectrometers and determines not only a molecule's structure, but also its atomic constituents" (p. 296) and CASNET which "associates treatments with various diagnostic hypotheses such as the severity or progression of a disease; applied to glaucoma" (p. 302). As Feigenbaum and McCorduck point out, these programs operate at a high level of expertise "often out performing human experts" (p. 16). These systems are considered to be "applied Artificial Intelligence" because of their extensive use of large amounts of detailed knowledge of some domain of expertise. Feigenbaum and McCorduck distinguish heuristic, practical knowledge that guides actual practice, from the data of a problem, that is, the objective facts about some problem, such as that a patient has a high temperature. This practical, rule governed knowledge is distinguished from data in that it is heuristic, roughly characterizable as rules of thumb or in terms of the knowledge that underlies practice and judgment. Because of the reliance on knowledge in this sense, rather than on broad general laws of thinking, expert systems are often referred to as knowledge-based systems.

As has been pointed out, expert systems are typically composed of antecedent consequent rules. Expert systems that are rule based are referred to as production systems and the rules are called production rules. MYCIN, an expert system which diagnoses meningitis and blood infections, uses rules of the form

IF: There is evidence that A and B are true,

THEN: Conclude there is evidence that C is true.

Rules can be coded in many forms. MYCIN used "a collection of quadruples, consisting of an associative triple and a certainty factor, which indicates how strongly the fact has been confirmed or disconfirmed (Buchanan & Shortliffe, 1984):

(identity organism-1 e. coli .8)

(site culture-2 blood 1.0)

(sensitive organism-1 penicillin -1.0)

Rules can also be represented as facts rather than as probabilities. For example, XCON is a program that configures computer components. An example of an XCON rule, as given in Winston (1984, p. 179) used by XCON is:

```
if    the context is layout and assigning a power supply
      an sbi module of any type has been put in a cabinet
      the position it occupies in the cabinet is known
      there is space available in the cabinet for a power supply
      there is no available power supply
      the voltage and frequency of the components is known
then  add an appropriate power supply. (p. 179)
```

Rules can also be coded in the notation of the predicate calculus. This is a logical notation that uses predicates. For example, in the statement "Jane is age 16," age 16 is a property of Jane. Predicates can be

used to express facts about objects. In this case, the predicate is age 16 and the object is Jane. Predicates are functions that map object arguments into TRUE or FALSE (Winston, 1984). Jane is said to satisfy the age 16 predicate if Jane is, in fact, 16 years old. The syntax is

predicate (object)

so, for the statement "Jane is age 16," one writes, age 16 (Jane).

Miller and Johnson-Laird (1976) use the notation of the predicate calculus for the representation of perceptual predicates. In their theory, "a perceptual judgment can be represented in theoretical language by a statement that some property of a percept has a particular value, or that some relation holds between perceptual entities or properties" (p. 37). They use the first order predicate calculus to represent expressions like "Percept x has property P" or "The relation R holds between percepts x and y," as $P(x)$ and $R(x,y)$ respectively. Of particular relevance to this study is their treatment, with this notation, of the perception of intention. "Intend" is treated as a relation: Intend (person, goal). Intend takes two arguments, the person who intends and the goal of the intention. A complex intention such as "John intends to scratch his nose" entails a means to that end and can be represented by, for example:

Cause (Intend (John, scratch his nose), Travel (his hand)).

This rendering of the sentence has propositions embedded within propositions. "John's hand traveled" is a proposition which is embedded in the proposition that "John intended to scratch his nose." That

John's hand traveled is represented as Travel (his hand). The parentheses are around the object, with the predicate preceding the object. This phrase is embedded in the phrase "John's intention to scratch his nose caused X" where X is that his hand traveled.

Translating rules, beliefs, wants, etc. (that is, the categorized intentional interpretations) into such a notation entails a certain commitment to the given interpretation. Translating the rules in this manner forces the analysis into a precise and rigid format which, in the present context, provides the analyst with a purified view of the logical entailments associated with that commitment. The purpose is to provide the expert with an unambiguous image of what he has said so that, if there is a rejection of some interpretation, one knows more precisely what is being rejected.

The following rule structures are meant as examples of the process and not as final products. It is beyond the scope of this work to demonstrate the development of an expert system. The rules presented here, however, do reflect a sense of the arguments presented in the above interview analyses. The form that the rules take is that of a set of conditions followed by either a conclusion or some recommended course of action. The symbols "<" and ">" are "less than" and "greater than" respectively. The variable "X" can stand for the word "someone," as in, restricts (X, patient), which would read if someone restricts the patient.

Pseudo-Code Data Representation

```

if      age (client, >12 and <17)
      (onset of depression=onset of menstruation)
      has(client,signs of depression)

then    PMS has a probability p of cause of depression

if      has (client, depression)
      want (therapist, lessen pain (client))
      want (therapist, have (patient, reason for depression))

then    refer (therapist, to (client, physician))

if      adolescent (patient)
      has (patient, no privacy)
      has (patient, parental type responsibility)

then    has (patient, excessive responsibility)

if      causes (emotional disturbance, feel (patient,
      overwhelmed by emotion))
      adolescent (patient)
      want (therapist, trust (patient, therapist))

then    soothe (therapist, patient)

if      adolescent (patient)
      understands (patient, situation X)
      situation X (possible cause of depression)
      cathects (patient, anger about situation X)

then    expect (therapist, clients (depression to lessen))

```

```
if      restricts (X, patient)
        father (X, patient)
        possible-cause (X, depression (patient))
then    interview (therapist, X)
if      restrictive (father, patient)
        adolescent (patient)
        sociopathic (father)
        overly intimate (father, patient)
then    hypothesize (therapist, possible abuse)
if      not (trust (patient, therapist))
        unprepared (patient, interpretations)
then    not (offer (therapist, interpretations))
```

CHAPTER 7

CONCLUSION

This study has attempted to demonstrate that it is possible to devise a method that would represent the structure of informal practical reasoning. The efficacy of a solution to the problem depends on the capacity of a method to provide an analyst with a means for locating the tacit rules implicit in practical reasoning. The structure of these rules amounts to a model of the expert problem solver.

The model of the person is derived from an analysis of the reasons for a given action. (An action is here represented by the intention to accomplish the action.) The wants represent goals that would be obtained if the intention is fulfilled. For example "I sent Jane for a PMS checkup" is an intention. The associated want is "I wanted to give the family something concrete to focus on." The "want" is the condition that the therapist wants to bring about by fulfilling the stated intention. If the interviewer asks "why" the intention was carried out, the want provides the reason or justification for the intention. The answer to the question "why?" tells what state of affairs stood as the goal for the agent. By getting an answer to the question "why" asked in this sense, we gain an insight into the relation between the agent and the world as it is perceived by that agent--that is, we get a partial representation of the phenomenological world of the agent.

The situational goals one wants to achieve by doing some action X come after X--they are an answer to the question why I did X. The goal

state is not the cause of the action but rather forms the ground or justification for the action. The goal is a reason for X, not the cause of X. The goal states given by the interviewee in the form of "wants" justify the action by linking the action to a goal or set of goal states and thereby put the action in a context and render the action comprehensible or, at least, allow the action to be judged as appropriate or inappropriate for attaining the stated goals.

"Beliefs" (about states of the world) and "laws" (about perceived regularities in the world) describe the enabling conditions that make the wants attainable. So for example, the belief "Jane was ready for help" is an enabling condition which, given all the other relevant circumstances, is a condition for the satisfaction of the want "to be there for Jane." The "rules" are the guides to conduct which are applicable or not, justifiable or not, given the appropriate wants, beliefs and laws. This set of intentional idioms, as representations of the intentional structure of an agent, forms a mutually supporting network in the sense that any one of these intentional states is only comprehensible against the background of the complete intentional network. The intentional network is a model of the agent given in terms of a representation of the beliefs, intentions, wants, and rules derived from an analysis of the problem solving interviews. The purpose of the interview analysis cycle, then, is to construct this intentional model of the person. The intentional model can be transformed into a computer representation that can generate predictions about actions that the modeled agent would take given a set of enabling conditions and an accurate representation of that agent's active rules.

The question of whether a method could be devised to make the development of such a model more efficient has arisen from a need in the area of Artificial Intelligence for a way of dealing with ill defined problems, especially where such a method might be made into a mechanical procedure. As Buchanan et al. (1983) put it:

Knowledge acquisition is a bottleneck in the construction of expert systems. The knowledge engineer's job is to act as a go-between to help an expert build a system. Since the knowledge engineer has far less knowledge of the domain than the expert, however, communication problems impede the process of transferring expertise into a program. The vocabulary initially used by the expert to talk about the domain with a novice is often inadequate for problem-solving: thus the knowledge engineer and expert must work together to extend and refine it. One of the most difficult aspects of the knowledge engineer's task is helping the expert to structure the domain knowledge, to identify and formalize the domain concepts. A method that has unambiguous rules that specify the steps an analyst should follow can speed up the process of a problem solving interview analysis. (p. 129)

The data this method analyzes are the self reports of an expert, however defined. Self reports are generally considered to be subject to various kinds of bias. If a person is asked whether he or she is prejudiced, the subject is likely to take the perceived views of the interviewer into account in answering, and even then, questions arise as to whether the subject understands what it means to be "prejudiced." There is, therefore, an inherent risk that an external structure of interpretation will be imposed on the responses by the mere presence of the questioner. There must be methodological principles that constrain the imposition of such biases.

This study assumes that a method to accomplish this task should be principled, which is to say that it would assure that the analyst does

not impose a model of the problem solver's methods "from the outside." Instead, the model that is generated of the problem solver's methods in the context of such ill defined problems (as discussed in Chapter 2) should accurately represent the problem solver's view of the dialog with the situation (c.f. Schon, Chapter 2 above). The method presented here does provide a way to construct an intentional model of a person which represents the implicit role/rule structure of the problem solver's domain knowledge. When an expert is describing reasons for some concrete action, where reasons are reflections of the rules used, the issue of whether the subject is trying to create a favorable impression is minimized since the rules given are either coherent (logically consistent) in the context of other rules given, or they are not. The real risk in such situations is that the interviewer's questions do not provide an adequate framework for stimulating the expert to reflect on accomplished reasoning.

Upon analysis of the two interview transcripts and the rule structures generated by the application of the methodology to them it has been shown that (1) the method successfully locates hidden premises that represent the rules admittedly used and recognized as used by a practitioner, and (2) such hidden premises can be used to generate a more complex and more highly constrained representation of such rule structures.

The sets of hidden premises, composed of implicit rules, beliefs, psychological "laws" and wants that were generated in the first round interview, served as the basis for hypotheses that were "tested" in the

second round interview. It has been shown that this iterative cycle of interview and analysis can be pursued as far as is necessary and to whatever depth is required, given the purposes of the interviewer/analyst.

The mode of testing the sufficiency of the analysis resulting from the application of the method is simply whether the interviewee sees the hidden premise as applying to the problem domain under consideration. Under more elaborate conditions such an analysis could be tested in more experimental fashion. For the specific case under investigation, the interviewee must first agree to the validity of the inference. If the inferred premise is not agreed to, the interviewee is requested to give further elaboration and justification. The general criterion for judging the revised hidden premise is the overall coherence of the interviewee's description of his/her rule structure. The interviewee thus provides more detail about the case which, in turn, provides increasing degrees of constraint on possible interpretations of past commentary.

This increase in the complexity and degree of constraint amounts to a coherence test (Pepper, 1972) of the validity of the overall intentional model of the person that is being built up by the analysis generated through this methodology. Coherence here means that the model of the person be capable of generating beliefs that are true of the interviewee given the rules that have been attributed to that person. This is not to say that the person being modeled has no inconsistent beliefs, only that the model ought not be able to generate inconsistent beliefs. The model is, in essence, a model of the competence of the expert; not a

performance model, i.e., with such "capacities" as memory lapses, or the ability to compartmentalize belief subsystems.

Data Summary

The purpose of the first interview/analysis was twofold. The first and primary purpose was to demonstrate the capacity of the analysis procedure to locate hidden premises in a complex practical argument. The second purpose was to demonstrate the steps that need to be followed in order to accomplish the analysis, thereby serving as a "tutorial" for doing the analysis.

In the second interview and analysis, the interviewer probed the rules that were generated as hidden premises in the first analysis. These probes took the form of questions that produced reflections upon the interviewee's perception of the validity of those hidden premises that were located by the first interview analysis. The format of the second interview analysis remained essentially the same as the first, except that transcript fragments were not included. The commentary in the first analysis focused on how the logic of the responses constrained the identification of hidden premises. The commentary in the second interview analysis focused on the specific results that a second interview analysis is intended to accomplish: how the second interview generates an increase in the complexity of the rule structure representation of the interviewee. The commentary attempted to make the general logic of the argument explicit and showed in each case, the logical basis upon which the hidden premises were derived.

It is necessary to emphasize that the overall process is iterative. That is, one does not expect to get an accurate set of rules the first time around. The development of a functioning expert system involves many steps in the refinement process. In fact, it is just this problem of the iterative nature of the analyst's task that this method is meant to address. The method is designed to bring the rules that are formulated through to the point where they can be encoded in an actual computer program. The method itself provides an explicit set of rule-governed stages that will eventually be mechanized.

For the most part, all of the hidden premises located in the first interview were confirmed in the second. The general trend across interviews was an increase in the amount of detailed reasoning presented by the interviewee. This was as expected. The first interview helps the interviewer formulate a general description of the problem solving process. Between the first and second interview the analyst has supplied a great deal of organization to the interviewee's thoughts, and has provided to the interviewee, implications of what was said in the form of the hidden premises. The hidden premises provide the interviewee with a clear reference point that can be used as a systematic basis for reflecting on the reasoning that led to the given action. The organization and implications presented to the interviewee clearly stimulates the interviewee to generate a more detailed and comprehensive account, with a good deal of new material and process steps.

Responses to questions about the first round interview results were of the following types:

1. Elaborations that did not add to the substance of the original argument. These were disregarded in the second analysis.
2. Elaborations that added to the substance of the original argument but did not change the logical thrust of the original.
3. Elaborations that bring new reasoning into the general problem structure.

The interview cycle thus illustrates that the method constrains the interviewer to follow the contour of the interviewee's problem space. The analysis must generate sentence paraphrases that accurately reflect the intention of the interviewee. This can only be accomplished by taking the full context of the protocol into account. The analyst is asking the question "what does this statement mean given the overall logical character of the account in which the statement is embedded?" This process is analogous to very careful listening, in the sense that it requires many of the same skills as inferring "what is meant" by a given utterance in ordinary conversation. The consequence for the successful protocol analysis is an overall understanding, on the part of the analyst, of what the interviewee is saying. This understanding is confirmed by the fidelity of the feedback the analyst gives the interviewee in subsequent rounds of interviewing.

Implications for Future Research

The primary implications of this study are those bearing on the construction of expert systems. The next phase for the development of the method proposed here will be its use in the construction of an

expert system. After an initial phase wherein a preliminary knowledge base is constructed, there will be the task of transforming this knowledge base to a computer program. This initial knowledge base will be enriched and refined as a function both of an interaction of the expert with the analyst and of an interaction between the expert and the developing expert system. That is, the interviewer analyst will continue to apply the analysis procedure to protocols elicited from the expert, but there will be the additional constraints imposed by the requirements of the computer program that is simulating the expert's reasoning.

There are also implications for the general technology of interviewing. As has been pointed out, the use of the method by an interviewer fosters an improvement in "listening skills." In the process of organizing the protocol into a coherent set of argument structures, the analyst develops a finely tuned sense of the intentions of the interviewee. This has been a consistent observation by the author in the course of the development and application of the method in prior studies, c.f. Peters, Johnson, and Lazzara (1982). The method has also been taught in a series of workshops where it has been found to have a marked impact on listening and interviewing skills.

At a more abstract level, future research with the method will address broader issues. Questions of relevance would concern the possibility of embodying, in the model of the expert, rule structures that reflect the ways in which an expert's reasoning might be shaped by cultural and even political forces. For example, one might ask how or whether internalized psychological and cultural assumptions might limit or distort problem solving.

This thesis has provided a philosophical and theoretical foundation for a method intended to alleviate the bottleneck in the acquisition of knowledge from experts. It has offered a way of dealing rigorously with what have been often thought of as subjective mental states, vis. beliefs, wants, and intentions. These states are analyzed instead as social constructs (Coulter, 1983). Having its roots in the philosophical traditions of phenomenology and in the theoretical traditions of the contextualism exemplified by Gibson (1978), it has extended these bases by providing a methodology for argument analysis. It is hoped that the ultimate value of the method though, will be seen in its capacity to alleviate the above mentioned bottleneck.

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Reflective not
as difficult
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APPENDIXES

APPENDIX A

FIRST INTERVIEW

I: How long ago did you find out she had been abused?

C: August of last year.

I: Were you seeing her before?

C: Uh-huh . . . started seeing her in May.

I: Four months before . . . what was the presenting problem?

C: She was referred by her school counselor because she came into school one day and started to cry and couldn't stop . . . they did everything they knew to do and they couldn't calm her down, so they called her mother to come pick her up and referred her to me that day.

I: Okay . . . so you started seeing her and what happened . . . how did you come to find out that she had been abused?

C: Well, ultimately, she told me . . . actually, her girlfriend told me . . . but before that she had been leading up to telling me by giving me dreams that she'd had that were very suggestive and . . . mainly the dreams were suggestive.

I: What were your general feelings about her before you found out?

C: In what sense?

I: Diagnosis.

C: Oh, . . . well, she was really depressed when she came in . . . and continued to be depressed during the entire period.

I: What did you think was causing it?

C: Well, I wasn't really sure at first . . . because there didn't seem to be any reason that anybody knew of . . . for her to suddenly be so depressed, although the mother had some vague suspicions at the time, that Angie's relationship with her father was wrong somehow . . . but we didn't really know in the beginning what was causing the depression.

I: What were some of your hypotheses?

C: Well, at the very beginning, my first thoughts were that it might be physically caused, that's the first thing you look at . . . so I referred her to a physician for a checkup and he came back and said that she was healthy, but she wouldn't allow him to do any blood work . . . she has a phobia about needles . . . and she wouldn't let him draw blood . . . so there still was some possible doubt . . . you know, about her health, but I felt relatively secure that it wasn't physical at that point.

I: At that time did you have any hypotheses about what might be causing it?

C: Well, I referred her to the physician specifically to check for Premenstrual Syndrome because that can cause depression the whole month, you know, during the whole month of the cycle, which is basically continuous depression . . . and her age, you know, was right for that to be possibly going on . . . she was 14 at the time.

I: Was your hypothesis about Premenstrual Syndrome before or after the mother was talking about the possibility of something wrong with her relationship to her father?

C: Well, before . . . this was initially.

I: So the very first thing that you started to concern yourself about, and this is before the mother started talking about possible problems with the father, was physical.

C: Because so many forms of depression could be caused by physical problems . . . you have to rule those out before you can, you know, go anywhere . . . so those were ruled out . . . then I started talking with the mother and the next thing that I thought might be the problem was the fact that Angie had too much responsibility for the other children and she had to care . . . she had to take care of them and baby sit them all the time . . . she never got to go out or do anything.

I: So you started talking to the mother and, in talking to the mother, you started to find out a lot about Angie's home life which involved such things as taking care of the children.

C: Two kids, yeah, that were younger than her.

I: So what were you thinking?

C: Then my next . . . you were asking me about hypotheses that I entertained, so that was the next, the second hypotheses after the health one was shot down . . . the hypothesis was that she was burdened beyond her years by the amount of responsibility she was given for the other children in the family and that she was depressed as a

result of that . . . which actually turned out to be correct to a certain extent, but it wasn't the whole store . . . she was being given too much responsibility and her mother was being unrealistic with her about those kinds of things, but . . .

I: In talking to the mother, you decided that it may be true that she had too many responsibilities and then you said that you came to the conclusion that it was true . . . how did you come to that conclusion?

C: Well, because the mother confirmed for me that Angie was correct in what she perceived as her responsibilities in the home and the mother agreed that she had never really examined it . . . she just felt that since she had those responsibilities when she was Angie's age, that Angie could handle it, too.

I: What were you doing at this point with Angie?

C: Talking, just talking . . . trying to talk . . . she was very miserable and not very communicative.

I: Why were you just talking?

C: Well, I was trying to get her to communicate with me about anything . . . trying during the first month or month and a half at least I was just trying to establish a relationship.

I: Is that typical?

C: Well, it goes a lot faster with some kids, but, you know, Angie didn't want to talk about anything and she was so depressed that she had very little energy to look at her own behavior and to analyze anything . . . she just didn't have the energy for it.

I: Why did you feel that that was the best thing to do in her case?

C: It was the only thing I could do . . . I mean, unless I could get her talking to me, I couldn't go anywhere, and when she first came in she wasn't . . . she wouldn't talk to me at all . . . she would just sit and cry.

I: So . . . let's see if I understand this . . . you checked out the physical, talked to the mother, then talked to Angie . . . Angie tells you that she has a lot of responsibilities and basically lets you know that the way she sees her responsibilities is also the way the mother sees Angie's responsibilities, so Angie, in that sense, isn't deluded about how much work she has . . . what does that lead you to conclude about Angie in general?

C: Well, I guess I saw her at that point as being honest and unselfish, basically, and that she probably had some good reasons for being as depressed as she was, although I didn't . . . I really sensed that what she was telling me wasn't all there was . . . I mean, she wouldn't be that depressed about the situation as she described it . . . she understood it too well.

I: Can you tell me more about this feeling that you had that she wasn't telling you everything?

C: Well, it was mostly in her body language, I think, more than anything else . . . she, you know, as our relationship developed and she started to trust me more, she would, when she was talking on subjects where she felt safe, she would give me a lot of detail, for example . . . there would be a lot of eye contact and so forth and when she . . . when I would draw the conversation around to why her dad wouldn't let her date, for example, or why she wasn't allowed to go to the school dances, what exactly did her father say about that, or anything that had to do with her father, then her whole body language shifted and she wouldn't look at me and she would give very terse answers and she just changed her style of communication.

I: What did you think about that at the time?

C: Well, at first I wasn't sure what to think because I'd been seeing . . . it's complicated here by the fact that I had been seeing the brother for a long time, so I already knew some things about the father and what he was like . . . and in the past he had been very explosive and kind of violent with the family . . . and so at first I thought that maybe she was afraid of him because of him being very strict and emotional.

I: What did you do next?

C: Well, by this time I had a pretty good idea of all the restrictions that the father was placing on Angie in terms of her social life and I had a pretty good idea of how he was undermining the mother's authority in the home . . . he's a truck driver, so he was gone on the road a lot . . . and so I demanded a meeting with him to try to get a better sense of what was going on.

I: Could you tell me more about why you wanted this meeting?

C: Well, I don't know . . . I don't think . . . I'd talked to him maybe once or twice before this, just when he'd come along to pick up David, the younger brother, from the therapy session, a group therapy session that he was in . . . so I'd never really talked to the man before and didn't know him at all and I felt at this point since he was having such an influence on what was happening that I needed

to meet him and draw my own conclusions about him instead of going on third party information.

I: What did you do next?

C: Well, I'd made an appointment with him to come in and met with him and his wife, you know, he and the mother, and talked with him about Angie's depressed state and if he knew of any reason why she should be so depressed . . . talked with him about her need for independence and to begin to go with boys her own age and to start having a social life and he said he didn't know any reason why she should be depressed, which was a lie . . . now, I know . . . and said she was too young to date and he wouldn't tolerate her hanging around with boys her own age.

I: And how old is she?

C: She was almost 15 at that time . . . eighth grade.

I: Is that a typical parental attitude?

C: No, because she wasn't asking to do things that were atypical . . . she wanted to go to the school dance or she wanted to go to the skating rink . . . ordinary activities that an eighth grader would be involved in . . . it wasn't like dating in a car or anything . . . that would have been too old for her . . . the only thing that really got accomplished in that meeting was that he liked me . . . he felt comfortable with me and decided that it was probably okay for Angie and David to be seeing me . . . all along before he had come in to meet me, he used to be very negative about his kids being in treatment and the mother brought them against his wishes and at that point, at that meeting, he changed his attitude about it and was supportive of them coming . . . but otherwise I didn't accomplish any of my goals, which was to get him to change his behavior towards Angie or to find out what was going on.

I: So what happened next?

C: By now, it's like maybe a month or so before I found out what was going on and I just went back to just doing treatment with Angie and trying to get . . . I asked her to keep a journal, to record dreams . . . I had her doing a lot of painting and drawing and things like that when she came in to see me as a way of trying to get at some unconscious information that might help me unravel what was going on with her.

I: Can you remember anything that was striking?

C: Yeah . . . she told me a dream that was a dream fragment, really, where she and her father were outside somewhere in the night . . . it was foggy and you couldn't see very well and somebody was dragging him away from her and somebody was dragging her away from him and he kept hollering at her, "I love you, Angie . . . You can't take her; she's my baby" or something like that and that's the only one I can remember completely.

I: What did you do with that dream?

C: Well, nothing overtly with her . . . I did not want to negate . . . I wasn't ready to challenge her consciously with the incestual implications of the material she was giving me.

I: Why not?

C: Because I didn't think she could handle it emotionally and I didn't think she was ready to face it . . . she was only becoming . . . she was . . . I think what she was doing during that period was preparing herself to come forward with it . . . she was terrified of sharing that information with anybody because one of the things that's typical in sexual abuse in children is that they're always threatened by the adult that if they ever tell, that they'll be horribly punished in some way.

I: At the time you didn't know . . . you said you only saw it as having incestuous implications . . . at that time why did you feel that you didn't want to talk to her about it?

C: Well, partly because it was still a strong hunch and I had no evidence at all for it other than my own thoughts on the matter, you know, based on the material I had been able to put together, and also because I felt . . . I was taking it one step further . . . if it were true, then this was her way of preparing the ground to tell me and I expected that she would tell me . . . I expected it was true at that point.

I: In the narrative here, in the steps, I'm not sure at what point you started to formulate the hypothesis that she had been abused . . . one step was . . . well, you talk about the body language . . . is that when . . .

C: Yeah, that was the first . . . my first stage of going into this hypothesis, that there was . . . that she was being sexually abused.

I: Can you be as specific as remembering a moment at which you started entertaining it?

C: No, there wasn't a single moment, I don't think . . . there was a pulling together of several sources of information . . . what the

mother was saying about something just not being right in the relationship and she couldn't put her finger on it and so on and the same concerns . . . that she didn't know what to do about it . . . Angie's body language when she talked about her father, the pattern of the family, of the father being overly emotional, impulsive, childlike in his demands, the mother being submissive and powerless in his absence . . . you know, once I got the idea that it might be the case, then I started searching for other evidence that would support that hypothesis based on information I knew of about victims and families of abused.

I: So she has this pulling apart dream, among other things that she dreamt and talked about . . . you don't remember anything else?

C: I have the other ones written down, but I can't recall them.

I: So basically what happened then?

C: Then the next event was when she . . . well, she gave me this dream and several others that I told you I wrote down the week before I found . . . that she told me about the abuse . . . the following week she came in with her best friend and said her best friend wanted to meet me and so I talked with her for a few minutes and then I had my session with Angie and I felt that night, and I don't remember exactly why, that Angie was going to tell me, you know, that night . . . what was going on with her father and she didn't . . . and she left the session and apparently that night she told her girlfriend what was going on with her father and the girlfriend immediately went to Angie's mother and told the mother who immediately told me and I instructed the mother of my obligations and her obligations legally and she made the call to the Department of Human Services the following day and reported it.

I: What did you do next?

C: Well, I had Angie come in specifically to have . . . to confront her about the information and to make sure that she expressed to me . . . she hadn't told anybody but the girlfriend . . . nobody had heard this from Angie except the girlfriend and so forth . . . so I had Angie come in and the girlfriend come in the following day and had Angie tell me what she had told her girlfriend.

I: Why did you do that?

C: Because at that point I figured that she had gone that far to tell the girlfriend she was ready for help and wanted help and the only way that she was going to get that help was to begin to talk about what was happening . . . and I felt that once she came up with

enough courage to say it out loud once, that we all had to move very quickly and support her before she got scared and refused to go any further.

I: Why did you feel that support was important?

c: Again, just because of what I know of what happens in situations like this . . . it's very frightening . . . the process is frightening . . . the whole idea is frightening to talk out loud about these kinds of things when all the child really expects is not to be believed but to be punished for saying something like that about their parent and, you know, she could just as easily back off and say, "I lied" and decide not to pursue it if she wasn't believed and she wasn't supported to go ahead and present her story.

APPENDIX B

SECOND INTERVIEW

- A: I want to review the first section here and the way I understand it . . . you have someone, a girl, who comes into your office and is depressed and in the first period of time here in the beginning, you're forming hypotheses about what could be causing the depression, and you're getting impressions from her about her personality and what's going on with her . . . and in the beginning, you said that the first thing that you thought of to look for was to see whether the depression was physically caused . . . Before we get into that, I'd like to explore any other impressions or feelings that you had about her that you can recall when you first met her that may have a bearing on your decision to send her to the doctor first.
- B: Well, what I remember was that it seemed so unusual to me to see a kid this age--she was 14 then--who was so emotionally out of control, and I was very concerned with the fact that she seemed unable to control her crying and I thought she probably was depressed but the behavior . . . it was so extreme, that I felt it was really important to make sure that there wasn't something unusual going on . . . some physical thing going on that could account for it.
- A: Let me see if I got this straight . . . you saw her as being, for her age, so emotionally upset that it was out of the bounds of your normal experience and given that, would you say that one of the first things that occurred to you was that it was physical? Am I correct in thinking that one of the first things that occurred to you was that it was physical?
- B: Well, yeah . . . I think also, a part of wanting her to be seen by a physician was to get another opinion on what I was seeing and to get an opinion from somebody who had a different perspective than I did and a different area of training.
- A: Now, you said that her level of emotional disturbance was unusual, that she was emotionally out of control . . . can you elaborate on your feelings or on the impression she made upon your feelings at the time?
- B: Well, my overriding, I guess the biggest feeling I had was a really strong sense of how much pain she was in and I wanted to be able to do something right away that would lessen the amount of pain she was in.
- A: Can you describe more deeply how that pain appeared to you?

B: Well, she came into my office and had obviously been crying for several hours, her face was red and puffy, around her eyes were swollen . . . she was extremely nervous, in that she wrung her hands and rocked herself back and forth in the chair . . . just cried continuously . . . found it very difficult to get any words out . . . avoided eye contact much of the time, although I didn't feel that she was opposed to being there with me . . . she just didn't seem able to deal with anything other than what was already happening to her . . . and so I felt a strong sense of not wanting to do anything that would cause her more pain, and yet needing to know something so I could help her.

A: And so, as I understand you then, it follows from that that wanting to help her without hurting her, one way that you could do this would be by getting a second opinion about the severity, which would mean sending her to the physician.

B: Yeah . . . also, in a lot of cases, having a physician verify that you're all right is comforting to people.

A: Very quickly then, I'd like to check out some of the things that I inferred from what you said the last time, one of which was that PMS would appear as continuous depression . . . is that accurate?

B: Yeah . . . I mean it would probably be a week or so during the month's time when she might more normal, but in general, from what I've read about it, yeah . . . it could be.

A: O.K., would you say that there was any evidence that was against the hypothesis that it was PMS?

B: Well . . . yeah, because it was a sudden, reportedly anyway, it was a sudden onset of symptomatology, and you really would expect the symptoms to appear more steadily over time, and in fact, I wasn't really that concerned about what it was as much as I was concerned with giving some concrete direction and reason for the referral that would make sense to both the mother and the daughter . . . and that I was relying on the physician because I had made contact with him and told him what I was after . . . I was going to rely on him to look at the whole picture and not just at what I was referring her for.

A: All right, so that there was, in a sense, some evidence against it being PMS, which amounts to the fact that the depression had a recent onset.

B: Right . . . it didn't seem to necessarily coincide with her menstrual cycle either . . . I guess the reason that I used that as a concrete reason for referral was one, that she had had a lot of trouble with her period, so it made sense to the family that this

could be happening, and secondly, because, like I said before, I was interested in giving them another way of looking at what was happening to her so that we could get some stability established, and thirdly, I felt that it was really important for my client as well as the mother of the client to have some sense that there was something that could be done about this problem, and to go away after that first or second meeting feeling as though there was something they could do right away that would begin to help us figure out what the problem really was.

A: Could you describe some of the reasoning that lies behind that decision . . . to give them that stability, that you had in your mind at the time?

B: Yeah, you see this is a little bit clouded by the fact that I had already been working with this family, via the younger brother, so it's not the same situation as the person who walks in for the first appointment and I know absolutely nothing . . . I already knew something about this family, and I felt that knowing this mother, that this mother has a strong feeling of helplessness and I felt it was important for her to have something concrete to do so that she wouldn't be dreaming up all kinds of terrible possibilities.

A: Later on you said Jane had to babysit a lot, and given that she was an adolescent, you felt that she had too much responsibility, from which I inferred, roughly, that any amount of responsibility that keeps an adolescent from time to herself is too much responsibility . . . how do you feel about that principle?

B: I don't know that that's something I was thinking at the time, maybe though . . . I did clearly feel that she did not have any privacy or free time to just think about herself and do the kinds of things that adolescents do as they are growing up . . . I felt that instead of being allowed to be a child, she was really playing the role that the mother in the family should play . . . the kinds of responsibilities that she had would normally be ascribed to the mother in the family.

A: O.K., let me see if I have this right . . . then, it is not so much the amount of the responsibility that led to your feeling that she had too much responsibility . . . it was, rather, the kinds and quality of the responsibilities that she had that led you to feel or perceive that she had too much responsibility . . . is that right? . . . would you care to elaborate on that?

B: Well it's both really, because . . . I like the way you discriminate between just too much responsibility and the kind of responsibility because that is a big part of what I was thinking at the time . . . but there's also the fact that even if the responsibility she was given was appropriate to her age and ability level, it's still

possible to have too many things to do so that she doesn't have time to do the kinds of developmental tasks that she needs to be working on at her age.

A: At the time, did you perceive her in that light, as having too much responsibility in the quantitative sense?

B: Yes.

A: O.K., later on you said that she wouldn't talk and was uncommunicative, that you had to get her to communicate with you, from which I inferred that you were "just talking" . . . you were in a sense just talking to her . . . could you describe your experience with her at that time, given those circumstances.

B: O.K. . . . she was so upset in the beginning of the treatment that she wasn't capable of reasoning or getting any distance from her feelings so that she could begin to describe them or talk about them or extract them or objectify them in any way, so I saw my role as more or less soothing her, in a way that you soothe any child that is crying or is hysterical . . . it's not so much the content of what you're saying, but the way in which you're saying it . . . you know, your tone, your body language, the kind of environment that you're providing for the child, that calms them down and leads them to feel that they can trust this person that they're with.

A: And so, my inference that you "just talked" to her is essentially correct, but what was more important to you at the time, was that you convey a certain sense of protection and convey to her a sense that she could trust you . . . have I got that right?

B: Yeah . . . she was safe in the environment with me . . . when she was with me she was safe.

A: Later on, you reasoned that given how depressed she was, that you said that she would not have been that depressed about the situation as she described it, from which I inferred that for you, depth of depression is a function of insight into the depression . . . is that accurate?

B: Well, not necessarily . . . not always . . . but with an adolescent, they don't have as much ability to cover up things as an adult has and so I expected that if the depression were a result of feeling angry at all her restrictions and limitations at home, that talking about those and giving her a receptive audience to talk about those things, the depression would have lessened and more anger would have been displayed about her situation if that was what she was really upset about.

A: In the first interview, the reasoning about how depressed she was and whether or not the situation could account for the depression was what led you to begin investigating the role of the father in the situation . . . would you like to comment on that rendering of what you described in the first interview?

B: Well, as I started to get more specific information about who was demanding what of her . . . there were the demands that her mother put on her then there were the demands that the father put on her . . . and they fell into two pretty separate categories . . . mother was demanding household responsibilities, and father was demanding social behavior that was not appropriate given her age and grade placement, and that was one of the first tip-offs that the relationship with her father was out of balance.

A: Would you describe some of the first impressions that you got about the father, given what you were perceiving in Jane's depression and the relation between the depression and her father.

B: Well, she would talk about the things that she would like to do that the other kids were doing that seemed perfectly reasonable, to me . . . she wanted to go in a group, a mixed group of boys and girls, to the skating rink, or to a supervised school dance or to a movie, and her father would get very upset about her wanting to do these things when there were going to be boys around . . . and that, in and of itself, isn't particularly odd . . . some fathers react that way when their daughters are growing up . . . but what was odd was the level of intimacy that he demanded from her for himself . . . he tended to confide in her, to expect her to control the children and held her accountable when she didn't control the children, and essentially treated her as a husband would treat a wife, rather than as a father would treat a daughter . . . and I think at that point, I was beginning to see it that way . . . and my reaction was, at first, kind of startled that he would have such a strong reaction to what would seem like normal activities, and I was interested in my startled response and that my own response led me to think much more seriously about what she was saying and to try to dig further and to find out more about her relationship with him to try to decide whether or not it was a normal relationship or not.

A: So would you say that it is true that what she told you does not account for all the depression?

B: Yeah.

A: Would you care to elaborate?

B: Well, in a way she was beginning to give me more information that would account for the depression in the sense that I just described,

although she wasn't . . . I don't think that she was really aware that that's what she was telling me . . . it seemed to me that she was presenting the information like any ordinary complaining adolescent griping about the rules and restrictions that they suffer under . . . that's the way that she presented it to me, but imbedded in those complaints and so forth, were these clues that there was more to the story than just "daddy won't let me do this or that".

A: O.K., what I hear you saying is that there is, in a sense, two levels . . . at the level of the surface, at the superficial level, there was the adolescent type complaining, and given that, you could not account for the depression . . . but on a deeper level, there was something hidden there, which you were beginning to suspect may account for the depression.

B: Right.

A: O.K. . . . later on you said that the father was explosive and kind of violent in that you thought she was afraid of him because he was strict, emotional and kind of violent, from which I inferred the principle that excessive emotionality in a parent like that might cause the depression and fear . . . could you talk about your hypothesis about his emotionality at that time.

B: O.K. . . . again, I was privy to information about the father because of my relationship with the younger brother . . . to my knowledge, the father had not been physically violent with any family members, but had been physically violent outside of the home, like getting his jaw busted in a bar brawl, for example, and I think that all of the family members perceived him as someone who might become violent with them if he were pushed too far, so I entertained the hypothesis for awhile that she was afraid to assert herself in the family for fear of being physically punished for it.

A: Would you say as a general rule, that excessive parental emotionality could cause depression and fear?

B: Sure.

A: Later on you said that you met with the father and you discussed some of the reasoning that led you to making the decision that you ought to meet the father . . . and from your discussion I inferred that you believed that one of the best ways to get this information would be to meet with him personally, and that you needed to know about the major factors influencing her problem . . . would you like to comment on those inferences?

B: Well, I think my main interest in meeting with him was to see him and to get some sense of what his thought processes were like, how he reasoned about his own behavior, how he would describe his

daughter's behavior, and to get some feel for how emotionally mature or immature he was.

A: Could you describe the impression that he made upon you when you did get to talk to him.

B: He was a truck driver . . . he sees himself as someone who . . . these are the things that he said about himself in the very beginning part of the interview . . . as someone who doesn't communicate very well verbally . . . who had a lot of negative thoughts and feelings about psychologists and what they do, and was not at all sure that he wanted to be there with me, and was more or less trying to impress upon me what a big favor he was doing me, having come to the interview in the first place . . . and more or less projected, he's a very kind of charismatic figure, and more or less projected his attitude of, "o.k. lady, you're on, let's see what you can do" . . . and he wasn't exactly uncooperative, and yet he was, seemed to me, engaged in some sort of game with me . . . and it was fairly obvious by the end of the interview, that he was not able to put himself in another person's place and to have any real understanding of the impact his actions have on other people.

A: O.K. . . . I'd like to try to tie this back into the next thing that you talked about in the previous interview which was that you eventually came to the possibility that there might be sexual abuse by the father, and so I'd like you to discuss how your feelings about him led to the beginnings of the hypothesis that you mentioned.

B: A lot of the emotional features that I just described about the father seemed to really jump out at me as sociopathic in nature, and the picture that I had from what I had gotten from the daughter, the mother and then my meeting with the father was that here was a situation that fit the textbook description of a sexual abuser and his family . . . he was emotionally immature, he was impulsive, he didn't feel that he had to abide by the rules . . . he didn't like women, and was basically very narcissistic and insensitive to the needs of others, and blaming of others for his problems, and so on and so forth . . . and after that meeting with him, I began to search vigorously for further evidence that my hypothesis was indeed correct, that she was being abused.

A: Later on, returning to Jane, you said that you didn't think that she could handle the issue emotionally, and that you felt that she was preparing herself to come forward with it, from which I inferred that whenever you think that one is preparing for something like that, you don't challenge them consciously.

B: That's correct.

A: Would you explain more why that's a rule for you.

B: I think it's always preferable for the person to uncover the difficulty on their own, than to have it forced on them or something, like cold water, when they're not really ready to deal with the information . . . that's one thing . . . the second thing is that I felt I had to be very cautious not to suggest to the client the nature of the problem, particularly in this instance, because of the kind of ramifications there could be, with sexual abuse.

A: Could you be more specific about how this rule applied, given your impression about Jane at the time.

B: You mean how she was doing emotionally?

A: I felt that she was very fragile, emotionally, and that I also felt that she probably never had a trusting relationship with an adult before where she could feel safe . . . and she was beginning to have those feelings in her relationship with me . . . and I felt that it would be very damaging to suddenly, in her mind, accuse her of something that she really wasn't ready to even say out loud or to accept herself . . . another reason why I didn't want to push it, was that I knew just from what I have read and understood about the processing and so forth, that when she finally admitted and decided that she wanted some help to get the abuse to stop, that that was going to be a very traumatic period for her and it was more important that my relationship with her remain one of trust and so forth, so that I would be there for her when she finally decided that she was going to face up to it and go through it . . . and if I pushed it, I might have just pushed her further away from it rather than helped her towards it.

A: O.K. . . . you said near the end of the first interview that she had told a friend and that you felt that she wanted and was ready for help . . . from which I inferred that her telling someone something frightening indicated to you a desire and readiness for help . . . is that rule an accurate one?

B: Yes.

A: Could you elaborate on it?

B: Well, this is not an ignorant person that I was dealing with, and she knew enough about this whole topic from the very friend that she told it to, to know what the consequences were going to be, that it would have to be reported to the proper authorities, and that it was going to mean some kind of public attention to the whole issue . . . and I think that she felt comfortable telling her girlfriend because she knew that the girlfriend would then do what she did, which was to tell her mother and to tell me . . . and that was something that Jane knew had to be done, but didn't quite have the nerve to tell an adult . . . so, I think that she was well aware of what would happen

. . . and she was relieved, actually, when it was finally revealed . . . the crying stopped, the depression decreased, and things got better almost immediately.

A: You say that you had her come in and tell you about the incest, from which I have inferred that the only way she was going to begin to get help was to talk about what was happening . . . could you elaborate on that?

B: Well, yeah . . . if I was going to continue therapy with this girl, it was really critical that she get up enough nerve to share with me what she had shared with her girlfriend, and it's just a basically well-known fact that the only way to resolve deep psychological problems is to get them out into the open and to begin to examine and explore them . . . and I felt that this was my best opportunity while it was fresh and, you know, it was her initial time of talking about it, that I hear what she had to say and how she said it, and all the emotions behind it and so on and so forth . . . and I wanted to be one of the first people to hear that statement, as opposed to hearing it after she had talked with DHS or after she had talked with the family lawyer or whoever.

A: Could you tell me more about the reasoning behind the decision that you be the first one that she talk with about it.

B: Well, I felt that as the story was told and I knew she was going to have to tell it more than one time, because I knew how the process would go, that as the story was told, the second, third or fourth time it was told, there would be less and less emotion behind it . . . just like anything terrible that happens to us, the first time you share it with somebody, you display more of the emotions that you feel than you will after you've told it many, many times . . . I wanted to have access to that emotional material.

VITA

Peter Lazzara graduated from Freeport High School in 1965. He graduated from the State University at Plattsburgh, New York, in 1976. His primary psychological interests are in thinking and problem solving, especially as these occur in interactional settings. An interest in conversation and interview methodologies has been coupled with an interest in computer applications in the area of Artificial Intelligence.