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Chapter IV  
Challenges to Formalism and  
the Hermeneutic Alternative

Formalism (in one or another form) has been perceived as the dominant position in philosophy and in both the physical and the social sciences for the last two centuries.<sup>1</sup> Given this perception it is unsurprising that a great deal of the interpretivist or hermeneutic position has been expressed in the form of challenges to the precepts of formalism. Challenges have taken on many forms and have been directed at a number of very specific issues. For our present

1 This perception persists (as noted in the beginning of Chapter III) despite the fact that specific incarnations of formalism have periodically been replaced with variations of interpretivism. [See Gardner 85 for a capsule discussion of such cycles in a number of disciplines.] Contemporary perceptions are more likely a reflection of a recent period of formalist ascendancy than of an uninterrupted 200 year dominance.

purposes it is sufficient to discuss a representative sampling of these challenges, grouped into two broad categories: First, challenges that are based on the issue of complexity that is intrinsic to the formalist position; second, issues concerning the adequacy of formalist representation.

Implicit in each of the challenges presented is the assumption that, however defined, "mind" is realized in the human organism - human beings constitute an existence proof of mind. A corollary to this assumption requires that any conception or model of mind must therefore be consistent with known properties of the human organism. Obvious inconsistencies between a model and the human organism serve to discredit the model.

#### Complexity

Cataloging all of the "objects" present in the material world would be a formidable task. Simply cataloging those unique objects that are encountered by any one person in a single day would yield an impressive number of entries. In a strictly quantitative sense the physical world is highly complex.

For those accepting of the formalist position (and especially Descartes' dualistic aspects of it) this

quantitative complexity is the initial source of a problem.

Because the mind is separate from the environment and because the mind must deal only with abstract symbols it is necessary for the mind to "contain" a unique symbol for every unique object perceivable in the external world.

Attempts might be made to reduce the number of discrete symbols required in at least two ways: by aggregation of objects associated with a single symbol, or by using a finite set of symbols modified by a finite set of "symbol adjusters." In the first case the problem is merely postponed because any aggregate category (things, them, dogs) has the potential need to distinguish among - and therefore symbolize - its members (pen-paper-pencil, John-Sally-Ramona, fido-sparky-rover). The problem is also exacerbated because of the extra symbols created for aggregates.

Positing a finite number of symbols and symbol adjusters also postpones (and exacerbates) the problem. In an ideographic scheme (like the Chinese language), for example, the number of unique symbols continues to increase as additional discontinuities in the environment are exposed. The use of modifiers (e.g. diacritic marks) slows the growth of base symbols, in comparison to a pictographic scheme for example, but this gain is offset by the need for

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a "decoding rule" that allows interpretation of the base symbol and its modifiers. Whatever scheme is adopted, the number of distinct or constructable (base symbol with

modifiers and a decoding rule) symbols must equal or exceed the number of objects in the external world.

In addition to the large number of symbols that must be present in mind is a large number of rules that enable the manipulation of those symbols - the dualist conception of "thinking." At first it seems as if the set of rules might be finite and relatively compact. It was this appearance that inspired early confidence in formalist approaches to cognition (grammar, logic, algorithms). The illusion was rapidly exposed as it became apparent that rules themselves were subject to meta-rules that varied either the application or content of rules to suit variable circumstances. Meta-rules were similarly subject to meta-meta-rules that determined the applicability of the meta-rules.

The formalist position requires an immense number of symbols and symbol manipulation rules. Cartesian variants of formalism require that the symbols and rules "reside" in the mind, separate from the environment. The mind must therefore exist as a simulacrum of the external world - a symbolic mirror of reality with all of the complexity of

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that which is mirrored. Many of the challenges to formalism are based on this quantitative requirement.

Harris, for example, attacks what he calls "cognitive idealism" in part by noting the exponential explosion in the number of rules required to account for observed behavior

that is supposedly caused (or at least motivated) by those rules. [Harris 75] If any observed behavior is the result of an application of rules then it is necessary to posit rules that explain inconsistent behavior (why a rule was seemingly violated). Inconsistencies arise between or among individuals that supposedly share the same rule set (culture), in the behavior of one individual at different points in time, and among all individuals over the course of time. Although each of the three axes of variation are independent in one sense they also interact so that the number of possible "meta-rule sets" is nine in number rather than three and each rule set is effectively open ended in terms of the potential number of member rules.

Harris' argument (as presented) assumes that the rules in question need be explicit or etic-ally expressible. His argument that it is impossible to enumerate the rules required to explain or predict behavior ignores the fact that it is possible to act on the basis of "rules" that cannot be explicitly formulated.

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When a doctor makes a diagnosis, for example, it is highly unlikely (as frustrated developers of diagnostic expert systems can attest) that the physician will be able to express the "rules" he or she has actually employed. When pressed for an explicit rule the physician will often provide a "textbook rule" (one remembered from early training or a textbook) that obscures and often contradicts

the actual decision making process. [Johnson 84]

Further examples of "rules" that govern behavior even though they cannot be explicitly stated include kinesthetic abilities like riding a bicycle. The explicit rule, "keep your balance," is a poor substitute for the actual (situation recognition - muscle response) process involved in performing the task.

A third example is inadvertently provided by Geertz in his famous discussion of the "wink." Interpretation of a facial gesture like a wink may not be expressible in terms of a set of rules governing how a particular expression is to be understood at a particular point in time in a particular situation.

The presence of hidden rules (compiled rules in the vernacular of AI) challenges Harris' implicit contention that an etic enumeration of rules is required to "explain" a culture.<sup>2</sup> It does not however, challenge his broader

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contention concerning the sheer number of rules that must exist (overt or hidden) if culture is to be explained in terms of operations based on those rules.

Harris' arguments attack the possibility of an explicit (etic) enumeration of the rules and objects required if culture is held to be a manifestation of the formalist conception of mind. Harris especially presents a telling argument against the possibility of explaining cognition (and through it, culture) in a manner analogous to

a physicist's explanation of celestial mechanics. His arguments, however, do not prove that the formalist position is impossible in principle, only that it is practically unrealizable given finite resources and limited time.

2Hidden rules are not replaceable by infra-structural entities as Harris would claim. Values assigned to infra-structural variables have little direct bearing on how a physician performs the cognitive task of diagnosis, kinesthetics, or one person's response to another's wink. Although it may be possible to correlate a diagnosis methodology with the class status of a patient (wealthy patients receive better articulated diagnoses), such a finding does not eliminate the need for rules, hidden or explicit, governing the diagnostic procedure. Harris' "marxist" arguments exacerbate the problem of a multitude of rules by increasing number of situations for which an alternative rule set must be present.

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Advocates of the formalist position argue that the ultimate correctness of the formalist position is less important than the results that have been obtained by building and analyzing formalist models. We will return to this argument towards the end of this chapter.

Three other aspects of the formalist position need discussion: problems dealing with novel situations; learning issues; and pragmatic considerations for modeling.

Imagine an isolated cultural population standing on a beach watching an anthropologist wade ashore. The cognitive "objects and rules" set of members of that population are

about to be confronted with a novel situation - the presence of a member of another culture (likely another race), an unprecedented situation. Some kind of response is required.

From the formalist perspective the first requirement is for a cognitive symbol; one must be created for, or an existing one applied to, this new external object. Second, some set of cognitive rules must be applied, invented, or adjusted to provide the basis for thinking about and therefore responding to this new thing. A similar process must take place in the mind of the anthropologist.

Mechanisms seem to exist that enable this process. Mechanisms with the linguistics derived labels of analogy, metaphor, metonymy, etc. and the anthropology derived label  
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of "anthropomorphism." The newcomer is assigned the symbol of "kind-of-person" and a multitude of descriptive symbols and thinking rules are similarly modified and assigned.

As noted in chapter one, metaphor is acknowledged as the principle mechanisms whereby the novel is made understandable. Metaphor (and the other mechanisms noted) present a grave problem for the formalist position - there is no formal criterion for how and why metaphors are created or applied. [MacCormac 85, Sacks 79] This inability (to date) to formally account for metaphor is a direct challenge to the formalist position as a whole.

In a narrower, purely linguistic sense, the problem is also manifest in terms of producing or understanding novel



sentences. Formalists like Chomsky and Fodor insist that novel sentences are created or understood in terms of recipe-like application of rules (transformational rules). Coulter [83:51-63] discusses the problems with this approach and summarizes some of the challenges directed towards this perceived weak point of formalist theory.

Perhaps one of the strongest challenges to the formalist position involves issues of learning. Given the complexity and volume of objects and rules that must be present in order to think (manipulate symbols according to applicable rules), how are those symbols and rules acquired?

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D'Andrade [81] presents some simple calculations that argue against the ability of a human mind to learn all that is required within the human lifespan. Nor is this problem new. Plato suggested that "learning" was really the awakening of built-in memories. Chomsky and other transformationalists argued against psychological behaviorists by pointing out the lack of time available for learning and adopted what is called the nativist position concerning language. Essentially this position holds that some of the fundamental properties of language are intrinsic (native) to the mind and are not learned. In at least one sense socio-biology is yet another response to the learning problem.

Another aspect of the learning problem concerns the fact that individuals seem to exhibit more knowledge than

what they have been taught, and certainly more than they have been formally taught. In the case of language, for example, humans have an ability to construct correct sentences long before they have been instructed in the nuances of grammatical construction. In the case of culture there is very little in the way of formal instruction and the small amount of instruction (relative to the body of cultural knowledge required) tends to be informal and indirect.

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Formalists will often respond to this type of challenge by asserting that the "ability to learn," i.e. transformational rules, induction rules, etc. are intrinsic to the organism (are native and unlearned). It is the non-conscious application of these rules that accounts for learning of that which is not taught and for the reduction in time required to learn. The most comprehensive application of this general argument is socio-biology where most of that which is called culture is held to be intrinsic to the organism and is evolutionary genetic history.

Even if the formalist response were correct and there are native capabilities (a proposition that cannot be empirically refuted), relying upon them remains a challenge to the formalist perspective. In some sense native properties remain outside the realm of that which is formally described and known.

This is not only a problem for formalists. As will be seen later in this chapter, the problem of accounting for the acquisition of all that we seem to know is a problem for hermeneutic approaches as well.

Despite the abstract challenges to the formalist position it has continued to flourish. In part this is because it has been successful in building models that

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embody the formalist perspective and in using those models to produce illuminating insights into cognitive problems. The advent of the electronic digital computer has strengthened this ability to build insight yielding models. At the same time, however, construction of these models and the limitations that they subsequently exhibit have served simultaneously to corroborate the challenges that have been leveled against the formalist concept of mind.

Consider the problem of "storage", for example. The formalist perspective requires that an immense number of symbols and symbol manipulation rules be present (in some sense) in the mind. In terms of a model this requirement translates into the need for large amounts of storage space, a physical repository for each symbol and the components of each rule. (In a computer based model, storage takes the form of electronic pulses and altered magnetic fields.) Depending upon representation schemes (discussed further below) and defining parameters, the amount of information that needs to be stored exceeds the capacity of existing

devices.

The number would also seem to exceed the capacity of the human brain - assuming, 1) that the brain is the physical embodiment of a human mind (our existence proof); and, 2) that the brain stores information analogously to a  
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computer, "one piece to one physical site." Although the second assumption was once seriously proposed it is no longer. Rejection of the second assumption is explicit in the connectionist models discussed in the next chapter.

Not only must the information be physically stored, it must be accessed. Access must be rapid and situationally triggered as well as functionally retrievable upon application of "thinking" rules. All of this translates into a need to have the information store organized to enable rapid retrieval of any needed piece of information. Rapid retrieval is required because of the second pragmatic limitation of formalist models, limited calculation (thinking) cycles.

There are two types of time limitations exposed by building formalist models as computer systems. First is simply the finite number of cycles available - even at nanosecond step times it can take ridiculous amounts of time to perform what appear to be relatively simple (for a human) tasks, like the recognition of a face in a crowd. The second type involves another comparison with our existence proof. At the basic component level, the human brain

operates very slowly (relative to a computer) and yet it performs its tasks with great rapidity. This leads to the conclusion that the means employed by the brain utilize

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fewer steps (by at least an order of magnitude) than any existing computer system. This in turn leads to the conclusion the human mind operates other than formalistically.

It is increasingly argued that formalist models capable of emulating the totality of any human individual's capabilities cannot be built with finite resources nor operated in finite periods of time. Because the human mind obviously operates in finite time and with finite resources, the argument is extended to include the proposition that the formalist conception of mind cannot explain the operation and construction of the human mind.

Purely pragmatic arguments, however, can be refuted by the next advance in technology. It is therefore inappropriate to completely rely upon them as a foundation for arguing against a philosophical or conceptual position. Such an argument is not advanced here. Instead it is simply argued that formalist models exhibit characteristics that support conceptual arguments against formalism. Arguments of this type have been advanced in advocating alternative approaches to model building, particularly "connectionist" modeling - a topic that will be returned to in the following chapter.

Again, although challenges to formalism derived from the complexity implicit in that perspective are pragmatically persuasive they do not eliminate formalism in principle. They do seem to demonstrate that the somewhat simplistic rule-based version of formalism is inadequate and that, if the formalist enterprise is to flourish, it must develop alternative tools, ones better matched to the complexity of the phenomena being investigated and modeled.

#### Representation

Formalist perspectives (and many others) require that the mind contain entities that are representative of entities perceived in the external world. The most obvious example concerns the use of symbols. A symbol set is not, in itself, a sufficient representation scheme. Also required are structures relating symbols and the ubiquitous rules for manipulating them. Together, the symbols set, the relationship structures, and the manipulation rules constitute a representation scheme. Such a scheme is illustrated by the ASCII character set (symbols), data structures, and algorithms (manipulation rules) operating in a computer system.

Another source of challenges to formalist theories is based on the conviction that formalists have chosen inadequate, inappropriate or inconsistent representation schemes to support their position vis-a-vis the nature of mind.

Attempts to create computer programs capable of using "natural language" (e.g. French, Japanese, English, etc.) as a basis for interactions with human users exposed one challenge. To date all such programs rely on what amounts to a syntactic representation scheme. The attempt is made to subsume semantics within syntactic representation although the "syntax" employed may extend beyond pure grammar to include structures that allow partial accounting for context.

In essence the syntax - semantics argument holds that the meaning of a single symbol (a word, for instance) is a function not only of its placement in a symbol structure (sentence) but also of that structure's relation to other structures (document), of the symbol system in which those structures were created (culture, perhaps) and of the purpose of both the creator and perceiver of the symbol. This function is so comprehensive in scope that it cannot possibly be subsumed by any finite syntactical representation.

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Proponents of this type of argument include the cultural analysis of Geertz and Turner, the linguistic

theory of Hymes, and the AI criticism of Winograd - among others in each realm. This position will be discussed in greater detail in the following section dealing with hermeneutic alternatives.

One of the most common challenges to the representation schemes employed in formalist conceptions and models of mind is that they are reductionistic. Reductionism is held to occur in at least three major ways: first by attempting to explain all of cognition in terms of electrical states of the brain; second, by proposing some form of discrete representation; and, third, by accepting Descartes' and Leibniz' belief that cognition is governed by a "formal language."

From ancient and superstitious times a favorite guessing game concerned the location of a human's essential self (soul, ego, mind). The heart muscle was an early favorite and Descartes liked the pineal gland, but the brain is the current field leader. A few hardy souls will speculate on a specific portion of the brain (cerebral cortex, for instance) and many will blithely dismiss portions of the brain stem and the central nervous system from consideration. While there is less concern with

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placing the mind in a particular group of tissues, there is an increasingly common acceptance that the mind is a function of the electrical activity in the nerves, neurons, and synapses.



Bergland [85] challenges this position from the perspective of neuro-chemistry. He notes that the brain functions as a gland, both producing and responding to the presence of various hormones and chemicals. Electrical activity in the brain is strongly influenced, if not wholly determined, by glandular activity and therefore any scheme that ignores chemistry must be an inadequate representation.

Beginning from an evolutionary and more anthropological starting place, but still within the biological context, Maturana and Varela [87] trace the roots of consciousness and come to parallel conclusions. Like Bergland, they note the critical importance of chemistry in the functioning of the nervous system (including the brain):

"The plasticity of the nervous system lies in the fact that the neurons are not connected as though they were cables with their respective plugs. The points of interaction between the cells are zones of delicate dynamic balance modulated by a great number of elements that trigger local structural changes, activity of those cells and of other cells whose products are released into the blood flow and wash the neurons. It is all part of the dynamics of

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interactions of the organism and its environment." [Maturana 87: 168]

Barbara McClintock's analysis of genetic transformations is similarly compatible with the analysis of Maturana and Varela. The conflict between her views of genetics and prevailing "master molecule" metaphors (as

recorded by Fox-Keller [83]) closely parallels the discordance between the "electrical-computational" and "chemical-interactional" representation schemes. Opponents of formalism argue that, just as syntax cannot subsume semantics, electricity cannot subsume chemistry and biology.

The discrete versus distributed representation argument is illustrated by the early attempts to map computer-like processing onto observable structures in the brain that focused on assigning particular memories, facts, etc. to specific aggregates of neuronal cells. This type of representation scheme is called by the label "Grandmother cell theory" - the extreme position that the concept of grandmother is represented by a single cell within the brain.

Part of the evidence advanced against this representation scheme is the ability to remove segments of the brain without eliminating memory (although clarity of memory may be impacted). [Pribram 71] While few argue for

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the extreme case in this type of discrete representation some sort of localization remains integral to currently mainstream formalist explanations of cognition. Arguments in favor of distributed representation schemes will be discussed in more detail below.

The third type of reductionism has already been alluded to and discussed, in part, in preceding chapters and sections. It concerns the adequacy of any "formal language"

as a representation for thought. Because this argument is at the heart of the hermeneutic alternatives discussed in the next section, portions of the general argument will be summarized once again.

Advocates of formalism believe that "mind" is an instance of a "symbol processing machine" and that everything cognitive (thought, feelings, intuitions, language, etc.) can be reduced to a series of tokens and a set of rules for manipulating those tokens. It is admittedly a difficult task to identify all the tokens and rules but this is a mere quantitative problem that can be solved by dividing the task into sub-parts. Once all the sub-problems have been formalized they can be combined to produce the ultimately desired result.

In AI two of the principal critics of this approach are Searle [Searle 84] and the Dreyfus brothers, Herbert and  
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Stuart [Dreyfus 86]. Searle's argument is expressed in his parable of the Chinese room and centers on the idea that some aspects of mentation (self-awareness for example) cannot be represented in a formal manner and will therefore be necessarily absent from any formalist model of mind. As Johnson [86] points out, Searle's argument comes very close to the old notion of an "elan vital" or essential essence (the breath of God?) that separates man (and his mind) from the more mundane inhabitants of the world.

The Dreyfus brothers similarly argue that there are

certain aspects of human cognition (intuition, insight, and comprehension) that cannot be represented in any formal system. However, where Searle's position focuses on a missing essence the Dreyfus' focuses on a missing context - the phenomenological experience of the knower, in which mentation is embedded.

Certain aspects of mentation cannot be formally represented, the Dreyfus' claim, because they have been "compiled," or inextricably intertwined with individual experience. Upon "compilation" they form a seamless whole which is not representable by any formal system.

Unlike Searle, the Dreyfus' do not entirely close the door on the possibility of a computer exhibiting intelligence. Their argument is very specifically addressed

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to the problem of formalistic representation and its inherent limitations - against "mechanistic" systems but not necessarily against "holistic" ones. (An example of a holistic model will be presented in the next chapter.)

Context, in the form of an ongoing interaction (a process) between the knower and the known, is the basis of challenges to formalist representation as advanced by Turner in anthropology and Winograd in AI. Using symbols (or language) as an illustration, this challenge claims that "meaning" is not an intrinsic property of an utterance but is a property that is "negotiated" between speaker and listener and the "tradition" within which they exist. This

type of objection goes beyond simply challenging formalism but becomes the foundation of an alternative to formalism, an alternative that is the subject of the following section.

#### The Hermeneutic Alternative

Hermeneutics enjoys as extensive a tradition as formalism; in philosophy (Dilthey [Rickman 76], Gadamer [75, 76], Heidegger [68], Husserl [Dreyfus 82], and Merleau-Ponty), in psychology (Vygotsky [86], and Wundt); in anthropology (Boas, Mead, Geertz, and Turner); and in AI (Winograd [86], and Dreyfus [85]). Leaf [79] documents how

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our definitions of, and theories concerning, man have alternated between the formalist and the hermeneutic (or interpretivist) poles. In the context of analyzing the works of Michel Foucault, Dreyfus and Rabinow provide additional insight on these opposing viewpoints. [Dreyfus 83]

Placing scholars who work in various disciplines and whose work, at least on the surface, is widely divergent under a single umbrella label is sure to be challenged. In doing so there is no intention to minimize the differences between the individuals cited nor to claim more than one or two common bonds among them. These individuals (and others) are considered together because each has been concerned with at least one aspect of a common problem and each has adopted

a position vis-a-vis that problem that is in contrast with formalist conceptions of that same problem.

The problem and central point of divergence between formalism and hermeneutics concerns a context-that-is-also-a-process which is missing from (its existence denied by) formalist models and is considered critical by advocates of hermeneutics. It is missing from formalist models for two reasons: the context component because of its scope; the process component because it is particularistic and ephemeral.

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A formalist model must assume that its tokens are static entities, not subject to whimsical reconstruction as a function of the moment, and that its rules for manipulating those tokens are consistent over time. An interpretivist challenges both assumptions.

For the hermeneutic approach attributes of tokens are a function of the context in which they are found, they are not static. This context encompasses, essentially, the whole of the universe. In the case of a word, for example, its meaning is a function of its place in a sentence, surrounding text, and a shared cultural setting that extends far beyond the borders of the text. (Hirsch's book [Hirsch 87] on cultural literacy illustrates this principle in a context other than cognitive science.) If this variability in attributes is to be captured in a formalist model, the number of rules required to determine which aspect of the

variability is to be employed in a given situation is unbounded.

Even if a set of rules could be constructed to relate situations with token attributes it would only apply to one particular situation at one particular time. Hermeneutics originated in the study of texts (usually religious) that were used and interpreted differently over centuries of time. Theories developed in this realm have been

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generalized to include all of cognition. Just as interpretation of a text is a function of when (the ephemeral aspect) and by whom (the particularist aspect) it is read, so too is all of cognition.

"Any individual, in understanding his or her world, is continually involved in activities of interpretation. That interpretation is based on prejudice (or pre-understanding), which includes assumptions implicit in the language that the person uses. That language in turn is learned through activities of interpretation. The individual is changed through the use of language, and the language changes through its use by individuals. This process is of the first importance, since it constitutes the background of the beliefs and assumptions that determine the nature of our being." [Winograd 86: 28-29]

In this type of world-view the rule set required in a formalist model would be highly dynamic, constantly changing as a function of who used the rules and how they used them.

It is not possible to fully present or argue the hermeneutic position in this thesis. Immediate purposes are

served by discussing, briefly, four representative advocates of hermeneutic theory: Wilhelm Dilthey, Clifford Geertz, Lev Vygotsky, and George Lakoff.

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Dilthey

Dilthey's philosophy has been characterized as a challenge to both positivism and historicism (at least those versions prevalent in Europe at the beginning of the twentieth century). [Makkreel 75, Ermarth 78, Bulhof 80] Paradoxically, his stated philosophical objective was the creation of a "human sciences" (Geisteswissenschaften) that would be as rigorous and productive as the "natural sciences," the exemplar of applied positivism.

Although it is generally agreed that he failed to achieve his grand objective, he developed a model of analysis and understanding for history and culture that has had extensive but, until recently, largely obscured influence. His influence is seen in the work of Boas, for example, [Stocking ] and the positions advocated by Geertz are direct echoes of those developed by Dilthey. Many of the most ardent opponents to the prevailing formalist model of mind in AI have been directly or indirectly influenced by Dilthey's thought.<sup>2</sup> It is appropriate therefore to begin



our synopsis of hermeneutic positions with his work.

2 Winograd and Flores via Gadamer and the Dreyfus brothers via Merleau-Ponty and Husserl. [Dreyfus 85, Winograd 86] See Bulhof [80] for discussion of Dilthey's influence on those intermediary philosophers.

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Dilthey's hermeneutics begins with history. Dilthey realized that his initial efforts addressing history (essentially formalist in orientation) could not attain the same kind of objectivity as natural science enjoyed vis-a-vis the physical world. This led to his position that regarded the concrete historical record as a text inviting various interpretations. Those interpretations were as reflective of the interpreter as of that which is interpreted. Historical understanding is the product of a "dialog," a "negotiation" of meaning rather than the simple disclosure of some meaning intrinsic in history itself.

Dilthey extended the insights derived from historical analysis to the psycho-cultural realm (the German term employed by Dilthey can be translated as either psychology or anthropology [Buholf 80: 137]) and to the analysis of reality as a whole. He considered human behavior and its products as interpretations of the grand text of reality as it is encountered by the individual. Knowledge becomes "the personalized image of an aspect of reality, or of reality as a whole, which a subject constructs in habitually processing his experiences in certain ways." [Buholf 80: 142]

Supporting Dilthey's various analyses is a concept of

mind that rejects the operation of "impersonal timeless rules" espoused by Kant, independent or isolated images  
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(symbols) of formalism, and passive registration of facts generated in the external world. Instead, for Dilthey, mind was a process:

"Knowing processes are extremely complex operations in which various mental activities, such as the distinguishing of differences, or the seeing of similarities, as well as the acts of connecting, separating, abstracting, or unifying entities, and discerning uniformities of several are interrelated. Far from being passive, the mind is therefore active - creating intelligible order out of chaos."  
[Buholf 80: 142-143]

Moreover, mind is a process that involves (includes) both the external and internal realms (in direct contrast with Descartes disembodied notion of mind). The operations of mind (its dynamics) are conditioned by both the natural and cultural environment in which it is located.

"An individual is always part of a social group. At each moment, one's mind takes account of personal past experiences; but however individualized these are, they are always infused with the experiences of his social group. Any individual begins to experience reality according to the directives received from those who raise him. Consequently, the individual mind's creations always bear the personal and cultural stamp of their 'creator' - whether this creation be a philosophical system, a religious creed, a work of art, or an action. Such a creation does not mirror an eternal truth; on the contrary, it is anchored in its creator's individual and cultural

experiences with reality; it mirrors the historical situation from which it emerged . . . [Buholf 80: 144]

While Dilthey provides a descriptive concept of mind he offers little that would support the creation of a model of mind. Building such a model was, of course, barely relevant to his primary endeavors, but he did recognize some of the problems that arise from the absence of a model of mental operations.

Memory (recall), for example, is a process central to his various analyses and he acknowledged the need to account for how that process worked; at least to the extent of accounting for how it was populated. An individual's memory is populated with information that the individual did not "learn" or acquire in any standard way. This observation led Dilthey to speculate (subtly) on an extra-sensory connection to a collective memory.<sup>3</sup> This speculative issue is raised only to point out that however well-developed a concept of mind might be, the lack of a model will leave open many valid and important questions - a point that will be raised again at the conclusion of this chapter.

3 See Makreel's [75:345-384] discussion of world-views (Weltanschauung) and Buholf's discussion of history as mankind's memory [80: 33-54] and West [85] for sources and development of this notion.

Mention "hermeneutic anthropology" and few names come more readily to mind than that of Clifford Geertz. In his *Interpretation of Cultures* he sets forth his basic positions of a hermeneutic approach to culture and mind. Although Geertz does not cite Dilthey or otherwise acknowledge his influence, the thoughts expressed by Geertz are direct echoes of the positions taken by the German philosopher.

For Geertz, like Dilthey, behavior and culture is a manifestation of an interpretation of reality by individuals and by collections of individuals. Symbols are central to his conceptions, but the meaning of such symbols is public, negotiated and contextually dependent. Although the points of agreement between Geertz and Dilthey are interesting, it is Geertz' approach to a conception of mind - one that skirts but nevertheless avoids actually becoming a model of mind - that is of central interest at this point.

"The term 'mind' refers to a certain set of dispositions of an organism." [Geertz 73: 82] These "dispositions" do not arise from any innate (genetic) capacity of the physical organism, which "is so functionally incomplete as to be unworkable." [op. cit.: 83] Instead, (and here Geertz states the hermeneutic position more forcefully than Dilthey), "Tools, hunting, family  
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organization, and, later, art, religion, and 'science' mold(s) man somatically; and are, therefore, necessary not merely to his survival but to his existential realization."

[ibid]

In a subsequent paragraph Geertz acknowledges that some kind of mechanism must exist whereby mind is realized:

"Although, conceivably, mere increase in numbers of neurons may in itself prove able fully to account for the florescence of mental capacity in man, the fact that the large human brain and human culture emerged synchronically, not serially, indicates that the most recent developments in the evolution of nervous structure consist in the appearance of mechanisms which both permit the maintenance of more complex regnant fields and make the full determination of these fields in terms of intrinsic (innate) parameters increasingly possible. The human nervous system relies, inescapably, on the accessibility of public symbolic structures to build up its own autonomous, ongoing pattern of activity." [ibid] (My emphasis.)

Geertz notes that certain mechanisms are required but does not address the nature of those mechanisms nor how a knowledge of their operation might affect our conceptual understanding of mind and of culture. Instead, perhaps correctly, he implies that such questions are best addressed in other disciplines with which ongoing dialogs need to be

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conducted. Anthropologists then are left with the same task definition as proposed by Dilthey:

". . . it is the task of the student of history and culture to interpret the expressions of alien life experience, and - as a true Hermes figure - to translate them into some idiom which

contemporary readers raised in their own cultural environment can understand; thus is set in motion a dialogue between alien and familiar cultures. The goal of such translation is not to forge a universal language which obliterates differences, but to understand other languages, and also to gain the ability to move within these languages. [Buholf 80: 194]

## Vygotsky

Like Dilthey, Vygotsky had a grand objective; i.e., to write a Kapital of psychology, to use the insights of Marx to create a unified and systematic view of psychology. At first glance this objective would seem to oppose Vygotsky to the hermeneutic perspective, but, again like Dilthey, the objectives and findings of a course of investigation occasionally diverge.

For Vygotsky the starting point was Marx' viewpoint on the relationship between consciousness and activity:

"Men are the producers of their conceptions, ideas, etc. - real, active men, as they are conditioned by a definite development of their productive forces and of the intercourse

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corresponding to these, up to its furthest forms. Consciousness can never be anything else than conscious existence and the existence of men is their actual life process." [Marx 59: 247]

Vygotsky wished to create a psychology that would be compatible with Marx' claims about the social origins of consciousness, to "show how the individual response emerges

from the forms of collective life." [Vygotsky 81: 65]

Although Vygotsky constantly emphasized the role of social forms in the shaping of mental forms (true to Marx) he (like Marx) was clear that the process of consciousness was interactive in nature. The bridge between the outer (social) structures of consciousness and the inner (mental) structures was semiotics. The fact that Vygotsky retained a dualistic conception of mind apart from but interacting with its environment produced the same kinds of problems encountered by others advocating interactionist or interpretivist positions - by what mechanisms did the inner structures come into being?

For Vygotsky the answer lay in "zones of proximal development," periods where those possessing competence in an area guided the development of those seeking such competence. Usually this was portrayed in terms of children being enculturated by adults. The essence of proximal

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development zones are activities, structured interactions, where novices participate, even though they are not capable of fully performing, until, with practice, they are able to assume responsibility for and reproduce the activity themselves.

The similarities between Vygotsky's proximal development zones and Turner's liminal periods is readily apparent. [Compare Turner 67: 93-110 with Cole 81 and 85.] Neither Vygotsky's zones nor Turner's liminality, however,

explicates a mechanism whereby the transfer of outer to inner structures (or alternatively, the transition from naivete to competence) takes place.

Vygotsky recognizes the problem of relating the inner and outer worlds of activity. Along with Leont'ev he recognizes that "the process of internalization is not the transferal of an external activity to a pre-existing, internal 'plane of consciousness': it is the process in which this plane is formed." [Leont'ev 81:57] Instead of proceeding with an explication of this process of formation however, Vygotsky and his followers attempt to offer a description of an individual's (usually a child's) emerging control of external sign forms. These descriptions are set in more mundane (ethnocentrically speaking) settings (the playroom, school classrooms, factory floor) than Turner's

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descriptions of Ndembu ritual, but in both instances they simply relate the meanings of certain signs and symbols - relate them to the socio-cultural (or materialist) circumstances in which they are embedded and relate how the individual comes to respond appropriately to the presence of those signs.

Like Geertz, Vygotsky explicitly states the need for a model of mind that would accommodate the mechanisms of internalization but avoids presenting the model or the mechanisms themselves. We are left with a dualism not far removed from Descartes' conceptions; with an inner and outer



world, the former of which is a simulacrum of the latter. As a simulacrum the patterns observable in the inner world (its structures) are duplicates of the patterns observed in the outer world (social and material structures) just as if they had been inscribed in the mind with some kind of metaphysical-psychological pantograph.

As illuminating as Vygotsky's interactionist-hermeneutic approach might be with regards to the relationship between mental and social forms, or as convincing as it might be with regards to its rejection of Platonist and Cartesian disembodied rules operating on ideal forms, it nevertheless leads us no further towards an understanding of the mechanisms whereby all this is  
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accomplished than any of the other positions discussed in this chapter.

Lakoff

Reflecting his linguistic orientation, Lakoff attacks the formalist position by demonstrating that the internal forms of mind, as reconstructed by advocates of formalism, are not discrete, objective, or uninfluenced by the culture in which they were conceived. Specifically he addresses the issue of categorization - an issue central to the formalist and hermeneutic conceptions of mind.

In *Women, Fire and Dangerous Things* he argues that

categories are (each in part): determined by the physiology of the human body (based on the work of Berlin [69], Kay[78] and McDaniel [78] on color perception); fuzzy (from Zadeh [65]); and based on prototype relationships rather than intrinsic characteristics of objects (after Rosch [81]). Each argument is in direct opposition to an aspect of categorization as it is conceived and presented in conventional formalist models.

It would be unfair to attempt a recapitulation of his extensive arguments in this space. What is of interest for present purposes, however, is not his alternative cognitive

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grammar or even his arguments per se (they are consistent with and support the general hermeneutic-interactionist position discussed so far), but is the fact that he too approaches the need for a model of mind but does not actually attempt to present one. He does offer some hints, however, as to what shape such a model might take when he indicates that his approach "does not contradict what have come to be called 'connectionist' theories, in which the role of the body in cognition fits naturally." [Lakoff 87:338]

In his brief discussion of the computational, mind-as-a-machine paradigm Lakoff provides further clues, or parameters, for the construction of an appropriate model:

"The information-processing system of the body is a joint body-mind system, not factorable into purely mental and

purely bodily functions in a way that fits the classical theory of concepts and categories. Instead, information-processing capacities used in bodily functioning are also adapted to at least certain areas of what has traditionally been called purely mental functioning.

Another way of thinking about this is in terms of the difference between signalprocessing and symbol processing. Both are forms of information processing. But individual symbols are assumed to have meaning and individual signals are not. Information processing in the central nervous system involves signal processing, not symbol processing. A joint body-mind system might involve both signal and symbol

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processing, without a single, clearly isolatable symbol processing subsystem."  
[Lakoff 87:350]

And:

"Going outside the mind-as-a-machine paradigm does not necessarily mean going outside of a more general information-processing paradigm. For example, within connectionist approaches, it may ultimately be possible to maintain a joint body-mind position that might make sense of categorization phenomena. It would require that the information-processing functions of the mind overlap with and significantly determine many of what have traditionally been called purely mental functions." [Lakoff 87:352]

Of all the interpretivists discussed in this chapter, Lakoff is the clearest in his recognition of the need for a model of mind in addition to and in support of a concept of mind. Although others have recognized at least implicitly the need for such a model, they avoided discussion of any details. Lakoff suggests that "connectionism," a relatively

new and recently revived area of AI research, might provide the basis for development of an appropriate model.

A remaining question (one of undoubtedly hundreds) is whether hermeneutic approaches to cognition and cognitive anthropology are desirable or likely to be beneficial. One answer to that question will conclude this chapter.

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#### Hermeneutic Models of Mind?

Hermeneutics, especially as represented by the previous scholars, makes a strong case for an alternative conception of cognition but does not offer any insights on how the kind of problems attacked by formalists might be approached. Although these scholars offer a clear alternative concept of mind they offer no alternative model of mind. Is such a model necessary? Is one possible? Or is the use of 'model' and 'hermeneutics' in the same phrase an oxymoron? The answers, I believe, are yes, yes and no.

There are two arguments for the necessity of a model. First, a philosophical position alone is an insufficient foundation upon which to build robust theory. Although it might be argued that a model is not a requisite addition to philosophy in order to theorize, one of the major differences between hermeneutic theory and formalist theory is the presence of well-defined models in the latter. Despite the ongoing attacks on formalism by interpretivists

(and despite the fact that many formalists accept the essence of the hermeneutic critiques) monism has yet to supplant formalist theories in most areas of scientific endeavor. If hermeneutics-interpretivism-monism is to attain status beyond that of the "loyal opposition" to

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formalism, it must develop a strong alternative theory, one that is amenable to modeling.

Second, a model will provide a bridge to other disciplines where models are sine qua non. Anthropology, I believe, has developed insights, both theoretical and empirical, that could be of major benefit to other disciplines, including (and perhaps especially) those involved in the study of cognition. It is difficult, however, to contribute to other-discipline theory without a common basis of understanding vis-a-vis data and analysis of data. A model that captured the essence and hopefully the detail of the hermeneutic approach to cognition would contribute to that kind of inter-disciplinary communication.

Whether or not it is possible to build an appropriate model is an open ended question, one that will not be answered in this thesis. Although an answer will not be claimed, an attempt to define a model will be made along with some suggestions as to how a model might be realized and evaluated. (Chapters V and VII)

Finally, concerning the possible contradiction between the construction of models and the hermeneutic approach,

there is a surface conflict, but only because models have come to so closely associated with the formalist approach and because, until recently, there was no way in which

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non-formalist models of sufficient complexity could be defined, realized and tested.

The core arguments of hermeneutics concern the inter-relatedness of reality and mind, the individualistic and somewhat ephemeral nature of mind, and the socio-cultural construction of the contents and operation of mind. However, just because phenomena like culture and cognition are inherently and exceedingly complex does not necessarily mean they are beyond modelling. As Lakoff points out, "connectionism" offers one approach to realizing appropriate models - an approach taken up in subsequent chapters.