A Conceptual Analysis of Radical Behaviorist Epistemology

Marcia L. Bennett

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A CONCEPTUAL ANALYSIS OF
RADICAL BEHAVIORIST EPISTEMOLOGY

by
Marcia L. Bennett

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Degree of Master of Arts

Western Michigan University
Kalamazoo, Michigan
December 1978
DEDICATION

I would like to dedicate this thesis to my parents, LeRoy and Pauline, whose support, concern, and patience have helped it to become a reality.
ACKNOWLEDGEMENTS

I wish to express my thanks to Jack Michael and others at Western Michigan University for their support and encouragement of my interests in verbal behavior. And to my teacher, Willard Day, who has helped me with this project, I offer my special gratitude.

Marcia L. Bennett
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A CONCEPTUAL ANALYSIS OF RADICAL BEHAVIORIST
EPISTEMOLOGY.

WESTERN MICHIGAN UNIVERSITY, M.A., 1978
Any good poet, in our age at least, must begin with the scientific view of the world; and any scientist worth listening to must be something of a poet, must possess the ability to communicate to the rest of us his sense of love and wonder at what his work discovers.

Edward Abbey
The Journey Home
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INTRODUCTION

Certain viewpoints in psychology, primarily aligned with the "philosophy of science," have come to be fairly commonly held as assumptions concerning proper research practice, the aims of research, and the ways in which research results fit into a more general concern with "psychological knowledge." These assumptions center particularly around a professional concern with "objectivity" in scientific practice and involve an insistence that objective research involves, in some form or another, experimental research design. While Skinner and others have addressed these assumptions, for the most part they have remained unarticulated.

The present project is concerned with examining these assumptions from a radical behaviorist orientation. Specifically, Skinner's treatment of scientific knowledge and the effect of research practices on the behavior of researchers will be examined. The epistemological focus of this project involves looking at the behavioral realities, within a context of controlling environmental contingencies, which comprise professional research activity. This project also attempts to organize and clarify some of Skinner's discussion relevant to epistemological issues in science.

The central concern with developing a radical behaviorist epistemology will be seen to revolve around the importance of verbal behavior, specifically the verbal behavior of scientists when "making sense" of a phenomenon of interest. While much scientific
activity is not necessarily "verbal," it is in the area of verbal behavior that epistemological issues generally arise. In particular, an orientation to verbal behavior as behavior which functions in particular ways to alter the behavior of others, and which is under the direct control of environmental contingencies, leads to certain conclusions concerning epistemological issues which are different than those commonly held within the traditional psychological community.

Some aspects of the author's verbal behavior in writing this thesis may be commented upon. First, the author has been primarily writing to members of the behaviorist verbal community. Therefore, a certain familiarity with a Skinnerian orientation has been assumed in the reader. Others with a different conceptual framework may therefore find the present paper difficult to understand. Secondly, the author has made extensive use of quotations and samples from other individuals' works. These are presented as samples of verbal behavior which have an integrity of their own and which, hopefully, are helpful in shaping particular discriminations in the reader. Finally, the author has tried, as much as possible, to emit verbal behavior which will be effective in engaging the reader's current repertoire with respect to the issues discussed herein.

This project is presented as a "conceptual analysis." This is to distinguish it from "experimental" or "research-oriented" theses more commonly encountered within the profession. While the project is concerned with research as an important aspect of issues relevant
to epistemology, no "data" are presented. The project is somewhat empirical, however, in attempting to get at the "facts" of professional research practice.

The major purpose of the present project has been (1) to clarify and articulate a radical behaviorist epistemology, (2) to show how epistemological issues engage the practice of research in psychology, and (3) to demonstrate how research practice may be looked at in a way which clarifies certain issues related to the generation of psychological knowledge. Chapter I introduces certain issues related to epistemology. Specifically, it attempts to clarify what is meant by "scientific knowledge" and how research procedures function to produce "scientific knowledge" in individuals. It is here that many of Skinner's discussions relevant to the issue will be encountered. In Chapter II, an epistemological position derived from a radical behaviorist viewpoint will be summarized. Also, some major implications of this view are presented. In Chapter III, the author attempts to illustrate how epistemological issues in psychology might be dealt with by looking at two particular examples of research on verbal behavior. In particular, the research is presented to illustrate how epistemological and conceptual issues may be approached by examining research behavior in some detail.
CHAPTER I

SCIENTIFIC KNOWLEDGE AND PRACTICE

In order to develop the radical behaviorist position with respect to epistemology and the implications such a position has for both psychological research methods and conceptions of scientific knowledge, I wish to contrast radical behaviorism with "methodological behaviorism." I will first offer three characterizations of methodological behaviorism. I will then look at both methodological behaviorism and radical behaviorism in the context of their respective views of scientific knowledge and certain methodological concepts and practices.

Kendler and Spence (1976) discuss methodological behaviorism in the context of a critique of neobehaviorism's (as opposed to the classical behaviorism of Watson; see Koch, 1964) epistemological and methodological commitments. They characterize methodological behaviorism as follows:

Reference has already been made to the distinction between metaphysical behaviorism and methodological behaviorism (Bergmann, 1956), the former denying the existence of mental states, the latter asserting that behavior rather than mental states is the primary datum of psychology.... The doctrine of methodological behaviorism, adopted by neobehaviorism, demands that the dependent and independent variables, as well as the theoretical constructs, be defined in terms of inter-subjectively agreed-upon events. (Kendler and Spence, 1976, p. 517)

Another picture of methodological behaviorism is given in Murphy and Kovach's (1972) description of psychology as an emerging science:
Until a few decades ago, the ambition to make psychology a science was considered to be possible only in those aspects of psychology which, by their content, were closest to physics. This was notable in studies of thresholds in psychophysics, in psychophysiology, and in those aspects of learning theory which were most clearly mathematical. But this is no longer the case. The severity of criteria for research design, the elaborateness of controls, the care given to the null hypothesis, the attempt to define how far a conclusion may be generalized and where the generalization must cease on the basis of a specific piece of research work—all these apply to all psychology.... From this viewpoint, it is not a portion of psychology that is conceived to belong fully to science; all of psychology is moving in the direction of standardizations of concepts and methods to make itself a part of today's general science. (Murphy and Kovach, 1972, pp. 469-470)

The distinction to be made between radical and methodological behaviorism is, by this time, not new. Skinner made the distinction as early as 1945 in his contribution to the Symposium on Operationism, about which I will have more to say later. For Skinner, the distinction revolved around the issue of the admissibility of private events as psychological data (Skinner, 1945, 1974). Others, notably Day (1975a, 1977), identify the distinction as involving broader professional issues, which include the nature of science, proper methods and values for research, and conceptions of how such research can demonstrate and increase knowledge. The following quotation from Day is illustrative of his view:

First, with respect to methodological behaviorism, it would be a mistake to restrict one's conception of methodological behaviorism to the commitment to a publicly-observable data-base alone. Most psychological research that I know of, including radical behaviorist research however characterized, involves in one way or another the analysis of publicly-observable phenomena. The trouble comes in getting hung-up about public observability.... Professional orthodoxy in psychology involves an insistence that psychology study
only publicly-observable behavior. This insistence, as a kind of intraverbal fetish, betrays that a broader set of professional beliefs and values lies at the heart of methodological behaviorism. Methodological behaviorism involves a widely accepted professional orientation towards how one should conduct psychological research in general. Verbalizations of this orientation amount to a kind of crude philosophy of science. (Day, 1977, p. 4)

What are these "professional beliefs and values" associated with methodological behaviorism? The reader may find a tenor of these values in the quotation from Murphy and Kovach, above. It is the purpose of this chapter to examine some concepts central to methodological behaviorism, to offer some criticisms which bring the tenets of methodological behaviorism into question, and to describe how radical behaviorism provides an alternative and, in my mind, important view. I will do this by addressing myself to two areas of concern which are conceptually interrelated in many ways, but which, for the purposes of this paper, will be treated separately. They are: (1) the nature of scientific knowledge and (2) the nature of experimental methodology.

The Nature of Scientific Knowledge

The notion of scientific knowledge that methodological behaviorism has embraced is centered around the notion of "objectivity"; that is, to discover what methodological behaviorism admits as knowledge it is necessary to look at what it means to be objective in scientific practice. The roots of this identification of knowledge and objectivity lie very deep in Western thought, but they were articulated and brought into the field of psychology in its
present form primarily through the acceptance of certain aspects of logical positivism, notably operationism, in the 1930's (Boring, 1950). For a more complete discussion of logical positivism and operationism the reader is referred to the *Encyclopedia of Philosophy* (1967) entries under "logical positivism," "operationism," and the "history of epistemology," to Boring (1950, pp. 653-658) and to Stevens (1939). I will summarize here only what I take to be the salient aspects derived from logical positivism which are generally accepted by methodological behaviorists.

(1) Logical positivism is a philosophical thesis which came about as essentially a reaction to the problem of subjectivity in science (Boring, 1950, p. 655). Logical positivism came to influence psychology in the form of operationism (Bridgeman, 1928; Stevens, 1939), which holds that the meaning of a concept can only be determined by defining the concept in terms of concrete operations used in its measurement and that concepts which cannot be so defined are meaningless and out of the realm of science.

(2) Basic data in psychology are therefore public, and conclusions drawn from such data are subject to general agreement.

(3) "Truth by agreement" (Skinner, 1945, p. 293) is that set of verbal and research practices whereby, while absolute knowledge of any phenomenon is unattainable, truth can be defined as a "set of empirical propositions agreed-upon by members of society" (Stevens, 1939) and the criteria for truth or falsity are based upon an observation-base that is publicly-verifiable.

(4) Therefore, knowledge in psychology is necessarily
objective; there is no room for subjectivism in science.

Inherent in these assumptions is a conceptualization of knowledge which Day (1977) has described as follows:

Basically what is involved are views to the effect that scientific knowledge is different in nature from, and intrinsically superior to, common sense knowledge. It is obtained by controlled experimental research, the objectivity of which is assured by the use of professionally endorsed methods of experimental design. The legitimacy of knowledge claims resulting from psychological research is generally assessed by techniques of statistical inference. The long-range aim of psychological research is to arrive at scientific laws which are then taken to explain behavior. In one way or another—but generally involving a mixture of material found in psychological journals and patterns of thought existing in the lay culture—the researcher arrives at notions which he regards as potentially interesting explanations. Modest potential explanations are advanced as hypotheses, more elaborate ones as theories. These hypotheses and theories are then subjected to experimental test. The immediate aim of research is to try to verify these hypotheses or theories as true. More or less successfully verified theories are regarded as psychological knowledge. And so on. (Day, 1977, p. 4)

Day is offering here a characterization of scientific knowledge as tied to a set of methodological practices, and he indicates that the assumptions of methodological behaviorists regarding the nature of knowledge in psychology can be revealed by looking at these practices. By doing so, one emerges with a view of scientific knowledge which states that if one's knowledge claims are publicly-verifiable and testable, and if one conforms to professional research practices, "knowledge" will automatically follow.

Before presenting some criticisms of the above view in preparation for a discussion of the radical behaviorist conceptualization of scientific knowledge, I wish to describe briefly another aspect
of methodological behaviorism which directly relates to the professional and research values presented above. This is the concept of "mentalism." Skinner (1945, 1964, 1974) has described mentalism as the verbal practice of explaining behavior by reference to mental events. He has also stated that methodological behaviorism, by refusing to consider mental (private) events as data because they are not publicly-verifiable, actually encourages a form of mentalism. The adherence to objective (observable) behavior as data can incorporate the idea that mental events exist, but they cannot meaningfully be studied by science—a type of dualism. Or, mental events can be studied to the extent that they can be operationally defined, and as such can be "inferred" from behavior, the actual data base. Thus, much psychological research is directed toward the study of mental constructs, such as "expectation," "memory," or "inhibition," which are operationally defined by behavioral indexes from which the functioning of such constructs is inferred.

Skinner (1974) and Day (1975a, 1976) have articulated the problems associated with methodological behaviorism's adherence to a logical positivist operationism and its concommitant mentalism. Skinner has again stressed the problem in terms of the status of private events and self-observation as data. He rejects the fruitfulness of public-verifiability as a criterion for proper psychological data, and instead psychologizes the concepts private events and self-knowledge by looking at the behavioral realities underlying such concepts. In About Behaviorism he has this to say:
The statement that behaviorists deny the existence of feelings, sensations, ideas and other features of mental life needs a good deal of clarification. Methodological behaviorism and some versions of logical positivism ruled private events out of bounds because there could be no public agreement about their validity.... Radical behaviorism, however, takes a different line. It does not deny the possibility of self-observation or self-knowledge or its possible usefulness, but it questions the nature of what is felt or observed and hence known....

Mentalism kept attention away from the external antecedent events which might have explained behavior, by seeming to supply an alternative explanation. Methodological behaviorism did just the reverse: by dealing exclusively with external antecedent events it turned attention away from self-observation and self-knowledge. Radical behaviorism restores some kind of balance. It does not insist on truth by agreement and can therefore consider events taking place in the private world within the skin. It does not dismiss them as subjective. It simply questions the nature of the object observed and the reliability of the observations. (Skinner, 1974, pp. 16-17)

Skinner's objection to mentalism rests on the fact that mentalistic explanations, in taking mental events to be causes of behavior, take our attention away from the role of the environment-behavior interactions which are to be seen as offering a truly causal account. The emphasis here is on what kinds of events (or constructs) are to play a role in the explanation of behavior. Day (1975, 1976a) has stated that it is not the use of mentalistic terms per se (such as ideas, knowledge, beliefs, etc.) that constitutes mentalism but the use of such terms in the explanation of behavior. The central opposition, then, is in giving mentalistic terms an ontological status, rather than, as the radical behaviorist would do, treating them as examples of verbal behavior which function in various ways, or as private events which can enter into contingencies controlling...
Before presenting the radical behaviorist view of the nature of scientific knowledge, I wish to present one more criticism of methodological behaviorism's adherence to a logical positivist stance.

Koch (1964) has discussed the problems resulting from methodological behaviorism's acceptance of logical positivism as a prescription for gaining scientific respectability. While referring to the fact that logical positivism, as a philosophy of science, had a short-lived place in philosophy and is no longer considered tenable, he is discussing also a set of larger cultural changes in the analysis of meaning and conceptions of knowledge which warrant, he feels, careful reconsideration of how psychology should view its own conceptions and practices. I will quote two fairly lengthy passages from his paper in order to give the reader a clearer understanding of how Koch views the problem, and also because his discussion engages directly the issues central to the radical behaviorist position on knowledge and scientific practice, in general.

[Speaking of psychologists] We are not known for our readiness to be in the forefront of history. It could almost be maintained that modern psychology ran out of its independence at the moment of declaring it. In every period of our history, we have looked to external sources in the scholarly culture—especially natural science and the philosophy of science—for our sense of direction. And typically we have embraced policies long out of date in those very sources. What is unique about our present lag relative to the rest of scholarly culture is that each branch of the latter seems to be either working toward, or inviting into existence, a redefinition of inquiry of a sort which must largely depend on psychological modes of analysis. Indeed, extant efforts in this direction everywhere involve psychological commit-
ments, often of a rough and ready sort. Yet psychology seems hardly cognizant of the challenge implicit in these circumstances. Or of the circumstances.

More curiously still, the emerging redefinition of knowledge is already at a phase, in its understanding of the particularities of inquiry, which renders markedly obsolete that view of science still regulative of inquiring practice in psychology. This can be said in utter literalness, for the view in question was imported, with undisguised gratitude, from the philosophy of science and related sources some three decades ago but, while remaining more or less concealed in psychology, was subjected to such attrition in those areas it can no longer properly be said to exist. Psychology is thus in the unenviable position of standing on philosophical foundations which began to be vacated by philosophy almost as soon as the former had borrowed them. The paradox is now compounded: philosophy and, more generally, the methodology of science are beginning to stand on foundations that only psychology could render secure. (Koch, 1964, pp. 4-5)

...[T]he picture of scientific method now beginning to emerge among physicists, other natural scientists, many philosophers of science, and others challenges the behaviorist conception of science and the imported methodological views on which it was based, at virtually every point. The idea of behaviorism was that replicability of findings, reliability of prediction, and so on, could be purchased only by use of fixed linkages with "objective indicators"; by conformity to schemata which assumed that elaboration, application, and verification of a theory must take place in something like a wholly articulate, wholly stated context of rules....

Among the re-analyses of inquiry that are now shaping up there is no point-for-point consensus, but most agree in stressing the absurdity in principle of any notion of full formalization, in underlining the gap between any linguistic "system" of assertions and the unverbalized processes upon which its interpretation and application (not to mention its formulation) are contingent, in acknowledging the dependence of theory construction and use at every phase on individual sensibility, discrimination, insight, judgment, guess. The emerging redefinition of inquiry knocks away virtually every one of the props on which the strange caution-inspired epistemology of the behaviorist has leaned. Even the presumptive, borrowed prestige attaching to his views is gone. (Koch, 1964, pp. 21-22)

It is interesting that Koch, in calling for a reexamination
of psychology's concepts of knowledge and methods of analysis, rejects Skinner's view as a part of the tradition in psychology which he is criticizing, yet his description of "the emerging redefinition of inquiry" lies very close to the radical behaviorist alternative. This alternative revolves around looking at scientific knowledge and practice in terms of the verbal and research behaviors of scientists (psychologists) in the context of what has been identified as a "functional analysis" or looking for controlling contingencies between such behaviors and their environmental and historical contexts.

I will later want to present Skinner's identification of specific contingencies operating in the scientific or psychological community with respect to research practice and verbal behavior concerning methodological issues. For the present, however, I wish to stick to the problem of conceptualizing scientific knowledge as a radical behaviorist. I will do this by discussing three issues which concern the notion of scientific knowledge: (1) Skinner's treatment of scientific knowledge as revealed in the distinction between rule-governed and contingency-shaped behavior, (2) Skinner's reconceptualization of operationism as the functional analysis of verbal behavior, and (3) "knowledge" as related to discriminative verbal behavior involved in the identification of contingencies operating to control behavior.

Knowledge as rules

For Skinner, scientific knowledge has often been conceptual-
ized as that formalized system of "facts," "rules," or "laws" which the scientific community generates in its descriptions of the world, and which it uses to teach effective behavior (Skinner, 1969, pp. 159-160; 1974, p. 235). These rules, as verbal behavior describing contingencies of reinforcement, can come to control behavior (such as in instruction, Skinner, 1957, pp. 362-365), and the behavior they bring about may resemble behavior actually shaped by the contingencies they describe. The distinction between rule-governed and contingency-shaped behavior is an important one. Verbal behavior (rules) can produce behavior similar to behavior shaped by the contingencies themselves and allow an individual to acquire behavior which he or she could not acquire otherwise. Skinner has called the rules which govern behavior "objective," largely because such rules, when recorded, no longer depend upon the behavior of a specific individual to have their effect and can enter into the control of the behavior of individuals no longer in contact with the original contingencies described by the rules. He says:

In contrasting contingency-shaped and rule-governed behavior we must take account of four things:

(1) A system which establishes certain contingencies of reinforcement, such as some part of the natural environment, a piece of equipment used in operant research, or a verbal community.

(2) The behavior which is shaped and maintained by these contingencies or which satisfies them in the sense of being reinforced under them.

(3) Rules derived from the contingencies, in the form of injunctions or descriptions which specify occasions, responses, and consequences.

(4) The behavior evoked by the rules.

...Items (2) and (4) are instances of behavior and, as such, ephemeral and insubstantial. We observe an organism in the act of behaving, but we study only the
records which survive. Behavior is also subjective in the sense that it is characteristic of a particular person with a particular history. In contrast, (1) and (3) are objective and durable. The reinforcing system in (1) exists prior to any effect it may have upon an organism and it can be observed in the same way by two or more people. The rules of (3) are more or less permanent verbal stimuli. It is not surprising, therefore, that (2) and (4) often take second place to (1) and (3).

(1) is said to be what a person acquires "knowledge about" and (3) is called "knowledge." (Skinner, 1969, pp. 159-160)

In About Behaviorism, in the section entitled "The Personal Knowledge of the Scientist," Skinner discusses the role of rules in generating effective scientific behavior in individuals:

The central question of scientific knowledge is not What is known by scientists? but What does knowing mean? The facts and laws of science are descriptions of the world—that is, of prevailing contingencies of reinforcement. They make it possible for a person to act more successfully than he could learn to do in one short lifetime or ever through direct exposure to many kinds of contingencies.

The objectivity which distinguishes rule-governed behavior from behavior generated through direct exposure to contingencies is furthered by tests of validity, proof, practices minimizing personal influences, and other parts of scientific method. Nevertheless, the corpus of science—the tables of constants, the equations, the laws—have no power of their own. They exist because of their effects on people. Only a living person knows science in the sense of acting under its control with respect to nature.... Knowledge is subjective in the trivial sense of being the behavior of a subject, but the environment, past or present, which determines the behavior lies outside the behaving person.

...[A] scientist must behave as an individual. But if he analyses the world around him, and if, as a result, he states facts or laws which make it possible for others to respond effectively without personal exposure to that world, then he produces something in which he himself is no longer involved. When many other scientists arrive at the same facts or laws, any personal contribution or personal participation is reduced to a minimum. (Skinner, 1974, pp. 144-145)

The sense in which rules specifying contingencies and the
behavior such rules generate are "objective" for Skinner is not to be confused with methodological behaviorism's concern with "objective" (as opposed to "subjective") data in psychology. Objectivity for Skinner is not a property of behavior, but rather is a description given to particular types of events which come to control behavior. Objectivity enters into a description of scientific knowledge in the following way:

(1) The rules, laws, and facts of science are records of verbal behavior and, as such, are visible and specifiable. They come to control behavior of individuals in the absence of contingencies which would shape the behavior.

(2) The verbal stimuli which generate rule-governed behavior are not the same as the contingencies they describe. The ability to describe contingencies is not the same as acting under their control. The verbal behavior involved in specifying rules arises because of other contingencies which make such specification important, including the effects such rules have on the behavior of others in bringing it under the control of relevant aspects of the environment.

(3) Methods of science are designed to further the degree to which the behavior of scientists is controlled by important aspects of the environment rather than by variables which may interfere with effective scientific action. Such behavior can be called "objective" in the sense of being under such control.

An individual may "demonstrate knowledge" by behaving in
particular ways which the verbal community calls "knowing," and
this behavior may be either contingency-shaped or under the control
of rules. But when certain contingencies operating in the verbal
community result in the verbalizations of relevant contingencies,
a special sense of "knowledge" is achieved, which for Skinner is
important because such verbal stimuli produce effective behavior
in individuals.

Scientific knowledge is verbal behavior, though not
necessarily linguistic. It is a corpus of rules for
effective action, and there is a special sense in which
it could be "true" if it yields the most effective action
possible. But rules are never the contingencies they
describe; they remain descriptions and suffer the limita­
tions inherent in verbal behavior.

...[A] proposition is "true" to the extent that with
its help the listener responds effectively to the
situation it describes. The account given by the
speaker functions in lieu of the direct control of the
environment which has generated it, and the listener's
behavior can never exceed the behavior controlled by the
situation described.... The canons of scientific methods
are designed to maximize the control exerted by the
stimulus and to suppress other conditions, such as inci­
dental effects upon the listener which lead the speaker
to exaggerate or lie. (Skinner, 1974, p. 235)

In summary, Skinner makes a distinction between knowledge in
general, which can be identified with an individual's behavior in a
particular situation, and scientific knowledge, which is verbal
behavior in the form of "rules" that enable individuals to behave
effectively with respect to specific contingencies of reinforcement.
Contingencies in the world shape behavior, and the rules which
describe these contingencies produce similar behavior, but the rules
themselves are the records of verbal behavior which arise because
of their special effects on a listener or reader, and it is this
special form of control which Skinner is interested in when speaking of scientific knowledge.

**Operational definition:** The functional analysis of verbal behavior

In his 1945 paper on operationism, mentioned earlier, Skinner presented his view of operational definition. We have seen how the concept of operationism which psychology adopted involved a set of practices whereby terms were to be defined through the use of concrete, publicly-verifiable events which could then enter into experimental procedures. This move toward an "objective science" was an attempt to assure that the psychological knowledge gained was rigorous, empirical, and replicable. Skinner, however, had a different notion of what should constitute operationism in psychology. His paper, entitled "The Operational Analysis of Psychological Terms," rested on his previous and concurrent interest in the functional analysis of verbal behavior. (His book, *Verbal Behavior*, published in 1957, had been taking form since he was a graduate student in the 1930's.) His treatment of operationism has a special significance here, both because it challenges traditional notions of how scientific knowledge is to be gained and because it provides an example of how Skinner, in dealing with concepts and practices central to psychology, is interested in uncovering the behavioral realities which underlie such concepts and practices by looking at how they function in human life. His reconceptualization also offers a method whereby "meaning" is brought out of the realm of mentalistic verbal practices and is given an empirical, psychological
base. His central position can be seen in the following passage:

A considerable advantage is gained by dealing with terms, concepts, constructs, and so on, quite frankly in the form in which they are observed--namely, as verbal responses.... Meanings, contents, and references are to be found among the determiners, not among the properties, of response. The question "What is length?" would appear to be satisfactorily answered by listing the circumstances under which the response "length" is emitted (or, better, by giving some general description of such circumstances). (Skinner, 1945, p. 271)

For Skinner, then, to define the meaning of a term is to look at the contingencies operating when the term (or piece of verbal behavior) is emitted. To understand the term "scientific knowledge" one would look at the types of circumstances in which a scientist would be described as "knowing" something. This move throws us back on the verbal behavior of scientists--that behavior in which "knowledge claims" can be said to exist:

To be consistent the psychologist must deal with his own verbal practices by developing an empirical science of verbal behavior. He cannot, unfortunately, join the logician in defining a definition, for example, as a "rule for the use of a term" (Feigl); he must turn instead to the contingencies of reinforcement which account for the functional relation between a term, as a verbal response, and a given stimulus. This is the "operational basis" for his use of terms; and it is not logic but science. (Skinner, 1945, p. 277)

I will return to Skinner's interest in the empirical analysis of verbal behavior. For the present, however, I wish to offer some additional material from Skinner's 1945 paper which bears on methodological behaviorism's view that objective data in psychology are necessarily publicly-observable behavior, and that such a data-base is desirable because the verbal community can agree on the truth
or falsity of a phenomenon defined in publicly-verifiable terms.

Towards the end of his paper Skinner says:

The public-private distinction emphasizes the arid philosophy of "truth by agreement." The public, in fact, turns out to be simply that which can be agreed upon because it is common to two or more agreeers. This is not an essential part of operationism; on the contrary, operationism permits us to dispense with this most unsatisfactory solution to the problem of truth.... The ultimate criterion for the goodness of a concept is not whether two people are brought into agreement but whether the scientist who uses the concept can operate successfully upon his material—all by himself if need be. (Skinner, 1945, p. 293)

The public-private distinction apparently leads to a logical, as distinct from a psychological, analysis of the verbal behavior of the scientist, although I see no reason why it should. Perhaps it is because the subjectivist is still not interested in terms but in what the terms are used to stand for. The only problem which a science of behavior must solve in connection with subjectivism is in the verbal field. How can we account for the behavior of talking about mental events? The solution must by psychological, rather than logical, and I have tried to suggest one approach in my present paper. (Skinner, 1945, p. 294)

To summarize, Skinner's treatment of operational definition revolves around the functional analysis of verbal behavior—the meaning of a scientific term is discovered by finding the factors which operate in its control. This reconceptualization of operational definition offers a distinct challenge to methodological behaviorism's view that scientific knowledge can be gained through a definition of terms based upon a specification of the operations used in their measurement. Such a view does not consider the environmental context in which such terms occur, and it treats psychological terms as essentially language devices which refer to processes or events in such a way that the meaning of such terms...
can be agreed upon by a given community. For Skinner, the verbal behavior of scientists is simply that—behavior—and it occurs in a context of functional contingencies. Behavior itself is neither subjective nor objective, but verbal behavior involved in talking about "subjective" events can be dealt with in the same way as any other verbal behavior by identifying the circumstances which function in its control.

Knowledge as discriminative responding

The knowledge demonstrated by an individual—his or her behavior, verbal and otherwise, with respect to the world—is operant behavior, made possible by a history of reinforcement. An important characteristic of most operant behavior is that, through differential reinforcement, it comes under the control of specific aspects of the environment. The control exerted by the environment in this sense is discriminative control, and behavior under such control shows a particular sensitivity to the environment in which it occurs. Such behavior is called by Skinner discriminative behavior (see Skinner, 1953, pp. 260-261). Skinner's description of the term "contingency of reinforcement" exemplifies this relationship between controlling events and behavior:

We describe the contingency by saying that a stimulus...is the occasion upon which a response...is followed by reinforcement.... We must specify all three terms.... Operant behavior almost necessarily comes under this kind of stimulus control, since only a few responses are automatically reinforced by the organism's own body without respect to external circumstances. Reinforcement achieved by adjusting to a given environment almost always requires the sort of physical contact which we call stimulation. The environmental control has an
obvious biological significance. If all behavior were equally likely to occur on all occasions, the result would be chaotic. (Skinner, 1953, p. 108)

Discriminative responding, which shows a controlling relationship between aspects of the environment (discriminative stimuli) and behavior, is a fundamental concept for Skinner. Contingencies which "select" behavior in the presence of certain events or properties result in such repertoires as those described by "abstraction," in which verbal behavior is brought under the control of a single property or combination or properties; i.e., the response "red," (Skinner, 1953, pp. 134-136) and "self-knowledge," in which verbal behavior comes under the control of other discriminative behavior of the individual (Skinner, 1953, pp. 264-266).

The complex behaviors of observation, description, and evaluation that are involved in carrying out and reporting research all can be seen to involve discriminative behavior on the part of individual scientists. That is, highly complex responses occur in relation to specific environmental events. The differential control of the environment which operates on the discriminative behavior of the researcher is demonstrated in Skinner's discussion of rate as a datum:

In choosing rate of responding as a basic datum and in recording this conveniently in a cumulative curve, we make important temporal aspects of behavior visible. Once this has happened, our scientific practice is reduced to simple looking. A new world is opened to inspection. (Skinner, 1956, p. 229)

"Simple looking" is discriminative behavior on the part of an individual, as can be seen in Skinner's discussion of "seeing,"
"perceiving," and "knowing" in *Science and Human Behavior*:

The functional control exerted by a stimulus enables us to distinguish between sensing and certain other activities suggested by such terms as "seeing," "perceiving," or "knowing." "Sensing" may be taken to refer to the mere reception of stimuli. "Seeing" is the "interpretive" behavior which a stimulus controls. The term "seeing" characterizes a special relation between behavior and stimuli. It is different from "sensing" just as responding is different from being stimulated. Our "perception" of the world--our "knowledge" of it--is our behavior with respect to the world. (Skinner, 1953, p. 140)

The visibility of changes in a cumulative curve enables the researcher to respond discriminatively such that relevant variables operating in the functional control of behavior can be identified, and such identifications then enter into further verbal practices involved in reporting and evaluating research results. The basic point I wish to make here is that the ways in which individuals respond to the world, their behavior with respect to the environment, is centered around their abilities, brought about by differential reinforcement, to respond discriminatively.

Part of the contingencies operating upon individual psychologists to produce the kinds of verbal behavior which are indicative of scientific knowledge is the action of what Skinner has called the "verbal community." It is this community, our social and professional environment, which shapes our capacities for observation, description, and "professional talk" concerning proper scientific aims and practices. For the radical behaviorist, the verbal community, of which Skinner's writings are largely a part, has shaped what could be described as an interest in the analysis
of controlling contingencies. As specified in the above quotation by Skinner, these contingencies are conceptualized as relationships between behavior, the antecedent environmental context in which it occurs ("stimulus control"), and salient historical and contextual consequences of the behavior ("reinforcement"). The identification of controlling contingencies involves the ability of an observer to respond discriminatively to environmental events that are taken to be relevant in the control of particular instances of behavior. Day (1975b) has discussed this point as follows:

...[1]t is important to recognize that the specification of the components said to be a part of a contingency of reinforcement generally involves conceptual complexity. Even the attempt to "observe" the operation of contingencies in the stream of behavior involves such conceptual complexity. This is because the observation of behavior consists solely of discriminative responding to the behavior at hand in its environmental setting, and this discriminative responding is generally under multiple stimulus control. The interpretation of behavior in terms of contingencies is regarded as no more than the emission of discriminative behavior on the part of the interpreter, where the repertoires involved are taken as having been made available to him from his previous reinforcement history. In this way conceptual complexity is generated. (Day, 1975b, p. 2)

The special verbal repertoires which Skinner has identified as scientific knowledge are no different than other discriminative behavior but are distinguished by the fact that scientific verbal behavior functions in the control of behavior of individuals in particular ways to lead to effective action. The radical behaviorist concern with the identification of controlling contingencies leads to verbalizations of certain kinds, involving claims concerning variables which are discriminated as being relevant to the
emission of behavior. These verbalizations are, in a real sense, knowledge claims, and it can be said that the radical behaviorist regards "knowledge" as information about controlling relations which is obtained by observing behavior in context and responding discriminatively to the phenomena that are there to be observed. This discriminative responding then enters into further discriminative behavior having to do with describing research practices, presenting evidence, discussing lawful relationships, and evaluating research results.

"Information about contingencies," then, is the verbal behavior of individuals when behaving discriminatively in a certain way to environment-behavior relationships. A full analysis of scientific knowledge would involve looking at knowledge claims as verbal behavior, and assessing the variables of which it is a function. Skinner has called for such an analysis in Verbal Behavior:

What are the defining properties of scientific...verbal behavior? When is such behavior effective or valid? How do the practices of the community generate and maintain it? How do these practices work? Can scientific...verbal behavior be improved, and if so, what practices would bring about improvement?... The verbal processes of...scientific thought deserve and require a more precise analysis than they have yet received. One of the ultimate accomplishments of a science of verbal behavior may be...a descriptive and analytical scientific epistemology, the terms and practices of which will be adapted to human behavior as a subject matter. (Skinner, 1957, pp. 430-431)

In summary, for the radical behaviorist knowledge in general, and scientific knowledge in particular, is a behavioral matter. The radical behaviorist conceptualizes knowledge as the behavior of individuals when behaving discriminatively to the world, and this
is a different conceptualization of the nature of knowledge from that held in traditional accounts. Methodological behaviorism supports a view of knowledge whereby knowledge is the result of careful and objective definition of terms, adherence to precise and accepted research practices, and logical deduction from experimental findings. The force of Skinner's reconceptualization of knowledge is that the basis of all knowledge is seen as discriminative responding, which can enter into further verbal practices operating in the scientific community to produce particular effects, and this view does not commit the radical behaviorist to any particular set of rules concerning how research should be performed. Instead, verbal behavior which is the result of research may be looked at according to its function in the scientific community and the variables which enter into its control. Contingencies which actually govern scientific behavior could be identified, and radical behaviorism offers a way of looking at the empirical realities of scientific practice. In the next section I will be interested in looking at "experimentalism" as a part of scientific practice and in presenting a characterization of experimental research practice which is consistent with the conceptualization of knowledge, derived from a radical behaviorist perspective, described above.

The Nature of Experimental Methodology

The traditional view of scientific knowledge has rested on considerations of what it means to be objective in scientific practice. The historical value of experimental methods as the means
whereby objective truths in science can be revealed has been adopted by psychology as a part of its objectivist stance. This means to a large extent that psychology, and methodological behaviorism in particular, is committed to a set of methodological procedures which are endorsed as the way by which useful knowledge about a particular problem or subject matter can be gained, and which play a part in professional values concerning proper research conduct in psychology. The value can be stated as follows: the scientific method (experimentalism) with its concern with controlled observation and manipulation is an established set of procedures by which psychological research becomes linked with the scientific process.

The previous section set forth a view of knowledge as consistent with the behavior of individuals when responding in certain ways, and it indicated that the behavior of researchers in response to a research situation can be looked at to gain an understanding of scientific knowledge. Not only do researchers respond to their research situations, they do so in a way which produces verbal behavior indicative of scientific knowledge, and this involves a consideration of how scientific verbal behavior functions within the professional community. The purpose of this section is to look at experimental methodology in the context of Skinner's conceptualization of scientific knowledge in order to discuss (1) how experimental methods effect the behavior of researchers to produce useful discriminations and (2) how the behavior of researchers which results from experimental investigations enters into the production of scientific knowledge. The first point will be discussed primarily
in the context of Skinner's treatment of the function of experimental procedures; the second point will involve a consideration of what it means to provide evidence in scientific practice.

**Experimentalism**

Experimental methods in psychology generally involve (1) the isolation of environmental variables or events whose effects on behavior are to be assessed, (2) the systematic manipulation of these variables or events in a controlled context, and (3) the assessment of the relationship between values of such variables and behavior. Traditionally experimental procedures have been identified with a hypothesis-testing model of science, but this is not necessary (see Sidman, 1960, pp. 4-40). Individuals interested in the experimental analysis of behavior are likely to conceptualize their research as an inductive enterprise based upon the finding of regularities between behavior and certain aspects of its environmental context. Skinner's interest in the development of a science of behavior involves a concern with the finding of such regularities, and he is committed to the methods of science (experimentalism) as the way to proceed. The following passages from Science and Human Behavior are illustrative of his position:

> We need not defend the methods of science in their application to behavior. The experimental and mathematical techniques used in discovering and expressing uniformities are the common property of science in general. Almost every discipline has contributed to this pool of resources, and all disciplines borrow from it. The advantages are well established. (Skinner, 1953, p. 16) In the laboratory many conditions are simplified and irrelevant conditions often eliminated. But what value are laboratory studies if we must predict and control
behavior where a comparable simplification is impossible? It is true that we can gain control over behavior only insofar as we can control the factors responsible for it. What a scientific study does is enable us to make optimal use of the control we possess. The laboratory simplification reveals the relevance of factors which we might otherwise overlook. (Skinner, 1953, p. 21)

An understanding of the importance of experimental methods for Skinner involves a consideration of the function of such methods in the control of the behavior of researchers. The techniques of research design involving experimental manipulation, control, and measurement have evolved, as Skinner has often pointed out, for practical reasons (Skinner, 1953, pp. 12-14; 1957, pp. 418-420, 428-431; 1974, pp. 228-229). These involve professional values of accuracy in reporting, of minimizing personal influences and maximizing objective evidence concerning a given phenomenon, and of increasing the effectiveness of human beings with respect to the world. Some of the function of experimental methods in controlling scientific behavior in accordance with such values can be seen in the following discussion by Skinner of "important characteristics of science":

In the long run, the issue is not so much one of personal prestige as of effective procedure. Scientists have simply found that being honest—with oneself as much as with others—is essential to progress. Experiments do not always come out as one expects, but the facts must stand and the expectations fall. The subject matter, not the scientist, knows best. The same practical consequences have created the scientific atmosphere in which statements are constantly submitted to check, where nothing is put above a precise description of the facts, and where facts are accepted no matter how distasteful their momentary consequences. (Skinner, 1953, p. 13)

Another way in which experimental methods function to produce
effective behavior in researchers interested in the functional analysis of behavior is that they allow the experimenter to "see" the relationships between behavior and aspects of its environmental context. Experimental procedures, through the isolation and manipulation of particular events, bring the researcher's discriminative behavior under the control of important aspects of the environment which operate in the functional control of the behavior of organisms:

...Experimental methods bring responses under a stricter stimulus control by manipulating states of affairs so that relevant properties are emphasized. (Skinner, 1957, p. 428)

This last point is important in view of an understanding of scientific knowledge as discriminative behavior on the part of researchers or scientists. Skinner's perspective is such that experimental methods are valued because they operate in the control of scientific behavior in particular ways; they make discriminations of relationships between aspects of the environment and behavior more precise by bringing the discriminative behavior of researchers under the specific control of manipulated values of stimuli and corresponding changes in the behavior of interest.

The discriminative behavior of researchers in response to a particular research situation is, in part, verbal behavior. When a researcher "identifies" changes in behavior in relation to changes in certain independent variables, it is the verbal behavior of the researcher that is largely changed. He or she "discovers" a functional relationship, orderly relations are "described" in a precise or new way, or certain practical problems (such as in

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applied behavior analysis) are "clarified" or "solved." Experimental methods which bring the verbal behavior of researchers under specific stimulus control of aspects of the research situation are valued, then, because the verbal behavior which follows has particular effects; it satisfies certain professional contingencies that control interests in problem-solving, clarification of phenomena, discovery of new facts, and so on.

Another function of experimental methods has to do with guaranteeing the "factual" nature of scientific verbal behavior. Discriminative verbal behavior that comes under the control of precise experimental conditions and resultant changes in behavior has the advantage that the control in such instances is specifiable. Values of independent variables and changes in a cumulative record or graph which represents behavior over time not only control the researcher's discriminative responses, they are reported in such a way that the professional community can make similar discriminative responses to the phenomena the research is designed to investigate. Techniques of research design lend credibility to phenomena by increasing the probability that changes in behavior are a function of the variables manipulated. Techniques of experimental methodology thus have the effect of bringing professional verbal behavior under the control of specific environment-behavior relationships while irrelevant sources of control are diminished.

A researcher responds to the data which result from research investigations with verbal behavior that can be termed "descriptive" in the sense of being under specific stimulus control of aspects of
the research situation. Yet the results of research are more than simple reporting of such discriminations. Researchers engage in further verbal behavior having to do with evaluation and confidence in research results. They are concerned with providing "evidence" for their knowledge claims, and here the function of scientific verbal behavior in the context of the professional community must be considered.

Evidence

The basic discriminative responses made to a research situation enter into further verbal behavior, largely derived from other verbal behavior in the field, such as relevant research literature. This professional verbal behavior can be described in many ways— as explanations offered, as discussions of what the research results prove, or as evidence for or against a particular psychological theory or stance. Research reports generally include this kind of verbal activity which is concerned with what a particular piece of research "means" in the broader professional context. The notion of evidence is applicable here since the verbal practices involved function in particular ways to have certain effects on a listener or reader; "evidence" is given for a particular approach which includes verbalizations of discriminations made to the specific research situation in question and ways of talking about or making sense of the phenomenon investigated.

The notion of evidence is closely tied to what Skinner calls the process of "confirmation" (Skinner, 1957, pp. 425-428), and his
discussion offers a conceptualization of how evidence functions in the psychological community. In *Verbal Behavior* Skinner describes the function of this process:

> When new verbal behavior has been constructed, it must often be "confirmed." The process is not limited to constructed sentences. We confirm any verbal response when we generate additional variables to increase its probability. Thus, our guess that something seen at a distance is a telescope is confirmed by moving closer until a weak response *I think it's a telescope* may be replaced by the strong *I know it's a telescope*. Similarly, our guess that a rather unfamiliar object is a kind of telescope is confirmed if we find that it can be used as such. In using it successfully, we provide additional stimulation for the unextended tact *telescope*. (Skinner, 1957, p. 425)

> ...[W]he speaker or listener may confirm the response by accumulating variables which raise its probability to a maximum.... [W]hat is usually meant by confirmation is the generation of the response as a tact.... To such responses the listener reacts with maximal (but, of course, by no means necessarily complete) confidence. (Skinner, 1957, p. 428)

Skinner is talking about the stimulus control over verbal behavior. Confirmation involves strengthening verbal behavior by the addition of variables which bring the behavior more specifically under the control of relevant environmental circumstances. Scientific practices involved in "giving evidence" strengthen verbal behavior of researchers and others interested in the research by bringing it more tightly under the control of the circumstances relevant to the phenomenon of interest. We are more likely to "believe" the results, and we are more likely to describe or explain the phenomenon in ways originally offered.

The provision of evidence involves generating variables which strengthen a particular set of responses to the phenomenon the
research is designed to investigate. The simple description of the experimental variables manipulated, the manner in which they were manipulated, and the resultant changes in behavior, the presentation of similar research results and professional discussion which share certain characteristics with the research and problem at hand, and the use of accepted professional methods of establishing the reliability of data all function to strengthen certain verbal responses of the reader or listener in such a way as to bring them under the control of particular environmental circumstances and points of view. Evidence of this kind is valued largely because of its effectiveness in generating verbal responses, by the addition of sources of strength, which prove useful both in "making sense" out of phenomena and in shaping up relevant discriminations to the phenomena of interest.

A reader or listener brings a certain verbal history to his or her understanding of a particular piece of research, and the verbal stimuli associated with research reports will be more or less effective depending on the verbal repertoire already "possessed." The verbal report will be judged "right," "true," or "important" to the extent that it is effective in strengthening verbal responses to the circumstances associated with the research which are similar to those of the researcher (see Skinner, 1957, pp. 275-280).

Scientific knowledge, as verbal behavior in the form of facts, rules, laws, statements of relationships, or theories, arises as discriminative behavior to the world science investigates. Contingencies which operate both within and without a specific research
situation to make the verbal behavior of scientists precise, to bring
verbal responses under relevant stimulus control, and to create
additional verbal behavior which brings the responses of readers or
listeners under similar stimulus control advance scientific knowledge
by advancing the discriminative capacities of the scientific
community. By looking at the function of particular aspects of
experimental methodology and the contingencies which operate in the
production of scientific verbal behavior, individuals interested in
a behavioral functional analysis could greatly illuminate the
processes whereby scientific knowledge is generated.

Experimental methodology: An overview

In the preceding sections I have discussed Skinner's conceptualiza-
tion of experimental methodology and the function of evidence
in the scientific community. This discussion has been general.
I have not attempted to look at specific aspects of scientific
practice in any detail, but I have been interested in conceptual-
izing research methodology as a set of procedures which function
in particular ways on the behavior of individuals.

A formalized system of research methodology is not the same
thing as the practices themselves—what researchers actually do.
Skinner has addressed this problem as follows:

If we are interested in perpetuating the practices
responsible for the present corpus of scientific know-
ledge, we must keep in mind that some very important
parts of the scientific process do not now lend them-
theselves to mathematical, logical, or any other formal
treatment. We do not know enough about human behavior
to know how the scientist does what he does. Although
statisticians and methodologists may seem to tell us, or
at least imply, how the mind works—how problems arise, how hypotheses are formed, deductions made, and crucial experiments designed—we as psychologists are in a position to remind them that they do not have methods appropriate to the empirical observation or the functional analysis of such data. These are aspects of human behavior, and no one knows better than we how little can at the moment be said about them. (Skinner, 1956, pp. 221-222)

In A Case Study in Scientific Method (1956) Skinner outlines some of the events which made up his early research activities. From the article one emerges with a picture of scientific practice in which the researcher is interested in looking at behavior, seeing orderly changes, and responding to the results of research in a fairly spontaneous, contingency-shaped way rather than to a set of rules about how research should proceed. The interesting thing about the article is that Skinner looks at his own research behavior and describes some of the events which entered into its control. He concludes:

It is perhaps natural that psychologists should awaken only slowly to the possibility that behavioral processes may be directly observed, or that they should only gradually put the older statistical and theoretical techniques in their proper perspective. But it is time to insist that science does not progress by carefully designed steps called "experiments" each of which has a well-defined beginning and end. Science is a continuous and often a disorderly and accidental process. We shall not do the young psychologist any favor if we agree to reconstruct our practices to fit the pattern demanded by current scientific methodology. (Skinner, 1956, p. 232)

The direct observation of behavior is important to Skinner and to radical behaviorists. Too often in reading research reports one is left with little idea what the behavior in question actually looked like in the context in which it occurred. The importance of finding ways to look at behavior and the factors in the environment
of which it is a function is clear when one considers that the func-
tion of research is to shape discriminative capacities, both in the
researcher and in a listener or reader. Methodologies which have
been or will be developed to enable both the researcher and the
reader to make contact with behavior-in-context make possible
relevant discriminations of functional relations as responses to the
research situation itself rather than to preconceived notions of
what will happen or to other verbal behavior not "tied down" to the
phenomena that are there to be observed.

One implication of Skinner's view is that the practices of
researchers themselves can be observed. If statistics reveal
important information about behavior, what is this information and
how does it function to increase knowledge of a subject matter? If
experimental methods produce important discriminations, how do they
do so? A methodology based on a description of actual research
behavior may reveal functional relationships of which psychologists
may not presently be aware.
CHAPTER II

A RADICAL BEHAVIORIST EPISTEMOLOGY

The purpose of this chapter is to present and summarize a view of behaviorist epistemology that is consistent with Skinner's position, particularly that presented in Verbal Behavior. In order to do this, I will be discussing how Skinner's epistemological stance differs from traditional perspectives. I will also be interested in addressing certain issues related to epistemological considerations: namely, the importance of a radical behaviorist epistemology and some implications which follow from such a view for professional considerations of scientific activity. The discussion in this chapter is presented in order to give the reader a clearer understanding of conceptual issues relevant to Skinner's treatment of verbal behavior. It is also intended to provide a basis for a review of some research on verbal behavior to be presented in Chapter III.

Traditional Views of Epistemology

Epistemology, or the theory of knowledge, is generally concerned with "the nature and scope of knowledge, its presuppositions and basis, and the general reliability of claims to knowledge" (Hamlyn, 1967, pp. 8-9). The study of epistemology is particularly a philosophical enterprise, and epistemology comprises a large sub-field within professional philosophy. It is not my purpose here to discuss epistemological views as they have evolved in philosophy.
Rather, I will briefly present two main epistemological positions which are relevant to a discussion of the epistemology of science adopted by psychology.

Historically, there are two basic epistemological perspectives which can be contrasted within the history of philosophy: rationalism and empiricism (Ross, 1971, pp. 21-22; Eacker, 1975, pp. 133-134). These views are concerned with answering the question: "How is knowledge gained?" The view of rationalism is that all knowledge is a result of individuals' powers of reason, logic, and deduction. The view of empiricism is that all knowledge is a result of individuals' experiences, derived through the senses, and induction from these experiences. Both positions are interested in articulating the relationship between knowledge claims and the world. That is, they are concerned with how language practices can reflect scientific truth.

Scientific epistemology has generally involved a mixture of these two views. Empiricism has given science its commitment to controlled observation based on sense experience. From rationalism, science has adopted its reliance on deductive reasoning and mathematical representations (Eacker, 1975, p. 134). The importance of sensation and experience as the basis for knowledge was emphasized by Locke, who was influential in the development of British empiricism and the formation of modern experimental psychology in the tradition of Wundt (Boring, 1950, pp. 168-176). The scientific method, as it has emerged from these traditions, has become an expression of the epistemology of science and psychology. That is,
through controlled observation, recording of data and logical
deduction from articulated theories or hypotheses knowledge is gain-
ed:

For most psychologists, the means by which we know
is the methodology of science, although that may not be
immediately obvious to students in psychology. Neverthe-
less, when psychologists are asked how they know something
about behavior, for example, they most often refer to
data obtained under controlled conditions of observation.
Consequently, it would seem that the methodology of
psychology is its epistemology, or its theory of know-
ledge; that is, the epistemology of psychology, as well
as the other sciences, is the epistemology of science,
and it, in turn, is the methodology of science. (Eacker,
1975, p. 131)

...There does appear to be some element of commonality
across the various statements of scientific methodology.
It is that, at some point, the conjectures or speculations
of a scientist are submitted to some sort of empirical
test under controlled conditions of observation. Perhaps
that is about as much as can be said about the "essence"
of scientific methodology or the epistemology of science
at the present time. (Eacker, 1975, p. 133)

In summary, traditional views of epistemology can be character-
ized as follows:

(1) Epistemological issues have been approached analytically,
as in identifying those conditions which are necessary for knowledge
to occur (see Hamlyn, 1967) rather than as questions of human
behavior.

(2) The basic epistemological assumption has been that the
world is what science is about, and it is there to be known through
methods of observation and test (Ross, 1971, pp. 36-37). The next
section will consider Skinner's alternative view.

A Radical Behaviorist View of Epistemology

A radical behaviorist epistemology revolves around Skinner's
views of verbal behavior. The best and most extensive source of
Skinner's treatment of verbal behavior is his book by the same name
(Verbal Behavior, 1957). In an epilogue to the book, Skinner
discusses the nature of verbal behavior, particularly his own:

Behaving about behaving raises the same difficulty as
knowing about knowing. Russell pictures the behaviorist
deciding whether the doings of animals show knowledge or
error instead of, as is more likely, measuring predispositions to act with respect to a given set of circumstances,
and he describes the behaviorist as "reporting his observ­
vations about the outer world," although observation is
suspiciously like "idea," or at least "image," and would
probably be avoided in favor of an expression like
"reaction to the outer world." But the crux of the
problem survives in translation. The present study offers
a case in point. If what I have said is reasonably
correct, considering the present state of knowledge in
the science of human behavior, what interpretation is to
be placed on my behavior in writing this book? I have
been behaving verbally and, unless my analysis is defi­
cient at some point, my behavior must have followed the
processes already set forth and no others. (Skinner,
1957, pp. 453-454)

Skinner goes on to describe some of his behavior in writing the
book and some of the reactions he hopes the reader will have to
the verbal stimuli in the book. He concludes:

In many ways, then, this seems to me to be a better
way of talking about verbal behavior, and that is why
I have tried to get the reader to talk about it in this
way too. But have I told the truth? Who can say? A
science of verbal behavior probably makes no provision
for truth or certainty (though we cannot even be certain
of the truth of that). (Skinner, 1957, p. 456)

Skinner's treatment of verbal behavior—that verbal behavior
is behavior just like any other behavior and that it is subject to
the same type of contingency analysis as any other behavior—leads
to a particular epistemological point of view. That is, the verbal
behavior of scientists—their knowledge of the world—has no special
status and is of no different kind than other types of behavior, verbal or otherwise. It is subject to particular forms of control which have evolved as scientific practice. It is also productive of certain kinds of effects on the scientific community. What this means is that logical analyses of the nature of knowledge or the form of knowledge claims are inappropriate to an understanding of epistemological issues. The issues themselves are behavioral matters which can be best formulated by looking at the empirical realities of the contingencies operating to control verbal behavior, especially the verbal behavior of scientists.

The connection between the world (what is "known") and verbal behavior ("knowing") is not revealed by looking at how language practices can reveal truths about environmental phenomena that exist independently of any human involvement. The crucial epistemological move made by Skinner is that verbal behavior is connected to the world through the action of controlling contingencies, which determine both the form and the effect or function of verbal responses within a social context. Knowledge, then, is not a passive entity in itself but is rather a human activity which occurs as a result of particular historical and situational interactions of individuals with their environment:

The functional relations between behavior and the environment are usually complex and very often confusing, but we are not in doubt as to their dimensions or the techniques with which they may be studied. We can disregard the troublesome dissection of human thought into the familiar pattern of (1) a man possessing (2) knowledge of (3) a world. Men are part of the world, and they interact with other parts of it, including other men. As their behavior changes, they may interact more effec-
tively, gaining control and power. Their "knowledge" is their behavior with respect to themselves and the rest of the world and can be studied as such. (Skinner, 1957, p. 451)

The Importance of a Radical Behaviorist Epistemology

In Skinner's conclusion to the first epilogue in *Verbal Behavior*, quoted above, he conceptualizes his treatment of verbal behavior as "a better way of talking." The reasons for this have to do with the effects of certain "ways of talking" on the behavior of individuals:

The responses which I have tried to get the reader to make function by singling out events or aspects of verbal behavior which should make his subsequent behavior more expedient. I have emphasized certain facts and ignored others. The justification for this has been that the facts emphasized seemed to belong together and that in talking about them to the exclusion of other facts, greater progress is made toward a unified account. (Skinner, 1957, p. 456)

Skinner is emphasizing here the fact that verbal behavior has particular effects, both upon the speaker and the listener or reader. A conceptualization of epistemology that is consistent with a functional analysis of verbal behavior as behavior leads to certain changes in the behavior of individuals, largely due to the fact that certain discriminative capacities are shaped as a result.

The verbal behavior of scientists in making sense of what they do--how research should be conducted, what problems need to be addressed, and how scientific behavior should be conceptualized--is the result of particular contingencies of reinforcement, and it also produces certain effects. An approach to scientific activity which is, in part, based on a radical behaviorist epistemology is
important largely because of these effects. That is, our conceptual systems (our verbal behavior) effect our professional behavior in many ways.

Part of the result of a radical behaviorist perspective is that professional behavior is brought more specifically under the control of important relationships between the environment and behavior, including the behavior of scientists. A radical behaviorist epistemology emphasizes the importance of the environment in shaping the discriminative capacities of scientists, and such a view may have the effect that individuals will begin to "look for" relevant contingencies which control professional behavior, including contingencies created by particular methodologies and research strategies. Such an investigation would be very different from the kinds of logical analyses of scientific methodology usually offered.

Skinner's interest in developing a science of verbal behavior is tied to his interest in the analysis of behavior-in-general. That is, to the extent that scientists can come to understand their own behavior and the contingencies operating in its control, the more likely it is that effective practices can be developed to deal with the wide range of behavioral phenomena that exist.

Implications for Scientific Practice

A radical behaviorist epistemology leads to a particular view of scientific activity that may have certain implications for how scientific practices and methods are conceptualized and carried out.
Scientific activity is seen as involving the discriminative behavior of individual scientists and an understanding of scientific behavior would involve looking at the contingencies which shape this behavior and bring it under the control of relevant aspects of the phenomena science investigates. In addition, the ways in which scientists engage in verbal practices having to do with the validity of their claims, proper methods for research, and the value of particular points of view are seen as having been shaped by certain professional contingencies and, hopefully, these contingencies result in behavior which is effective, both in the sense of being under the control of "the facts" and in shaping relevant discriminative behavior in others.

Scientific methodologies are tied to epistemological issues largely because of their status as an important source of controlling contingencies over the behavior of researchers. In the preceding chapter, experimental procedures were discussed as providing certain kinds of control over scientific behavior. Not all useful scientific verbal behavior is a result of exposure to experimental contingencies, however. Methodologies vary according to the degree of experimental control used, the complexity of the phenomena investigated, the context in which the research takes place, whether or not variables are systematically manipulated, and so on (see Skinner, 1953, pp. 37-39). These differences in methodologies are differences in contingencies operating on the behavior of individual researchers. The resulting discriminative behavior of the researcher will occur in response to those aspects of the
phenomena investigated which the particular contingencies operating in the research situation "allow" to be discriminated in conjunction with the individual's current repertoire. Controlled experimental research results in particular kinds of discriminative responding, usually to specific or subtle aspects of behavior-in-context. The control over a researcher's discriminative behavior is always present, however, and aspects of environment-behavior relationships may be responded to in a variety of research contexts.

Skinner seems particularly interested in laboratory studies of behavior and the methods of science appropriate to laboratory investigations. This is because such methods result in precise control over the behavior of the researcher:

The experimental method includes the use of instruments which improve our contact with behavior and with the variables of which it is a function. Recording devices enable us to observe behavior over long periods of time, and accurate recording and measurement make effective quantitative analysis possible. The most important feature of the laboratory method is the deliberate manipulation of variables: the importance of a given condition is determined by changing it in a controlled fashion and observing the result. (Skinner, 1953, p. 37)

Much of Skinner's professional activity, particularly in the field of verbal behavior, has been of another sort, which he calls "interpretation." In Verbal Behavior he describes this activity as follows:

One important feature of the analysis is that it is directed to the behavior of the individual speaker and listener; no appeal is made to statistical concepts based upon data derived from groups. Even with respect to the individual speaker or listener, little use is made of specific experimental results. The basic facts to be analyzed are well known to every educated person and do not need to be substantiated statistically or experi-
mentally at the level of rigor here attempted. No effort has been made to survey the relevant "literature." The emphasis is upon an orderly arrangement of well-known facts, in accordance with a formulation of behavior derived from an experimental analysis of a more rigorous sort. The present extension to verbal behavior is thus an exercise in interpretation rather than a quantitative extrapolation of rigorous experimental results. (Skinner, 1957, p. 11)

"Interpretive" verbal behavior serves a particular function in the scientific community, as the results of Skinner's interpretive verbal behavior in Verbal Behavior on the discriminative behavior of the careful reader may indicate. Particularly, the discriminative behavior involved in interpretation may be conceptualized as useful when verbal behavior under the control of specific experimental findings relative to a particular phenomenon or area of interest is unavailable, or when a more general effect on a listener or reader is required. Skinner discusses the value of this type of activity in About Behaviorism and he notes that interpretive behavior is particularly useful when the individual doing the "interpreting" has a certain type of history with respect to seeing behavior in terms of functional relationships:

Obviously, we cannot predict or control human behavior in daily life with the precision obtained in the laboratory, but we can nevertheless use results from the laboratory to interpret behavior elsewhere. Such an interpretation of human behavior in daily life has been criticized as metascience, but all the sciences resort to something much like it....

Those who argue that laboratory results cannot account for human behavior in the world at large presumably believe that they know what is happening in that world, or at least that it can be known. They are often speaking of casual impressions. But if a statement about behavior is less to be trusted in daily life than in a laboratory setting, we must certainly ask whether the impression against which it is compared is any more
reliable. Those who feel that they understand what is happening in the world at large may be tested in a very simple way: let them look at the organism as it behaves in a modern experiment and tell us what they see. The contingencies currently under investigation, though extremely complex, are far less complex than those in daily life, yet it is almost impossible to discover what is going on. Those familiar with laboratory research will be more likely to look for the important things and will know what other things to ask about; they will have a better understanding of what they see. That is why they can more accurately interpret daily life. The laboratory analysis makes it possible to identify relevant variables and to disregard others which, though possibly more fascinating, nevertheless have little or no bearing on the behavior under observation. Many of the technological advances derived from the study of operant behavior have had the benefit of that kind of interpretation. (Skinner, 1974, pp. 228-229)

What Skinner is pointing to in the above discussion is that a history of exposure to certain kinds of contingencies results in a pattern of responding to important functional relationships between behavior and its environmental context. This occurs explicitly in laboratory research, where the methods involved and the contingencies created by the research environment shape discriminative behavior in the researcher to factors which operate in the control of the behavior under investigation. It also may occur in other settings, where the control over the researcher's behavior is not so explicitly defined, but where certain historical contingencies enable similar kinds of discriminative responding on the part of an observer to take place.

There are many kinds of scientific activity, ranging from "interpretation" to "experimental" research, which provide useful information about behavior. It appears that discriminative behavior on the order of interpretation may occur particularly in areas which
have not been subjected to a more controlled and precise experimental analysis. Such is the case at the present time in the area of verbal behavior, although empirical investigations are beginning to be done. In addition, behavior as it occurs "in daily life" is often precisely the phenomenon some researchers are interested in looking at. A conceptualization of scientific knowledge as discriminative behavior which has certain practical and professionally valued effects, and a realization that such behavior occurs in a variety of contexts, offer a way to look at research practice, not in terms of the specific research design used, but in terms of the historical and contextual variables which are relevant to the particular discriminations the investigator makes.

The identification of controlling contingencies, which is the goal of a behavioral analysis, may occur in various contexts, depending on the degree of research control involved and the specificity of the phenomenon observed. The relevance of a radical behaviorist epistemology to this point is that, as behavior is observed, be it in a controlled laboratory setting or in a "real-life" situation, the discriminative responses of the researcher are of the same kind to the extent that they are the result of contingencies which shape discriminative behavior to the phenomena at hand.

The next chapter will look at two examples of empirical research of verbal behavior. They differ in terms of (1) the setting in which the verbal behavior was generated, (2) the degree of control used, and (3) the kinds of discriminative behavior
which the research situations evoked in the researchers. They are similar in that (1) the researchers were interested in doing empirical work tied to a contingency analysis of verbal behavior, and (2) the researchers had similar histories with respect to contact with Skinner's work, including *Verbal Behavior*. I will be interested in outlining and discussing the methods used in the light of the present conceptual approach in order to present concrete examples of how empirical work in the analysis of verbal behavior may take place. In addition, an understanding of the research presented seems to me to depend on a grasp of radical behaviorist epistemology of the kind presented here.
CHAPTER III
EPISTEMOLOGICAL ISSUES AND RESEARCH

The function of the present chapter is to present examples of research on verbal behavior in such a way as to illustrate the relationship between such research and epistemological considerations. In order to do this, I will summarize two research studies on verbal behavior recently carried out by graduate students in the Radical Behaviorism program at the University of Nevada, Reno. These research studies have involved efforts on the part of the researchers to develop methods which are appropriate to the study of "real-life" verbal behavior (on-going verbal behavior in situ) and which allow relevant discriminations to be made concerning the verbal phenomena observed. I will describe the methods used in each study in order to give the reader some idea of the ways in which two individuals interested in doing functional analyses of verbal behavior in situ have approached the problem. In order to clarify the methods used, I will attempt to describe what the researcher did in conducting his or her research. I will also be interested in looking at the kinds of discriminations the researchers made concerning the phenomena observed. To do this, I will attempt to describe not only the methods used (the research behavior) but also the factors in the research situations which allowed the researchers to respond discriminatively to relationships operating in the control of verbal behavior.
The studies to be presented here have evolved as the result of much exposure to Skinner's work, particularly *Verbal Behavior*. Many of the particular moves made by the researchers are directly influenced by Skinner's conceptual and epistemological verbal behavior. One of the studies shares particular characteristics with traditional research approaches in the experimental and applied analyses of behavior. In the other, the reader may find the approach taken unfamiliar or "non-experimental" in nature. Both examples of research, however, appear to me to engage a consideration of Skinner's epistemological position, at least as it has influenced the research behavior of the individuals concerned.

The emphasis here will be on the discriminative behavior of the researchers and certain contingencies or factors operating in the research situations, as well as in the histories of the researchers, which enabled relevant discriminations to be made.

RESEARCH EXAMPLE I

The first example of research to be discussed is entitled "An Exploratory Functional Analysis of Stimulus Control in Descriptive Verbal Behavior." This piece of research was performed at the University of Nevada, Reno by Brian Lahren for his doctoral dissertation. In his research, Lahren was interested in providing:

...an example of methodological research the goal of which is the discovery of an analytic technique which minimizes researcher interference with behavior in progress. Secondly, it is research which attempts to discover what Skinner has called controlling functional relations (cf. 1969, p. 7). The method involves preserving a real-time based picture of the stimulus context in which descriptive talk occurred. (Lahren, 1978, p. 4)
Lahren was thus interested in looking at descriptive verbal behavior as it occurs in circumstances similar to those in which such talk generally occurs within our verbal community. This interest is not unrelated to the importance of descriptive verbal behavior as it functions in science (see Lahren, 1978, p. 237). Furthermore, he was attempting to devise a method whereby important controlling relationships between descriptive verbal behavior and the stimulus conditions of its occurrence could be "seen," or responded to discriminatively by a researcher:

The central methodological concern in the design of the present research was the protection and preservation of a detailed picture of descriptive talk in its original context of occurrence. (p. 238)

Lahren's research is particularly interesting because it focuses on finding controlling relations between verbal behavior and its immediate context rather than emphasizing behavior-consequence relationships. With this focus, Lahren's work can be considered as somewhat pioneering in the field of the analysis of verbal behavior. More important to the purposes of this paper, however, is the opportunity the research report provides in illustrating the way in which one particular researcher set about to create a research procedure whereby controlling relationships between on-going verbal behavior and its context of occurrence could be seen and described or depicted by the researcher. In my discussion of Lahren's research, therefore, I will be focusing on what Lahren did in (1) generating on-going descriptive verbal behavior, and in (2) developing methods whereby controlling
relations could be discriminated. I will also be emphasizing the relationship between Lahren's procedures and his subsequent discriminations of stimulus control; that is, I will look at the factors in the research procedure which seemed to control his behavior in identifying behavior-environment relationships.

The Data

Influenced by Skinner's early research on animal behavior, which is reviewed in the introductory chapter of the dissertation, and by a concern with observing response consistencies to the same stimulus events, Lahren devised a method whereby descriptive verbal behavior could be generated to the same stimulus events in repeated sessions. His data consisted of verbal descriptions of a short film which was presented 13 times to four subjects. The film was a 4-minute and 25-second segment of Herrnstein and Morse's "Changing Behavior Through Reinforcement," which showed a pigeon responding under four different schedules of reinforcement. Lahren approximated a baseline-manipulation-baseline design by splicing the film into four segments and changing the order of presentation in Sessions 6, 7, and 8. The subjects, college students, were alone in a room while observing the film and were instructed to describe the events in the film in a way "natural" for them. Their verbal behavior was recorded for subsequent analysis. Thus, the data consisted of 13 tape recordings of descriptive verbal behavior to the same stimulus events for each of the four subjects.
The Analysis

Construction of "real-time" transcripts of verbal behavior

In order to compare verbal behavior across sessions, the researcher instructed the subjects to indicate when the film began in such a way as it could be picked up by the tape recorder. In this way, the researcher could construct what he called "real-time" transcripts of the verbal behavior, which could then be compared to events on the film as they occurred. This was accomplished by:

1. recording on the tapes, beginning with the "start" indicator, a sound which marked off 1-second time intervals,
2. transcribing the verbal behavior on the tapes and noting where the 1-second markers occurred in relation to the verbal behavior on the transcript, and
3. constructing a "real-time" transcript which depicted the verbal behavior of each subject as it occurred within each 1-second time interval. A sample of this "real-time" transcript is presented below:

Real-Time Transcript: Subject 004, Session 1

1: OK, the film's on now
2: there's a pigeon
3: moving his head
4: back and forth
5:
6:
7: his wings are up
8: in the air flapping
9:
10: he's turning
11: around
12:
13: there's a
It is interesting to note that originally the researcher divided the verbal behavior into 5-second intervals, but that the use of the longer interval was abandoned because it was felt that a more detailed picture of the verbal responses in relation to the stimulus events in the film was needed for precise relationships to be found. In essence, the 5-second intervals did not provide for sufficient differential control over the researcher's behavior in analyzing the data.

In this initial part of the analysis, then, the researcher responded to the data with verbal behavior which both recorded the data in visual form and also preserved a picture of the verbal behavior in the data as it occurred through time.

**Grouping response classes**

The next part of the analysis involved finding groups of responses (response classes) which could then be looked at to determine any similarity in functional control. To do this, Lahren inspected the "real-time" transcripts across sessions for pieces of verbal behavior which (1) occurred at similar points in time (presumably in the presence of the same stimulus conditions on the film) and which (2) appeared to be meaningfully related to each
other. He says:

Looking down the transcript for any session one can see repeated references to "pecking," to a "light," to the pigeon "eating," or "getting food," etc. Secondly, looking across all 10 baseline sessions it is apparent that similarly meaningful responses occur at similar points in time. These meaningfully similar responses are often quite dissimilar in form.

Fortunately, human beings are equipped by their verbal communities to respond to topographically dissimilar verbal responses with judgments as to their equivalence of meaning—although the problem of just what meaning is or how it functions is a topic for considerable debate.... (p. 152)

The observation that there are collections of responses which appear similar in meaning provides a clue to the identification of functional relations in verbal behavior. When similarities of meaning are identified in a collection of responses, the researcher should search those situations in which the similar responses occurred for common independent variables—for example, for shared stimulus control. (p. 153)

Lahren also repositioned the verbal behavior in Sessions 6, 7, and 8, in which the film segments were shown in different orders than in the rest of the sessions, enabling a comparison of the verbal behavior in these sessions to "baseline" sessions. This allowed him to identify functionally equivalent responses across all sessions. In his report, Lahren presented two examples of a response class for two subjects—showing those responses which occurred within a narrow time band (presumably to the same events on the film) across the sessions and which displayed how the "meaningfulness criterion" was employed. An example of such responses is given below:

<table>
<thead>
<tr>
<th>Response Item: Subject 002</th>
<th>Session in which response occurred</th>
</tr>
</thead>
<tbody>
<tr>
<td>nothing appears to be happening</td>
<td>1</td>
</tr>
<tr>
<td>and there seems to be no food</td>
<td>2</td>
</tr>
</tbody>
</table>

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As a result of this procedure, Lahren concluded:

...meaningfully equivalent verbal responses occur in Sessions 6, 7, and 8 at points predictable from knowing when similar responses had occurred in baseline conditions. This is direct evidence that stimulus control is a significant determinant of the occurrence of "meaningfully" equivalent forms of response in descriptive verbal behavior. On the basis of this functional evidence one may presume that what have been identified in these tables are classes of responses. (p. 163)

In summary, in identifying classes of responses, Lahren observed verbal behavior which occurred at similar points in time in relation to the film and which occurred fairly consistently across sessions. He then made a determination of which responses seemed to be meaningfully related. In doing so, Lahren was focusing on the effects the verbal responses had on him as a reader. Judgments of "meaningfully related" responses were based upon the fact that such responses had similar effects on him such that Lahren was led to consider them as members of a response class.

**Defining stimulus properties which controlled descriptive verbal behavior**

So far, Lahren had a tentative identification of response classes based on their time of occurrence and their similarity of
meaning (shared effects on him). He was concerned, however, with the problem of discovering what stimulus properties in the film seemed to control the occurrence of members of a class. He was also concerned with maintaining a truly functional definition of verbal behavior; that is, classes of verbal behavior are to be discovered by looking for similarities in the variables controlling members of a class. This is similar to Skinner's (1957) categorization of "mands," "tacts," etc., in which verbal behavior was grouped according to functional relationships which could be seen to apply. In the next part of his analysis, Lahren set out to "capture" the stimulus events in the film which might then be related to the data as instances of stimulus control.

To achieve a description of the film's stimulus properties, Lahren:

...sat before [the film]...and began a process of stop-watch timing and recording the temporal location and duration of every discernable event in the stimulus film. For each stimulus event that was identified a start and stop point would be marked on a blank real-time verbal transcript form and a simple verbal description of that event written in the right margin opposite the appropriate time marks. (p. 171)

Lahren then devised identifiable marks or symbols which represented the different occurrences of stimulus events that he had identified on the film and transferred these "stimulus displays" onto plastic transparencies. These transparencies were superimposed on the verbal transcripts so that the researcher's stimulus representations and the subjects' verbal responses coincided visually. In this way, occurrences of previously identified members of a response class

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could be located and their relation to similar stimulus events as represented on the transparencies could be observed.

As a result of this procedure the researcher was able to locate the exact occurrence of response class members, relative to the point at which a specific stimulus event was present in the film, across all sessions. This allowed a picture of the variability of the time at which the response occurred, given the same stimulus event. He was also able to eliminate a response from a response class if its occurrence did not coincide with the presence of the stimulus event seen by the researcher to be "controlling" other members of the class.

One example of this procedure, of identifying stimulus and response relationships, will be described briefly. Lahren had identified a class of verbal responses he called "peck" responses. The verbal responses in this class would be meaningfully similar to a subject saying "the pigeon pecked the key." For example, the following verbal responses occurred at approximately the same time (seconds 31-34) for one subject: "the pigeon pecked it" (Session 1); "the pigeon now looks up, pecks the light" (Session 2); "he's pecking" (Session 3); "he pecked at it" (Session 4); "he pecks at the light" (Session 5); "he went over the give [sic] it an inquisitive peck" (Session 6), etc.

When Lahren combined stimulus displays and the verbal transcripts, he could then note where, in relation to the stimulus display, the members of the class "peck" had occurred. One result of this combination of stimulus display and verbal behavior, for the
class already mentioned, is presented below. The stimulus symbol for the event of the pigeon pecking is a horizontal line, which occurs below between seconds 31 and 32. The graph on the right of the display shows where, in relation to the peck on the film, a member of the verbal class "peck" occurred in each session.

Subject 002

<table>
<thead>
<tr>
<th>Sessions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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</table>

In this way, Lahren was able to identify classes of verbal responses in such a way as to directly relate their occurrence to identifiable events in the stimulus film.

One aspect of Lahren's procedure for identifying stimulus properties in the film, which could then be related to the occurrence of verbal responses as instances of stimulus control, deserves further comment. In constructing his stimulus displays, Lahren was behaving much as his subjects had; that is, he attempted to describe events in the film as they actually occurred. The difference was in the additional controls over Lahren's behavior in devising his description (i.e., the use of the stop-watch, the ability to start and stop the film at will, etc.) which allowed a more detailed verbal account (more discriminations could be made). Also, by the time Lahren constructed the displays, he was extremely
familiar with the aspects of the film his subjects had responded to
(the salient or important features to look for) by having had
repeated exposure to both the film and the verbal behavior in his
data. His procedure shares certain features with research in the
applied analysis of behavior in which behavior and environmental
events are coded, or otherwise verbally represented, and conclu-
sions about controlling relationships are drawn from the coded
data (e.g., Patterson, 1974). The differences are that, in the
present case, (1) the verbal behavior was transcribed from tape
recordings which allowed a preservation of most of its original
characteristics, and (2) Lahren's verbal description was limited
perhaps only by his ability to discriminate an event's occurrence
and the salience of the event in its relationship to the verbal
behavior in his data. The central importance of the researcher's
abilities to respond discriminatively is evident.

Locating stimulus-response relationships for one subject

One of Lahren's subjects (001) produced verbal behavior
which was sufficiently different in style from that of the other
subjects that Lahren singled it out for separate analysis. The
differences in this sample of verbal behavior included: (1) more
frequent and lengthy periods of pausing, (2) rapid responding when
verbal behavior did occur, and (3) the impression from listening
to the tapes that the subject was nervous (see Lahren, pp. 207-
208). Also, Lahren noted:

In addition to the differences in pausing there
was a difference in the verbal behavior itself. Rather
than the typical response pattern witnessed in the preceding section this subject frequently responded with what seemed to be a more interpretive style involving the employment of "psychological" terms. For example, [001] would watch the film for 16 to 35 seconds and then report that the bird was "confused" or that "he makes a distinction between the black and white light" or that the bird "is unaware of anything in his present environment." Responses containing the same "interpretation" were often seen to occur over a slightly more encompassing time-band than was characteristic of the controlled responses of the other subjects. (pp. 209-210)

Lahren observed several examples of this subject's verbal behavior which occurred at the same time a series of pecks could be observed on the film. While the verbal responses were formally dissimilar in some ways (i.e., "now he becomes more interested in the white light as he pecks it more times" (Session 6), "as he pecks it his curiosity is aroused highly" (Session 7), "now he seems to be getting a little bit annoyed at the white light" (Session 11), Lahren was able to identify a response class, which included members such as "aggravated," "annoyed," and "aroused," that seemed to be under the control of repeated instances of pecking in the film.

Because the verbal responses of Subject 001 occurred less frequently than the other subjects', Lahren picked a tentative response class ("curiosity," "curiosity's sake") and examined what stimulus events preceded its occurrence regardless of where the responses occurred on the transcript. He says:

If, due to low response rates, it is not possible to scan across a given time location for all sessions and locate similar responses, then response similarities can be noted wherever they occur and their immediately preceding stimulus events scanned for matching stimuli. (p. 213)
As a result of doing this for Subject 001's "curiosity" responses, Lahren was able to observe that such responses followed events in the film in which the pigeon, after paying no attention to the key for a period of time, then returned to the key (during FI and mixed FR-FI schedule segments of the film). Lahren was thus able to discriminate a fairly complex relation between the verbal behavior of the subject and a property of the stimulus conditions under which it occurred.

**Presentation of debriefing protocols**

Next, Lahren presented the transcripts of his "debriefing" sessions with the subjects which occurred after their participation in the research project was completed. His main purpose in including the transcripts, or "protocols," was to show that, according to the subjects, they had not consciously tried to say the same things at the same times in each session. Also, the protocols provided further evidence, from the subjects' verbal behavior in discussing what they did, that confirmed some of the researcher's judgments about their verbal behavior in the sessions. For example, Lahren made an assessment that Subject 001's verbal responding manifested his nervousness in the experimental setting and that he seemed to be composing verbal responses to the film and then "blurting" them out (p. 208). According to Subject 001's protocol, he said:

> And I think the first thing when I saw it myself it was hard to sit down and say what was going on. Because I was thinking in terms of what I was supposed to be saying and what you want to hear, and what's actually
happening with the bird, you know? And I think the first
couple of times it was hard, for me anyway, cause I didn't
know exactly what to say. (p. 223)

Lahren presented the protocols, then, to function as further
evidence, or additional sources of control over the behavior of the
reader, and they may have functioned similarly for him as a
researcher. He says:

...the subject is literally sharing with us the events
which were the stimulus conditions for particular
aspects of his responding. The information in these
protocols supports the analysis of control presented
in the preceding section and offers nothing which would
undermine a stimulus control account of the occurrence
of the response groups presented in this chapter.
(pp. 223-224)

It is interesting to note here that Lahren responded to the
verbal behavior of his subjects in the debriefing sessions as
functioning to identify sources of control over the verbal behavior
in the sessions. What this means is that aspects of the subjects'
verbal behavior in the protocols had a similar effect on Lahren
as had aspects of his own previous responding in making assessments
of controlling relations. The subjects' verbal behavior in the
protocols added an additional source of control over Lahren's
"judgments" and thus functioned to "confirm" or strengthen certain
discriminations previously made. Because of this effect on him,
Lahren was led to say that the subjects had identified sources of
control over their own responding.

One-year follow-up

The final part of the researcher's analysis of his data
involved looking at similar transcripts of two subjects' verbal
descriptions of the film 14 months after their initial participation in the study. The follow-up data were obtained in the same way as originally, and the verbal behavior obtained was compared to the previous data. Lahren reports:

The results produced by this session are quite interesting in that the behavior of each subject is virtually identical with that in the earlier sessions. (p. 224)

Lahren then demonstrated the similarity by showing where follow-up "peck" responses occurred in relation to his previous data for one subject. He concluded:

The most interesting outcome of the follow-up procedure is the revelation of the incredible stability of descriptive response patterns. It is apparent for both of these subjects that their characteristic response pacing, phrasing, the grammatical frameworks employed, and the events which control responding are so well established as to allow very little variation in what they will say or when they will say it even with the passage of over a year's time. (p. 223)

In summary, the methods which Lahren developed to demonstrate stimulus control over descriptive verbal behavior involved (1) generating descriptive verbal behavior to the same stimulus conditions several times, (2) ordering the verbal data as they occurred in time so that comparisons across sessions could be made, (3) tentatively identifying response classes (verbal behavior under similar functional control) according to (a) where the verbal behavior occurred in the sessions and (b) whether or not the responses seemed meaningfully related, (4) creating a display of the stimulus events as they occurred in time, (5) finding correspondances between stimulus events and instances of a response.
class, and (6) comparing the verbal responses to responses recorded more than one year later in the same circumstances. As a result of behaving in the above ways, Lahren concluded:

Obviously the design features of this research do allow at least a gross identification of the experimental variables controlling the occurrence of verbal responding and the identification of the controlled features of the response class. However, the data so far presented constitute only a first step in the development of a systematic experimental study of the stimulus control relations in verbal behavior. What has been presented offers little more than the "orderly arrangement of well known facts" (1957, p. 11) which Skinner advocated in the first chapter of Verbal Behavior. What is most promising at present is that following the advice contained in Verbal Behavior, it has been possible to design a procedure which directly reveals an aspect of stimulus control that occurs in verbal behavior. (pp. 235-236)

Controlling Factors

Mention has already been made of some of the ways in which the procedures in Lahren's study "engaged" or controlled his discriminations of stimulus-response relationships. Here I will briefly describe what I take to be some major factors controlling Lahren's behavior in his research. First, I will examine some conceptual issues which appeared to control his behavior in designing the experiment as he did. These issues are actually factors in the researcher's history (and elements or characteristics of his verbal behavior in discussing his research) which appeared to me to have played a part in the control over his general research behavior. Secondly, I will attempt to make clear how Lahren's research behavior, in the organization of the data, produced further controls over his ability to "see" functional
relationships. Finally, I will briefly discuss certain epistemological issues which the procedures engage.

Lahren's research is distinguished by the fact that he attempted to create a situation in which "response consistencies" in verbal behavior could be observed. This attempt appears to be tied to several factors in his professional history: (1) Lahren's familiarity with Skinner's early operant research on animal behavior in which Skinner developed his interest in rate as a datum providing an opportunity for a researcher to evaluate functional relations, (2) Lahren's familiarity with baseline-manipulation-baseline designs in the experimental and applied analyses of behavior, and (3) Lahren's exposure to Skinner's (1957) prescription for scientific analysis to involve (a) "simple description" of the phenomena of interest and (b) the "explanation" of behavior in terms of its relationship to other variables (see Skinner, 1957, p. 10), and the fact that descriptive verbal behavior (as in "tacts") has a fairly straightforward controlling relationship to its immediate context of occurrence. I believe all these conceptual considerations played a part in Lahren's behavior in designing his research.

In terms of Lahren's behavior in carrying out his analysis, several things can be said. Once Lahren had generated his time-based transcripts, the problem of identifying response classes became a matter of "simple looking" at the verbal responses across the sessions, much as a researcher observes response patterns on a cumulative record. The verbal behavior of the subjects, ordered
according to time of occurrence in relation to the stimulus film, came to control Lahren's behavior in making judgments of "meaningful" units. The main point here is that the records of Lahren's behavior in creating the time-ordered transcripts produced a situation in which certain aspects of the responding of the subjects could come to directly control further behavior on Lahren's part.

It should also be clear that the stimulus displays Lahren constructed were responses to the film events as they occurred. Lahren put himself in a situation in which his own discriminative responding could be controlled, as much as possible, by the events on the film.

The stimulus displays themselves provided an additional source of control over Lahren's initial discriminations of response classes. By observing the relationship of his subjects' verbal responses to his own constructed stimulus displays, Lahren was able to confirm (or reject) his tentative identifications of response class members. He was also able to compare responses which occurred at different times in the transcripts, and which seemed to be "meaningfully" related, by noting similarities in the relationship of such responses to events on the stimulus displays (i.e., Subject 001's responses to repeated instances of pecking).

Finally, the subjects' verbal behavior in the debriefing protocols offered an additional source of control over certain of Lahren's discriminations of factors controlling the subjects' verbal behavior.

The procedures Lahren developed for the analysis of descrip-
tive verbal behavior thus functioned, as was discussed in Chapter I, to bring the researcher's discriminative responding under more precise control of important characteristics of the data. They also functioned to strengthen or confirm initial discriminations which were made. This study, then, illustrates certain epistemological issues relevant to research; that is, new "knowledge" is gained by the shaping of relevant discriminations to a particular phenomenon of interest. It also illustrates how verbal behavior on the researcher's part is able to help shape similar discriminations in a reader (i.e., the present writer).

RESEARCH EXAMPLE II

A conspicuous example of research based upon a Skinnerian epistemological position is found in Marguerite McCorkle's (1978) doctoral dissertation entitled "A Radical Behaviorist Study of 'Women's Experience of Conflict'." McCorkle's dissertation incorporates an unconventional approach to psychological research, largely because McCorkle conceptualized her research not just as a study of interesting verbal behavior but also as an opportunity to observe and attempt to describe her own behavior as a researcher engaged in looking at verbal behavior. While her dissertation is clinical in focus and interest, McCorkle relies heavily on the conceptual work of Skinner in order to present and make sense of what she does.

Perhaps the best way to introduce McCorkle's study is to offer an example of her own verbal behavior in presenting her
The main purpose in undertaking this project has been to develop and articulate a radical behaviorist perspective (or "theoretical rationale"), and to maintain this alternative point of view while beginning a long-range program of research dealing with a problem of considerable professional interest, namely, "women's experience of conflict." While this approach will be discussed throughout the following pages, it can generally be set apart from other psychological orientations by (1) its opposition to mentalistic explanation, and (2) its fundamental reliance on a conceptual framework which emphasizes the analysis of contingencies of reinforcement. This approach directs attention towards behavior, and in particular to the relation of behavior to antecedent stimulus conditions and reinforcing consequences. This fundamental conceptual framework also provides a basis for considering the theoretical foundations of scientific research. The reader will be asked to read about the behavior of a researcher as this behavior actually occurs in the conduct of a sample of preliminary scientific research. In this, the emphasis will not be so much on the nature of the practices themselves as upon the way in which these practices engage the behavior of the researcher. (McCorkle, 1978, pp. 3-4)

McCorkle's dissertation, taken as a whole, offers an interesting opportunity for a reader to see how certain conceptual and analytical approaches influenced one individual's behavior in carrying out, reporting, and putting into a professional context a piece of research on verbal behavior. Specifically, as can be seen in the above quotation, McCorkle aligned herself with the conceptual approach of radical behaviorism. However, this identification with radical behaviorism, particularly with respect to Skinner's epistemological position, led McCorkle to make some moves which are different than those commonly encountered within the behaviorist literature. In approaching her research as a radical behaviorist, McCorkle felt called upon to (1) put her understanding of radical
behaviorism into a professional context which included certain conceptual approaches and practices outside of a strictly behaviorist tradition, (2) focus attention on her own behavior as a researcher interested in the analysis of verbal behavior, and (3) structure her research report in such a way that her verbal behavior therein functioned to shape particular discriminations in the reader. I will be describing here some of the ways in which McCorkle approached these areas in her dissertation.

Consideration of Other Conceptual Approaches

In introducing her research, and in creating a context from which certain conceptual issues relevant to her research approach could be viewed, McCorkle presented extensive discussion and material regarding conceptual orientations which she felt shared certain characteristics with a radical behaviorist view. These discussions involved looking at the ways in which radical behaviorism shares certain characteristics with (1) a "human science" approach to psychological research, (2) ethology, (3) "naturalistic" research approaches, and (4) phenomenological psychology. In the following, it is important to keep in mind that each of these areas of concern were presented in order that the reader may more clearly respond to particular aspects of a radical behaviorist approach to research which McCorkle deemed important.

Human Science

Chapter I of McCorkle's dissertation is entitled "The 'Human Science' Tradition in Psychology." In this chapter, McCorkle sets
out to distinguish an approach to psychological research which is different than that of the "natural-scientific" view commonly held within the profession. By "natural-scientific" McCorkle means the methodology of the natural or physical sciences, which psychology adopted in the late 1800's: 2

This methodology of the natural sciences was primarily experimental, where laboratory conditions could be controlled and systematically varied so that their effects on another variable could be isolated and recorded.... Measurement and quantitative accounts were valued as more precise and more objective, particularly because repeated observations could then be made and results compared, and thus accidental and private (i.e., investigator-influenced) factors affecting the results could be ruled out. Questions were formulated in the form of testable hypotheses, and the experimental results were viewed as impersonal facts. By such methods, the physical sciences had been able to discover the "basic particles" of which wholes were composed and were then able to formulate general laws in which the interaction of the (supposedly) fundamental units were related. (pp. 10-11)

With such a characterization of the natural science view, largely adopted by psychology as "methodological behaviorism" (cf. p. 20), McCorkle contrasted the "human science" tradition. To do this, McCorkle presented arguments against a natural-science or methodological behaviorist approach to science by several individuals, including Wilhelm Dilthey, Franz Brentano, William James, Abraham Maslow, Amedeo Giorgi, B. F. Skinner, and Willard Day. While I will not discuss specifically McCorkle's presentation of these arguments, I will offer a characterization of the human science approach as McCorkle presented it.

A "human science" approach is concerned with approaching the subject matter and methodology of psychology in ways which preserve
the "human context." McCorkle says:

The human science tradition insists that the subject matter (or content) of psychology include complex activities and experiences of human beings as they live their lives. Psychology should not limit itself to only those elements which can comfortably be fitted into a physical science paradigm, a practice which tends to exclude the human context. A second point, which I believe is also a part of the human science perspective, ...is a perspective towards "science" in which it is regarded essentially as a human activity (or behavioral phenomenon). (pp. 18-19)

This concern with maintaining or preserving the "human context" of psychological phenomena is seen by McCorkle as opposed to the fundamentally reductionistic and structuralistic orientation of mainstream psychology.

As McCorkle develops her characterization of "human science" traditions in psychology, she touches on several aspects of that approach which she sees as "compatible" with radical behaviorism. Specifically, radical behaviorism is seen by McCorkle to be compatible with a human science orientation in the following ways:

1. A human science position emphasizes description of human experience rather than the construction of theories about human functioning (pp. 32-33). Radical behaviorism is also concerned with opposing theory-construction, because it has led to mentalistic accounts of human behavior. Rather, behavior should be directly observed and related to factors operating in its control.

2. A human science position emphasizes the importance of maintaining the human context of important human phenomena. Radical behaviorism is also interested in the context in which behavior occurs. It seeks to discover functional relations between behavior...
and its immediate and historical context (pp. 36-39).

(3) A human science approach insists that the human qualities of the researcher be taken into account. Radical behaviorism "accounts for the behavior of the researcher with the same paradigm it uses to account for the behavior of the person being investigated" (p. 39).

The human science approach is thus presented to highlight certain issues in psychology which McCorkle wishes to stress as relevant to her understanding of radical behaviorism. McCorkle, in reviewing the human science tradition in psychology, is interested in bringing these issues to the attention of the reader in order that similar characteristics of her radical behaviorist approach may be responded to. These issues are summarized at the end of Chapter I as follows:

First, the approach takes for its subject matter the experience and behavior of the human person. Rather than seeking basic structural formulations, in a broad sense this approach seeks explanation in terms of functional relations between the subject-phenomenon and its human context (i.e., the environment as discriminated by given persons). The approach assumes by its methods the responsibility for empirical and detailed analysis of the phenomenon in question, and while experiments may be included as part of the method, the human science approach is not committed to the natural science model as it is practiced. The traditional natural science view of "objectivity" is reconceptualized, and therefore there is a certain reflective quality in the methodology, because the human qualities of the researcher need to be accounted for. Science is regarded as no more than a particular human activity, and as such its connection to certain value-orientations should be recognized. Since the human science approach tends to be concerned with the analysis of fairly complex human experiences, it should be recognized that the commitment is to the investigation of such human activities, and not to a particular methodology. Rather, appropriate methods must be developed and empirically evaluated. (pp. 41-42)
Before moving on to a discussion of McCorkle's treatment of similarities between radical behaviorism and other research approaches in psychology, I wish to briefly describe what McCorkle means when she talks about a "radical behaviorist methodology." In Chapter II of her dissertation, entitled "A Rationale for a Radical Behaviorist Methodology," McCorkle presents certain treatments by Skinner of such concepts as "scientific knowledge," "the analysis of contingencies," "causation" and "control," and the role of the scientist in research. In doing so, it is interesting that McCorkle states that, as yet, no clearly defined radical behaviorist methodology exists (p. 43). This is because, as McCorkle sees it, a radical behaviorist methodology is concerned with the development of procedures for the analysis of controlling contingencies, yet such an analysis revolves centrally around the abilities of an observer to respond discriminatively in certain ways under particular conditions and is not necessarily tied to experimental procedures. McCorkle states:

Unfortunately, there seems to be little professional, intellectual concern with the problem of how a trained observer is able to assess the contingencies governing behavior which occurs in the laboratory or other controlled settings.... What must be made evident, however, is that the significant change in frequency of the target behavior must be discriminated by someone, even if this simply requires observing changes in the slope of a cumulative record.

However, the move from the analysis of behavior in an experimentally controlled environment to the analysis of behavior in situ appears to generate conceptual difficulty for the non-behaviorist and naive behaviorist alike.

...[O]ne need not emphasize nor assume a significant difference between a trained observer's capacity to analyze contingencies in the two situations, although
the difference in the observer's relevant reinforcement history in the two situations is again pertinent. However, one of the important issues which does arise concerns the greater difficulty in initially specifying the antecedent stimulus control (S^D's) governing the observer's assessment of the on-going stream of behavior in situ. (pp. 51-52)

McCorkle is thus calling attention to the fact that, as a radical behaviorist interested in the analysis of verbal behavior in situ, there seems to be no professionally endorsed methodology for her to follow, nor is she interested in approximating controlled experimental procedures. Rather, she is interested in relying on her own discriminative capacities to be shaped by contact with the phenomenon she observes. Part of what McCorkle means by a "radical behaviorist methodology," which again emphasizes this point, is presented below:

A helpful rule might be that, whenever any kind of behavioral phenomenon is placed for professional purposes under direct observation, the next step must always be simply to get the observer to talk under the control of what has been observed, that is, to verbalize in recordable form whatever interesting new discriminations were produced by the act of observation....

Such a proposed research format, as an activity or process, should be designed in such a way that the researchers increasingly refine or sharpen their ability to identify the stimuli to which they are actually responding.... From a radical behaviorist perspective, we are interested in the researcher being able to provide an initial description of the behavioral episode including concurrent environmental conditions. However, given such a methodology, we must also be prepared to make additional discriminations concerning the differences that exist between "description" and other classes of verbal behavior, e.g., verbal behavior that appears to be more intraverbally controlled. Much of the writing of research reports can be expected to consist of descriptions of behavior, descriptions of relevant environmental context, and the simple verbal responding to protocols by way of reporting discriminations. However, other relevant writing in the report may involve...
the verbal manipulations necessary to place the research properly in its appropriate professional context, and this is intraverbal behavior. (pp. 55-57)

The material presented above is representative of the kinds of discriminations McCorkle wishes her reader to make with respect to her approach to research. In developing her "rationale," McCorkle relies heavily on the work of Skinner and Day. In particular, she is concerned with shaping her reader's responses with respect to (1) the role of the observer in any assessment of behavior and its controlling relations, (2) the need for the development of procedures which shape interesting new discriminations in the observer to the phenomenon observed, (3) the central importance of description in any attempt to assess behavior, and (4) the behavior of the researcher in reporting these discriminations and otherwise shaping the reader's responses.

With this brief background in McCorkle's approach to radical behaviorist research, I now wish to discuss how McCorkle aligns her approach with certain aspects of ethology, "naturalistic" research, and phenomenological psychology. This discussion occurs in Chapter III of the dissertation: "A Review of Similar Methodologies."

Ethology

In this section, McCorkle reviews what are the essential features of the field of ethology as she sees them. Included in this discussion are such topics as the influences of Charles Darwin, the procedures of the "comparative method" used by Lorenz
and others in studying species-specific behavior and the conditions under which such behavior occurs, and the use of evolutionary concepts such as "selection pressure." Ethology is seen to be similar to radical behaviorism in the following ways: (1) Both ethology and radical behaviorism involve the use of Darwinian concepts; (2) both seek functional analyses of behavior in situ; (3) both are concerned with the use of observation and description in their methods; (4) both are concerned with stimulus control over behavior.

McCorkle also outlines some major differences between the two fields. They include (1) the kinds of behaviors of interest ("instinctive" vs. "operant"), (2) ethology's reliance on a structuralistic morphology or categorization of behavior as opposed to radical behaviorism's interest in strictly functional relations, and (3) ethology's inclusion of certain mentalistic concepts to explain behavior.

"Naturalistic" research

McCorkle, in this section, finds a similarity between radical behaviorism and various "naturalistic" research approaches primarily in the interest in observing behavior in situ and in the assertion that there are certain limits to the predominant experimentally-oriented approach to research. However, she is careful to point out that naturalistic research approaches often involve structuralistic and mentalistic aspects to which a radical behaviorist would be opposed.

A major point made by McCorkle in this section involves the
differences between the behavior a researcher engages in when studying a phenomenon and the ways in which the researcher conceptualizes or verbalizes what occurred in the research. While "naturalistic" research often involves the observation and description of on-going human behavior in situ, the theoretical discussion involved often calls upon concepts which the radical behaviorist would not use, i.e., as in characterizing a piece of research as "pre-theoretical" or "hypothesis-building" (cf. p. 89).

Phenomenological Psychology

Lastly in Chapter III, McCorkle discusses those aspects of phenomenological psychology which she sees as relevant to her radical behaviorist approach. The "branch" of phenomenology she presents is that of Amedeo Giorgi, whose philosophical orientation comes from the influences of Husserl and Merleau-Ponty. Giorgi, in his work, affirms a "human science" approach to psychological investigation. Also, he is:

...concerned with the analysis of human experience and behavior as it is experienced by the human person. "The real is to be described and not constructed" (Giorgi, 1970, pp. 138-139). Consequently, the methods are designed so that the researcher remains "open" to the emergence of the actual and by means of description tries to capture the phenomenon as faithfully as possible.... Phenomenological descriptions of experience are systematically condensed in order to provide an "essence" of the structure of the phenomenon in question. The "essence" is, as it is viewed from that perspective, the researcher's "subjective vision" of the phenomenon, but it is presented in a form that can be shared. (pp. 90-91)

McCorkle presents an example of the phenomenological method in her discussion, which illustrates how "meaning units" are
derived from a verbal protocol and how the researcher then constructs a more condensed and general description of the phenomenon discussed in the protocol. She then delineates areas in which phenomenology and radical behaviorism can be said to be similar in interest and focus. These include (1) an emphasis on descriptions based on empirical investigation, (2) a recognition of the role of the observer's history as it influences the assessment, (3) a concern for the context within which a behavior or experience occurs, and (4) a concern with the analysis of verbal behavior. She also points out that phenomenology and radical behaviorism involve different conceptual approaches and therefore phenomenological descriptions are likely to involve both structuralistic explanations and mentalistic accounts and do not emphasize the role of the environment in contributing to controlling contingencies.

McCorkle's discussion of radical behaviorism's affinity to other research approaches provides verbal stimuli which are presented to shape certain discriminations in the reader. These discriminations have to do, in part, with important aspects of a radical behaviorist approach to research. As McCorkle summarizes:

[All of these approaches can be viewed as similar in that they move away from the dominant, methodologically-behavioristic orientation of mainstream psychology. The approaches were also similar in that most of them proposed functional (or contextual) considerations of their subject matter.... (p. 99)

McCorkle's discussion in Chapter III is particularly interesting because she points to areas of similarity between radical behaviorism and other approaches not commonly considered by the
behaviorist community. In this sense, she appears to be interested in pointing to certain areas within the profession with which radical behaviorists may be able to dialogue or find interests in common, in spite of differences in conceptual systems (or verbal communities).

An Example of Discrimination Training: Theoretical vs. Descriptive Verbal Behavior

Chapter IV of McCorkle's dissertation, entitled "An Introduction to Women's Issues," is designed to function in a particular way for the specific purpose of shaping up one particular discrimination on the part of the reader. In general, the chapter is used to "introduce" the topic area of McCorkle's research: "women's experience of conflict." More particularly, however, the chapter is designed to establish a contrast between two types of verbal behavior. Verbal stimuli, moreover, are presented in a way designed to produce a particular discrimination on the part of the reader with respect to these two types of verbal behavior. The chapter also sets up the reader to respond appropriately to the kind of verbal behavior McCorkle is interested in investigating as a radical behaviorist.

In the first section of the chapter, McCorkle presents professional and "theoretical" discussions concerning women and "psychological conflict." The samples of the professional literature represent Freudian, Marxist, and Jungian treatments of the topic, all by prominent women in the fields concerned. They are, respectively, Juliet Mitchell (Psychoanalysis and Feminism,
1974); Charnie Guettel (Marxism and Feminism, 1974); and M. Esther Harding (The Way of All Women, 1970).

In the second section of the chapter, McCorkle again presents verbal behavior from literature which pertains to "women's experience of conflict." However, these selections are not taken from the professional literature. Instead, they are found in writings by women who have, for one reason or another, wanted to describe their own personal experience. The verbal behavior concerned is taken from personal, autobiographical accounts of three women: Hannah Tillach, From Time to Time (1973); Anais Nin, The Diary of Anais Nin (Vol. 1, 1931-1934); and Carolina Maria de Jesus, in Revelations: Diaries of Women (1975).

Within the body of the chapter, McCorkle does very little "discussion" concerning the content of the literature samples she presents. For the most part, her verbal behavior in the chapter consists of simply presenting the material, as "samples of verbal behavior" (p. 127). In order to illustrate the effect of the presentation of these two types of verbal behavior on the reader, I will reproduce here some brief excerpts from that verbal behavior. The following are samples from the first, or professional, type of literature presented by McCorkle:

In both sexes, castration is the signal to give up the mother—but for the boy only so that he should wait for his turn and in good time get his own woman; for the girl, acceptance of 'castration' indicates that she should become like her mother. The overcoming of the Oedipus complex of both is a sign to start identifying finally with the parent of the same sex so that society can go on accordingly. The confirmation of his first love-object for the boy which is his Oedipus complex
is renounced till he grows up like his father whom he meanwhile internalizes as his superego by identification. The contradiction of her first love-object for the girl, which is her Oedipus complex, never really need be renounced, for that is her feminine destiny. (p. 105)

The main contradiction is not between men and women, but between the forces of production, people's labour power, machines, materials, etc., and the property relations of production, the ownership of almost everything by a few capitalists who produce only for profit. The struggle between the classes is an expression of this contradiction. Capitalism tried to use reproduction, sexuality, masculine-feminine socialization of children in such a way as to make us more exploitable, not to satisfy human needs. Herein lies the special oppression of women as women, as well as of women as workers. (p. 109)

But humanity at large has moved since those days toward a greater consciousness, chiefly through the emergence of a conscious and personal ego whose aims have conflicted with the simple urges which Mother Nature first implanted in our breasts. Thus, as woman has evolved and become more aware of herself as a separate entity—an ego—a conflict has arisen within her psyche between the individual values which she has attained and the ancient, collective, feminine trends—and conflict is the beginning of consciousness. (p. 116)

What follows are samples of the verbal behavior taken from the second, or "autobiographical," type of literature. The three samples presented below are from the writings of Hannah Tillach, Anaïs Nin, and Carolina Maria de Jesus, in that order:

Now I am seeing the image of my first husband, the one who had to propose to me three times, and even then it was still wrong. I was a child-woman then, hiding my intellect. (This was before Heinrich had made me aware of my own dignity.) I pretended to be what my first husband wanted me to be, the body beautiful. He drew, painted, and worshipped me. For him, I was the little woman; he pampered, spoiled, and ruled. It was by walking through the door of my intellect that I left him. (p. 121)

There are ideas which Dr. Allendy [her psychoanalyst] abandons. But every time he touches upon the theme of
confidence, he sees the turmoil and distress I feel. I lie back and I feel an inrush of pain, despair, defeat. Dr. Allendy has hurt me. I cry. I feel weak. It is time to go. I stand up and face him. His marine-blue eyes are very soft. He feels pity for me; he says, "You have suffered a great deal." But I did not want pity; I wanted him to admire me, to think me a unique woman. (p. 124)

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...Senhor Gino came to me to ask me to go to his shack. That I am neglecting him. I answered: no! I am writing a book to sell. I am hoping that with this money I can buy a place and leave the favela. I don't have time to go to anybody's house. Senhor Gino insisted. He told me: "Just knock and I'll open the door." But my heart didn't ask me to go to his room. (p. 126)

The discrimination to be made between the two approaches should be fairly clear. McCorkle is interested in a professional concern and treatment of aspects of women's experience. She is also interested in ways in which this topic may be approached from a radical behaviorist viewpoint. While a typical professional move might be to investigate or attempt to clarify or translate theoretical conceptions related to the topic, it is apparent that there is a wide discrepancy between the kinds of discriminations which would be produced by contact with the two kinds of verbal behavior presented. The "professional" samples are clearly much more intraverbally controlled. The personal writings, on the other hand, appear to "describe" or "get at" the kinds of phenomena which women actually encounter in their lives. It is this second, "descriptive" quality of verbal behavior which McCorkle regards as potentially more professionally informative and useful. She concludes:
The second kind of literature reviewed was not "theoretical" but rather can be considered as examples of the kind of verbal behavior one might expect from a person trying to describe their own experience. This literature should at least support the notion that we, as professionals, have much to learn from simply talking to people. In other words, this literature supports the professional move of asking women themselves about how they behave and what they experience. Research undertaken with this approach in mind would produce a line of research remarkably distinct from research which is designed to test (the goodness of fit of) our theoretical models. (p. 128) [Emphasis added]

The Research Project: "Women's Experience of Conflict"

Given the preceding discussion of McCorkle's behavior in (1) providing a professional context for her research approach, and (2) providing for a particular discrimination in the reader to the kind of verbal behavior she is interested in investigating as a radical behaviorist, I wish now to consider how McCorkle approached the problem of investigating "women's experience of conflict." McCorkle's behavior in setting up and carrying out her research project was primarily influenced by her interest in approaching a research situation as a radical behaviorist. What this means specifically is that, first, McCorkle wished to directly observe a particular type of verbal behavior "descriptive" of "women's experience of conflict." She then wished to allow her contact with the verbal behavior to shape whatever particular discriminations occurred in her, and she wanted to be able to describe these discriminations in some way. In addition, McCorkle wished to have her own behavior in response to her data develop as a result of her previous responding in the research situation, as opposed to
following a prearranged research plan or method of analysis. In this way, McCorkle was interested in having her own behavior in response to her data become increasingly more under the control of important aspects of the verbal behavior in her data. She was also interested in letting her behavior be guided by the specific contingencies which would emerge as a result of her interaction with her data and her previous behavior in responding discriminatively to her data.

The results of this process lend a different quality to McCorkle's behavior than may be expected (i.e., by members of the behaviorist community interested in learning something about the functional analysis of verbal behavior). While McCorkle is interested in the functional analysis of verbal behavior, her research did not have this as a specific goal. Rather, she attempted to enter a research situation, primarily guided by her conceptual approach, to see what kinds of behavior might be shaped, in her, as a result. Her research is reported in Chapter V of her dissertation, which is entitled "Demonstration Study."

The data

For the purposes of her research, McCorkle was interested in gathering some "real-life" verbal behavior having to do with "women's experience of conflict." To do this, she obtained the cooperation of three adult women who participated with her in ten weekly hour-long "Interview" sessions. These sessions were tape-recorded and observed behind a one-way mirror by another graduate
student. McCorkle's behavior in the interview setting was designed to produce a particular type of verbal interaction with the participants. Concerning the interview environment, McCorkle has this to say:

In general, the research setting was intimate and supportive. There was an attempt on the part of the researcher to create an atmosphere that would occasion a behavioral style for all participants that was "spontaneous, open, and honest." The focus of the interaction between the interviewer and the subjects was to frankly discuss some of the difficulties they had encountered in relation to their femaleness. Participants were asked about topics that would usually be considered "private" or "intimate," e.g., evaluating interpersonal relationships. (p. 135)

McCorkle, therefore, attempted to create a research environment conducive to the generation of verbal behavior descriptive of real issues the women participants had encountered in their lives. Given this type of verbal behavior as her data (approximately 25 hours of tape-recorded material), McCorkle was not interested in "proving" anything specific to "women's experience of conflict." Rather, she was interested in bringing her own discriminative behavior under the control of significant verbal behavior as it occurs under particular circumstances—where individuals are encouraged to "describe" their experience in a variety of ways—and she was interested in letting her behavior "evolve" as a result of the interaction with her data.

McCorkle's interest in allowing the research situation to shape whatever discriminative responses would occur in her meant that, unlike with much psychological research, McCorkle had few "a priori" assumptions concerning how to respond to her data. To
this point she says:

...[T]he reader is reminded that the current methodological perspective proposes to allow the researcher, at least in part, the opportunity to be "controlled by the data." Even with respect to developing research procedures, the researchers simply responded to the data at hand. Consequently, the methods used in organizing these data were not planned a priori, but instead they developed as responses to the actual data. (pp. 193-194)

Given a data-base of approximately 25 hours of taped verbal behavior, McCorkle responded in several ways. Her behavior in response to her data can roughly be separated into (1) displaying the data in order to bring the researcher or the reader into contact with the behavior observed, and (2) selecting verbal behavior relevant to "women's experience of conflict." I will briefly outline how McCorkle responded to her data. In doing so, I will attempt to emphasize and describe the major discriminations McCorkle made regarding her data in order that the reader may see how the research process resulted in new discriminative behavior on the researcher's part. In the following discussion, it is important to keep in mind that McCorkle was primarily involved in her "demonstration study" in a particular way: to let her responses to her data develop as a result of the contingencies which emerged as the research situation progressed and as her behavior came increasingly under the control of aspects of the verbal behavior in her data.

Displaying the data

One of the first problems which McCorkle faced was that of "capturing" or displaying the on-going verbal behavior on the tapes.
She responded to this problem in two ways: (1) she constructed written transcripts of segments of the data, and (2) she devised a "Catalogue" system which involved verbal descriptions of the material on the tapes.

In her dissertation, McCorkle included a sample transcript of one Interview session. The transcript is lengthy (it comprises approximately 40 pages of material) but McCorkle felt it was important to include it "in order to bring the reader into contact with the relevant behavior" (p. 136). The transcript does illustrate the kind of verbal behavior of interest. In it, the participant describes certain aspects of a "conflict" situation involved in making the decision to leave her husband.

In order to preserve aspects of her own responding to the interaction in the Interview sessions, McCorkle engaged in what she called "Debrief sessions." These sessions occurred immediately after each interview. They were composed of discussion between McCorkle and her assistant/observer concerning what had occurred in the immediately preceding interview. The verbal interaction in the Debrief sessions was tape-recorded. Specifically, the Debrief sessions were designed to allow the researchers the opportunity to record their responses to the stimuli in the interview at a time when these responses would still be at some strength. The discriminative responses recorded would be, presumably, maximally under the control of the immediately preceding behavior which occurred in the interview session. McCorkle says about the Debrief process:
These sessions are viewed as having helped shape relevant discriminations on the part of the researchers and as in other ways having influenced their subsequent behavior. (p. 181)

The dissertation includes a transcript of a Debrief session. The presentation of this transcript was viewed by McCorkle as serving a similar function as that of the first; that is, the transcript was presented as an example of the verbal behavior of the researchers as it actually occurred. The transcript is particularly interesting in that it illustrates the kinds of discriminative responses on the part of the researcher and her assistant which occurred in response to the interaction of a particular interview session.

It should also be noted that the presentations of the Interview and Debrief transcripts in the dissertation function to expose the reader to a sample of the original verbal behavior and that such an exposure brings the reader under the control of conditions similar to those operating in the research situation. McCorkle relies on the presentation of transcripts to shape certain discriminations in the reader regarding (1) the kind of verbal behavior women engage in when asked to talk about conflict situations in their lives, and (2) the types of verbal behavior the researchers engaged in when responding discriminatively to aspects of that verbal behavior.

After the data had been recorded, McCorkle faced the problem of how to locate segments of the verbal behavior which would be of interest to her for further analysis. She devised the
"Catalogue" of data which functioned to condense the material on the tapes:

The Catalogue of data was constructed to function as an index to the tapes, primarily for use of the researchers. Catalogue segments were constructed as a verbal description of the Interview sessions, reflecting both the content and process of discussions. In general, two or more relisting sessions were necessary prior to constructing the Catalogue entry. The tape for a given session was reviewed and notes taken. The description of the session was written with an aim of maintaining as much of the original verbal behavior as convenient. (p. 194)

The Catalogue, then, was verbal behavior on McCorkle's part, in response to a taped session, which functioned to (1) condense the data of taped verbal material, (2) allow a researcher to locate particular taped segments without having to listen to an entire taped session, and (3) provide a reader with some idea of the nature of the verbal behavior involved in the sessions. A sample Catalogue for one participant, which covered the first eight Interview sessions, is presented in the dissertation. In general, the Catalogue system was viewed by McCorkle as a method, primarily for the benefit of the researcher, to allow her easier accessibility to material on the tapes. It should also be noted that in constructing the Catalogue entries McCorkle was responding verbally to the verbal material on the tapes, and the entries themselves provide a sample of her discriminative responses to her data regarding what were significant aspects of the verbal behavior in the Interview sessions.

Another way in which McCorkle responded to the material on the tapes was to construct biographical descriptions of two of the
participants. These descriptions, as further verbal behavior on McCorkle's part in response to the taped material, were constructed in order to provide a context from which specifics of the women's verbal behavior could be viewed. In other words, McCorkle extracted material from the tapes in which the women discussed their back­grounds and constructed a biographical sketch which she viewed as important because of its function in helping to make better sense of the verbal behavior of the women. In doing so, McCorkle was interested in (1) providing information which would further shape relevant discriminations to the verbal behavior she was interested in, and (2) approximating a verbal description of the women's "reinforcement histories" in the broad sense of that term.

The problems McCorkle faced in displaying and ordering her data revolved around the following issue: given a large sample (25 hours) of recorded on-going verbal behavior, how do you begin? In displaying and ordering her data, it appears that McCorkle responded to several things. First, McCorkle was interested in preserving aspects of her data which could be used to help shape discriminations concerning the issues the women discussed in the sessions. She also wished to preserve "the dynamic qualities of on-going verbal behavior in situ" (p. 244). Secondly, McCorkle was interested in the problem of exposing a reader to the kind of verbal behavior she had generated. Thirdly, she was interested in the problem of making the verbal behavior accessible to a researcher. The next way McCorkle responded to her data had to do with the identification of certain responses on the part of the participants
having to do specifically with "women's experience of conflict."

The development of a response class

Following her discussion of the Catalogue system, McCorkle described her efforts to identify segments on the tapes which were illustrative of "conflict" situations. In doing so, McCorkle was attempting to respond discriminatively to segments of verbal behavior which shared certain properties or had similar effects on her as a listener. She was also attempting to expose the reader to the kinds of verbal behavior in her data which were descriptive of conflict situations. She says:

The excerpts presented below represent the researcher's initial identification of that class of responses regarding "conflict situations". Continued analysis of the verbal material may further refine the researcher's discriminations regarding relevant or interesting aspects of that verbal behavior. For the current purposes, however, the excerpts can be used to define "conflict" in a broad sense, or at least to help clarify what we mean by "conflict." Verbal episodes which seemed to fall within the class "conflict" included usages of the following words: "unbalanced," "confused," "feeling pulled," "black or white thinking," "...in two places," "conflict." (p. 126)

In her dissertation, McCorkle presented several excerpts from the tapes, in edited transcript form, in which she discriminated the kind of verbal behavior illustrative of talk about "conflict" situations. A sample excerpt is presented below:

Taped segment in which C. describes, in retrospect, a "conflict" situation regarding her sexual feelings.

C. ...I wasn't a fully integrated person. I wasn't able to be aware of some of my feelings. Like, I was confused by sex.... I remember when I was a sophomore...[describes situation] and I remember it felt so good. One night I
jumped out of the car and ran up [to the house].
And I remember thinking that's terrible. Terrible!
So I was in two places. It was so good and it was
terrible...(unintelligible except that C. mentions
"church"). And I guess that was a "conflict"
(pause, laughs).

(Comment: In this excerpt, one can observe Carol's
attempt to specify the environmental conditions surround­
ing one experience of "conflict.") (p. 218)

Some aspects of McCorkle's treatment of defining or developing
the response class of "women's experience of conflict" deserve
further comment. First, as can be seen in the excerpt above, the
verbal behavior presented was intended to serve as general examples
of the kinds of talk women do when asked to describe "conflict"
situations in their lives. McCorkle, in developing the response
class, responded to the taped material from her own reinforcement
history. That is, she attempted to discriminate verbal behavior
which seemed to "describe" the phenomena associated with what we
ordinarily call "conflict situations." McCorkle had no pre­
conceived definition of the components necessary for "conflict" to
exist or the nature of the verbal behavior which may "describe"
conflict situations. As a radical behaviorist, McCorkle's tech­
nique was similar to Skinner's (1945) prescription for operational
definition as described in Chapter I of the present thesis. That
is, McCorkle regarded "conflict" as a verbal response which is
controlled by a variety of circumstances. She was interested in
assessing the kinds of verbal stimuli in her data which occasioned
the response "conflict" in her. The excerpts she presents are
representative of the kinds of verbal stimuli which controlled her
discriminative responding concerning "conflict."

Secondly, it is also the case that McCorkle was interested in the phenomena of women's experience which underlie (or contributed in the control of) the verbal behavior in her data. The verbal stimuli in the data which occasioned McCorkle's identification of "conflict" situations functioned as descriptions of the kinds of circumstances the women encountered in their lives with respect to "conflict." The verbal behavior in these descriptions was regarded as a source of control over McCorkle's discriminative behavior with respect to the circumstances which women face and experience as "conflict" situations. The problem of convincing a reader that such verbal behavior is illustrative of "conflict" situations is handled by relying on the reader's reinforcement history and discriminative responding with respect to circumstances under which the reader would agree that "conflict" is described.

Closing Remarks

There is a sense in which "taking Skinner seriously," particularly with respect to his treatments of verbal and scientific behavior, produces a significant source of control over the kinds of research approaches individuals may undertake. McCorkle's dissertation shows one example of how an interest in the analysis of verbal behavior, and a recognition that researcher behavior is largely shaped by professional and research environments, may result in some remarkably distinctive approaches to research and research reporting. The functional analysis of verbal behavior is
currently receiving attention from two other individuals at the University of Nevada, Reno. Diane Spooner, for her Master's thesis, is undertaking the analysis of one transcript from McCorkle's data. In her analysis, she is attempting to identify verbal behavior which functions to clarify the "meaning" of a particular verbal response. Spooner is interested in the fact that verbal behavior which clarifies "meaning" often is descriptive of environmental factors which appear to be relevant in the control of the behavior in question. She is also approaching the problem by assessing how the verbal stimuli associated with clarifications of "meaning" function to control and shape her own discriminative behavior in response to the situation described in the transcript. Harold Cook, for his doctoral dissertation, is interested in responding to Skinner's interest in the analysis of scientific behavior. He has gathered samples of professional verbal behavior which function as "scientific description" and "scientific explanation." In his analysis, he is attempting to identify factors which appear to him to be controlling the professional verbal behavior in his data. He, too, is dealing with the assessment of aspects of the verbal behavior in his data which control his own behavior in identifying functional relationships relevant to that data.

All of these research endeavors are largely a result of professional contingencies which resulted in a particular conceptualization of researcher behavior. The kinds of behavior, verbal and otherwise, which individuals will engage in from such a radical behaviorist conceptual framework are probably varied.
However, the major concerns of such individuals at the present time appear to be (1) the development of procedures which will help shape discriminative responses in the researcher to verbal behavior and factors operating in its control, and (2) the clarification of conceptual issues relevant to these procedures.

A concern with formulating a radical behaviorist epistemology has naturally led me to examine the relationship between scientific research activity and certain factors which operate in its control. The importance of research practices in shaping relevant discriminative behavior on the part of the researcher has been examined. Furthermore, earlier chapters have stressed the importance of examining scientific verbal behavior.

While Skinner has called for an examination of the contingencies controlling scientific behavior, it may be clear that we, as behaviorists, have only begun to explore this important area. Certain "rules" concerning proper research conduct do exist within the profession, but the ways in which our professional behavior is shaped by our research and professional environments have received little empirical attention.

As we confront certain conceptual issues related to the production and communication of knowledge in our field, perhaps more effective verbal and research practices will be developed and our current practices better understood. Since so much of our behavior as scientists appears to be rule-governed, it is hoped that the development of rules which, in fact, describe important contingencies operating in the production of useful
scientific behavior will make subsequent professional behavior more expedient. Human behavior, as Skinner has pointed out, is terribly complex, but it is our task as psychologists to bring about a clearer understanding and explanation of important aspects of that behavior, and a place to begin to do this may well be in examining our own behavior as scientists.
FOOTNOTES

1 Historically, male-gendered words have been commonly used to refer to both sexes. However, the use of such language, for many persons, carries sexist connotations. While several quotations presented in this thesis use male-gendered words to refer to people in general, the author will present the remaining quotations without further comment.

2 The following citations in this chapter all refer to McCorkle, 1978. Therefore, I will be giving only the page numbers from that source which refer to the relevant passages.
REFERENCES


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