

Should the behavioral sciences become more pragmatic? The case for functional contextualism in research on human behavior

ANTHONY BIGLAN

Oregon Research Institute

STEVEN C. HAYES

University of Nevada

Abstract

Although societal need for behavioral science research is enormous, current research practices seem to be inefficient vehicles for producing knowledge that guides practical action. Many of our most popular theories provide little direct guidance for application. They focus on the development of models of the relationships among organismic events such as attitudes, self-efficacy expectations, and behavior, but pay little or no attention to the contextual influences on behavior. Such research is in keeping with a long-standing mechanistic tradition in psychology. We propose a version of contextualism as an alternative paradigm for the behavioral sciences. According to this paradigm, theories and research are evaluated in terms of their contribution to the prediction and influence of behavior. Basic research organized to pursue this goal has a direct bearing on how behavioral phenomena can be changed for practical purposes. Conversely, applied research contributes to basic understanding of the determinants of psychological phenomena.

Key words: Contextualism, Environmental causes, Impact of behavioral sciences

No serious observer of the current situation in the United States could fail to be concerned about the social and behavioral problems that we confront. Estimates of the number of homeless Americans range from 600,000 to 3 million (Breakey & Fischer, 1990). The proportion of children being raised in poverty is the highest of any developed nation (Rodgers, 1982). We have the highest rate of teenage parenting among industrialized democracies (Population Reference Bureau, 1989). As of 1980, the rate of suicide among teenagers was twice what it had been in 1965 (Schaffer & Fisher, 1981). Although a highly educated workforce is the key factor in national economic well-being (Reich, 1990), our young people have fared poorly on math and science

achievement tests compared to other developed nations (U.S. Department of Education, 1989). The proportion of our citizens who are in prison is among the highest in the world (Elvin, 1991), yet our rate of violent crime is the highest of any developed nation (Kalish, 1988). Between 1980 and May of 1991, 113,426 people died from AIDS in this country (Centers for Disease Control, 1991), but we are far from knowing how to modify behaviors that lead to the spread of human immunodeficiency virus.

Faced with such problems, one might expect that the society would turn to behavioral scientists for solutions and that the behavioral sciences would mobilize to meet the challenge. Superficially, this may even appear to be the case. Problems of social importance, such as AIDS and drug abuse, draw the attention of highly knowledgeable and productive researchers; government and private funding of research on these problems is substantial. Certainly the behavioral sciences have made significant progress in areas such as clinical and health psychology, organizational behavior and management, and prevention.

Yet few would argue that our social problems are being ameliorated. The United States remains a world leader in

Preparation of this paper was supported in part by Grants CA44648, CA38272 from the National Cancer Institute, HD26249 from the National Institute of Child Health and Human Development, MH45651 from the National Institute of Mental Health, and by DA08634 from the National Institute on Drug Abuse. The authors thank Shawn Boles, Hamish Godfrey, Jerry Patterson, and Ted Sarbin for their feedback on earlier versions of this paper.

Address correspondence and reprint requests to: Anthony Biglan, Oregon Research Institute, 1715 Franklin Blvd., Eugene, OR 97403-1983.

violent crime. Our murder rate in 1988 was 8.4 per 100,000, which is higher than the rates in any of the major industrial democracies (Interpol, 1988). The murder rate among 15- to 19-year-olds in the United States was 3.6 per 100,000 in 1960, but rose steadily to 11.3 per 100,000 in 1988 (Fuchs & Reklis, 1992). The rate of rape is more than twice that in any other industrialized country and rose 9% between 1986 and 1990 (U.S. Department of Justice, 1991). The rate of assault rose 23% between 1986 and 1990 (U.S. Department of Justice, 1991). The deleterious consequences to children of poverty and teenage parenting are well established (National Research Council, 1987), yet the proportion of children being raised by single teenaged parents has increased steadily over the past 30 years (Marshall, 1991). Homelessness got worse during the 1980s (Breakey & Fischer, 1990). Average SAT scores have been declining over the past 30 years (Fuchs & Reklis, 1992). Approximately 29% of our children fail to graduate from high school (U.S. Department of Education, 1989), and in some inner cities the rate is much higher.

Good science takes time. We cannot expect the behavioral sciences to deal effectively with these social problems simply because they are important. It is necessary to have some basic understanding of the psychological processes involved and to translate knowledge about the behavior of individuals into programs that can affect the incidence and prevalence of behavioral problems (Biglan, Glasgow, & Singer, 1989). Nevertheless, the practices of behavioral scientists can be examined to see whether they lead efficiently to practically useful knowledge. In this article we argue that much of behavioral science theory and empirical practice is not well suited to the development of preventive or ameliorative procedures. It focuses narrowly on developing models of the relationships among organismic events and pays too little attention to identifying contextual variables that predict and influence cognitive, emotional, and overt behavior.

The first section of the article provides examples of research programs that focus on building models of intraorganism relationships and suggests that this focus is in keeping with the traditions of a mechanistic research paradigm. The second section advocates a pragmatic or contextualist framework for research in the behavioral sciences that has as its goal the identification of variables that allow the prediction and influence of behavior. This framework would lead to a more integrated approach to basic and applied research and could increase the rate at which preventive and ameliorative programs are developed.

The Focus on Intraorganism Relationships in the Behavioral Sciences

Psychological research can examine (a) the relationships among organismic events and characteristics, (b) the relationships between organismic events or characteristics and the environment, or (c) both. Examples of intraorganism

relationships include the relationships between attitudes and overt behavior, the relationship of memorization strategies to performance on memory tests, the relationships between racial or ethnic characteristics and behavior, and the relationship of self-rated expectancies to overt behavior. Examples of organism–environment relationships include the analysis of reinforcement, the analysis of family or other social interactions, the relationships between stressful life events and psychological functioning, and the relationships between parenting practices and children's behavior.

Current research practices in the behavioral sciences emphasize the development of models of intraorganism relationships. This emphasis leads to a kind of knowledge that is inadequate to the challenges described at the outset of this paper. Knowing that one organismic event or characteristic is related to another does not by itself indicate how the probability of either organismic event can be affected. To affect the probability of an organismic event, knowledge about environment–organism relations is needed, because the only events that others can *directly* manipulate are those in the environment.

Psychologists are so accustomed to the study of intraorganism relationships that their shortcomings as a guide to influencing behavior are easily overlooked. For example, it is often assumed that knowing about an attitude–behavior relationship means that one can change the behavior by changing the attitude. This is not necessarily the case. Suppose favorable attitudes toward contraception are positively related to contraceptive behavior—some people have favorable attitudes and use birth control and some have unfavorable attitudes and do not use it.

This correlation does not necessarily mean that changing an unfavorable attitude will affect behavior. Possibly the attitudes develop along with the behavior in order to be consistent with it (Cooper & Croyle, 1984). For example, those who do not use birth control may say that they don't like it, because that statement justifies their not doing something they think they should do. In this case, changing attitudes may be of little value in changing birth control use.

This is not the only problem. Even if such a correlation *did* mean that changing attitudes would change behavior, the correlational finding alone tells us nothing about how actually to change attitudes. To change another person's attitude, one needs to do something in their environment such as providing a persuasive argument from a credible source.

Evidence regarding environment–attitude relationships is always needed if behavior change is a goal. To change any psychological event—whether it is an overt behavior, a cognition, an attitude, or an expectation—one must ultimately manipulate something other than psychological events. Stated another way, psychological events are the dependent variables of psychology—the independent variables lie elsewhere. If the behavioral sciences are going to contribute to changing any of the things that people do, they have to include in their theoretical models variables that are

in the external environment of the psychological event to be changed. If research does not include environmental variables, it may generate precise and replicable laws, but it will not contribute directly to our ability to influence behavior.

Examples of Research Focused on Intraorganism Relationships

Fishbein and Ajzen's theory of reasoned action. The theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) is one of the most widely cited theories in recent social-psychological literature. From 1985 through 1990, Fishbein and Ajzen's (1975) text on attitude theory was cited more than 1,700 times according to the Social Science Citation Index. The theory is designed to predict behavioral intentions and actual engagement in behaviors that are under the person's "voluntary control" (Ajzen, 1988). According to the theory, the intention to engage in a specific behavior is a function of the person's attitude toward the behavior (A_B) and his or her subjective norms (SN). Subjective norms refer to the person's perceptions of the normative pressures from others to engage or not engage in the behavior.

The model has prompted an impressive amount of research, much of it focusing on behaviors of practical significance such as having an abortion, breast feeding, smoking marijuana, entering treatment for alcoholism, and voting choice (Ajzen, 1988). Ajzen (1988) presented the results of 10 studies that tested the model's ability to predict such behaviors. In each study, both attitudes toward the behavior and subjective norms were significant predictors of behavioral intentions.

The theory does not, however, specify what could be done to *change* the behaviors under study. It implies that behavior might be changed if attitudes and norms were changed, but it does not identify variables that could be manipulated in the interest of changing attitudes or norms.¹

Self-efficacy theory. Self-efficacy theory states that behavior change is a function of changes in self-efficacy expectations. Differences in the effectiveness of different therapeutic interventions are hypothesized to be caused by differences in the degree to which they alter self-efficacy expectations. In a series of studies on anxiety treatment, (a) ratings of self-efficacy predicted subsequent behavior, (b) anxiety treatment procedures that had a greater impact on anxiety problems also had a greater effect on self-efficacy, and (c) ratings of self-efficacy were correlated with self-report and physiological measures of arousal (Biglan, 1987).

The theory (Bandura, 1977) has probably had a greater influence on clinical research than any other theory in the past 15 years (Biglan, 1987). According to the Science Cita-

tion Index, the seminal description of the theory (Bandura, 1977) was cited more than 2000 times from 1985 through 1990. In addition to anxiety treatment, it has been applied to smoking cessation (Conditte & Lichtenstein, 1981; Baer, Holt, & Lichtenstein, 1986), smoking prevention (McAlister, Perry, & Maccoby, 1979), depression (Zeiss, Lewinsohn, & Munoz, 1979), social skills (Kazdin, 1979), and arithmetic skills (Bandura & Schunk, 1981).

There is little question that the theory has been successful in predicting the effects of diverse clinical procedures from changes in rated self-efficacy (Biglan, 1987). The theory is not well organized, however, to identify new or more effective methods of changing the target behaviors it seeks to predict. The theory correctly states that behavior change strategies that involve getting people to engage in the target behavior will be more effective than interventions that are less "enactive." This fact was generally understood prior to the statement of the theory, however, and enactiveness is not a major concept in the theory. The major focus has been on the effects of previously identified treatments on self-efficacy expectations and the correlation of self-efficacy with subsequent behavior. The focus has not been on how new interventions might be developed and evaluated, but on how clinical change might be explained in terms of cognitive mediation.

Cognitive science. The proliferation of information processing models of human behavior over the last 25 years can hardly be denied. The "cognitive revolution" has integrated such areas as artificial intelligence, computer design, neuroscience, and human experimental psychology. The common thread of these areas is concern with how organisms can detect and process information. In the case of psychology, understanding human performance is viewed as a matter of constructing models that describe how information processing mechanisms combine to produce behavior (Ericson & Simon, 1984).

From this vantage point, a person interested in socially significant human performance would study how the individual analyzed the information relevant to a particular action. Various measures of these processes could be taken and models would be constructed describing how the processes combine. Overt performance would be viewed as an output of the system, caused by the parts, relations, and forces described by the theoretical model. To the degree that the model predicted overt performance from measures of cognitive processing (e.g., reaction times, brain activity, problem-solving strategies, rule use, expectancies), it would be said to be valid.

This approach also does not focus on the variables that influence overt performance. Rather, the central focus of most of this research and theorizing has been on the development of models of the cognitive processes that mediate relationships between stimulus inputs and overt performance. The ways in which the environment might influence or moderate processes such as remembering has been ne-

¹ The theory does imply that one could change an attitude toward a specific behavior by modifying the person's perception of the outcomes associated with the behavior and/or their evaluation of those outcomes. However, it does not specify environmental events that would influence these perceptions.

glected, while theoretical models of mediating processes have proliferated (Watkins, 1990).

The Heritage of the Mechanist Paradigm

The generic question for these three areas might be stated, "How does the human machine work?" Each is concerned with constructing and validating a model of the relationships among aspects of human beings (such as attitudes, expectancies, or memory strategies) that accurately predicts their behavior. A premium is placed on showing that the theoretical model fits diverse samples of data. For example, the theory of reasoned action models the relationships among attitudes, subjective norms, and behavioral intentions for behaviors ranging from voting to contraception. Self-efficacy theory attempts to predict behavior from self-efficacy expectations for behaviors ranging from phobic avoidance to exercise.

This approach is in keeping with the paradigm of mechanism as described by the philosopher Stephen Pepper (1942). According to him, a paradigm or world hypothesis is a systematic framework for understanding and analyzing phenomena. The two key facets of a paradigm are its *root metaphor* and its *criterion* for the truth or validity of analyses. Mechanism has as its root metaphor the machine. The machine might be as simple as a lever or as complex as a computer. In the common sense world, machines are made up of (a) a set of parts, that (b) are combined in a given way so as to (c) transmit forces in a predictable fashion.

In mechanism, theories are considered true or valid if they correspond to the world. Their correspondence is measured by the extent to which their predictions are verified. However, correspondence is unimpressive if the very same facts serve both as the source of the description and as the means of its verification (Hayes, Hayes, & Reese, 1988). Thus, there is a premium on deriving a theory from a small sample of data and then showing that it corresponds to diverse samples. For example, cognitive theorists have argued that the more derived and indirect theoretical predictions are, the better test they provide for the theory (Ericson & Simon, 1984). Hypothetico-deductive research methodology exemplifies this logic.² Working within this paradigm, scientists naturally gravitate toward the predictive verifica-

tion of theoretical models of the organismic events or hypothetical constructs associated with behavior. Questioning how psychological events might be changed in light of the model is merely an applied issue; it might be of practical value but it is not and cannot be of basic theoretical importance.

There is a strong tradition of mechanism in psychology. For example, Hull was explicitly mechanistic (Smith, 1986). We are not, however, saying that current investigators have consciously adopted the mechanist paradigm as Pepper (1942) described it. Rather, we would argue that they have simply continued a long-standing tradition of developing and validating models of hypothetical constructs that predict behavior (e.g., Cronbach & Meehl, 1955; Dulaney, 1968; MacCorquodale & Meehl, 1948). Nothing more is required within mechanism, and when considered on its own terms there is nothing to criticize about the approach.

However, these research practices do not lead naturally and easily to the ability to predict *and influence* behavior. Even the most accurate and basic description of intraorganism relations do not indicate how the environment affects any of the organismic events. As a result, these models are not well suited to the needs of those who wish to take practical action such as preventing or changing problem behaviors. Only theories that elucidate the context for psychological events can directly guide practical action because only the context of these events, not the events themselves, can be *directly* manipulated (Hayes & Brownstein, 1986).

Summary. A common practice in the behavioral sciences is the creation and testing—across diverse samples of subjects—of models of how human behavior is influenced by cognitive and attitudinal processes. Such models can include concepts involving the environment, but the central focus is on validating the hypothesized relationships between cognitive and attitudinal concepts and behavior (or behavioral intention). Such an approach is in the tradition of mechanist theorizing that encourages analyzing phenomena in terms of relationships among their parts and verifying theories in terms of their predictive ability. Although this paradigm has generated a wealth of replicable findings about intraorganism relationships, the models it has achieved do not necessarily lead to knowledge that can be used in the interest of preventing or ameliorating behavioral problems.

A Functional Contextualist Framework for the Behavioral Sciences

Behavioral scientists might contribute more to the prevention and amelioration of important behavioral problems if they adopted a contextualist philosophy that had, as its central goal, predicting and influencing behavior. Such a framework would seek *the development of an organized system of empirically based concepts and rules that allow behavioral phenomena to be predicted and influenced with precision,*

² It has sometimes been suggested that the influence of mechanism in the behavioral sciences has stemmed from its success in the physical sciences (Sarbin, 1977) where practical action has resulted quite naturally from theoretical development. There may, however, be a difference between phenomena in the behavioral and in the physical sciences such that mechanism is more likely to yield principles that guide practical action in the latter field. Mechanism studies the relations between parts of the machine. In the physical sciences, knowing the relation between any two parts usually gives direct information about how one could be used to affect the other because all of the parts are typically directly manipulable. However, in the behavioral sciences the organismic events included in a model are not directly manipulable. They can only be changed or manipulated by manipulating some environmental event that affects the organismic event. Mechanistic theories that focus on behavior-behavior relationships thus do not provide direct information about manipulable variables.

scope, and depth. *Precision* means that a limited number of concepts are relevant to a given phenomenon given a specific analytic goal. *Scope* means that a wide range of phenomena can be analyzed with a limited number of concepts. *Depth* means that analytic concepts relevant to one level of analysis (e.g., the psychological level) cohere with others at other levels (e.g., the anthropological level).

Such a system would also enable the *description* and *interpretation* of behavioral phenomena. Behavioral or psychological phenomena can be described in terms of the same system of concepts that proves successful in predicting and influencing them. Phenomena that we may currently be incapable of predicting or influencing can be interpreted in terms of the system of concepts that has proved useful in predicting and influencing related or similar phenomena (Skinner, 1974). Such interpretations may be the first step in developing empirical research on the phenomenon.

This framework is one version of pragmatic or contextualist philosophy (Pepper, 1942). Various contextualist approaches have in common the analysis of phenomena in terms of a root metaphor of the act in context and a criterion for the truth or validity of analysis in terms of their contribution to the achievement of a goal (Hayes et al., 1988; Hayes, Hayes, Sarbin, & Reese, 1993; McGuire, 1986; Sarbin, 1977, 1986, 1993; Morris, 1988; 1993; Reese, 1993). The framework might be called *functional contextualism*, as distinct from more descriptive forms (Biglan, 1993; Hayes, 1993) because of its dual focus on the functional context for behavioral events and the functional utility of analysis itself.

Prediction and Influence as a Scientific Goal

The truth criterion of contextualist paradigms is "successful working." An analysis is said to be "true" or "valid" to the extent that it leads to the achievement of an analytic goal. Analysts can adopt various goals. Hence, there can be a variety of contextualisms. The version of contextualism we are advocating has as its goal the prediction and influence of behavior.

Prediction and influence is one goal, not two. "Prediction" is used in a restricted sense that is tied to control. An analysis would be said to achieve prediction if it met two criteria: (a) it identified variables that permitted the prediction of the event in question and (b) the identified variables would, if they could be manipulated, affect the probability of the event. Thus, the approach seeks to identify predictor variables that could ultimately lead to *both* prediction and influence.

It should be noted—indeed underscored—that the choice of a goal in contextualism is arbitrary. We make no claim that the goal of predicting and influencing behavior is "the right goal" or the only goal one might choose.

The choice of this goal does have certain consequences for the types of research that are likely to be done, however. For the reasons listed earlier, it would lead to less emphasis

on studies of the correlations *among* organismic events or constructs, and indeed on correlational research in general.

This is not to say that correlational research would be eliminated, however. Knowledge of how one organismic event is related to another provides clues as to the environmental events that could be used to affect the probability of one of those events. For example, knowledge about the relationship of negative cognitions to depressive behavior led to the development of treatments for depression that focus on ways of changing cognitions (Beck, Rush, Shaw, & Emery, 1979). (This is typically described as evidence that changing cognitions changes other depressive behavior, but to change cognitions, a therapist does and says things in the *environment* of the client.)

Moreover, studies that correlate environmental events with behavior provide clues as to the variables that predict and influence behavior. For example, studies of the relationships between parenting practices and children's antisocial behavior (e.g., Patterson, Reid, & Dishion, 1992) have provided important information about the social context that shapes and maintains antisocial behavior and have contributed to the development of effective parenting skills-training programs (Kazdin, 1987). Indeed, causal modeling in this area shows that contextual variables account for substantial variance above and beyond the contributions of organismic variables (e.g., Henggeler, 1991). Similarly, studies of the conditional probability of one person's behavior given another person's behavior also provide clues as to the social contingencies affecting behavior (e.g., Biglan, 1991).

If one is interested in identifying variables that both predict and influence behavior, the most effective strategy is experimental: manipulate events in the context of the behavior and examine their effects on its occurrence. This can be done within or between subjects, but the crucial issue is the nature of the variable concerned, not the design used. For example, in an "experimental" design one might split subjects on the level of their locus of control and assign them to two different treatment conditions. Although it has become common to talk about the "effect of locus of control" on behavior in such a study, strictly speaking, such a design only indicates the *correlation* between locus of control and other variables.

The Root Metaphor of the Act-in-Context

The root metaphor of contextualism is the act-in-context. How does one think of events to be analyzed? As acts that participate in and with their context. To get the sense of this one might use only verbs such as making things, solving problems, and enjoying art (Pepper, 1942). Such acts consist of complex activities that are intricately connected to their environment.

A given act can be analyzed in multiple ways. Analysis is therefore seen as a process of creation, not discovery. Theories are thought of not as unimpeachable descriptions of the way the world is, but as verbal descriptions of an act-in-

context that may assist the analyst in reaching some goal. It is the achievement of the particular goal that validates the analysis. Concepts resulting from contextualist analyses specify relations between behavior and the environment.

Contextualism's adoption of the root metaphor of the act-in-context does not preclude the possibility of generalizable laws, but it starts with the unique case and recognizes that a given analysis may or may not be applicable to other cases. One reason for this is the unique character of the individual act-in-context. Any act, when considered in its context, is unique. Even a highly repetitive act such as brushing one's teeth is never the same twice.

This view might seem to threaten the achievement of a science of generalizable laws and indeed, contextualism does not assume that generalizability is an inherent characteristic of the world (Pepper, 1942). However, contextualism is open to finding that a given type of analysis is applicable to more than one case. Each case may be unique, but it may be possible to analyze different cases using the same terms and verbal descriptions—not because the cases are the same, but because the same analysis works for them.

Examples of This Strategy

Examples of the success of this strategy are not hard to find. Perhaps Skinner's most important contribution was the development of general principles regarding the effects of reinforcers and discriminative stimuli. The principles were derived from experimental analyses of the behavior of individual organisms. The strategy of building generalizations from analyses of individual cases has contributed to progress in clinical psychology and education. In clinical work, treatments of choice have been identified for diverse problems such as anxiety (Barlow, 1988), depression (Gotlib & Colby, 1987), childhood aggressive behavior (Kazdin, 1987; Patterson & Chamberlain, 1988) and social isolation (Hops, 1983). In education, methods of curriculum construction have been developed that result in demonstrably more effective methods of instruction across diverse academic topics (Becker, 1986). Evidence from these areas suggests that prediction and influence with some scope and precision is achievable.

Behavior analysis is not the only example of contextualist research focused on identifying variables that predict and influence behavior. Bronfenbrenner (1979) developed a comprehensive theory of the contextual variables influencing child development. Family systems theory focuses on the ways in which one family member affects the behavior of another and on how relationships among two or more family members affect the identified patient. Henggeler and colleagues (e.g., Henggeler & Borduin, 1990) have derived a multisystemic approach to the treatment of delinquent adolescents largely from these approaches. The significant treatment outcomes that they (e.g., Henggeler, Cunningham, Pickrel, & Schoenwald, in press) have demonstrated and the beneficial effects of family therapy indicated

by meta-analyses (Henggeler, Borduin, & Mann, 1993) testify to contribution of this contextual orientation.

Environmental and community psychology also focus on the influence of environmental variables on human behavior. The effort is typically to prevent difficulties before they arise. For example, Felner, Ginter, and Primavera (1982) have shown that academic and social behavior problems associated with the transition to high school can be prevented to some extent by increasing social support and reducing the complexity of the school setting. Geller has demonstrated the value of server intervention training to reduce customer alcohol consumption (Geller, Russ, & Delphos, 1987) and has described a number of techniques for increasing automobile seat belt use (Geller, 1988).

In areas such as smoking control (e.g., U.S. Department of Health and Human Services, 1994), cardiovascular risk reduction (Farquhar et al., 1985), and child passenger safety (Seekins et al., 1988) researchers are identifying school, community, and state level interventions that might affect health and well-being.

An Integrated Approach to Basic and Applied Research

This framework provides a set of analytic assumptions that makes productive relations between applied and basic work more likely. In functional contextualism influencing behavior is not merely an applied issue. It is fundamental to the validity of all research. Research that is directly focused on the achievement of a practical outcome can contribute basic principles to such a contextualistic science. For example, the study of family interactions has identified patterns of aversive interaction that are germane to the development of general principles of avoidance conditioning (Biglan, Lewin, & Hops, 1990).

Yet functional contextualist research need not be concerned with socially significant problems to have applied value. Many of the principles that have proved useful thus far in applied areas have been derived from work with the behavior of nonhuman species that is quite unlike the problems with which humans are most concerned. Similarly, basic research on human behavior that is designed to identify influences on behavior often has direct applied implications (Hayes & Hayes, 1992).

Such an integrated or complementary relationship between basic and applied research does not flow as readily from research focused on the predictive verification of models of intraorganismic relationships. Many of the basic principles that are achieved by that type of research do not have direct implications for applied problems. Even the most accurate models do not point directly to variables that can be exploited when one is interested in preventing or ameliorating a behavior of practical importance. At the same time, research that is designed to prevent or ameliorate behavior problems is unlikely to contribute to general principles about intraorganismic relationships. Information about changing behavior does not necessarily provide information

about the relationships among organismic events or constructs.

The Relationship of This Framework to Behavior Analysis

Perhaps the most significant example of a functional contextualist paradigm is behavior analysis. The cardinal feature of behavior analysis has been the analysis of individual cases to "discover all the variables of which probability of response is a function." (Skinner, 1969, p. 78).³ Adopting a contextualistic stance, however, liberalizes methodological and conceptual practices in a way that has not been characteristic of behavior analysis.

Methodological practices. For the most part, behavior analysts have focused on experimental analyses of the variables influencing the probability of the behavior of individuals. Yet other methods are germane to the identification of variables that predict and influence behavior. Randomized control trials (or group design experiments) are useful for assessing the generalizability of relationships between contextual variables and behavior. As noted above, studies of the correlations between contextual variables and behavior, although falling short of demonstrating the influence of the variable on behavior, can provide important clues as to what variables influence behavior. Even correlational studies of intraorganism relationships could be useful because knowing that one organismic event is correlated with another suggests that contextual variables that affect the first organismic event might bring about changes in the second. Thus, a more diverse set of methods are encouraged, but always with the overriding concern that they contribute to the goal of prediction and influence of behavior.

Conceptual practices. In principle, behavior analysis involves the study of **any** variables that affect the probability of behavior (Biglan & Kass, 1977; Skinner, 1969). In practice, however, behavior analysts have concentrated on examining the effects of the contingencies of reinforcement and similar processes.

If a science of the prediction and influence of behavior is going to be fully developed it will need to encourage a wider range of approaches to the environmental influences on behavior. From the contextual viewpoint taken here, the proof of a theory is in its contribution to prediction and influence. Any way of talking about behavior and its context that contributes to this goal is legitimate. Examples of other theoretical perspectives that focus on the environmental influences on human behavior include social interactionist perspectives (e.g., Cairns, 1979), family systems theory

(e.g., Bronfenbrenner, 1979; Henggeler & Borduin, 1990), and cultural materialism (Harris, 1979).

Some might argue that intraorganismic model building of the sort that we have criticized is among the theoretical approaches that has generated valuable preventive and ameliorative programs. However, our argument is that such theorizing is an inefficient means for doing so. Indeed it often distracts from a focus on developing better interventions. For example, self-efficacy theory had the effect of shifting attention from treatment outcome research to studies of the mediating role of self-efficacy expectations in treatment programs that had been developed previously (Biglan, 1987).

The Need for a Science of Larger Social Units

If the behavioral sciences are going to improve their contribution to the prevention and amelioration of problematic human behavior, a contextualist analysis of larger social units will also be needed (Biglan, Glasgow, & Singer, 1990; Biglan, 1995). It is unlikely that even the most effective analyses of the behavior of individuals can, by themselves, lead to reductions in the prevalence of behaviors such as cigarette smoking, sexual risk taking, or antisocial behavior. Many of the factors that influence the prevalence of behaviors involve the practices of organizations.

Research on reducing tobacco use provides the best example of the trend toward research on larger social units. Tobacco control research is increasingly focused on how the practices of larger social systems can be modified to reduce the prevalence of tobacco use. The practices being examined include the promotion and marketing of cigarettes, state and federal taxation, laws restricting smoking at worksites and public facilities, and the use of mass media to discourage tobacco use (e.g., U.S. Department of Health and Human Services, 1994). Efforts to reduce illegal sales of tobacco to minors have shown that the proportion of stores that sell tobacco illegally can be significantly reduced through increased law enforcement (Jason, Ji, Anes, & Birkhead, 1991; Feighery, Altman, & Shafer, 1991) and by mobilizing reinforcement for clerks who refuse to sell (Biglan et al., in press).

Being explicit about a focus on the prediction and influence of the practices of larger social units is important because the branches of the behavioral sciences that have traditionally focused on larger social systems have been loath to create an interventive science. There is a strong tradition opposing efforts by anthropologists to influence cultural practices (Geertz, 1973). In the context of Western European and American imperialism, anthropologists have developed norms that discourage the use of their science to suppress and exploit other cultures. Sociologists have been disinclined to articulate theories that might threaten the interests of powerful groups in society (Harris, 1991).

Cultural materialism (Harris, 1979) provides a useful starting point for the development of a science of larger social units that identifies variables that predict and influence the practices of larger social units. The approach is

³ Behavior analysts have typically talked about this in terms of the prediction and *control* (e.g., Skinner, 1953). We use the term "influence" rather than control for two reasons. The first is the pejorative connotations of the term "control." The term has often been taken to mean that behavior analysts have a desire to command or dominate people—to usurp what was traditionally conceived of as the control that the people had over their behavior. Second, the relationships between behavior and context are probabilistic and the term "influence" connotes this better than does the term "control."

contextualistic in the sense that it seeks to account for the practices of groups in terms of their context. For example, Harris (1974) accounts for practices as diverse as the veneration of cows and war-making in terms of material conditions such as food availability and population size.

The approach is consistent with functional contextualist analyses of the behavior of individuals. For example, the practices of groups are seen as selected because of their consequences for members of the group. Consistency between levels—what we would term “depth”—is both practically and intellectually important. For example, those concerned with a science of the practices of groups could make use of the results of a science of the behavior of individuals.

Ensuring Ethical Practices

As we learn more about environmental influences on human behavior, the possibility grows that this information will be used to exploit people (Skinner, 1971). This danger exists whether we are explicit about prediction and influence or adopt more muted models of behavioral influence in which behavior change is said to result from changes in “expectancies,” “attitudes,” “decisions,” etc. If a preventive or ameliorative program affects a behavior, it can be misused—whatever its theoretical packaging. It thus behooves all behavioral scientists to ensure that scientific research goes forward in the context of ethical practices that protect the rights, autonomy, and well-being of human beings.

Efforts to predict and influence behavior can be carried forward in the context of the full informed consent of those whose behavior is of interest. Indeed, being explicit that variables will be manipulated to affect the probability of specific overt behaviors, cognitions, or emotions is a fundamental step in assuring informed consent, because informed consent requires accurate information about the events to which the subject will be exposed and the likely effects of those events.

Beyond informed consent there is the issue of who chooses the specific goals to be pursued in research. From a contextualist standpoint, the behavior of a researcher in choosing goals is, itself, an act in context. Salient features of that context include funding agencies and other scientists whose writings and reviewing indicate what is “important.” However, especially when practical outcomes are at issue, those who might be affected by the research can play a direct role in determining the goals to be pursued. This point has been extensively discussed among community psychologists (e.g., Fawcett, 1990; Kingry–Westergaard & Kelly, 1990; Rap-

aport, 1990). Indeed, standards by which target populations play a role in the selection of goals are an important counterweight to the influences of other groups in society.

The Context for Research Practices

A thoroughgoing contextualism cannot ignore the context for research practices. In this article, we have tried to provide verbal stimulation that might influence research practices. However, advocating a set of practices is a rather weak influence. If the prevalence of research practices that focus on the prediction and influence of behavior is going to be increased, research practices should themselves be analyzed within this framework.

What are the variables that affect our research practices? Obvious candidates include funding priorities and peer reviews of grant proposals and publications. Research on the influence of such variables on research practices would be valuable.

A practical suggestion for increasing attention to prediction and influence would be to adopt a standard for evaluating research in these terms. Research practices have been influenced by the development of standards for (a) assessing the statistical power of research (e.g., Cohen, 1990); (b) assessing the reliability of measures; (c) examining the clinical significance of therapeutic change (Jacobson, Follette, & Revenstorf, 1984); and (d) reporting the effect sizes for statistical relationships (Cohen, 1990). Why shouldn't reviewers of journal articles and grant proposals begin to ask the question, “What can this research tell us about the prediction and influence of behavior?”

CONCLUSION

It is not a given that the behavioral sciences will contribute to the prevention and amelioration of society's problems, and not all kinds of knowledge are equally useful toward this end. The type of paradigm that we adopt may foster or hinder our contribution. A paradigm that focuses on discovering the contextual variables that predict and influence behavioral or organismic events seems particularly likely to develop knowledge of practical value in addressing social problems. It is not that this is the “one true paradigm” for the behavioral sciences. One can explicitly choose among a number of alternatives. But research practices have consequences. For those who wish to make a pragmatic impact on society, a contextualist framework focused on the prediction and influence of behavior appears to be particularly useful.

REFERENCES

- Ajzen, I. (1988). *Attitudes, Behavior and Personality*. Chicago, IL: Dorsey Press.
- Ajzen I., & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Baer, J. S., Holt, C. S., & Lichtenstein, E. (1986). Self-efficacy and smoking re-examined: Construct validity and clinical utility. *Journal of Consulting and Clinical Psychology*, *54*, 846–852.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*, 191–215.

- Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology*, *41*, 586–598.
- Barlow, D. H. (1988). *Anxiety and its disorders*. New York: Guilford Press.
- Beck, A. T., Rush, A. J., Shaw, B.G., & Emery, G. (1979) *Cognitive therapy for depression*. New York: Guilford Press.
- Becker, W. C. (1986). *Applied psychology for teachers: A behavioral cognitive approach*, Chicago: Science Research Associates.
- Biglan, A. (1987). A behavior-analytic critique of Bandura's self-efficacy theory. *The Behavior Analyst*, *10*, 1–15.
- Biglan, A. (1991). Distressed behavior and its context. *Behavior Analyst*, *14*, 157–169.
- Biglan, A. (1993). Functional contextualism and the science of large social units. In S. C. Hayes, L. J. Hayes, T. R. Sarbin, & H. W. Reese (Eds.), *The varieties of scientific contextualism*. Reno, NV: Context Press.
- Biglan, A. (1995). *Changing Cultural Practices: A Contextualist Framework for Intervention Research*. Reno, NV: Context Press.
- Biglan, A., Glasgow, R. E., & Singer, G. (1990). The need for a science of larger social units: A contextual approach. *Behavior Therapy*, *21*, 195–215.
- Biglan, A., Henderson, J., Humphreys, D., Yasui, M., Whisman, R., Black, C., & James, L. (in press). Mobilizing positive reinforcement to reduce youth access to tobacco. *Tobacco Control*.
- Biglan, A., & Kass, D. J. (1977). The empirical nature of behavior therapies. *Behaviorism*, *5*, 1–15.
- Biglan, A., Lewin, L., & Hops, H. (1990). A contextual approach to the problem of aversive practices in families. In G. Patterson (Ed.), *Depression and aggression: Two facets of family interactions*. New York: Erlbaum.
- Breakey, W. R., & Fischer, P. J. (1990). Homelessness: The extent of the problem. *Journal of Social Issues*, *46*, 31–47.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Cairns, R. B. (Ed.), (1979). *The analysis of social interactions: Methods, Issues, and Illustrations*. Hillsdale, NJ: Erlbaum.
- Centers for Disease Control (June, 1991). *HIV/AIDS Surveillance*, 1–18.
- Cohen, J. (1990). Things I have learned (so far). *American Psychologist*, *45*(12), 1304–1312.
- Conditte, M. M., & Lichtenstein, E. (1981). Self-efficacy and relapse in smoking cessation programs. *Journal of Consulting and Clinical Psychology*, *49*, 648–658.
- Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. In H. Feigl & M. Scriven (Eds.), *Minnesota studies in the philosophy of science: The foundations of science and concepts of Psychology and Psychoanalysis* (Vol. 1). Minneapolis: University of Minnesota Press.
- Cooper, J., & Croyle, R. T. (1984). Attitudes and attitude change. *Annual Review of Psychology*, *35*, 395–426.
- Dulany, D. E. (1968). Awareness, rules, and propositional control: A confrontation with S-R behavior theory. In D. Horton & T. Dixon (Eds.), *Verbal behavior and general behavior theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Elvin, J. (1991). U.S. now leads world in rate of incarceration. *The National Prison Project Journal*, *6*, 1–2.
- Ericson, K. A., & Simon, H. A. (1984). *Protocol analysis: Verbal reports as data*. Cambridge, MA: MIT Press.
- Farquhar, J. W., Fortmann, S. P., Maccoby, N., Haskell, W. L., Williams, P., Flora, J. A., Taylor, C. B., Brown, B. S., Solomon, D. S., & Hulley, S. B. (1985). The Stanford five-city project: Design and methods. *American Journal of Epidemiology*, *122*, 323–334.
- Fawcett, S. B. (1990). Some emerging standards for community research and action: Aid from a behavioral perspective. In P. Tolan, C. Keys, F. Chertok, & L. Jason (Eds.), *Researching community psychology: Issues of theory and methods*. Washington, DC: American Psychological Association.
- Feighery, E., Altman, D. G., Shaffer, G. (1991). The effects of combining education and enforcement to reduce tobacco sales to minors: A study of four northern California communities. *Journal of the American Medical Association*, *266*, 3168–3171.
- Felner, R. D., Ginter, M., & Primavera, J. (1982). Primary prevention during school transitions: Social support and environmental structure. *American Journal of Community Psychology*, *10*, 277–290.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior, An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Fuchs, V. R., & Reklis, D. M. (1992). America's children: Economic perspectives and policy options. *Science*, *255*, 41–46.
- Geertz, C. (1973). *The Interpretation of cultures* New York: Basic Books.
- Geller, E. S. (1988). A behavioral science approach to transportation safety. *Bulletin of the New York Academy of Medicine*, *64*, 632–661.
- Geller, E. S., Russ, N. W., & Delphos, W. A. (1987). Does server intervention training make a difference? An empirical field evaluation. *Alcohol World, Summer*, 64–69.
- Gotlib, I. H., & Colby, C. A. (1987). *Treatment of depression: An interpersonal systems approach* New York: Pergamon Press.
- Harris, M. (1974). *Cows, pigs, wars, and witches: The riddles of cultures*. New York: Random House.
- Harris, M. (1979). *Cultural materialism: The struggle for a science of culture*. New York: Random House.
- Harris, M. (1991). Anthropology: Ships that crash in the night. In R. Jessor (Ed.), *Perspectives on Behavioral Science*, Boulder, CO: Westview Press.
- Hayes, S. C. (1993). Goals and the varieties of scientific contextualism. In S. C. Hayes, L. J. Hayes, T. R. Sarbin, & H. W. Reese (Eds.), *The varieties of scientific contextualism*. Reno, NV: Context Press.
- Hayes, S. C., & Brownstein, A. J. (1986). Mentalism, behavior-behavior relations and a behavior analytic view of the purposes of science. *The Behavior Analyst*, *9*, 175–190.
- Hayes, S. C., & Hayes, L. J. (in press). Language and the evolution of behavior analysis. *American Psychologist*.
- Hayes, S. C., Hayes, L. J., & Reese, H. W. (1988). Finding the philosophical core: A review of Stephen C. Pepper's *World Hypotheses*. *Journal of the Experimental Analysis of Behavior*, *50*, 97–111.
- Hayes, S. C., Hayes, L. J., Sarbin, T. R., & Reese, H. W. (Eds.). (1993). *The varieties of scientific contextualism*. In S. C. Hayes,

- L. J. Hayes, T. R. Sarbin, & H. W. Reese (Eds.), *The varieties of scientific contextualism*. Reno, NV: Context Press.
- Henggeler, S. W. (1991). Multidimensional causal models of delinquent behavior and their implications for treatment. In R. Cohen & A. W. Siegel (Eds.), *Context and development* (pp. 211–231). Hillsdale, NJ: Erlbaum.
- Henggeler, S. W., & Borduin, C. M. (1990). *Family therapy and beyond: A multisystemic approach to treating the behavior problems of children and adolescents*. Pacific Grove, CA: Brooks/Cole.
- Henggeler, S. W., & Borduin, C. M. & Mann, B. J. (1993). Advances in family therapy. Empirical foundations. In T. H. Ollendick & R. J. Prinz (Eds.), *Advances in Clinical Child Psychology*, 15, 207–241.
- Henggeler, S. W., Cunningham, P. B., Pickrel, S. G., & Schoenwald, S. K. (in press). Multisystemic therapy for serious juvenile offenders and their families. In R. R. Ross (Ed.), *Going Straight: Effective delinquency prevention and offender rehabilitation*. Ottawa, Ontario: Center for Cognitive Development.
- Hops, H. (1983). Children's social competence and skill: current research practices and future directions. *Behavior Therapy*, 14, 2–18.
- Interpol (1988). International Crime Statistics. Report issued by the International Criminal Police Organization.
- Jacobson, N. S., Follette, W. C., & Revenstorf, D. (1984). Psychotherapy outcome research: Methods for reporting variability and evaluating clinical significance. *Behavior Therapy*, 15, 336–352.
- Jason, L. A., Ji, P. Y., Anes, M. D., Birkhead, S. H. (1991). Active enforcement of cigarette control laws in the prevention of cigarette sales to minors. *Journal of the American Medical Association*, 226, 3159–3161.
- Kalish, C. B. (1988). International Crime Rates. *Bureau of justice statistics special report*. Washington, DC: Department of Justice.
- Kazdin, A. E. (1979). Sociopsychological factors in psychopathology. In A. S. Bellack & M. Hersen (Eds.), *Research and practice in social skills training* (pp. 41–74) New York: Plenum Press.
- Kazdin, A. E. (1987). Treatment of antisocial behavior in children: Current status and future directions. *Psychological Bulletin*, 102, 187–203.
- Kingry—Westergaard, C. & Kelly, J. G. (1990). A contextualist epistemology for ecological research. In P. Tolan, C. Keys, F. Chertok, & L. Jason (Eds.), *Researching community psychology: Issues of theory and methods*. Washington, DC: American Psychological Association.
- MacCorquodale, K., & Meehl, P. E. (1948). On a distinction between hypothetical construct and intervening variables. *Psychological Bulletin*, 55, 95–107.
- Marshall, R. (1991). *The state of families, 3: Losing direction*. Milwaukee: Family Service America.
- McAlister, A., Perry, C., & Maccoby, N. (1979). Adolescent smoking: Onset and prevention. *Pediatrics*, 63, 650–658.
- McGuire, W. J. (1986). A perspectivist looks at contextualism and the future of behavioral science. In R. L. Rosnow & M. Georgoudi (Eds.), *Contextualism and understanding in behavioral science* (pp. 271–302). New York: Praeger.
- Morris, E. K. (1988). Contextualism: The world view of behavior analysis. *Journal of Experimental Child Psychology*, 46, 289–323.
- Morris, E. K. (1993). Is behavior analysis contextualistic? In S. C. Hayes, L. J. Hayes, T. R. Sarbin, & H. W. Reese (Eds.), *The varieties of scientific contextualism*. Reno, NV: Context Press.
- National Research Council (1987). *Risking the future*. Washington, DC: National Academy Press.
- Patterson, G. R., & Chamberlain, P. (1988). Treatment process: A problem at three levels. In Wynne, L. C. (Ed.), *The state of the art in family therapy research: Controversies and recommendations* (pp. 189–223). New York: Family Process Press.
- Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). *Antisocial boys: A social interactional approach* (Vol. 4). Eugene, OR: Castalia.
- Pepper, S. C. (1942). *World hypotheses: A study in evidence*. Berkeley: University of California Press.
- Population Reference Bureau (1989). *Teen Mothers: Global Patterns* (Research Report Washington, DC: Author).
- Rappaport, J. (1990). Research methods and the empowerment social agenda. In P. Tolan, C. Keys, F. Chertok, & L. Jason (Eds.), *Researching community psychology: Issues of theory and methods*. Washington, DC: American Psychological Association.
- Reese, H. W. (1993). Contextualism and Dialectical Materialism. In S. C. Hayes, L. J. Hayes, T. R. Sarbin, & H. W. Reese (Eds.), *The varieties of scientific contextualism*. Reno, NV: Context Press.
- Reich, R. B. (1990). The real economy. *The Atlantic Monthly*, 35–52.
- Rodgers, H. R. (1982). *The cost of human neglect: America's welfare failure*. New York: M. E. Sharpe.
- Sarbin, T. R. (1977). Contextualism: A world view for modern psychology. *Nebraska symposium on motivation*. 1976. Lincoln, NE: University of Nebraska Press.
- Sarbin, T. R. (1986). The narrative as a root metaphor for psychology. In T. R. Sarbin (Ed.), *Narrative psychology: The storied nature of human conduct* (pp. 3–22). New York: Praeger.
- Sarbin, T. R. (1993). The narrative as a root metaphor for contextualism. In S. C. Hayes, L. J. Hayes, T. R. Sarbin, & H. W. Reese (Eds.), *The varieties of scientific contextualism*. Reno, NV: Context Press.
- Schaffer D., & Fisher, D. (1981). The epidemiology of suicide in children and young adolescents. *Journal of American Academy of Child Psychiatry*, 20, 545–565.
- Skinner, B. F. (1953). *Science and human behavior*. New York: MacMillan.
- Skinner, B. F. (1969). *The contingencies of reinforcement: A theoretical analysis*. New York: Appleton-Century-Crofts.
- Skinner, B. F. (1971). *Beyond Freedom and Dignity*. New York: Knopf.
- Skinner, B. F. (1974). *About behaviorism*. New York: Knopf.
- Smith, L. D. (1986). *Behaviorism and logical positivism: A reassessment of the alliance*. Stanford, CA: Stanford University Press.
- Watkins, M. J. (1990). Mediationism and the obfuscation of memory. *American Psychologist*, 45, 328–335.
- U.S. Department of Education (1989). International comparison shows U.S. inferior in math and science. *Education Reports* Washington, DC: Author.

U.S. Department of Health and Human Services. (1994). *Preventing tobacco use among young people: A report of the Surgeon General*. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health.

U.S. Department of Justice (1991). *Crime in the United States. Uniform Crime Reports*.

Zeiss, A., Lewinsohn, P., Munoz, R. F. (1979). Nonspecific improvement effects in depression using interpersonal skills training, pleasant activity schedules, or cognitive training. *Journal of Consulting and Clinical Psychology, 47*, 427-439.