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PREFACE

This book was born of frustration and hope: frustration that human society knows so much more than it currently makes use of in addressing critical social issues, and hope that science can make a meaningful difference in creating solutions for even the most apparently intractable of such issues. We passionately believe that the science of behavior is an essential element in "saving the world." While at a conference in New York City that dealt with bridging the gaps between research and practice, we began to conceptualize what we recognized as an almost impossibly ambitious task—a single volume that might demonstrate how this gap could be bridged with regard to the full range of major contemporary social problems. It quickly became clear that achieving this goal would require the combined expertise of many leaders in the behavior analytic community, and an outline of an edited volume quickly began to form.

Behavior analysts, beginning with B. F. Skinner, have already done considerable conceptual and empirical work that could contribute to this effort, and we hoped that many would push what is already known even further for this book. Our challenge was to organize and present the material in such a way that this volume might contribute to a process that could make a substantive difference. To do so, we presented the chapter authors with a difficult task of their own: to prepare chapters that would be scientifically adequate and still be accessible to the audiences that we hope to reach. These audiences include policymakers who might come to examine policy options through behavior and cultural analytic lenses, students who might be inspired to pursue the many critical threads that could only be introduced in the book, teachers who might adopt it for classes,

and our behavior analytic colleagues who have the expertise to assist in pushing these and similar analyses much further than has been done so far.

Our seemingly impossible task was inevitably scaled back during the process of preparing the book, as we determined that only a critical but limited set of issues could be included in one volume. Nevertheless, those issues that are included suggest the potential breadth of the approach. We are enormously in debt to the chapter authors, who rose to their challenging task to an extent we did not expect. These are frustrating times, both because of an apparent preference for oversimplified solutions to complex problems, and because the usefulness of science itself for helping is commonly questioned. Based on the analyses presented in this volume, however, our hope remains.

We could not have hoped for a better choice of publisher than APA Books, which offered an intensely professional editorial staff whose assistance strengthened the volume immeasurably. Particularly valuable were the contributions of development editor Beth Beisel and technical/production editor Sarah J. Trembath.

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INTRODUCTION

Moving into the 21st century, the major sociocultural problems we face are primarily behavioral in nature. Science and technology have provided at least partial solutions to issues of food production, reproductive rates, housing, prevention of disease and injury, communication and transportation, and many others. These solutions are applied unevenly, however, and many social problems rooted in human action or inaction remain. Violence (personal and political); child maltreatment; the breakdown of the educational system; the lack of mutual respect and caring across cultural, ethnic, and class lines; and other primarily behavioral issues could ultimately threaten the survival of the human race and other species.

Much more is known about how to address and manage these problems than is often recognized; although there is much yet to learn, humanity now knows, in an important sense, how to address the issues that confront it. Again, science (in this case, the science of behavior analysis) must lead the way. Behavioral scientists not only know a great deal about simple, basic behavioral processes, but are also coming to understand a good deal about how these processes interact on sociocultural levels, and how they apply specifically to important human issues. This volume is an attempt to capture the contemporary state of the art—which is promising despite the enormous challenges remaining. Ongoing research will certainly

lead to even greater specificity—and perhaps even new principles and models—over the next few years.

This is not to suggest that solutions will be either simple or inexpensive—only that they may be possible. The problems included in this volume were selected because of their critical impact on human life, and because of the availability of an author who has done extensive work in each area. Some important issues, such as homelessness, crime and corrections, and domestic and international violence, could not be included. The behavior analytic literature includes material in these and other crucial areas, and readers are encouraged to mine these resources further. The material included here is perhaps best viewed as a series of examples. We hope such work can be replicated in other areas and perhaps published in a subsequent volume.

This is not the first time behavior analysts have explored solutions to important social issues. Malagodi and Jackson (1989) placed a radical behaviorist frame on C. Wright Mills' classic distinction between personal troubles and public issues and explored linkages between behavior analysis and empirically rooted social science. In particular, Marvin Harris's work in cultural materialism (e.g., Harris, 1979, 1989) has been used and interpreted by a number of behavior analysts, including Sigrid Glenn (1988, 1991), Richard Malott (1988), and Malagodi & Jackson (1989). These authors suggested that Harris' materialistic anthropology, which emphasized selection at the level of *cultural infrastructure* (i.e., practices related to production and reproduction), has much to offer as behaviorists increasingly expand their view to include cultural analysis.

Lamal and his contributors (Lamal, 1991) explored the underlying principles and methods of sociocultural analysis from a behavior analytic perspective. The journal *Behavior and Social Issues* focuses specifically on related questions. The present volume concentrates a portion of this work in an effort to advance the current state of knowledge regarding practical applications of the general principles; it is, therefore, heavily applied rather than theoretical in focus.

STRATEGIC SCIENCE

The approach taken in this volume suggests that the science of behavior (often called behavior analysis and sometimes *behaviorology*) has much more to offer for reducing human problems than is widely recognized. Science is an organized and orderly set of practices for controlling, predicting, and making changes in the natural world while controlling for bias (to the extent possible) that may distort those processes. If human behavior is organic to the natural world, then scientific practices should help us to understand and influence that behavior. Our major social issues are rooted

in behavior; therefore, applying the principles of science to patterns of such behavior should offer valuable insights into how to ameliorate human misery and reduce social problems.

In other words, we believe that science can help. Although a tremendous amount of scientific investigation that is helpful in understanding and preventing social problems has been done, only a limited amount of this work has been *strategic* in the sense that we mean it in this volume. Strategic science attempts to go beyond low- or mid-level experimentation that may be useful in understanding or affecting discrete events. Instead, strategic science focuses on identifying approaches that can have meaningful effects at a community, organizational, or society-wide level. It is, for example, one thing to find ways to treat one violent youth, but quite another to identify approaches for reducing the incidence of violent acts perpetrated by youth in a neighborhood. Strategic science also emphasizes the use of general principles (e.g., increasing the use of positive reinforcement or reducing the level of coercion) that have been shown to be powerful across a wide range of human issues and that most likely can be applied to new and emerging problems as they arise as well.

Strategic science as it relates to human behavior emphasizes the need to understand the behavioral and cultural processes that shape and maintain practices that perpetuate problems as well as those required to resolve them. For example, drug-related crime accounts for more than 50% of the homicides in some urban areas (Reiss & Roth, 1993). Knowing this statistic, however, is not the same as being able to identify the related manipulable variables that may be accessible to intervention. Strategic science offers the tools needed to disentangle and disaggregate the elementary processes at work in such situations. It also provides the means to understand cultural phenomena at their own level of organization. Although rooted in the science of behavior, strategic science also encompasses the science of *cultural design* (Biglan, 1995; Matarini, 1996). Cultural design captures and organizes the active variables within the culture of a family, a community, an organization, or other such groups.

BEHAVIOR ANALYSIS

Behavior analysis is, at root, the science of "things done" (Lee, 1994). In other words, behavior analysis does not study bodily movements, but rather how the action of an organism "operates on," or changes, the environment. Behavior analysis also looks at how these changes affect the future rate, form, and strength of the behavior. The science of behavior focuses particularly on the consequences of human action and their effect on future actions. Although this may seem counterintuitive at first glance, behavior analysts believe that consequences are the central factor in un-

understanding how and why behavior is shaped or maintained; behavior is selected by consequences through a process analogous to natural selection (Skinner, 1981). Events and conditions that precede actions (*antecedents*) also affect behavior due to their association with behavior and consequences. The actions of interest include complex human (Skinner, 1953) and social (Biglan, 1995; Lamal, 1991; Skinner, 1948) behaviors. Both private (covert) and public (overt) behaviors can be analyzed using the tools of behavior analysis (Hayes, 1989; Skinner, 1953).

Although behavior analysis as a distinct stream of scientific activity began with basic laboratory research with rats and pigeons, the contemporary science includes several interconnected but discrete clusters of activity, including basic research with humans and other animals (the *experimental analysis of behavior*), applied research and intervention in socially important areas (*applied behavior analysis*), theoretical and historical explorations (the *conceptual analysis of behavior*), and *cultural analysis and design*. The latter seeks to understand and influence social systems. These streams have produced and will continue to produce substantial cross-fertilization, particularly from basic science to the more applied subdisciplines, and many chapters in this volume draw from each of them.

Behavior analysis as a science began inductively through examination of experimental data; theoretical principles, such as how the process of reinforcement operates, were extracted from those data. The approach is deeply empirical, avoids the use of unobservable constructs that cannot somehow be tested, and continuously searches for broadly applicable principles rather than collections of low-level findings. As a result, the science of behavior has what has been called an "austere elegance" that may be unmatched by any alternative system. This parsimonious and data-based science has particular power for understanding the complex events that constitute human culture because it permits us to extract the basic processes involved, regardless of the level of noise present.

No introduction to the science of behavior would be adequate without reference to Burrhus Frederick Skinner, who was among the towering intellectual figures of the 20th century and in the history of science. Not only did Skinner define the basic terms and experimental practices on which the science has been based, he also had an unwavering vision of its potential power for changing human life in ways that could both enhance its quality and extend its survival. Much of his work was controversial and often misunderstood, but he maintained his intellectual integrity and humanism throughout. From his first book, *The Behavior of Organisms* (1938) through work completed only days before his death in 1990, his research and writing inspired and guided the field. Nearly all authors whose works are included in this volume can trace their intellectual provenance to Skinner with few degrees of separation. Many psychologists and other behav-

iorists have extended (and even corrected) Skinner's work in many areas, but his seminal contributions must be acknowledged.

THIS VOLUME

In this volume, the editors and authors hope to show that the science of behavior has much to offer to contemporary society, beyond its usefulness in narrow niches like special education and developmental disabilities. In a period when "anti-science" has become fashionable in many circles, we believe it is essential to demonstrate the importance and value of science—and the science of behavior in particular—for resolving major social issues. The approach taken is to trace a wide range of existing and potential applications of the science, applying it to representative social issues as they play out at the community, interpersonal, and individual levels. In addition to sketching existing knowledge and applications, chapters identify important areas for further research. Recognizing that humanity is far from final answers to many social problems, it is crucial to recognize the extent to which behavioral theory can guide us to ask the questions in ways most likely to produce effective answers.

The Organization of the Book

This volume is organized into five major sections. The three chapters in Part I present the basics of behavioral theory and its applications to larger sociocultural issues. Chapter 1 defines and provides examples of the basic elements of behavior analysis as well as cultural analysis and design. The material includes recent advances in the field including, for example, current work in rule-governed behavior and equivalence relations at the level of individual behavior. It also discusses contingency interlocks in cultural analysis. (Readers who are well-versed in these areas may wish to skim or skip this chapter.) Chapter 2 sketches out how the science of behavior can guide macrolevel efforts to develop social policy with the best chance of success. In Chapter 3, we have had the privilege of reprinting an important paper by B. F. Skinner, in which he considered at a theoretical level how to most effectively help people, from the perspective of the experimental approach to ethics that he consistently espoused.

The second major section of the book examines issues that need to be addressed primarily at community and larger sociocultural levels. There are chapters on youth violence, racism, sexism, the breakdown of contemporary schools, and productivity in the workplace. Although individual-level interventions may be of some use in each of these areas, the

establishment and support of interlocking community practices are required in each case to make a meaningful difference at a community level.

In the third section, the authors address problems that require intervention in private relationships in addition to larger community levels. The issues included are child maltreatment, teenage sexuality, and sexual coercion, each of which is critically important in itself. In addition, the approaches taken may be of value as exemplars for similar issues, such as domestic violence or the breakdown of family relationships.

The fourth part of the book turns to problems that are commonly thought of as requiring individual treatment, and includes chapters on psychosis, loneliness and social isolation, and drug abuse. Each of these problems also constitutes a public issue, however: the connections among psychosis or drug abuse and homelessness, for example, are well known. In addition, substantial public funding goes toward responding to these problems, and ensuring that these funds are efficiently and effectively spent, in a time of contracting resources, is clearly important. Intractable loneliness and isolation are commonly the result of many of the issues discussed in the earlier chapters of this volume. However, the need to connect people in ways that lead to an enhanced sense of community also exists. This need is now widely recognized.

The final chapter of the volume moves back from the specific to the general. In this chapter, Mairani provides a summary sketch of how the principles and strategies outlined throughout the volume could guide social change in many areas; he suggests that applications drawn from the science of behavior can enhance human life and social justice.

Chapter Organization

Each chapter generally follows a similar outline, although the nature of the subject matter and the depth of available knowledge result in some variations. Each chapter begins with a description of the nature and scope of the problem, including its personal and social costs. This is followed by a review of current approaches to the issue. The authors examine the extent to which current approaches are grounded in empirical data. The heart of each contribution is a detailed behavioral analysis of the issue that often clarifies the reasons why traditional approaches have had limited success. The reasons for the success of a particular approach are also reviewed. The authors then sketch the contours of behavioral approaches to intervention and prevention at both personal and community levels, offering data on efficacy when these are available. Because the research is quite advanced in some areas and quite preliminary in others, the depth of discussions of interventive options varies substantially. In some cases, clear guidelines are available. For others, only conceptually promising hypotheses can be pre-

sented. Because the current state of knowledge is less than adequate for any of the issues presented, lines of research are suggested throughout.

The overall approach taken in this volume, of which each chapter is only an exemplar, is that the science of behavior and cultural analysis provides a framework for understanding social issues and developing comprehensive approaches for addressing them. In other words, this is a book not so much about a few specific problems, but rather about an approach for integrating evidence from many fields in a coherent way that is likely to lead to effective solutions for a broad range of issues. Each chapter makes a specific contribution, but also offers a slightly different cut on a general approach to human issues.

THE AUDIENCE FOR THIS VOLUME

Authors were asked to prepare their chapters to be of value to multiple audiences. We hope that practitioners working in each area will find here specific guidance for their work as well as a framework for thinking about the problem in ways that may lead to programmatic innovations. Researchers will discover no shortage of critical questions awaiting answers and many crucial hypotheses to test. In many chapters, the most pressing research questions emerge clearly. Behavior analysis emphasizes single-case designs, and practitioners—researchers can contribute a great deal to the field by pursuing these.

Perhaps students are the most important audience for this book. They are the ones who will construct a future that may work better than the past. Students will find a good deal of information here, and, perhaps, some inspiration to dedicate their professional careers to making the world a more reinforcing and just habitat for humanity—an ideal that we believe to be a genuine possibility.

Policymakers and informed citizens may also find the material here useful, in part because of the practical and applied focus taken by the chapter authors, and in part because until now, most of this material was not available in one place. This volume emphasizes clarifying and presenting the current state of the art. It also provides specific and prescriptive recommendations wherever possible. It therefore may be useful for informed decision making and for suggesting the questions that need to be asked before decisions are taken. Although we are not suggesting that there are easy answers to complex issues, we do believe that the specificity and applied nature of the analyses and evidence presented here implies that substantive and positive change is realistic.

A FINAL WORD

The approach advocated in this volume is, of course, a more difficult process than simply exhorting people to change (e.g., "Just Say No!" or "Squash It!"—antecedents with few ties to consequences) and doing so "louder, longer and meaner" (Daniels, 1994, p. 17) if the desired results don't appear. The more complete approach is likely to be essential, however, to producing lasting social change responsive to important public issues. What is required are new practices, stabilized by new networks of interlocking contingencies, in some cases within new cultural entities. This strategy would allow the application of the tremendous power of behavior analytic methods to the root causes of major sociocultural problems. The differences between this framework and more traditional ones are paradigmatic, and resistance to any new paradigm is only to be expected (see the final chapter). Nevertheless, we believe it is an ethical imperative to consider—and test—approaches that might profoundly affect the quality of life for large numbers of people. The following chapters provide many examples of beginning efforts to do so.

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I

BEHAVIORAL THEORIES OF
CHANGE

1

PUBLIC ISSUES, HUMAN BEHAVIOR, AND CULTURAL DESIGN

MARK A. MATTAINI

This chapter presents an overview of the current state of psychological knowledge about how behavior and cultural practices are acquired, maintained, increased, or reduced. It also introduces the terms and concepts used throughout the remainder of the book. Recent advances enable us to capture and conceptualize complex verbal, social, and cultural phenomena more coherently than we could even a few years ago. This chapter is organized as follows: First, the critical and often neglected importance of *consequences* (events that follow an action) for shaping and maintaining human behavior is discussed. Then a description of the connections among *antecedents* (events and conditions that precede actions), *consequences*, and behavior is presented. These are the basics of the science of behavior. The chapter also presents the fundamentals of *cultural design*, a recent expansion of behavior analysis to higher-level sociocultural phenomena. This is followed by a small example of the application of the principles of cultural design, a description of the Community Reinforcement Approach for the treatment of substance abuse. Other larger-scale examples are provided in subsequent chapters.

SELECTION BY CONSEQUENCES

Skinner (1981), writing in *Science*, identified the three levels at which behavior, including human behavior, is shaped, as well as the connections and similarities among them. The core notion is that behavior is *selected* at the genetic, the operant, and the cultural levels by conditions and events that follow it. In other words, behavior is selected by its consequences. This relatively simple statement implies enormous potential for addressing issues of social importance; therefore, the concept will be briefly summarized here, with particular emphasis on cultural selection. Cultural selection is the active principle in which this book is rooted.

Genetic Selection

In natural selection, those genetic variations that produce organisms better adapted to environmental conditions are more likely to survive. Adaptive variations are thereby selected by their environmental consequences. Sociobiologists occasionally exaggerate the extent to which human behavior is shaped in this way (Harris, 1979), but there are biological substrates for much human behavior. Some aggressive behavior may be hard-wired, for example, and it makes biological sense that aggressive action toward any nearby organism when one is exposed to pain would result in improved survival (Sidman, 1989).

As is often true in science, an elegant principle like that of natural selection, while basically valid, oversimplifies to some extent. Gould (1994) argued that random processes are also important in tracing why some variations survive and others don't; some things just don't matter much for survival and may vary a fair amount or drift over time without apparent adaptive advantage. Sudden major environmental changes also sometimes select certain traits serendipitously. Similar random processes also probably are operative at the other levels of selection. For example, some behaviors may occur, be followed by a positive outcome, and be maintained, whereas other potentially adaptive variations may never occur. Random events (precipitation, for example) may also occur after some cultural practices are performed, thus shaping superstitious behavior.

Operant Selection

Through natural selection, living organisms developed, at some point, the capacity to respond flexibly to environmental events and conditions, to learn from experience through operant and respondent behavior. (Operant behavior—action that actively "operates" on the environment—is the primary focus of the material presented in this volume. Such action shows enormous variability in humans and is the most substantial contri-

butor to, and resource for, most social problems. Another variety of learning involves *respondent* behavior—visceral activity that comes under the control of novel stimuli through conditioning, as in the development of some phobias. In respondent conditioning, a stimulus (food) that naturally produces a response (salivating) is paired with the novel stimulus (e.g., McDonald's golden arches). Eventually, the novel stimulus produces the response on its own. Although respondent behavior is involved in a few issues discussed here, its role is generally peripheral in this book.

Once the capacity to adapt behaviorally had evolved, organisms began to learn from their transactions with the environment. Roughly, those behaviors that worked tended to be performed more often, whereas those that didn't work or had negative outcomes tended to drop out. Although a thorough understanding of operant behavior would require a much more complex discussion, generally speaking, this is what operant behavior is about. The organism's environment selects behavior by differential outcomes (consequences). For example, children learn to walk by experience; motor behavior that leads to falling drops out, while that leading to stability and movement is gradually refined.

The Selection of Cultural Practices

Sociocultural phenomena constitute the most crucial level of selection for addressing public issues. *Cultural practices* are a special case of operants—behaviors that are transmitted among individuals and across generations—and are maintained by established and relatively stable networks of reinforcement (often but not always social in nature). Skinner defined a *culture* as, "The contingencies of social reinforcement maintained by a group" (Skinner, 1986, p. 74). *Contingencies* are the relationships and dependencies among behaviors and their consequences and antecedents. A group that shares a culture in this sense is a *cultural entity*. Note that this definition encompasses groups of many different sizes, some with relatively simple repertoires of practices, and others maintaining exceedingly complex social patterns. Families, communities, and organizations fit this definition, as do nations. There are crucial similarities and differences among these, an issue to which we will return later in the chapter.

As special cases of operant behavior, cultural practices are also rooted in biological selection and may also involve specific genetic variations. The evolution of physiological adaptations that make language possible, for example, were essential for this most important set of cultural practices to emerge, although social reinforcement from the group is also required for language to develop.

Natural selection, in a sense, operates at two levels: the evolution of particular characteristics, and the emergence of new—and extinction of existing—species. Cultural evolution involves both the shaping of parti-

cular practices that produce better outcomes for members of the group and, in some cases, the survival or demise of entire cultural entities (Skinner, in Catania & Harvad, 1988, p. 36). Although cultures like those of nations or the Aztec empire only occasionally are formed or disappear, smaller entities (businesses, families) do form and disappear relatively frequently.

Sigrid Glenn (1988, 1991) introduced the term *metacontingency* to describe the dependencies between a cultural practice and its aggregate outcomes for the group. The processes by which these aggregate outcomes emerge depend on basic operant principles. A cultural practice consists of behavior emitted by individuals, but the level of organization is different here. Roughly, individuals perform the practice because doing so is reinforced, but the reinforcement is often provided by other people. Why? Because they, in turn, are reinforced for doing so.

Such a system of interlocking social reinforcement is often required to stabilize a cultural practice. The way interlocking practices and the cultures that support them result in an aggregate outcome is depicted in Figure 1. Various classes of actors (e.g., students, teachers, administrators, parents, media, and voters) maintain practices that interlock in multiple ways, with the result that only 45% of students complete high school in a particular community. There is no single cause of this unsatisfactory outcome. If the outcome leads to changes in the interlocking practices, which in turn lead to a different outcome over time, a metacontingency has been established. Lacking such a feedback loop, the outcome can be viewed as a relatively random result of the practices. The discussion of cultural design later in this chapter is an effort to specify in finer detail the interlocking practices and contingencies represented on the left side of Glenn's image, as well as to provide a technology for moving toward more desirable aggregate outcomes.

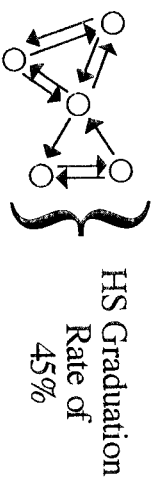


Figure 1. A depiction of the way interlocking practices and the cultures that support them result in an aggregate outcome. Adapted with permission from "Contingencies and metacontingencies: Toward a synthesis of behavior analysis and cultural materialism," by S. S. Glenn, 1988, *The Behavior Analyst*, 11, p. 170. Copyright 1988 by The Association for Behavior Analysis.

Note that such interlocks may not be required if the practice results in immediate natural reinforcement for the behavior; if a person sees someone else eat a novel food, imitates that person, and finds the food delicious, social reinforcement is not required to maintain the behavior. However, in cases in which consequences are delayed or cumulative, or in which the behavior results in improved outcomes for others rather than the person (e.g., altruism), interlocking contingencies are generally required.

Basic behavioral terms and principles used throughout this volume are summarized in the sections that follow, with examples. For further technical detail, readers may want to consult Malott, Whaley, and Malott (1993), Michael (1993), or other standard works.

BEHAVIORAL CONSEQUENCES

Consequences, that is, events and conditions that follow an action, are of central importance in the science of behavior. The basic forms of consequences include positive and negative reinforcement and punishment. *Extinction*, the result of a lack of contingent consequences, is also an important process. The material that follows provides an introduction to each of these possibilities.

Reinforcement

The basic process of reinforcement is straightforward. Behavior is followed by an event or condition (a *postcedent* or *consequence*) that is somehow "better" than the situation existing before the behavior occurred. As a result, the rate of that behavior tends to increase in the future. When the behavior is followed by presentation of a reinforcer, the process is called *positive reinforcement*; when it results in escape from or avoidance of a negative condition, the process is called *negative reinforcement*. Operationally the two are different, but both lead to increases in behavior, and to a situation after the behavior that is in some way improved over the situation before. They can, therefore, be viewed as subtypes of the same process.

Negative reinforcement often seems confusing, because the term is commonly misused in everyday language. By definition, all reinforcement increases behavior. If a parent spanks a child to stop a behavior, that is *punishment*, not reinforcement, because the rate of the behavior of interest *decreases* rather than increases. By contrast, when your alarm clock goes off, it *produces* behavior to escape from the irritating tone, so the process is negative reinforcement. When people wake up before the alarm goes off, they may be acting to prevent it from doing so. This is an example of *avoidance*, the other form of negative reinforcement.

Why does an event or condition reinforce behavior? It is not adequate to say that it is reinforcing because presenting it leads to an increase in behavior, because that is how we defined it as a reinforcer in the first place. Ultimately, reinforcement must be seen as rooted in biology. Food, water, sex, and, probably, affection produce effects that were adaptive for survival. Some anomalous and accidental reinforcers—like cocaine—also have immediate biological effects, including stimulating the pleasure centers of the brain. Other reinforcers are learned through temporal association with primary reinforcers. Money, for example, is a powerful learned generalized reinforcer that can lead to high levels of behavior (and substantial physiological arousal) for adults, but is not reinforcing to an infant. The capacity to respond to conditioned reinforcers is an important biological root of behavior.

There are many complexities involved in these concepts. The schedules on which reinforcement is provided have a good deal to do with exactly how behavior changes. Intermittent schedules of reinforcement can lead to stable behavior that is difficult to eliminate. For example, many people regularly check their paper or electronic mail, even though they only occasionally find something of real value to them. Many behaviors also have multiple effects. Some acts of street violence provide a good example. Although the robbery of a jacket by a member of a street gang may appear to be reinforced by the jacket itself, the kind of jacket that reinforces that behavior has often been shaped socially, and the reinforcers (e.g., respect) provided by other members of the group—both for the act of robbery and for wearing the jacket—are usually the more crucial consequences. Avoiding punishment (disrespect) from others for failing to take such action may also be relevant.

These simple processes can explain rather complex patterns of social behavior if the elements are assembled in the right ways. Further, much of human behavior is verbally mediated, responding to "rules" that may be extracted by observation, learned accidentally from or explicitly taught by others, and may or may not be accurate. "If I study hard, I'll get a good grade," or, "It doesn't matter how hard I try, I can't do this," are examples. Rules, and their connections with reinforcement, are considered in a later section of this chapter.

Extinction

Although positive and negative reinforcement increase rates of behavior, our biological makeup also provides avenues for reducing behavior. When a behavior has previously been reinforced (positively or negatively), but that reinforcement at some point stops occurring, the behavior tends to drop out. The adaptive advantages of susceptibility to such extinction seem clear: when a behavior no longer works, it is best if it fades. In many

cases, the rate and intensity of the behavior tends first to increase (an extinction burst) when reinforcement is no longer forthcoming, which also makes sense—"trying harder" often does result in reinforcement. The behavior will often reappear at intervals over a period of time, also probably an adaptive pattern.

Many children, sadly, obtain few reinforcers in school settings, particularly those children whose initial repertoires are the weakest. It is therefore only to be expected that paying attention, studying, and attending school then tend to extinguish, especially if there is little attention from home for these generalized response classes. With little or no reinforcement forthcoming from home or school, reinforcers available elsewhere, in particular on the street, are potentiated, often leading to increased antisocial behavior. If the child also has a long history of severe punishment, the effects will be compounded; punitive processes often have many problematic side effects.

Punishment

Punishment is the application of an *aversive* (i.e., something the individual tends to escape) or the removal of a reinforcer following the occurrence of a behavior. Under some conditions, punishment may lead to a decrease in the behavior. Punishment is generally experienced as unpleasant and may result in behavioral and emotional side effects. Skinner (1969) suggested that excessive punishment is responsible for many clinical problems. Seidman (1989) further argued that the many personal and social side effects of coercive strategies (in which he included both punishment and negative reinforcement), including depression, counteraggression, and some forms of emotional disturbance, are so problematic that such strategies should be avoided except in emergencies.

Mild punishment (like water-mist spray or small fines), on the other hand, can sometimes have dramatic effects, reducing life-threatening behavior or helping people achieve important and difficult health-related self-management goals (Malott et al., 1993). The issue, therefore, is not straightforward. To be effective, punishment must be relatively certain and usually immediate. Because the punished behavior is being reinforced by something else, the behavior is likely to occur again so long as the reinforcer remains available. If the punishment is withdrawn, the problem will then usually resurface.

There are two other possible issues with punishment that should be taken into account. First, punishment may reduce inappropriate behaviors, but it does not teach more effective ones; for this reason, if used at all it should always be combined with the teaching of, and reinforcement for, better alternatives. Second, punishment can be seductive; historically, it has been abused primarily, although not exclusively, under

nonprofessional auspices (e.g., by families and governments). Punishment sometimes works quickly, thereby reinforcing further use of punishment in the future. There is a danger that the punisher may then turn increasingly to punitive strategies, without thoughtful consideration of possible long-term costs or side effects. For these reasons, an emphasis on and preference for positive reinforcement procedures, and extinction where necessary, seems generally indicated.

Consider, for example, the case of antisocial actions committed by young people (e.g., vandalism or violence). If such behaviors are being maintained in part by the respect of others (social reinforcement), connecting the youths with alternative sources of reinforcement for more socially acceptable behavior (which in the long run will also pay off better for them) is a good place to begin. When possible, working with the peer group to reduce the reinforcement for antisocial behavior would also seem to be an effective (though admittedly challenging) strategy. A culture in which positive behavior provides access to valued items and privileges might be established (Cohen & Filipezak, 1971/1989; Stuart, 1971; Stuart & Lott, 1972). In some cases, it may prove necessary to add, say, small-point fines to achieve optimum results, but this decision should be made based on the data.

There is an immense body of literature regarding the effective use of consequences. The material just discussed provides only an introduction to the basic principles and terms used in later chapters in this volume. Because behavior is ultimately selected by consequences over time, antecedents also have powerful effects, as a result of their connections with consequences.

ANTECEDENTS

Circumstances prior to an act, *antecedents*, affect its occurrence, rate, frequency, and intensity. Five subtypes of antecedents are discussed here, some of which have been thoroughly explored over decades of research, and some of which have only recently been clearly articulated.

Occasions

Occasions are the circumstances under which a particular consequence is likely to follow a particular behavior. (The technical term for an occasion is a *discriminative stimulus*.) Under some circumstances, a behavior is likely to be reinforced (or punished), under others, it is not. Children often learn that if they ask for a cookie from, say, a grandparent, they are likely to receive it, whereas if they ask their parent, they probably will not. The act of asking then becomes more likely on occasions when the grandparent is present, and less likely when the parent is present. The grandparent is a

discriminative stimulus signaling the availability of cookie reinforcement; the presence of the parent signals lack of availability (i.e., is a *stimulus delta*).

A more complex example would be the making of sexist remarks. If such remarks are maintained by peer attention, such behaviors may occur primarily when peers are present (although verbal behavior complicates the situation, because a later report may also be reinforced). Threatening with a gun is only likely if a victim is present (or in front of a mirror, but this is a different behavior, with different functions, although it looks identical). Victims and peers, under some circumstances then, become associated with reinforcement of violent threats and actions. Note that unless the connection among the presence of peers, a violent act, and social reinforcement has been established, the presence of peers would not prompt violence. The consequence is the crucial determinant, whereas the occasion serves as a signal or cue for the availability of the consequence.

Structural Antecedents

The term *structural antecedents* is used in this instance to describe aspects of a person or situation that are relatively invariant, and that may provide the means, or tools, for the behavior to occur. For example, vocal language can only occur when the necessary physiological structures are in place. And although running 50 miles per hour would probably be highly reinforced, it is apparently not structurally possible for humans. Structural antecedents, then, include the availability of the behavior. They may also involve the availability of other antecedents and consequences; this is particularly true for aspects of environmental structure, which can limit the available behaviors. If no gun is available, a person will not shoot someone in the course of a robbery; if there are no dark corners available, muggings in dark corners will not occur.

In some cases, working with structural antecedents can be among the most effective intervention strategies. Some forms of violence can be reduced by redesigning streets and buildings or by limiting the availability of handguns. Physiological structure is a trickier prospect. The National Research Council has called for increased research into biological determinants of violence (Reiss & Roth, 1993). Although such research, sensitively conducted, is valuable, the potential use of medications or genetic interventions for a problem that seems to be largely shaped and maintained by social forces raises important ethical issues.

Establishing Operations

Establishing operations are events or conditions that in some way affect sensitivity to a consequence and tend to evoke the behaviors associated

with that consequence (Michael, 1993). Establishing operations affect motivation. Food deprivation, for example, is an establishing operation that potentiates the reinforcement value of food and often leads to an increase in food-seeking and consuming behaviors. By extension, generalized deprivation potentiates the value of what reinforcers, of whatever type, are available. The matching law, which has been well established among humans and with other species, indicates that the relative rates of multiple behaviors are determined by the relative levels of reinforcement available for each (McDowell, 1988). If one has many behaviors available that are likely to lead to reinforcement, he or she is less likely to perform any particular one of them, particularly those that may also be costly.

Satiation, on the other hand, tends to decrease the valence of that form of reinforcement. Too much reinforcement too easily obtained leads to a drop in behavior (and in some cases the emotional-physiological condition called boredom). Technically, satiation is an *abolishing operation*, but the term *establishing operation* often is used generically to refer to both those that decrease sensitivity to a reinforcer as well as those that increase it.

There are other establishing operations beyond deprivation and satiation, including certain schedules of reinforcement, some forms of verbal behavior, and those that have been conditioned by association with others. These will be discussed as they come up in subsequent chapters, but two additional examples may be useful. Many children at high risk for antisocial behavior have never been exposed to a wide range of alternative types of reinforcers (e.g., those associated with sports, libraries, arts, activities, and organizations) that may be available in their neighborhoods and are often inaccessible by public transportation. One useful strategy may well be to give them opportunities to sample such alternative reinforcers, which is simply termed *reinforcer sampling*.

Obtaining available reinforcers, like some of those already discussed, sometimes requires preexisting repertoires that may need to be constructed first. For example, libraries may be accessible, but reading is not reinforcing in itself for most people until a certain level of fluency is achieved. Other reinforcers (attention, approval, gold stars, points) may be required to help individuals reach the level of proficiency that potentiates intrinsic reinforcement for reading.

Imitating Models

Another repertoire with generic roots is that of *imitation*. There were, and continue to be, many adaptive advantages for imitating what others do, both to obtain reinforcers and escape or avoid aversives. Children learn early on that if they do what others do, they may achieve similar consequences. There is an extensive literature on imitation and modeling that suggests that this response class is crucial among human beings. An entire

stream of contemporary psychological thought—*social learning*—draws heavily on this repertoire.

Some differences exist, however, in the way that social learning theorists and behavior analysts construe the process. The former tend to rely more on hypothesized unobservable constructs like self-efficacy than do the latter. Social learning theorists also tend to attribute behavior to internal, autonomous causes while behavior analysts view environmental factors as central (Poppo, 1989). Behavior analysts also may emphasize somewhat more than social learning theorists that people can learn to imitate those who are not similar to themselves and that contingencies can override the effects of modeling.

Imitation is crucial to the development of many sophisticated cultural practices, and research on the processes involved informs much contemporary behavior analytic work in those areas. Clearly, imitation is an important consideration in reducing violence. Although growing up with violence does not automatically result in becoming a perpetrator, it seems apparent that observation and imitation of violence at home, on the street, and in the media is associated with increased violent behavior (Widom, 1989), perhaps particularly for those with limited alternative repertoires for obtaining reinforcement and avoiding aversives. Note, however, that violence may be tolerated and reinforced in many of those settings, so separating the effects of imitation from other contingencies is not simple.

Rules and Rule-Governance

An important area of contemporary behavior analytic research and theoretical development involves the understanding of *rule-governed* behavior. This refers to behavior that is not shaped by immediate contingencies, but rather by verbal descriptions of such contingencies (see Hayes, 1989, for a review of this work). For example, imagine that someone you trust (a person whose advice has become a discriminative stimulus for reinforcement) told you that if you drop everything and read a particular article, she would give you \$1,000. Chances are good you would read the article. You have probably never read the article before, and most likely never have been paid \$1,000 for reading any article. Therefore, if you read it, you did so because you were responding to the verbal rule provided by your friend.

Rule-governance is crucial in the learning of complex behaviors and cultural practices, identifying the potential consequences of the act. It can also guide the topography of the behavior (how it looks). Rules, once learned, are sometimes relatively insensitive to the actual contingencies in effect. Excessive or inaccurate rule-governance can be of clinical significance; much of what occurs in cognitive therapy involves work to change those patterns.

Weak repertoires involving rules can also be problematic. Youths with underdeveloped rule-following repertoires are unlikely to do well in school, for example. Although antisocial and aggressive behaviors usually involve direct-acting contingencies, many alternative ways to obtain reinforcement (say, participating in sports) or to escape aversives (say, using negotiation skills) require at least moderately developed rule-identifying and rule-following repertoires. Rules help to bridge the gap between behavior and delayed consequences and thus are critical to deterring gratification and completing the long chains of behavior required to achieve distant, difficult goals. Malott and his colleagues (Malott & Garcia, 1991; Malott et al., 1993) argued that rules actually bridge delays by providing covert, direct-acting contingencies. They view stating the rule as an establishing operation that increases the aversive effects of not following the rule. These elegant, if controversial, discussions cannot be adequately captured here, but are likely to lead to significant advances in the field.

CONCURRENT CONTINGENCIES

Human beings are immersed in a "sea of concurrent contingencies" (Malott et al., 1993, p. 378). Many acts are concurrently possible, and each may have multiple reinforcing—and aversive—consequences. Look, for example, at Figure 2, which identifies some of the multiple contingencies that may simultaneously be involved in a violent attack on the street in which a leather jacket is taken. Multiple and conflicting biological, simple operant, and cultural-level outcomes are involved, as are rules, establishing operations, discriminative stimuli, structural antecedents, and imitation. These contingencies are only those related to one possible class of acts; but there are an almost infinite variety of others that might occur instead. And many of the relevant antecedents and consequences are themselves behaviors, often performed by other people, each of which has been selected by its own often inconsistent network of consequences over time.

This image may help to portray how the rather simple elements of behavior combine and permute, resulting in complex repertoires. The basic principles are relatively straightforward, but recognizing multiple concurrent contingencies is essential to the analysis of the kinds of behavior involved in most problems of social importance. And because of the interlocking nature of these contingencies, intervention focused on single points in the system may fail if other powerful elements tend to return the system to its previous homeostasis. Adding an unlikely jail term almost at random (see Figure 2), for example, will not change the other elements of the picture and, therefore, is unlikely to result in a stable decrease in viol-

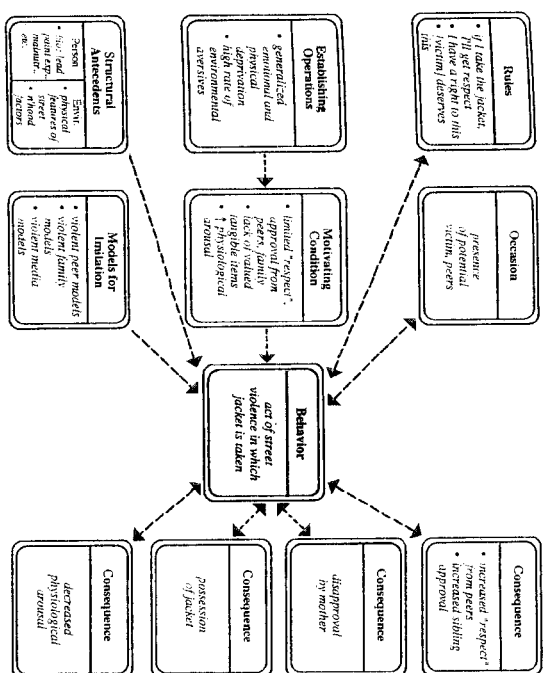


Figure 2. Contingencies associated with an act of street violence.

ence. The interlocking networks of (primarily social) consequences need to be modified—and this is the concern of cultural design.

CULTURAL DESIGN

Cultural design refers to the explicit planning, establishment, and stabilization of cultural practices, cultural entities, and cultures, as previously defined in this chapter. Existing cultural practices may once have been relatively functional, but their aggregate outcomes may be quite costly now. An example is aggression against members of other groups; although such behavior patterns were certainly protective for bands of early hominids, tribalism and racism continuing into the present have become critical sociocultural problems. The associated practices have largely negative aggregate outcomes at this point, but the networks of interlocking contingencies that shape and maintain these behaviors remain in place.

Other practices may have emerged superstitiously and are also maintained by cultures (of whatever size), although their actual outcomes may be largely neutral. In these cases, more effective variations may not have

occurred, or if they have, they may not have been supported by existing social contingencies and may drop out before their utility can be established (i.e., being "ahead of one's time").

Cultural design is by its nature planned and rooted in either hypothesized or established rules—descriptions of contingencies and of probable aggregate outcomes. Design involves the explicit arrangement of not only new contingencies, but also new interlocking and therefore self-stabilizing networks, or systems of contingencies. It begins with what is often called *cultural analysis*, but note that cultural design goes beyond analysis (which primarily seeks understanding) to establishing new systems. These new systems are developed not for purposes of inquiry, but rather to achieve improved practical outcomes. Cultural design, therefore, is a highly applied science.

Malort (1988) argued that cultural innovation has often been largely rule-governed throughout human history. Malort theorized that at least the innovators themselves often understood rules in terms of cultural outcomes, although sometimes they couched their proposals in other (often supernatural) terms. At any rate, proposals for social change in the modern world generally are explicitly couched in terms of their aggregate outcomes—for the persons affected as well as for the cultural entities involved. For instance, the advertisements shown on television during the health care debate of 1994–95 emphasized negative and positive outcomes of particular policy choices. These outcomes were, generally speaking, untested, so what emerged were primarily samples of generalized classes of rules maintained by the cultures of political entities. The current proposals to redesign welfare are proceeding along similar lines—most decisions have been made based on existing repertoires of rules, not on empirical data.

The cultural design alternative is to apply the methods of science to cultural issues. This involves extracting the rules empirically rather than emotionally or superstitiously, and applying them to design. Such a process would introduce and stabilize cultural practices while leading to improved outcomes. Although understanding and establishing interlocking networks of contingencies is more complex with large cultural entities like nation-states than with small ones like families, once their commonalities as cultural entities are recognized, strategic similarities also emerge.

Natural History as Method

Families, schools, or nations cannot ordinarily be brought into the laboratory for fully controlled study. Even if they could be, by amputating these entities from the environmental networks within which they and their members are embedded, the phenomena observed would no longer be those in which behavioral scientists are interested. But this need not mean that the questions cannot be approached scientifically (consider how

meteorological or astronomical phenomena are studied). Behaviorists do need to turn to different tools, however, for such investigations. There are many methods of inquiry available that can be useful here, ranging from research with animals to statistical analyses (Pierce, 1991). In particular, the methods of natural history (including some drawn from ethology, ecology, astronomy, and other disciplines) may be valuable for cultural analysis and design, because they allow rigorous examination of phenomena that remain rooted in their natural ecological situations.

Marston Bates (1950/1990), a founder of ecological science, identified the intertwining of (a) *organized observations*, (b) *controlled* (to the extent possible) *experiments* in the natural environment guided by those observations, and (c) the *development and evolution of conceptual frameworks* rooted in these observations and experiments as the essential method of natural history. My colleagues and I are currently working on the design of new cultural practices that we hope to embed and stabilize in both existing and new cultural entities. These practices will produce, as an aggregate outcome, a reduction in youth violence. The first step in our developmental research program was to specify a preliminary conceptual model of violence (including subtypes) that relies on an integration of behavior analytic theory with existing data from multiple sources. What we expected—and, indeed, what we are finding—is that some of the crucial contingencies have not been clearly established; we are therefore now turning to *theoretically guided observations* in natural settings to gather more information. Note that at this point, two of Bates' three processes have been applied in our investigations, leaving the third, *experimentation*.

Experimentation in the natural environment is different from that conducted in the laboratory. Different forms of control are usually required because, for example, random assignment is often not possible. An important behavior analytic tool for work with individuals also can be of service: the single-case, or *single-system experimental design*. A full discussion of applications of this methodology to cultural analysis and design is beyond the present purposes, but it is important to note that this technology is well-adapted to work in natural settings (Biglan, 1995). Reversal, multiple baseline, changing criteria, and alternating treatment designs are all possible in work with cultural practices and entities, as well as the less powerful, but easier to apply, AB designs with replications.

Ecologists also provide strategic guidance for the design of realistic experiments in natural cultural environments. Rigorous observation and conceptual analyses—the two other legs of the natural history tripod—often suggest questions that can be studied with quite modest experiments. Wilson wrote:

[T]heory, even if airtight and plausible, is not enough to put the seal on . . . complex . . . processes. . . . There must be experiments to con-

firm the predictions of theory and, in the case of ecology particularly, to expose them to the exhilarating intrusions of natural history. But how can experiments be performed on archipelagoes and entire faunas and floras? The answer is to miniature. *(Italics added)* (Wilson, 1992, p. 223)

He goes on to describe experiments that test the rate of species recolonization on tiny islands averaging 15 meters across. Physicists do much the same thing, addressing literally universal questions at the level of subatomic particles. Similarly, behavioral scientists may often need to begin with very small cultural entities, such as single families, small groups of peers, a city block—a process that will not be foreign. There may later prove to be differences of scale, but this will be a start.

In the case of our work in reducing youth violence, data from our naturalistic observations will be integrated with the conceptual model, producing modifications and enrichment. Based on that model, we will design a first approximation to an interventive package, including plans to establish the necessary contingencies to obtain and stabilize support from existing cultural entities. We will then test the package on a very small scale and use the results to further refine the conceptual model. This will lead to a next iteration of design and testing. The process we will use is likely to involve multiple iterations of each of Bates' three strategies. It will result not only in potentially substantial new scientific information, but also in a replicable package that can be tested and, with designed variations, used to establish similar practices elsewhere.

Varieties of Cultural Entities

Substantial evidence exists that new practices and new cultures can be established with entities of many different sizes and levels of complexity. Each of these new practices could constitute a chapter in itself; however, a few comments here will set the stage for the following discussion about practical details of cultural design.

Much of the existing behavior analytic research at first glance involves changing the behavior of individuals, rather than changing cultural practices or networks of contingencies maintained by groups. Note, however, that individual behavior is changed by changing the environment. A major issue in the literature relates to how to maintain change once it has been obtained (Sulzer-Azaroff & Mayer, 1991). The problem is not that new behavior somehow breaks free of the contingencies and disappears, but rather that contingencies required to maintain the behavior are often not designed with adequate attention to maintaining the behavior of those in the environment that provide those contingencies. The individual remains responsive to the contingencies, but as soon as the environment reverts to its original state, so does the behavior of the individual.

Preventing this requires the design of self-maintaining networks of interlocking contingencies. In clinical work with individuals, for example, unless the actions of either the client or the clinician result in exposure to stable networks of new consequences, change is unlikely to be maintained.

Families, in all of their multiple forms, are social entities that produce substantial stability of culture over time. Family therapists often refer to what we are defining here as cultural practices maintained by interlocking contingencies as the *structure* of the family, a term emphasizing the stability of family culture. Minuchin (1974; Minuchin & Nichols, 1993), for example, emphasized two primary treatment processes: *joining*, which involves becoming a significant part of the consequent system, and *restructuring*, which refers in our terms to the establishment of new, stable systems of interlocking contingencies. The principles of cultural design, therefore, should apply to families. (The same is true for formed and natural groups, although the details will not be elaborated in this chapter.)

Those working with formal organizations such as businesses and schools were among the first to recognize the importance of introducing not so much isolated new practices as redesigned behavioral systems to achieve lasting change. The subdiscipline of *organizational behavior management* has developed an extensive technology (e.g., Daniels, 1994), much of which can be adapted for work with other types of cultural entities.

The potential for systems redesign in education has also been clearly demonstrated (e.g., Mayer, Butterworth, Narpakritis, & Sulzer-Azaroff, 1983). The CABAS (Comprehensive Application of Behavior Analysis to Schooling; Greer, 1991, and chapter 5, this volume) schools are perhaps the most thorough-going example, in which all participants (students, teachers, parents, administrators) are involved in explicitly designed interlocking contingencies. Increased teacher compensation in the CABAS system, for example, depends on documented student learning—the behavior of the student controls the functions of all components of the school system.

Larger systems (e.g., communities, political entities) also are cultural entities, and the design of new practices and new networks of interlocking contingencies to support them is crucial to improved aggregate outcomes at those levels as well. A fair amount is known about work with neighborhoods and communities (Mattaini, 1993), but the level of complexity involved in transactional patterns within such larger systems becomes geometrically more challenging. Think for a moment about the changing health care system in American society. As this is written, the extent of possible health care reforms that may occur in the future is not known, but it is clear that the momentum toward managed care and cost containment will continue. How is this happening? Generally speaking, these changes are not based on explicit attention to health outcomes; on the contrary, the incentives built into managed care in fact support under-

serving (Strom, 1992). Rather, the trajectory toward managed care is the result of (rule-governed) decisions by various interest groups concerned about reducing costs and increasing or maintaining profit in the business sector, and freeing limited resources for other priorities in the nonprofit sector.

For work with such cultural entities, the scientific challenge is not so much to discover entirely new technologies to shape and maintain cultural practices (remember that cultural practices are special cases of operant behavior). Rather, the challenge is to find ways to organize what is known about behavior analysis and change in ways that take into account contingency interlocks.

Practical Steps Toward Cultural Design

Cultural design is by nature an iterative process that occurs as part of an ongoing stream of events. Therefore, the choice of where to begin is somewhat arbitrary. But a first step often is to determine those practices society would like to see established or increased, based on what existing data, observation, and theory suggest will lead to desired aggregate outcomes. The choice of such targets should be tested by experimentation as soon as possible, often by miniaturizing. For example, Newman (1992) suggested that legalization of drug use and sales may produce the best cultural outcomes. There is room to disagree here; my own analysis suggests the opposite (Marraini, 1991). If Newman's proposal were viewed by a political entity as potentially valuable—if high-risk—it certainly would be best to try it first on a small and reversible scale.

Designing Contingencies to Support a New Practice

If we are interested in what at least appears to be a discrete class of behavior, say, rate of school attendance by young mothers on welfare, cultural designers ought first to look at the current consequences, both those supporting other incompatible behavior and those discouraging attendance. (I am leaving aside for simplicity the often crucial antecedents, which would need to be examined as well for a comprehensive analysis.) These are roughly sketched in Figure 3. Some improvement might, as data from Ohio suggest, occur by simply adding a small financial incentive to the existing network. (In the Ohio experiment, a reduction in welfare benefits is also made for nonattendance. Because this results in increased poverty for most of the families involved, including their children, it is doubtful that this can be justified; Opulente & Marraini, 1993). To achieve more powerful results, however, it may be important to think about ways to change at least the more powerful of the other consequences involved. As

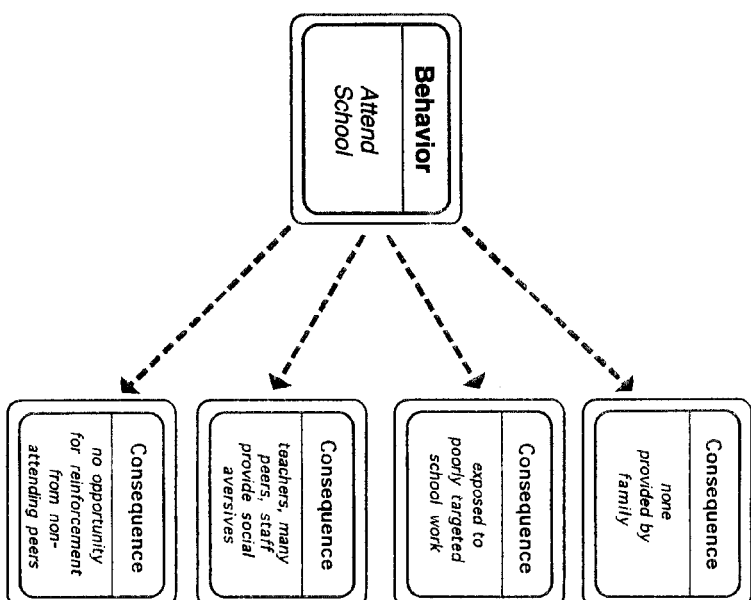


Figure 3. Consequences associated with school attendance for some young welfare mothers. Adapted with permission from Marraini (1995).

behavioral scientists begin to think about changing these contingencies, they are actually dealing with changing the behavior of other people that interlinks with that of the student. For example, a scientific analysis may suggest that changing teacher behavior, parent behavior, and peer behavior is important. In each case, cultural designers must not only specify how that behavior should change, however, but also determine what consequences will maintain such changes. Preparing contingency diagrams for each may be a useful first step here.

Designing Contingencies to Increase the Incidence of a Scene

In many cases, behavioral scientists are interested in more than increasing or decreasing a single practice; they are interested in designing supports for a desirable sequence of interaction known as a scene—a concept borrowed from the anthropologist Marvin Harris (1964). To do so, it is necessary to specify:

1. Who the participants are (classes of actors taking on particular roles, because individual participants are often interchangeable in cultural practices; it is not clear that the behaviors emitted should be viewed as cultural practices if each participant in the exchange always acted in individually distinct ways);
2. What the behaviors are that each participant displays;
3. What the sequences of actions are (if that is important); and
4. What the relevant antecedents and consequences are for each behavior identified.

Figure 4 illustrates how this might be done. In this example, the interest is in increasing positive exchanges between a couple, a crucial aspect of relationship enhancement (Bornstein & Bornstein, 1986; Stuart, 1980). In this very simple culture, prompts to begin the exchange may result in a self-perpetuating process. Note that the desired behavior classes are spe-

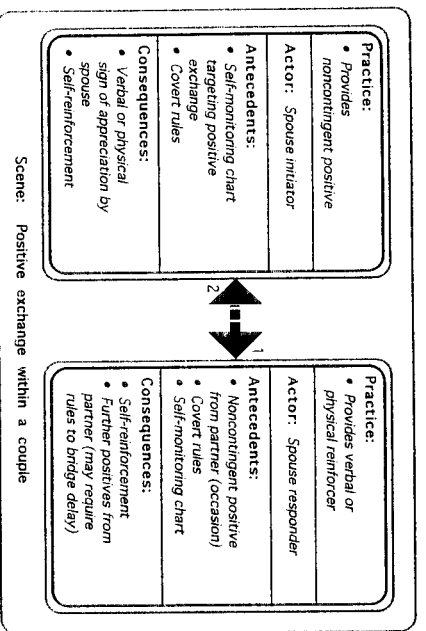


Figure 4. A basic set of interlocking contingencies in a very simple culture.

cified, as are the classes of actors, critical antecedents of each behavior class, and consequences. To establish this sequence of practices, it is generally not adequate to simply identify the preferred behavior, which, in this case, would be to give advice to act nicely to one another. The antecedents and consequences must also be specified, with plans to introduce and stabilize them.

The scene is also a useful way of framing interactions in far more complicated systems. It is known from previous research that increasing the level of positive reinforcement used by teachers results in improved student behavior and learning, even with highly disadvantaged groups of students (e.g., Cohen & Filipezak, 1989; Mayer et al., 1983). We also know, from centuries of experience, that this is not a practice that is spontaneously emitted and maintained. Although it may seem that a simple explanation would result in increased reinforcement as shown within the boundary of the scene in Figure 5, it often does not. There are other classes of actors outside the immediate scene that may be able to provide crucial antecedents and consequences to the teacher (note the administrators and

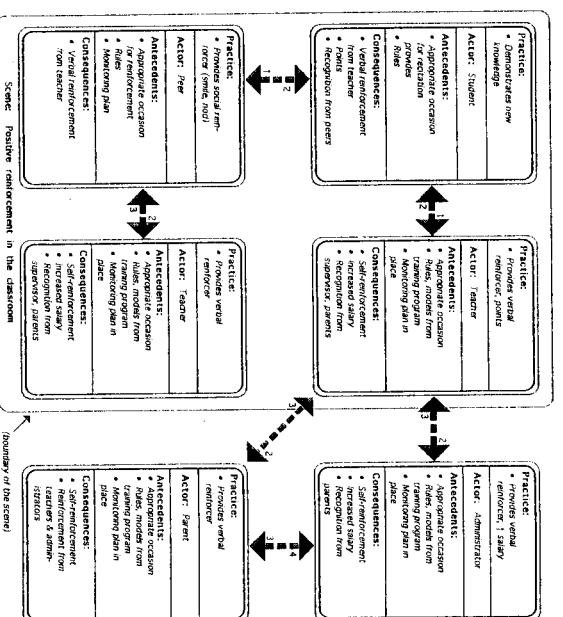


Figure 5. A relatively stable set of interlocking contingencies supporting desired cultural practices.

parents of actors outside the right boundary). However, there is also no reason to suppose that those administrators and parents will spontaneously emit the desired actions. Contingencies for their behavior must also be designed. Only in this way will stable patterns of interlocking contingencies emerge. Otherwise, the existing contingencies may damp down the new variations. This is the beauty of systems like the CABAS schools, in which contingencies for all relevant actors are explicitly designed. The final test, of course, comes in examining changes in aggregate outcomes, in this case documentation of student learning.

AN EXAMPLE: CULTURAL DESIGN AND ALCOHOL ABUSE

At first glance, alcohol abuse would appear to be quintessentially an individual issue—a physical addiction that requires only that the person and the substance to be present. In fact, available data suggest that alcohol addiction and problem drinking can be dramatically affected via cultural design. The prevalence of alcohol-related problems is substantial. Although specific numbers vary depending on the diagnostic criteria used, the estimate that 5% to 7% of the adult U.S. population suffered from alcohol dependence during the past year, and perhaps twice that over a lifetime, is consistent with the data (American Psychiatric Association, 1994). Problem drinkers—persons who experience significant problems as a result of drinking, but do not show signs of dependence—are substantially more common, perhaps by a ratio of 4:1 (Institute of Medicine, 1990). Social costs (financial, family, and otherwise) associated with alcohol abuse may exceed those of any other problem discussed in this volume.

The first barrier with which those interested in effectively responding to these problems need to grapple is a set of beliefs (rules) that are widely supported in the broader, and to a substantial extent the professional, cultures. These include the following:

1. Nothing works very well, and the results of all approaches tested are roughly the same (only slightly better than the rate of "spontaneous remission," which may be around 20%; Miller & Hester, 1980).
2. The primary issue in initiating treatment is breaking through denial through confrontation.
3. A person must "hit bottom" (lose those things most important to him or her) before he or she will be ready for treatment.
4. Abstinence is the only appropriate goal for everyone who experiences alcohol-related problems.

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None of these statements is consistent with available data. Something works. In fact, several things work, depending on the client's situation. For problem drinkers who are not physically dependent, guided self-change treatment (Sobell & Sobell, 1992), a very brief behavioral treatment focused on identifying and modifying relevant contingencies associated with problem drinking, appears to be adequate in about 50% of cases. Guided self-change treatment apparently enhances motivation for further treatment for most of the remaining 50% as well. For those with more severe problems, the Community Reinforcement Approach (CRA), developed more than two decades ago by Nathan Azrin and his colleagues (Hunt & Azrin, 1973), and iteratively enhanced and extended since (Azrin, 1976; Azrin, Sisson, Meyers, & Godley, 1982; Budney, Higgins, Bickel, & Kent, 1993; Budney, Higgins, Delaney, Kent, & Bickel, 1991; Meyers & Smith, 1995; Sisson & Azrin, 1989), is an outstanding example of the power of cultural design, and also a clear example of how interlocking contingencies among cultural entities can stand in the way of effective responses to social problems.

Components of the Community Reinforcement Approach

Although not especially staff intensive as treatments for addictions go, the Community Reinforcement Approach is a multicomponent model that assists clients in building a rich network of connections with nondrinking cultures. Included are procedures to

1. Improve marital functioning (where relevant);
2. Assist clients in finding jobs—not just any jobs, however, but those that encourage social contact and stability;
3. Build connections with nondrinking social networks and recreational opportunities, including a buddy system, involvement with a specialized social club, reconnection with family and friends, and even pets (and plants!);
4. Implement Antabuse¹ assurance (this is not simply a prescription, but rather a set of interlocking practices structured into family culture, an approach we will discuss later in this chapter);
5. Provide drink-refusal training; and
6. Train in controlling urges to drink.

Results

In four controlled studies with both inpatients and outpatients, the CRA has proven substantially more effective than standard treatment. For

¹Antabuse is a medication that will make a person ill if combined with alcohol.

example, at 6-month follow-up, patients originally treated with the CRA on an inpatient basis drank on fewer than 1% of days, compared with 55% in the standard treatment group; 20% of the CRA clients were unemployed, compared with 56% of the control participants (Azrin, 1976). At 6-month follow-up in a study with outpatients (Azrin, et al., 1982), the standard treatment group reported more than 50% drinking days, whereas the CRA treatment group experienced almost total sobriety. For patients who were married or living together (who also tended to have richer social networks), only the Antabuse assurance procedure was required; for single patients, the entire CRA package was important. Variations of the CRA have recently been tested with drug abusers as well. Results have been very encouraging in work with persons with cocaine and marijuana problems (Budney, Higgins, Bickel, et al., 1993; Budney, Higgins, Delaney, et al., 1991). Pilot data for work with inner-city crack cocaine users and heroin addicts suggests that the CRA may have promise for work with that population as well (Meyers & Smith, 1995; Ojeda & Mattaini, 1995).

The Community Reinforcement Approach as Cultural Design

One way to think about the CRA is simply as a multicomponent intervention package that appears to reliably produce excellent outcomes, and this is clearly true. At the same time, the work of Azrin and his colleagues and those who are replicating that work can be more precisely viewed as being deeply rooted in the concepts of cultural design on several levels. A central target of the approach is to establish new practices in the microculture of the family. For example, establishing a ritual for the person in treatment around the daily taking of Antabuse in the presence of a significant other involves reciprocal interlocking behaviors and consequences for both parties (note how different this is from a simple commitment to take Antabuse on one's own). In addition, the CRA was among the pioneering approaches that emphasized the need to establish a culture (set of social contingencies) of positive exchange in the marital relationship (Reciprocity Marriage Counseling), a concept that has been extended by a number of behavioral innovators (Holtzworth-Munroe & Jacobson, 1991; Stuart, 1980).

Establishing new practices in the family is only the beginning, however. The CRA in its full implementation also involves the design of new cultural entities (e.g., the Job Club and the United [social] Club), each of which is established specifically to reinforce positive alternative behavior patterns among members and is explicitly designed to ensure that important contingency interlocks are present. These are not simply new arrangements of contingencies that are set up to support an individual, but rather they are networks of practices that involve interlocking contingencies for

classes of participants that are transmitted to new members of the group over time—new cultural entities with their own cultures.

At yet another level, the CRA strongly encourages clients to participate in existing cultures (particular types of jobs and recreational activities) in which contingency arrangements support sobriety for the individual who joins those cultures. Just how different the CRA is from other approaches that primarily emphasize exhortation, confrontation, individual commitment, and encouraging the client to take particular steps without explicit attention to the network of consequences that will support and maintain the new behavior, may not be immediately apparent. If, however, one steps back and examines the respective contingencies for each, the distinctions are crucial. Exposing the client to new systems of consequences (some of which he or she is involved in creating, and all of which he or she is involved with maintaining) is the key difference. Often, the traditional approach simply provides new rules with the hope that the client will follow them (and perhaps be exposed to alternative sets of contingencies). It does not address this issue directly, however. By emphasizing a kind of conversion experience, the traditional model places the causes of drinking as well as the responsibility for recovery firmly with the individual (despite the concept of powerlessness). Although new rules can often help for a time, some clients may follow the new rules for varying periods without experiencing adequate reinforcement for alternative behavior soon enough to maintain sobriety. The differences between the CRA and traditional approaches may appear subtle when taking a cross-sectional look at the events occurring in treatment; however, the CRA's emphasis on explicitly rooting the client in new contingency interlocks is, in fact, profound. Note that for those for whom they work, self-help groups such as Alcoholics Anonymous and therapeutic communities also involve exposing the client to a new culture, and those who do best in such programs appear to be those who become deeply immersed in them. I argue that explicit attention to the operative interlocking contingencies in such settings may be valuable in enhancing and extending their effectiveness. Why is a demonstrably effective model like the CRA not better known and in widespread use? This question is also a matter of cultural practices that probably needs to be analyzed with the tools discussed in this chapter: the cultures of the treatment community and funding sources are important places to start.

Although not yet well known, programs rooted in cultural design already exist in the alcohol treatment field and, in retrospect, may appear to be obviously sensible. But with regard to many of the other problems discussed in this volume, a cultural design perspective has not commonly been taken. Responses (even behavioral responses) to violence and sexual coercion, to school failure, and to many other problems, have typically

emphasized the problem behavior of the individual. These responses have looked at finding ways to change the individual (biologically, psychologically, cognitively, etc.), but have not focused on the interlocking behavioral systems needed to maintain new individual behaviors over time, much less on the need to establish behavioral cultures that prevent problems—and respond effectively to them when they do occur—for entire classes of persons.

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2

BEHAVIOR ANALYSIS AND SOCIAL WELFARE POLICY

BRUCE A. THYER

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This chapter provides a review of the application of elementary principles of operant behavior (more accurately, rule-governed behavior), toward the conceptualization, design, and evaluation of social welfare policy. All social policy is intended to influence human behavior, and it does this most often through the contrived manipulation of contingencies of punishment and, sometimes, reinforcement. Policy examples that use contingency management are provided in this chapter to support this thesis.

The interdisciplinary field of behavior analysis takes as its purview the empirical investigation of how environmental events affect the actions of organisms. No activity in the realm of human comportment is excluded from this definition. Within our field, behavior has been defined for the past 50 years as the actions of a person—whether externally observable or private. (Private actions occur within the skin and are not obviously detectable to a second party.) The silent movements of one's lips, the spoken word, and the thoughts that occur prior to speech are all grist for the

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