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PERSONALITY THEORY AND FIRESETTING:

An Elaboration of a Psychological Model

Robert G. Vreeland and Marcus B. Waller

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Prepared for and sponsored by

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Notice

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PREFACE

This report is the second major product of a two-year project sponsored by the Center for Fire Research, National Bureau of Standards (Grant Number G7-9021), designed to place what is known about firesetting in the context of current knowledge of personality and behavior. The first year's report reviewed the firesetting literature and outlined a conceptual basis for classifying firesetting behavior and for analyzing and understanding its determinants. The function of the first report was an informative one. Its target audience was selected members of various professions, (e.g., criminologists, psychologists, educators, and social workers) with general responsibility or interest in the field. In contrast, the current report is aimed at behavioral scientists and clinicians who are specifically concerned with understanding and treating firesetting as deviant behavior. Although some sections of the present report will doubtless be of interest to the general reader, we have made no specific effort to write for this group. The purpose of this report is to integrate an understanding of firesetting behavior with a more general understanding of behavior theory and to examine in detail the implications of the theoretical framework presented for future research and for clinical treatment of firesetting in children and adults. To accomplish this purpose in a manageable document we assumed that readers would bring a general knowledge of personality theory and some familiarity with the basic principles of behavior theory and social learning theory to the task. While some of the material presented might be subjected to a more quantitative statement we have not done so since it might imply that data characterizing firesetting are in better shape than they actually are. We do not wish to contribute to an illusion of precision without a firm conviction that adequate data banks are a part of the near future.

Having stated our strategy we must quickly add that the report is not uniformly technical. Even the casual reader can understand the main points of the argument by simply skipping over the jargon. For the reader with a focused interest, e.g., on treatment of firesetters, those portions of the report can be read directly without prior consideration of theoretical issues. Similarly, the reader interested in our recommendation for future research will, we hope, come to understand that a psychological analysis of firesetting depends on adequate data being available for analysis. We are not likely to make progress unless and until a detailed description of the setting, the fire, and the firesetter are collected and made accessible for analysis.

A different set of questions might be raised regarding our emphasis of social learning theory. Certainly other approaches were available. We chose to develop social learning theory specifically because it offered an opportunity to develop a unified approach which is derived from and depends on a broad base of research data. The psychology of firesetting is poorly understood not only because the data are weak but also because the theories have only asked for weak data. Social learning theory requires robust data and we hope this conception will encourage both individual researchers and interested agencies to get on with the collection and utilization of the data.

Finally, we feel compelled at the outset to admit that while there is a strong empirical base for social learning theory and for the extension of this conceptualization to firesetting behavior, the theory has not been tested on firesetting. Only future research efforts and attempts at treatment of firesetting based on the social learning model will substantiate the value of

this approach. It is our hope that the theory will be tested often, well, and soon.

Several people, both individually and collectively, have contributed to this report. Dr. Bernard Levin of the Center for Fire Research has guided the project from its inception, and his informative suggestions and comments are greatly appreciated. Dr. E. E. Baughman has served as a valuable source of information on personality theory and clinical psychology. Drs. G. R. Patterson and J. B. Reid, along with the staff of the Oregon Social Learning Center, contributed a great deal of time and effort in sharing their knowledge of the determinants of deviant social behavior with us. Many of our ideas on the treatment of youthful firesetters doubtless originated with the Youthful Firesetters Workshop, which was held in Los Angeles in April of 1978. For this we owe a debt of gratitude to Laura Buchbinder of the U.S. Fire Administration, Captain Joe Day of the Los Angeles County Fire Department, and all of the participants in that workshop. We acknowledge the contributions of all of these people to what important ideas are present in this paper, while of course retaining responsibility for those ideas open to criticism. Finally, Patricia Eichman has been invaluable as typist and as a consultant in form and style.

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ABSTRACT

This report attempts to develop a theoretical framework for understanding firesetting behavior in terms of social learning theory. An advantage of the social learning approach is that it provides a unified functional approach to classification, theory, and therapeutic change, and that there is some continuity between an understanding of firesetting and an understanding of the determinants of behavior in general. Three major aspects of the interaction between a person's behavior and the social environment are considered. (1) At the behavioral level, the individual's behavior acts upon and is acted upon by the environment, and aspects of the rearing environment which may lead to firesetting are considered. (2) Vicarious processes determine how behavior is influenced by other sources of information, including modeling and instructional influences. (3) Cognitive processes determine how a person selects, encodes, and evaluates incoming information about the social environment, and how behavioral sequences are determined in light of the person's expectations and abilities. These three components, which are considered basic processes in a person's successful adaptation to the environment, sometimes interact in ways which produce and maintain deviant behavior patterns, including firesetting. The implications of social learning theory for the treatment of firesetting in children and adults are discussed in detail. While the importance of social learning processes in the development and maintenance of behavior has received wide empirical support, applications to firesetting behavior have been largely unexplored. The present paper provides a framework for future studies examining the social learning determinants of firesetting behavior.

INTRODUCTION

In an extensive review (Vreeland & Waller, 1978), we were critical of two major aspects of the firesetting literature which have impeded the understanding of firesetting behavior. The first was the lack of an adequate classification system. The second was an over-reliance on psychodynamic explanations of firesetting. The solution we proposed to the classification problem resulted in a system that led us to an understanding of firesetting behavior in terms of social learning theory. The theoretical implications of our approach were, however, only briefly touched upon. In the present report the classification system will be revisited and the significant features of social learning theory will be fully developed. First, though, by way of introduction, we will briefly restate our earlier arguments.

Classification Systems

Early attempts at classifying firesetters have concentrated on identifying single overriding characteristics of various groups of firesetters. Almost universally, classification has been in terms of motives for the firesetting act, such as revenge, jealousy, excitement, the "irresistible impulse" to set fires, and the like (Inciardi, 1970; Lewis & Yarnell, 1951). The problem with this approach is that potentially distinguishing characteristics may be ignored. An example is provided by Virkkunen (1974) who compared a group of 30 schizophrenic arsonists to 30 nonschizophrenic arsonists. For both groups, Virkkunen found "hate" to be the predominant motive for firesetting. However, for the controls, the "hate" motive, and hence the firesetting acts, appeared to be directed primarily against relatives and acquaintances, while for the schizophrenics, the "hate" motive appeared to be directed more towards outsiders and the community as a whole. The majority of schizophrenics set fire to objects or buildings which were unoccupied at the time of the fire, while the majority of the controls set fires to residential houses. As might be expected, schizophrenics were considerably more likely to be described as having set their fires as a result of hallucinations or delusions than were the controls. Controls set more fires under the influence of alcohol than did the schizophrenics.

Without even considering the problems of a study based on psychiatric diagnosis, Virkkunen's (1974) study has some interesting implications. Based on the use of alcohol, the presence or absence of delusions or hallucinations, the types of structures burned, or the object of the "hate" motive, the schizophrenics could be said to differ markedly from the controls. However, based on the presence or absence of the "hate" motive, most of the schizophrenics and controls would be classified similarly. It is this latter strategy which seems to be the principal one adopted by Lewis and Yarnell (1951) and Inciardi (1970), who classified firesetters principally by motives. This could be a fruitful strategy if the firesetting motive turned out to be, in fact, the most important consideration, with other factors playing a relatively minor role. However, if motives were not the only significant factor, then important distinctions between firesetters will have been overlooked.

It is our contention that such important distinctions have, in fact, been overlooked. For example, many of the firesetters who were considered psychotic in Lewis and Yarnell's (1951) sample were included in the revenge group. In addition, a separate category of psychotic firesetters was

specified that included only those who did not fit easily into one of the specific motive classes. This is a confusing state of affairs since the classes have no common base and are not mutually exclusive. Practically, the system has not proven to be very useful in understanding when and under what conditions firesetting will occur, or in providing appropriate intervention strategies to reduce occurrences of firesetting. Rather than classify firesetters a priori and then try to provide a more detailed description of the various classes selected, the reverse tactic might be more appropriate. That is, the development of an adequate descriptive system should precede a functional classification system.

The descriptive system we proposed employed a basic model of behavioral assessment (cf. Goldfried & Davison, 1976) which considered four major aspects of behavior: antecedent environmental conditions, organismic factors, actual firesetting behavior, and the consequences of firesetting. Antecedent events refer to the individual's physical and social environment, and to specific events which may precipitate firesetting. Organismic factors are personal variables which an individual brings into any situation and may include such things as age, sex, genetic factors, physical disabilities, associated behavioral and psychiatric problems, intellectual abilities, and cognitive style. Some of the important aspects of actual firesetting behavior might include the degree and sophistication of preparation, the incendiary materials used, the location of the fire, the structures burned, and whether or not the firesetter flees or remains at the scene of the fire. Finally, actual or potential consequences of the firesetting act may serve to reward or otherwise maintain firesetting behavior. These include the warmth and visual stimulation of the fire, the confusion which the fire creates, praise from peers for an act of defiance, praise from authority for helping to put out the fire, and economic gains.

Many of these aspects of firesetting have been considered in a variety of studies on youthful and adult firesetters. Yet what is crucial about the approach suggested here is the recognition that for each individual firesetter there are likely to be multiple determinants of the target behavior. This is a contention which was explicitly stated by Macht and Mack (1968) and one which few clinicians would dispute. However, its implications have escaped a systematic examination by researchers. "Types" of firesetters may be better identified by clusters of factors which commonly occur together and which are likely to interact with one another. While we have a good idea from the literature what many of these factors are, it is through a consideration of how they interact that there will be an improvement in classification and in an understanding of the determinants of firesetting behavior.

Theoretical Considerations

Psychoanalytic approaches to understanding firesetting have long dominated the literature. This is partly because psychoanalytic thinking has been a dominant force in all of psychiatry and psychology. Perhaps a more important reason in the case of firesetting is the heavy emphasis of psychoanalysis on the symbolic nature of behavior. Fire has played such an important role in the development of civilization that myths of its origin have appeared in nearly every culture (Frazer, 1930; Freud, 1932; Grinstein, 1952), and it is a universal symbol in language and literature for sexual passion and for extremely destructive impulses (Axberger, 1973; Grinstein,

1952; Lewis & Yarnell, 1951; Topp, 1973). It is a small wonder, then, that so many theorists have accepted the notion that firesetting is an expression of repressed sexual impulses (Gold, 1962; Lewis, 1965; Robbins, Herman, & Robbins, 1964; Simmel, 1949; Stekel, 1924a, 1924b). Psychoanalytic theory systematically integrates myth, symbol, and behavior in an account of firesetting.

Yet it is precisely the fact that fire is a universal symbol of sexual passion, and that sexual conflict is virtually a universal human experience, which makes sexual explanations of firesetting of limited value. Moreover, there is apparently no simple equation which relates sexual conflict to firesetting. Among adult firesetters, marital and occupational adjustment, alcoholism, and other antisocial behaviors have been common. In children, firesetting has been associated with hyperactivity, running away from home, truancy, stealing, destructiveness, and aggression (Nurcombe, 1964; Vandersall & Wiener, 1970; Yarnell, 1940). We stated in an earlier paper (Vreeland & Waller, 1978) that sexual conflicts as well as these numerous other problems may perhaps be viewed more accurately as parallel indicators of a more generalized behavioral disturbance (Vandersall & Wiener, 1970). It is this generalized disturbance that must be considered in any psychological analysis of firesetting. Indeed, many of the characteristics of firesetters appear to be similar to those of other delinquent populations.

There also appear to be distinguishing features of firesetters. For example, a number of studies of adult firesetters in prisons and hospitals have found that as a group, firesetters commit a greater number of offenses against property (other than arson) and fewer crimes against persons than do other types of criminals (Hurley & Monahan, 1969; McKerracher & Dacre, 1966; Tennent, McQuaid, Loughnane, & Hands, 1971; Wolford, 1972). This is a potentially significant finding because it suggests that arsonists may avoid situations which involve direct confrontation with other people.

From the preceding discussion, there appear to be three basic levels of understanding to be taken into account: (1) characteristics which firesetters have in common with other delinquent populations which distinguish them from the normal population, (2) features which distinguish firesetters from other types of delinquents, and (3) features which distinguish "types" of firesetters from one another. The search for such distinctions involves the assumption that differences in behavior will, on analysis, reflect differences in the determinants of those behaviors. This does not necessarily mean that fundamentally different processes are operating. It may be that different environmental events are interacting with basic behavioral processes to produce different outcomes. It is this assumption that environment is fundamental which is the basis of the social learning approach to understanding firesetting which we proposed earlier (Vreeland & Waller, 1978) and which will be the focal point of the theoretical formulations of this paper. A clear advantage of social learning theory is that it provides a unified functional approach to classification, theory, and therapeutic change. It also provides continuity between an understanding of firesetting and a more general understanding of behavior.

It would be presumptuous on our part to suggest that enough data exist to formulate a complete theory of firesetting. It would be more appropriate to say that we shall attempt to lay some extensive theoretical groundwork for future research. For example, although there is an extensive body of research covering social learning in general, some large gaps will

necessarily exist in its application to the study of firesetting. Many of our conclusions will be in the form of statements of needed research, predictions about what such research may reveal, and interpretations of currently available data in terms of social learning, even though such data may not be conclusive. Nevertheless, we believe that these exercises will lend a structure to the study of firesetting which has not heretofore existed, and which will suggest fruitful research strategies for the future. It is also true that, although the social learning approach may handle them somewhat differently, many concepts which appear in other theories of personality and behavior have their counterparts in social learning theory. In some cases it will be instructive to examine these concepts in the light of the theoretical system developed here.

SOCIAL LEARNING THEORY

An Overview

Human beings are highly structured, complex organisms. Behaviorally, the complexities of structure are often expressed in terms of various capabilities, capacities, or competencies. However, although various capacities may constrain or limit behavior in certain ways, it is nevertheless true that within whatever limitations exist, behavior comes about through the interaction of an individual with an environment. The environment instructs the individual as to what behavior is appropriate in a given situation, it informs the individual of impending events, and it provides feedback on performance.

These environmental influences on the behavior of people occur primarily in a social context. In educational, employment, home, and recreational settings, much of what people do both affects and is affected by the behavior of other people. Behavior is a stimulus as well as a response, and this is perhaps the most significant aspect of human social behavior. A person's actions in a particular situation may alter other people's responses to that person in the future, and this may in turn further alter his behavior. Thus social behavior must be considered in the context of an interacting system, in which all participants mutually affect the behavior of one another. In well-developed social systems, such as the family unit, somewhat stable response patterns between members are likely to evolve, and in some cases they may have highly maladaptive long-term consequences. For example, children who have been identified as aggressive tend to come from families where all members exhibit high rates of aggressive or coercive behaviors (Patterson, 1976, 1978; Patterson et al., 1975). The role of the entire family has been emphasized in recent approaches to therapy (Minuchin, 1974) and prevention of disturbances (Klein, Alexander, & Parsons, 1977).

An analysis of human social behavior must take into account the situation in which the behavior is observed. Upon hearing that an individual behaved in a loud and boisterous manner, for example, we would not be surprised to learn that such behavior occurred at a football game. Our eyebrows might be raised, however, if we were told instead that the behavior occurred at a church service, where such behavior would normally be considered inappropriate. On the other hand, further investigation might reveal that the person belonged to a particular religious sect which permits or even encourages frenzied behavior. A judgment of the appropriateness of a set of actions

necessarily depends on the setting and cultural context in which the behavior occurs. Through experience human beings are normally quite sensitive to what is or is not permitted in various situations, and often there is a fairly wide tolerance for permissible behavior. It is when there is a serious divergence from social norms that behavior, and the person exhibiting the behavior, are labeled "deviant" (Bandura & Walters, 1963; Szasz, 1961; Ullman & Krasner, 1969).

The situational specificity of behavior has led to extensive criticisms of trait theories of personality. Trait theories (cf. Allport, 1961; Monte, 1977, ch. 12) postulate personal dispositions to exhibit consistent patterns of behavior. For Allport, traits were considered real. Neuropsychic structures determined behavioral consistencies by rendering many different stimulus situations functionally equivalent. Mischel (1968, 1973), in extensive reviews and analyses of trait theory, found little support for traits or for global consistencies as determinants of behavior, with perhaps the exception of intellectual functioning. His major conclusions may best be abstracted in his summary of several trait studies investigating the relative contributions of persons and situations to behavior: "On the whole, these studies have indicated that the sampled individual differences, situations and response modes when considered separately tend to account for less variance than does their interaction" (Mischel, 1973, p. 255).

A hypothetical example of two types of person-situation interactions is shown in Figure 1. In the first panel, individual A exhibits more of behavior X in both situations Y and Z than does individual B, even though there is also an obvious situation interaction. This result could be consistent with both trait theory and social learning theory. With the additional consideration of some environmental moderating variables, differences in an underlying trait or disposition to behave in a certain way might still be hypothesized to explain the ordinal relationships between the two individuals in the two situations.

In the second panel, however, the ordinal relationships are reversed in the two situations. This would present a problem for trait theories, since no simple theory of behavioral dispositions would predict such a reversal. Such a result might be obtained if we were to measure sociability in two individuals, one deaf and the other hearing, in two situations, one in which the other people present were deaf and one in which the other people present were hearing, as is depicted in Figure 2. The deaf person, if he knew sign language, might be very sociable with other deaf people with similar skills but keep to himself in the presence of only hearing persons. The hearing person, without the requisite skills to communicate with the deaf, might very well show just the opposite pattern. This is an extreme example, but it illustrates an important point.

Ultimately, the important theoretical as well as practical question is not one of the relative importance of either the environment or personal variables in determining behavior. Behavior does vary with situations, but consistencies in behavior across situations may also be observed. The important question is: How shall we consider them? In the viewpoint presented here, consistencies as well as differences in behavior are viewed as outcomes, rather than evidence of underlying determinants of behavior (Bandura & Walters, 1963); they are the result of the interaction between the person and the various situations he encounters. "To say that what a person thinks, and does and feels--and hence what he is at any moment--

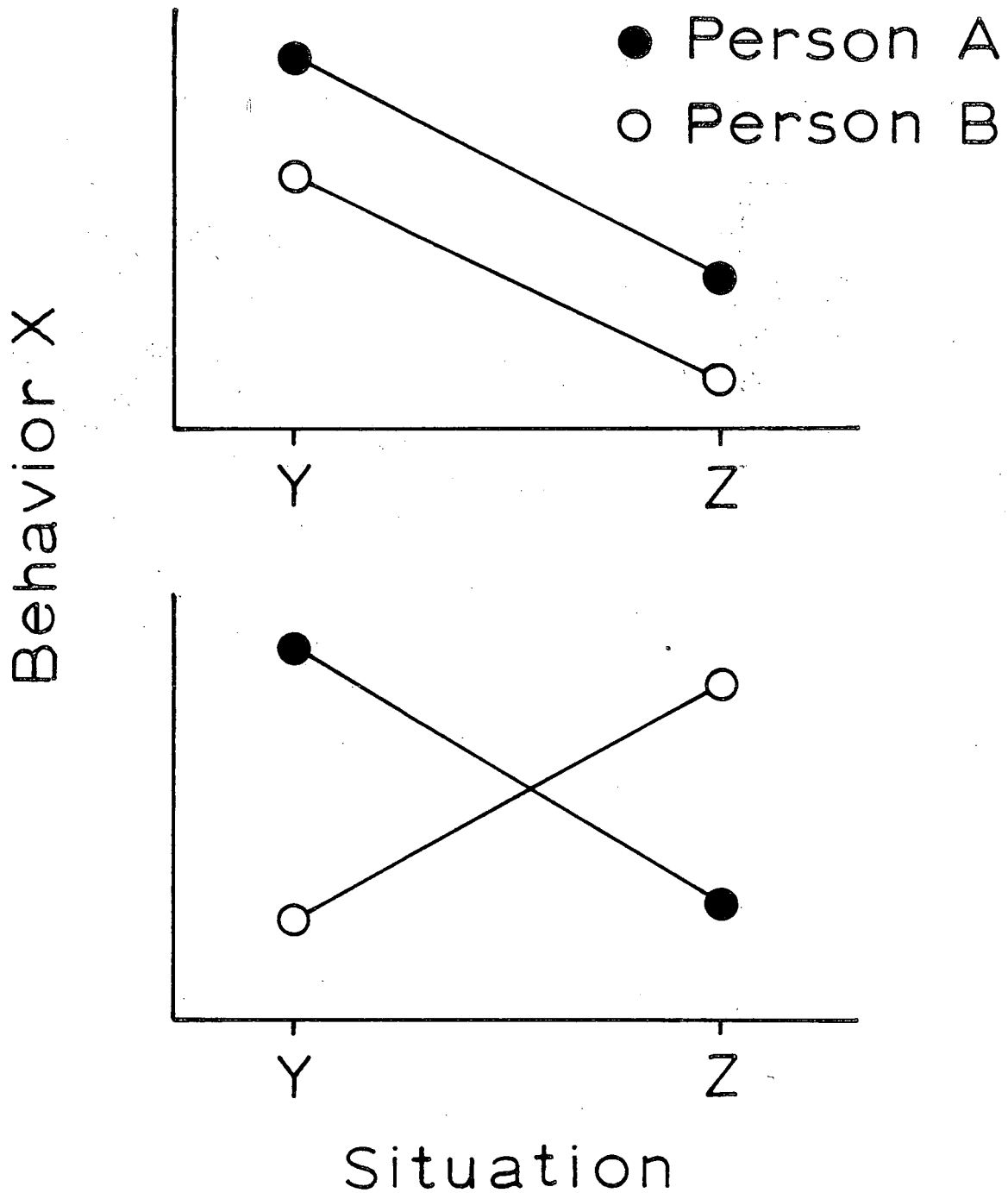

Figure 1. Hypothetical depiction of two types of person-situation interactions. In the top panel, ordinal positions of persons A and B are preserved across situations. In the bottom panel, the ordinal positions are reversed.

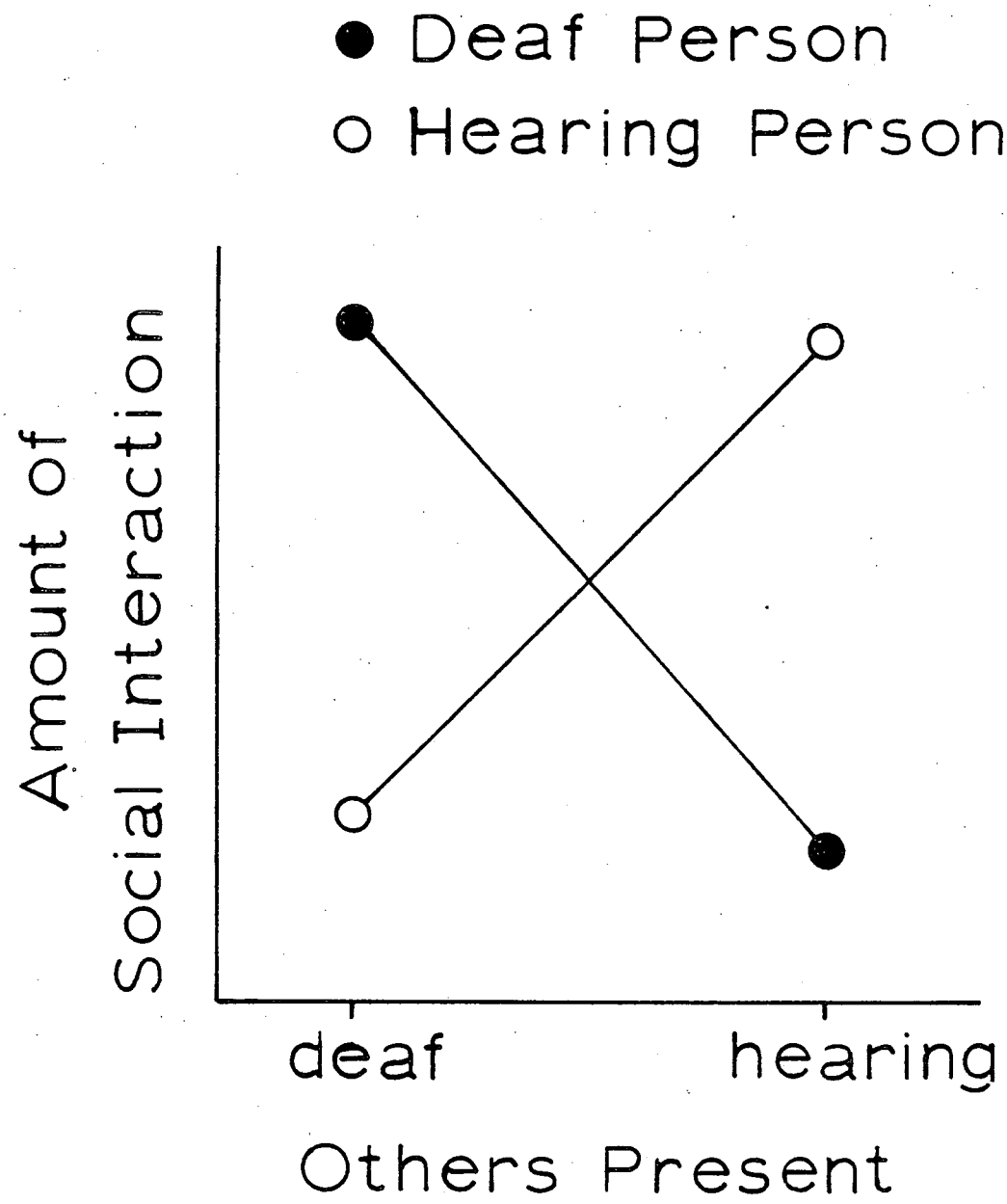

Figure 2. Hypothetical person-situation interaction showing social interactions of two persons, one deaf and the other hearing, across two different social situations. In one social situation the other people present are deaf, while in the second situation the other people present are hearing. The figure demonstrates the type of person-situation interaction shown in the bottom panel of Figure 1.

depends on many subject and condition variables is also to underline the complexity and uniqueness of his behavior" (Mischel, 1973, p. 256).

The preceding arguments are important to the topic of firesetting because the characteristic behaviors of firesetters have been said to be due to impulsive traits or characters (Rothstein, 1963; Schactel, 1943). These consistencies in behavior may be properly studied in their own right, and are important considerations in the study of firesetting as we have elsewhere indicated (Vreeland & Waller, 1978). But ultimately they must also be explained, for they are observed phenomena rather than causative agents. Moreover, we are convinced that the search for an explanation of firesetting, or any other behavior for that matter, must necessarily link an understanding of the causes of the behavior to an understanding of the agents of change for that behavior. Though we are far from any such complete understanding of firesetting, a social learning or interactional approach seems to be a good start, and a great deal of what is already known is consistent with such an analysis.

Basic Considerations

Much of the recent theoretically important research on conditioning and learning has centered around findings that there appear to be constraints on learning which go beyond mere physical limitations on performance. Breland and Breland (1961) reported that in various species, natural reactions to reinforcement often interfered with the behavioral sequence being conditioned. Bolles (1970) proposed that animals will show superior avoidance or escape conditioning in the laboratory if the required avoidance or escape response is similar to what the animal would do in a natural avoidance or escape situation rather than a response which is incompatible with the natural response. Garcia and his associates (cf. Garcia & Koelling, 1966), in studies of rats, have found that gustatory and olfactory cues are more readily associated with later illness, whereas auditory and visual stimuli are more readily associated with painful electric shock, suggesting that there may be an innate predisposition to associate specific environmental cues with specific consequences. In a similar vein, pigeons have been found to readily peck at stimuli which predict food (Brown & Jenkins, 1968) even when such pecking eliminates the predicted food presentation (Williams & Williams, 1969).

In a review of such phenomena, Seligman (1970) introduced the term "preparedness" to describe prepotent response tendencies. The subject is treated in a detailed fashion in a later collection of works edited by Seligman and Hager (1972). Bandura (1977b) has stated that while severe biological constraints may play an important role in the behavior of many species of lower animals, they are not likely to play a large determining role in human behavior. Citing an "advanced human capacity to symbolize experience and limited inborn programming" (p. 73), Bandura goes on to say that the wide variety of behavior which humans are capable of learning under diverse circumstances is evidence for the action of highly generalizable processes of learning in humans.

While Bandura's (1977b) statement may be essentially correct as far as innate stimulus-response mechanisms and the ability to develop diverse adaptive responses are concerned, it ignores the real importance of biological mechanisms in human learning. The human capacity to symbolize experience, and to learn by observation and other vicarious processes, is perhaps as

"preprogrammed" as are specific stimulus-response mechanisms in other animals, and it certainly is as biologically determined. Moreover, even the "general processes" of learning which are thought to operate in a wide variety of species must be understood as biologically adaptive mechanisms. General principles of behavior change have been found to apply in a wide variety of species which have been separated for countless ages on the evolutionary scale. It is very likely that similarities in findings across species represent similarities in the way adaptive behavior mechanisms have been selected for by the natural environments or different species. Thus, questions about the "general processes" of learning are questions about biological processes of behavioral adaptation.

The foregoing is an important issue for the study of "deviant" behavior such as firesetting as well as for normal behavior. As a first approximation, it will be useful to look at the extent to which firesetting may be a result of the operation of adaptive mechanisms in abnormal situations. Individuals with some highly deviant behavior patterns may also show a great deal of adaptive behavior in their day-to-day living. This means that it may be more correct to view deviancy on a continuum with normal human behavior, rather than to try to establish clear distinctions between normal and abnormal processes. Our approach is clearly different in this way from that of Yochelson and Samenow (1976). Note that our approach does not deny the existence of individual differences or of predispositions to behave in certain ways. However, it recognizes that, even considering such predispositions, a great latitude of behavioral outcomes is possible (Mischel, 1973). The purpose here is to consider the processes involved in the development and maintenance of firesetting behavior.

To this end, we will review briefly the findings of previous research and attempt to show how the variables delineated suggest a small number of basic processes. We will then try to show how these processes combine to suggest a general theory of social behavior that can offer insight into firesetting as an example of deviance. Finally, we will attempt to show that our theory offers new directions for future research and a theoretical basis for therapeutic intervention with firesetters.

Patterns of deviance are generally apparent early in life (Patterson, 1978; Robins, 1966), and adult firesetters as a rule do not deviate from this finding. Rearing environments have often consisted of large families of low socioeconomic status in which one or both parents were absent from the family constellation (Hurley & Monahan, 1969; Inciardi, 1970; Lewis & Yarnell, 1951; Wolford, 1972). Similar findings have been reported for families of firesetting children (Kanner, 1957; Macht & Mack, 1968; Nurcombe, 1964; Siegelman, 1969; Siegelman & Folkman, 1971; Vandersall & Wiener, 1970). Children who set fires have been shown to have considerable academic difficulties as well (Kaufman, Heims, & Reiser, 1961; Siegelman, 1969; Siegelman & Folkman, 1971; Vandersall & Wiener, 1970), which is consistent with a finding in adults showing the educational level of arsonists to be lower than for a sample of nonarsonist criminals (Wolford, 1972). All of these studies of both firesetting children and adults have shown that these individuals also typically display other deviant patterns of behavior, both delinquent and social.

The similarities between findings in the child, adolescent, and adult literature on firesetting suggest that at least in the consideration of early developmental aspects of firesetting, studies of children may provide

a good model for the understanding of older firesetters as well. This temptation to generalize must of course be tempered by considerations of sample bias (Vreeland & Waller, 1978) as well as by other considerations. Among adults, the only firesetters studied are the ones who are caught. Adult studies have been mainly of the so-called "psychologically motivated" firesetters, and have virtually ignored arson-for-profit (Vreeland & Waller, 1978). Arson-for-profit very likely represents something quite different from other types of arson, and we will occasionally point out psychological variables which may be important for arson-for-profit as this discussion proceeds. Studies of childhood firesetters have, with few exceptions (Kafry, 1978; Siegelman, 1969; Siegelman & Folkman, 1971), employed samples from clinical populations, and firesetting often has not been the primary reason for referral in these studies. Moreover, childhood firesetting is sometimes considered only a reaction to transient situational problems or an outgrowth of curiosity about fires (Kafry, 1978; Siegelman, 1969), while in older individuals it is always considered a serious maladaptive behavior.

In spite of these difficulties, findings across a variety of situations show enough consistency to warrant an attempt to develop a general model of firesetting in order to generate a framework for continued study. As better data become available, of course, this justification can be tested, and the model can be improved upon. An incidental advantage of the childhood firesetting model is that much more information is available about the families of firesetting children than about the rearing environments of older firesetters, undoubtedly in part because families of firesetting children are available to take part in the studies and thus the available information is likely to be much more detailed. Thus, to the extent that the model accounts for the presence of deviant patterns in older as well as younger firesetters, future research on the determinants of firesetting behavior may be considerably more productive.

BEHAVIORAL PROCESSES IN FIRESETTING

A major portion of the theory of the development of firesetting presented here depends on the observation of many researchers that firesetters are reared in environments which appear to support deviant behavior. Parents of youthful firesetters have been variously described as unresponsive, rejecting, aggressive, or overly punitive (Nurcombe, 1964); selfish and depriving the child of love and security in the home (Yarnell, 1940); alcoholic, abusive, and psychotic (Kaufman, Heims, & Reiser, 1961). Of 21 juvenile firesetting cases, Nurcombe (1964) found only one case in which he considered both parents to be "primarily adequate, affectionate, mature, accepting, or consistent figures" (p. 583). Vandersall and Weiner (1970) found that mothers of firesetting children "were, to varying degrees, affectively distant, rejecting, ineffective, and in some cases overprotective" (p. 65). Such environmental stress may produce considerable cognitive and emotional effects which in turn affect behavior, and these will be discussed later on in this paper. The immediate focus of our attention is an account of the behavioral reactions engendered by these situations.

The account we propose emphasizes two possible reactions to social deprivation or punishment. First, changes in response intensity characterize aggression. Second, shifts in response variability characterize firesetting and other similar responses. Furthermore, whether changes in response intensity or response variability predominate in a given situation depends on

specific variables operating in that situation.

Response Intensity Shifts

When reinforcement is withdrawn or the rate of reinforcement reduced, responding often becomes more intense. The result may be an increase in the force of responding, more exaggerated responding, or an increase in the rate or speed of responding. These results have been demonstrated empirically in a number of studies, and findings on children have been reviewed by Bandura and Walters (1963, pp. 133-137). A simple example will also illustrate the point. You may be accustomed to easily unscrewing a jar lid. If the lid becomes stuck, however, your first tendency is to increase the force you apply to the jar lid, and if you are fortunate, the lid then gives way. Not only was there an automatic response of increasing the applied force, but the increased use of force was reinforced, i.e. it produced the desired result. The increased use of force may be more likely to occur again in a similar situation. Notterman and Mintz (1965) found that the increased response force of rats during extinction was enhanced if the rats had been previously reinforced for increases in response force.

Such a mechanism may help to account for the development of aggressive behavior in children. Patterson (cf. Patterson, 1968; Patterson et al., 1965) notes that even in families of non-problem children, fairly high rates of aversive, or what Patterson calls coercive, behavior are observed. Aggression, in modest quantities, may be quite normal, and in some cases may be adaptive. For example, retaliatory aggression may serve to punish the initial aggressive response, and thus be negatively reinforced. However, under certain circumstances, a child may learn that successively more intense aggressive behavior eventually leads to desirable outcomes. When escalated aggression leads to reinforcement and becomes a primary mode of receiving reinforcement, the defined limits society places on aggression may be violated, and aggression may be recognized as a problem for the child, and indeed for the whole family of the child.

The foregoing analysis will be seen to be related to the familiar frustration-aggression hypothesis (Dollard, Doob, Miller, Mowrer, & Sears, 1939), which states that aggression results when the attainment of a goal is blocked. In the original statement, aggression was considered an inevitable result of frustration; however, it has since been modified to say that frustration increases the probability of aggression (Berkowitz, 1969).

However, Bandura and Walters (1963) found little use for the frustration-aggression hypothesis in explaining aggression. In a well-documented argument, they pointed out that the influences of training and experience may play the most important role in determining aggression. In his most recent account of social learning theory, Bandura makes no mention of the frustration-aggression hypothesis, even though many animal studies, including those with primates, have found attack to be a response to extinction or aversive stimulation (Azrin, Hutchinson, & Hake, 1966, 1967; Hutchinson, Azrin, & Renfrew, 1968; Reynolds, Catania, & Skinner, 1963; Ulrich & Azrin, 1962). Azrin, Hutchinson, and McLaughlin (1965) found that the opportunity for aggression during aversive stimulation may act as a reinforcer for an operant response. Even in these animal studies, however, aggression has been shown to be a modifiable response (Azrin, 1970; Baisinger & Roberts, 1972; Ulrich, Wolfe, & Dulaney, 1969), and in any case Bandura (1977b) rejects the notion of species-specific stimulus-response

relationships in humans, and emphasizes the flexibility of human behavior.

The present position differs significantly from the frustration-aggression hypothesis in that it does not posit the initial cause of aggression. Rather, we accept Patterson's (1976) argument that aggression is already in the repertoire of the child. Our theory attempts an explanation of how aggression may become a significant problem, i.e. increased response intensity. Some of the sources of the facilitation of aggression include positive reinforcement of aggression (Bandura & Walters, 1959, 1963), modeling (Bandura, 1965; Bandura & Walters, 1963), and generalization from other responses and situations (Lovaas, 1961; Walters & Brown, 1963). However, aggression may become a significant problem, increasing in frequency and intensity, when it is reinforced. The child may learn that escalation of aggression may produce positive reinforcers, or, when the aggression is a response to aversive stimulation from others, it may serve to reduce or eliminate that aversive stimulation (negative reinforcement). Evidence for the latter case comes from Patterson (1976) who suggested that negative reinforcement may be a primary process in shaping and maintaining aversive behavior in children. Since all members of families of aggressive children tend to show high rates of aversive behavior, the opportunity for aggressive behavior to develop and be negatively reinforced is increased. Patterson has shown that parental punishment of aversive and aggressive behavior in these children accelerates rather than suppresses such behavior, thus supporting the response escalation interpretation of aggression. The primary influence of "punishment" in such cases appears to be as a discriminative stimulus for an increase in response intensity or frequency.

Whether increases in response intensity are learned or innate reactions to interruptions in reinforcement is open to question. Without question they are biologically adaptive precisely because they often produce adaptive consequences in the natural environment. Our inclination is to view an increase in response intensity as a natural reaction to a reduction in reinforcement, but this view may be open to the same criticism that Bandura and Walters (1963) leveled against the frustration-aggression hypothesis; namely, that the response may be more readily described as a function of the learning history than of some innate process. The fact that learning history affects a performance does not necessarily mean that biological determinants of behavior are not operating, an argument which has not escaped recent supporters of the frustration-aggression hypothesis (Berkowitz, 1969). It is the biological organism's interactions with the environment which are the important determinants of behavior, and so we should not be surprised that it is not merely increases in response intensity, but the fact that such increases are differentially reinforced which is crucial to an analysis of the development of aggression.

Reinforcement of increases in response intensity may also affect aggressive behavior in other situations and towards other objects. Walters and Brown (1964) reinforced school children for striking a plastic clown (a Bobo doll) with a high or low intensity. During later play situations, boys who received high intensity training were observed to be more aggressive than boys who received low intensity training. The experiment was counterbalanced so that the reinforcement conditions were reversed 2 weeks later. The results were the same, and order of high and low intensity conditions had no effect on results.

The results of the Walters and Brown (1964) study demonstrate how

reinforcement of response intensity may modify aggressive behavior, and moreover that the effects may generalize and facilitate aggression in quite different situations. However, the reversibility of the results also testifies to the temporary nature of these facilitative effects without some maintaining consequences. In families of aggressive children, the requisite maintaining mechanisms may be well developed. Patterson (1976, 1978) points out, for example, that very young children in both distressed and normal families have developed coercive responses and use them at a high rate. The difference between aggressive and normal children is that for normal children the frequency of coercive behavior decreases as a function of increasing age, while aggressive children continue to employ coercive behaviors at a high rate. Thus coercive responses may have had a considerable time to be firmly established. Patterson (1976) cites the failure on the part of parents to consistently reinforce prosocial behavior and the use of ineffective and inconsistent punishment of coercive behavior, thus promoting negative reinforcement, as likely mechanisms in the maintenance of aggressive behavior. Lacking adequate prosocial skills and with a firmly established repertoire of aversive control skills, it should not be surprising that coercive patterns of behavior will be employed in situations outside the family as well.

Shifts in Response Variability

Increases in response variability typically result when the reinforcement rate is reduced. This result has been demonstrated in animal studies (Antonitis, 1951; Eckerman & Lanson, 1969; Ferraro & Branch, 1968; Notterman & Mintz, 1965; Vreeland, 1975) and in humans (Eckerman & Vreeland, 1973; Lane & Shinkman, 1963). Such changes in response variability may be most readily measured and understood when a "topographical" response dimension (Ferraro & Branch, 1968), such as the location of a response along an extended response manipulation, is employed (Antonitis, 1951; Eckerman & Lanson, 1969; Eckerman & Vreeland, 1973; Ferraro & Branch, 1968; Vreeland, 1975). When "quantitative" response dimensions are employed, such as response force (Notterman & Mintz, 1965) or response duration (Margulies, 1961; Millenson & Hurwitz, 1961), increases in variability may accompany changes in the mean force or duration, and may at least partially reflect a greater opportunity for response variation with increases in the mean.

It should be pointed out, however, that changes in either a "quantitative" response dimension or a "topographical" dimension constitute the appearance of new response variants that appear when previously reinforced variants are no longer adaptive. In real-world situations, opportunities for both types of shifts may be present. In the previously mentioned example of jar opening, attempts at the increased use of force may be ineffective, and shifts to other (topographical) response variants may appear, such as tapping the jar lid with a knife or running the lid under hot water. In this example changes in response intensity predominated over changes in response variability in that they tended to occur first, and responding became topographically variable only after increases in response intensity did not prove adaptive. This may not always be the case, however; for example, a child who is denied something desirable by a parent may attempt to gain the desired item by manipulating other family members (increase in variability), and failing this, throw a temper tantrum (increase in intensity). Characteristics of the situation and previous history of the individual in that situation may determine the predominance of one type of shift over another.

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g of new response patterns from ex-
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ened, but rather a constellation of
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wishes to shift behavior, and thus
ng variants is selected for rein-
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nsure that it will occur and can be
t for responses falling in the "old"
se in response variability about the
n the "new" class will result in a
s so that it now surrounds the mean
s of this procedure may produce a
from the original. Continued rein-
response class will result in a
se variants, or "stereotyped"

sized the selective effects of rein-
nsidered the environmental adapta-
atural selection in evolution.
in terms of the correlation between
iven situation, a positive correla-
an animal's behavior and the delivery

of reinforcement, that behavior will generally come to predominate in that situation" (Staddon & Simmelhag, 1971, p. 17). The notion of correlation is most important here, for it represents a significant departure from the contiguity-based law of effect, which holds that it is the contiguous presentation of response and reinforcer which strengthens the response. Since contiguity is merely a special case of correlation, it would seem that the notion of correlation adds little to an account of changes in response variability discussed thus far.

This would indeed be true were it not for the fact that the notion of a correlation-based law of effect (Baum, 1973) allows a far more general extension of these principles to situations relevant to our current topic. These are the cases in which multiple response alternatives are concurrently available, each alternative being associated with a particular reinforcement rate. In even the simplest experimental situation, this is the case, even though other responses and their associated reinforcers are often left unspecified. When such response-reinforcer relationships are known and specified, it has been found that, in a wide variety of situations, the response rate of a given response alternative relative to the total response rate for all alternatives is equal to the reinforcement rate for that alternative relative to the total reinforcement rate over all alternatives. This relationship may be expressed by the following equation, known as the Matching Law (Herrnstein, 1970):

$$\frac{R_i}{\sum_{j=1}^{N} R_j} = \frac{r_i}{\sum_{j=1}^{N} r_j} \qquad (1)$$

where R_i represents response rate of the i^{th} response alternative, r_i represents reinforcement rate correlated with the i^{th} response alternative, and N is the number of response alternatives.

Equation (1) applies readily to situations in which similar responses are being measured and similar types of schedules of reinforcement (Ferster & Skinner, 1957) apply. When responses or types of reinforcement schedules differ markedly, the more general form of equation (1), suggested by Baum (1973), applies:

$$\frac{t_i}{T} = \frac{r_i}{\sum_{j=1}^{N} r_j} \qquad (2)$$

where t_i represents the time spent engaging in a given behavior, T represents total time, and r_i and N are the same as in equation (1). This equation states that the relative time spent engaged in a given behavior is proportional to the relative reinforcement rate contingent upon that behavior. Finally, an abstract form of equation (2), stated by Baum (1973) applies to complex situations that are not subject to experimental analysis:

$$\frac{t_i}{T} = \frac{v_i}{V} . \qquad (3)$$

Equation (3) states that the relative time spent in a given situation is proportional to the relative value of that situation in comparison with other available situations. Value represents the sum of all the positive and negative outcomes in a given situation. In its most general form, then, the matching law states that the relative control over behavior exerted by a situation is equivalent to the relative reinforcement value correlated with that situation.

Equations (1), (2), and (3) each provide the same explanation of behavior but vary in the level of analysis required for verification. Equation (1) is subject to direct experimental verification when responses and reinforcers are each measurable in the same units (e.g., a laboratory rat's response rate in each stimulus situation is expressed in terms of lever presses per minute and the reinforcement rate is measured in terms of food pellets per minute). Equation (2) expresses the behavioral side of the matching equation in terms of the time spent engaging in various behaviors when they are qualitatively different (e.g., wheel-running and lever-pressing). Finally, equation (3) is an analytic expression of the matching relation when both responses and reinforcers are qualitatively different. A concrete example would be an analysis of the amount of time a person spends playing basketball versus the amount of time spent studying. There is currently no practical way of directly measuring the complex variables which determine the values of these two activities. There are undoubtedly some common determinants of value for the two activities as well as some factors unique to each. However, if equation (3) is accepted as valid, the

relative value of each of the activities is defined in terms of the relative time spent engaging in those activities. There are some practical as well as theoretical limitations to equation (3) which are beyond the scope of the current analysis. However, the matching law is a generally useful description of behavior when there are a number of freely available behavioral alternatives, and it will serve the analysis of firesetting behavior well.

To see how the relationship between response variability and reinforcement rate operates at these molar levels, consider a simple case in which three different situations account for all of a child's behavior, as is depicted in Figure 3. Situation B controls 75% of the child's behavior, and the remaining 25% is divided equally between situations A and C. (According to equation 2, 75% of the time would be spent in behavior B and 25% shared by A and C.) It is assumed that the relative reinforcement values also approximate this distribution. Now suppose the reinforcement rate in situation B is reduced so that it represents only 50% of the total reinforcement value. This can be accomplished by reducing the relative frequency of positive and negative reinforcement or increases in relative punishment. The stable resultant is a doubling of the relative standing of situations A and C, and since these three situations represent a closed system, the actual time spent in situations A and C increases as well. There has been an increase in the variability of behavior with the reduction of reinforcement rate correlated with situation B.

The important observation is that a reduction in reinforcement rate leads to a shift in behavior away from the response or situation correlated with that reduction, and an increase in reinforcement rate leads to a shift in behavior towards the response or situation correlated with that increase. Changes in the value of one component of a system lead to changes in behavior not only in that component, but in other components of the system as well. This can be seen as a basic process in an organism's adaptation to changes in environmental conditions. We will now show how it can also lead to behavior which is ultimately maladaptive.

The Development of Firesetting

We have characterized firesetting as exemplifying a pattern of high response variability in response to a relatively lower rate of social reinforcement in the home. Certainly this view is supported by evidence reviewed earlier in this paper and by Vreeland and Waller (1978) which suggests that both firesetting children and adults come from socially impoverished home environments. There are also other lines of evidence which strengthen this view and place it in a consistent framework.

First, firesetting is behavior which usually occurs outside the normal social milieu of the home. Evidence supporting this proposition is based more on the social context of the fire than on the location of the fire. With respect to location, there has been some disagreement over whether children set fires predominantly in or near the home (Yarnell, 1940) or away from home (Siegelman, 1969; Siegelman & Folkman, 1971). In adolescents there is apparently a shift to firesetting almost exclusively away from home, as might be expected (Lewis & Yarnell, 1951; Yarnell, 1940). With respect to social context, children have been found to set fires either alone or in the presence of siblings or other children (Kafry, 1978; Nurcombe, 1964; Siegelman, 1969; Siegelman & Folkman, 1971). Whether other children are

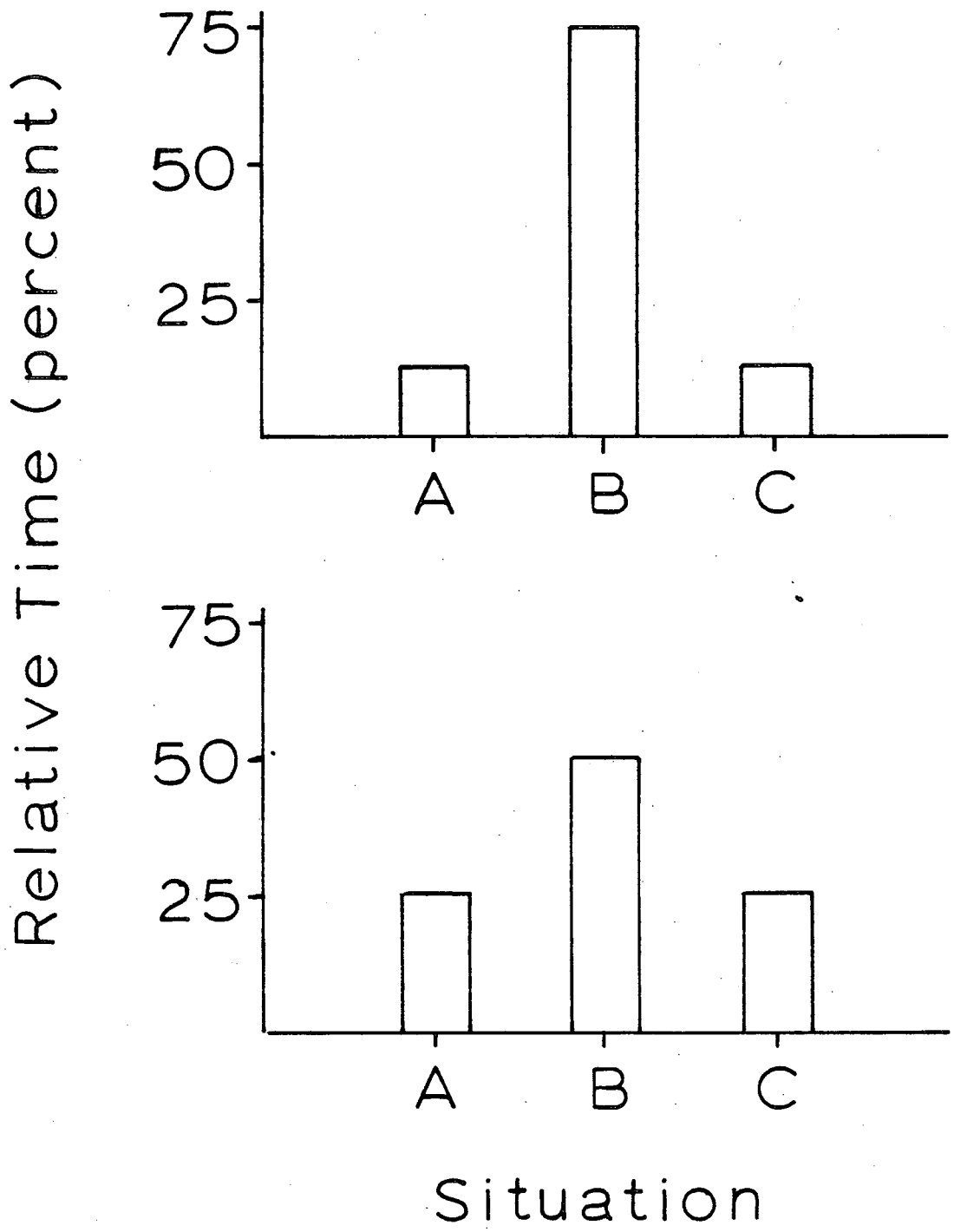

Figure 3. Two hypothetical distributions of the relative time spent by a child in three different situations, A, B, and C. In the top panel the relative time spent in situation B is 75%, with little time spent in either situation A or C. When the relative time spent in situation B is reduced to 50% (bottom panel) the relative time, as well as the actual time, spent in situations A and C is considerably increased (see text).

participants or merely observers is not clear. Firesetting in adolescents apparently often occurs in pairs or groups (Lewis & Yarnell, 1951; Yarnell, 1940), but Yarnell (1940) reported that these pairs or groups represented an isolated social unit, since they tended to move together to the exclusion of all other friends.

However, whether firesetting occurs in or away from the home, or in the presence or absence of other children, it is almost certain not to occur where parents or other adults are present. Rather than distinguish between fires at home or away from home, Kafry (1978) stressed the fact that fires set by children occurred mainly in places where they could not be detected easily by adults: in a yard or field, under a bed or in a closet, bathroom, tool shed, garage, or basement. To varying degrees children may find fire itself rewarding, and may receive some kinds of social rewards from peers who may be present, but discovery by parents will likely lead to punishment. Some parents may allow children to light fires in fireplaces and the like under supervision, and they may teach children the safe use of fire, but virtually no parent will encourage children to play with fire in a clandestine fashion. It is simply forbidden, and it is in this sense that when firesetting occurs, it occurs outside the social control of the parents and the normal social milieu of the home.

A second reason for suggesting that firesetting represents a pattern of high response variability as we have defined it, is that firesetters often exhibit other behaviors which also seem to be characteristic of variable response patterns. These include stealing, lying, running away from home, truancy, and property destruction (Nurcombe, 1964; Patterson, 1978; Siegelman, 1969; Vandersall & Wiener, 1970; Yarnell, 1940). Aggression has sometimes been mentioned (Siegelman, 1969; Yarnell, 1940), but adequate comparison groups in these studies have generally not been available. Recently, Patterson (1978) provided evidence suggesting that defiance, lying, wandering, stealing, and firesetting form a progression, or scalogram of delinquent behavior categories, such that a child exhibiting a given category of behavior will also be likely to exhibit behavior falling lower on the progression. Thus, a child who lies is also likely to be defiant; a child who steals is likely to wander, to lie, and to be defiant; and so on. In both an initial study and a replication, firesetting was the highest category in the progression, and firesetting children tended to show all the behavior problems in the progression. Patterson referred to the sample of children who fit this progression as "stealers," because stealing appeared to be an appropriate descriptive feature of the behavior of this group, and one which distinguished this group from a group of children displaying social aggression.

It would perhaps be somewhat misleading to portray children falling into one or the other of these two major categories as exhibiting all of one or the other characteristics of these categories--that is to say, that firesetters show all characteristics typical of stealers and none of the characteristics of social aggressors, and vice versa. Rather, it is more likely the case that the two groups show some overlap of characteristics. Patterson (1978) and Reid and Hendriks (1973), for example, reported that the rate of coercive behaviors employed in family interactions by children identified as stealers was lower than that for children identified as socially aggressive, but higher than that for normal children. Presumably the use of coercive responses by firesetters, who represent a subset of

stealers, would show a similar relationship, and this may explain why aggression is often mentioned as a behavior associated with firesetting. However, to the extent that firesetters show patterns similar to the larger group of stealers, the rate of aversive behavior employed by firesetters should be lower than that employed by socially aggressive children. It must be remembered that the hypothesized changes in response variability or response intensity apply mainly to behavior, not to persons. A particular child might, to one degree or another, show characteristics of both types of behavior. It is the predominance of one pattern of behavior or another which leads to the labelling of the child.

Thus, within the framework of the theory presented here, the predominant response mode of children identified as aggressive is the escalation of both intensity and frequency of aversive behaviors which gain reinforcement within the context in which they occur. The predominant response mode of firesetting children, faced with a similar home environment, is to shift to different responses which gain reinforcement within a different context. This increase in response variability, however, is not necessarily a random selection of novel responses; very likely the shift will be to a response already in the behavioral repertoire (Staddon & Simmelhag, 1971). This appearance of already learned responses was demonstrated by Pryor, Haag, and O'Reilly (1969) in a procedure designed to increase response variability in a porpoise by reinforcing novel responses. Earlier reinforced responses reappeared during extinction of the most recently reinforced response. Bandura and Walters (1963) observed that what is commonly thought of as regression to more primitive behavior is actually a shift to previously learned behavior, when currently emitted responses no longer produce reinforcement.

The evidence suggests that a high percentage of children, particularly males, possess cognitive and behavioral prerequisites for firesetting. Block, Block, and Folkman (1976) found that fire assumes an increasing salience in the thinking of children between 3 and 6 years of age. Both interest in fire and cognitive salience of fire were far higher in boys than in girls. Girls were more likely to be fearful of fire. These early sex differences in the interest and cognitive salience of fire may help to account for the predominance of males in firesetting behavior of both children and adults, although it must be recognized that this may merely reflect the predominance of males in exhibiting delinquent behaviors in general.

Kafry (1978) reported that, on the average, her sample of elementary school children were able to sort obviously burnable from non-burnable items with about 90% accuracy. During a test of fire skills, 71% lit matches, although only 42% were described as reasonably competent. Nevertheless, 45% of the children were reported to have engaged in clandestine fire play, and of these nearly half (21% of the total sample) had set fires. None of the children who did not play with matches had set fires. Of the children who had set fires, a third had set them on the very first instance of matches play, and 81% of the children who repeatedly played with matches had set a fire. This finding suggests that firesetting may often be a consequence of fire play, and of children's natural curiosity about fire.

This analysis of firesetting appears to be somewhat different from that presented by other authors, notably Kaufman, Heims, and Reiser (1962), who viewed firesetting in children as indicative of a serious psychiatric disorder. Much of this difference in interpretation may be accounted for by

the fact that the children in the Kaufman et al. study represented a highly selected sample who had already been labelled as seriously disturbed, while the children in the Kafry (1978) study represented a relatively unselected sample of school boys. For Kafry, an analysis of the factors associated with firesetting involves an analysis of the factors associated with fire play. Yet many of these factors appear to be similar to those described for firesetting children in other studies. Kafry went further and suggested that the manner in which parents train their children in fire use and channel their natural curiosity about fire might have influenced children's hazardous fire play. Such training may serve to develop appropriate behavior with fire in children. It may also be true that parents who train their children in appropriate fire use generally give more attention to their children and are more likely to reinforce other prosocial behaviors as well (Kafry, personal communication). In the treatment of childhood firesetting, training in the appropriate use of fire has been successfully used both as a method to establish appropriate fire-related behavior and as a forum for establishing a better relationship between parent and child, which may be an important component of treatment (Holland, 1969; Vreeland & Waller, 1978).

It seems reasonable to conclude that for many children, firesetting does indeed appear to be a result of hazardous fire play, similar to accidents resulting from other types of hazardous play. Kafry (1978), for example, found that children who played with matches had significantly more injuries due to falls during play than did children who did not play with matches. Both Kafry and Block, Block, and Folkman (1976) found evidence that for most children interest in fire and fire play may decline after 6 or 7 years of age. Thus, for many of these children, fire play may represent a less serious problem which is amenable to relatively innocuous intervention strategies, such as training in the responsible use of fire (Kafry, 1978). By "less serious" we refer to the factors leading to fire play and firesetting, and not to the behavior itself. The consequences of fire play can be disastrous, and fire play in any child must always be taken seriously. Yet in many cases, the prognosis for relatively simple intervention strategies may be quite good.

On the other hand, it also seems reasonable to suppose that for some children firesetting represents a considerably more serious problem requiring a more extensive intervention. Siegelman (1969) reasoned that, while a single instance of firesetting might be a fortuitous result of a child's natural curiosity about fire, multiple firesettings are probably indicative of a seriously disturbed family background and personality characteristics. Accordingly, she compared characteristics of a group of recidivist firesetters, 6-12 years old, to those of a group of children who were known to have set only a single fire. The findings of this study were combined with the findings for a group of children who were not known to have set any fires, and summarized in a separate, briefer report (Siegelman & Folkman, 1971).

Families of recidivist firesetters were found to be more disturbed than families of non-recidivist firesetters on a number of measures, including a greater incidence of father-absent families, a higher incidence of marital discord, a greater incidence of serious health problems of parents, and a greater likelihood that another member of the family had previously sought psychiatric help. Recidivist families were also generally larger than non-recidivist families and lower on the socioeconomic scale. These family

problems were reflected in the greater likelihood of recidivist firesetters to have problems in school, to have difficulties in peer relations, to lie, to steal, and to destroy property. While the non-recidivist firesetters shared some of the characteristics of both the recidivist children and the non-firesetting children, Siegelman and Folkman reported that they were generally more similar to the non-firesetters. Environmental disturbances associated with single firesetting episodes were considered to be mostly transient disturbances, whereas recidivist firesetters resided in chronically disturbed home environments.

It is in the context of these serious, long-lasting disturbances in the home environment that stable patterns of delinquent behavior are most likely to develop. Not only are deviant behaviors likely to be relatively more valued under such conditions, but they may become further strengthened as the child develops skills and experiences a greater variety of reinforcers associated with these activities. These problems may be compounded when parents, siblings, and peers who might otherwise serve as models of appropriate behavior react negatively to the child's deviance, and the child in turn reacts by exhibiting further deviant behavior. In essence, the normal social milieu has lost control of the child's behavior. With the approach of adolescence, when behavior quite naturally occurs more frequently away from the home, the individual lacking the requisite skills in normal social behavior and self-control will find the sources of social reward restricted, and the risk that a serious criminal offense will eventually occur is enhanced.

Yochelson and Samenow (1976) emphasized a one-way relationship between child deviance and family deviance, in which family disturbances are more likely to be a result of, rather than a contributor to, the disturbed personality of the child who later leads a criminal life as an adult. In contrast, the analysis presented in this paper is consistent with Patterson's (1976) conception of the deviant child as both a victim and architect of a disturbed social system. Though individuals may differ in their vulnerability to the development of deviant behavior patterns, it nevertheless remains most plausible that these patterns are the result of behavior-environment interactions. Patterson (1978) has outlined these interactions in his "deviancy drift hypothesis." He suggests that crucial omissions in the development of social skills may start a chain reaction which ultimately results in an adult who is ill-prepared to cope with the everyday demands of adult life. While problems may begin within the family, the child is likely to elicit negative reactions from people outside the family, leading eventually to difficulties in school and to further social deviancy. The crux of the argument is that these children continue to fail at each stage of social development precisely because they have not yet acquired the prerequisite social skills. Thus, the problem is one of cumulative deficits leading to a narrow range of social interactions. Such individuals may find little reward in "normal" social interactions for which they lack the appropriate skills. Instead, the effective social environment may consist of individuals operating at a similar level of social skills who maintain and strengthen deviant social behavior.

Such limited social environments may be reflected in the observation by Yarnell (1940) that young adolescents who set fires in small groups or pairs tended to move within those groups to the exclusion of other social contexts. Similarly, adult firesetters have been considered socially isolated, and

findings of few marital ties, poor employment records, and widespread alcohol abuse are indicators of the wide spectrum of social problems which adult firesetters display (Hurley & Monahan, 1969; Inciardi, 1970; Lewis & Yarnell, 1951). More recent instances of arson are almost certain to be frequently associated with abuse of other drugs as well.

Virtually all prison and hospital studies of arsonists show extensive histories of criminal and antisocial behavior in these individuals. Furthermore, the types of emotional behavior shown by arsonists in these studies tend to support the hypothesis that firesetting is indicative of a pattern of high response variability rather than high response intensity. When compared with a group of non-arsonist offenders, these studies have consistently shown arsonists to have histories of significantly more crimes against property and fewer crimes against persons (Hurley & Monahan, 1969; McKerracher & Dacre, 1966; Tennent et al., 1971; Wolford, 1972). Soothill and Pope (1973) reported similar findings concerning subsequent offenses in a 2-year follow-up study of convicted arsonists. McKerracher and Dacre (1966) reported that both arsonists and non-arsonists were equally likely to have committed previous sexual offenses. However, it is again the case that the type of offense is important; the sexual offenses of non-arsonists were far more likely to have been considered aggressive.

As we noted earlier (Vreeland & Waller, 1978), most studies of firesetting are lacking in important descriptive details of either person or situation. This lack is seen particularly in the systematic analysis of antecedent conditions, organismic variables, actual firesetting behavior, and possible maintaining consequences. While some of these deficiencies may in fact be a result of conceptual approaches to firesetting which are different from the approach taken here, it is also true that data gathering in studies of adult firesetters is extremely difficult. Formidable obstacles exist in gathering research information from cases which have not yet been legally adjudicated. When information finally does become available, it may be a considerable length of time after the firesetting act, and in the context of a considerably different environment. If, as we have suggested, both youthful and adult firesetting represent behaviorally and functionally similar acts, then it follows that a great deal of information about firesetting in general may be obtained from studies of youthful firesetting. Studies of children and young adolescents offer a distinct advantage over studies of adults, in that interactions of family members may be directly studied, thus providing stronger data on early social development. Furthermore, information may be more timely, and can be gathered primarily in subjects' natural environments.

Of course, the extent to which the factors contributing to youthful and adult firesetting are functionally similar is an empirical issue which must be further investigated. We are not advocating an abandonment of studies of adult firesetters, since these empirical issues must be further substantiated, and since treatment procedures for adults may require different approaches than for children (Vreeland & Waller, 1978). However, we are advocating increased attention to firesetting children and their families, with particular attention to family interaction processes. Not only are such studies likely to yield further information about firesetting, but about the relationship of firesetting to other delinquent behavior patterns.

VICARIOUS LEARNING PROCESSES

As Bandura (1969, 1977b) quite correctly points out, if learning depended solely upon the reinforcement and punishment of overt behavior, human beings would hardly be equipped for survival. Humans learn much of their behavior vicariously by observing how others behave, and by exposure to pictorial, verbal, and written instructions. Behavior acquired by observing others behave or by observing animated reproductions of behavior (films, videotape recordings, etc.) is often referred to as imitative learning, observational learning, or modeling. The following discussion concentrates on modeling as perhaps the most powerful vicarious influence on social behavior, as well as the most extensively studied, although the importance of other persuasive communications and instructions must also be recognized. Vicarious influences on behavior have been extensively reviewed by Bandura (1969, 1971, 1977b) and by Mischel (1968).

Observational learning may affect the performance of behavior already in the repertoire of the observer, may result in the learning of novel responses, or both. Bandura (1965), for example, found that children were more likely to imitate the behavior of a model when the model's performance was rewarded than when the model's behavior was punished or not consequated. However when attractive rewards were then offered the children for performance of the previously modeled behavior, children exposed to any of the three modeling conditions were able to imitate the modeled behavior equally well. Thus, the children under all three modeling conditions had learned the modeled responses, and only the performance had been influenced by the observed outcomes. On the other hand, Grusec and Mischel (1966) demonstrated that certain characteristics of the model may result in actual differences in learning. One group of children interacted with a highly rewarding model who described herself as the child's new teacher, thus presenting herself as having future control over the child. Another group interacted with a nonrewarding person who described herself as a visiting teacher, thus presenting herself as having no future control over the child. After establishment of model characteristics, the model exhibited several behaviors which were considered neutral or aversive. When children were later offered lucrative rewards for performance of modeled behavior, children in the rewarding-future control group performed more of the modeled neutral and aversive behaviors than did the group exposed to the nonrewarding-no future control model. Thus, using a test for learning similar to that used by Bandura (1965), Grusec and Mischel found differences in the actual number of behaviors learned in the two groups. They suggest that acquisition of imitated behavior may be mediated by factors which control attention to the model and covert rehearsal of the to-be-imitated behavior, while performance is mediated by the expected consequences.

In actual social situations, children are rarely if ever offered rewards for reproducing the behavior of this or that specific model (except perhaps in explicit training situations where they are instructed to do so). It is useful, then, to consider what aspects of modeling situations actually do influence the performance of imitative behavior. One of these influences has already been discussed: Behavior which produces observed positive consequences is likely to be reproduced. Beyond observed outcomes, established characteristics of the model influence imitative responding, as was demonstrated in the Grusec and Mischel (1966) study. Perhaps the most important

such characteristic may be generally referred to as the social power of the model (Bandura, Ross, & Ross, 1963). According to the power theory, behavior of models who appear more authoritative and controlling of rewards is more likely to be reproduced than the behavior of models who do not show such characteristics.

Bandura, Ross, and Ross (1963) provided a direct test of the importance of the influence of social power on imitation. Children were exposed simultaneously to two adult models. One of the adults assumed the role of controller of reinforcers, dispensing rewards liberally according to one of two possible conditions. Either the other adult received all of the rewards and the child was essentially ignored, or the child received all of the rewards and the other adult was ignored. Following this treatment the two adults exhibited different patterns of behavior in front of the child. Subsequently, with the models absent, the child was tested for imitative responding. Results showed that, while the children did not imitate solely one or the other of the models, they primarily imitated the responses of the controlling model. This was true whether or not the child or the other model was the recipient of reinforcers during the experimental social interaction phase of training, and results for these two conditions did not differ. Bandura et al. interpreted these findings as arguing for the importance of social power, as opposed to either the status envy (other adult recipient of reinforcers) or secondary reinforcement (child recipient of reinforcement) as an influence on imitative behavior.

In a somewhat different experiment, Mischel and Grusec (1966) attempted to separately assess the influence of both power and rewardingness of models on both the rehearsing and transmission of modeled behavior. As in the Grusec and Mischel (1966) studies, children were either told that the model was their new nursery school teacher (high future control) or that she was a visiting teacher who was leaving that day (low future control). Each of these groups was divided so that the model was either highly rewarding or nonrewarding. Thus, the four conditions represented a 2 by 2 design, manipulating control (high or low) and rewardingness (high or low). After model characteristics were experimentally established, the model exhibited a series of neutral and aversive responses toward the child during a game. These neutral and aversive responses were subsequently scored during a period when the child was alone (rehearsal) and when the child was "teaching" the game to someone else (transmission). During rehearsal, rewardingness significantly increased the rehearsal of neutral behaviors but not aversive behaviors, while results for the high versus low control groups showed that high control increased the imitation of both aversive and neutral behaviors. In summary, both rewardingness and control dimensions influenced imitative behavior, it generally being the case that the higher the rewardingness of the model, the greater the number of imitative responses. Results for the transmission of modeled behavior were somewhat different, with the only significant difference being the number of aversive responses being transmitted by the high-reward and low-reward groups. Subjects exposed to the two high-reward conditions showed significantly more imitation of aversive behaviors than did children exposed to the two low-reward conditions.

The results of the Mischel and Grusec (1966) study are difficult to interpret because of their complexity, and the authors go to great lengths in considering the implications of these complexities. Overall, however, the results point to the importance of both control and rewardingness in

determining imitative behavior. The differential effects of rewardingness on only aversive behavior during transmission may be due to two major factors. First, overt rewardingness ultimately may be the most salient measure of power. Secondly, the aversive behaviors demonstrated by the model may have been the most salient features of the modeled behavior sequences. Since the transmission phase of the experiment occurred last in the sequence of experimental events, these most salient features may have persisted into this phase of the experiment. Whatever the case, the results of the Mischel and Grusec (1966) study and the Bandura et al. (1963) study, taken together, demonstrate clearly the importance of the power of the model in determining imitated behavior.

These results have important implications for the general models of aggressive and firesetting behavior presented in the previous section. If the family situation for aggressive children, as we have suggested, remains a high valued component, being controlled by both positive and negative reinforcement, then the results of Mischel and Grusec predict that punishment (i.e. aversive behavior) by parents may actually serve as a modeling influence on children. The fact that these modeled aversive behaviors are maintained by positive and negative reinforcement serves to strengthen them. On the other hand, if the families of firesetting children are exemplary of a low valued stimulus situation which exerts relatively lesser control over the child, we can expect that modeling influences within the situation will be minimal. Thus, the situation for firesetters can be seen as one of cumulative deficits. Not only do extrafamilial experiences gain control over behavior because of basic reinforcement processes, but the child is in turn less susceptible to vicarious influences on behavior from the family. The problem may be further compounded when the family is highly deviant, because there may be relatively fewer appropriate behaviors to be modeled. When these considerations are taken into account along with Patterson's (1978) deviancy drift hypothesis, it should not be surprising that for some children in some situations, continued deviant behavior seems almost a certainty.

Actual data on modeling influences on firesetting are wholly inadequate. Macht and Mack (1968) reported that the fathers of all four firesetting adolescents in their study had had some involvement with fire. All four fathers were absent from the family constellation, and Macht and Mack suggested that the firesetting represented a symbolic reuniting with the absent father. The importance of fire in each of the situations may have been overestimated, however. In only one case did there appear to be a clear-cut modeling influence. One of the fathers worked at an auto junkyard, and often burned old automobiles. During one year the child watched as his father set fire to the cars, and during the next year he participated in the burnings. The other three adolescents only had some knowledge of their fathers' relationship to fire, but no direct observation or experience. Yarnell (1940) considered the possibility that various experiences with fire may have influenced children's firesetting behavior, but she was unable to uncover any information which would indicate that the experience of her firesetting children differed from those that might be expected of normal children. One problem with searching for a history of salient modeling experiences with fire in firesetters is that there may be none. Kafry (1978), for example, has demonstrated that firesetting in children occurs mainly outside the purview of adults, and she suggests that children's play with fire may be in part influenced by a lack of training in fire safety skills--

something that would not likely be picked up in a search for salient experiences with fire. Furthermore, certain kinds of imitative learning experiences may contribute to firesetting without actually being associated with fire. Bandura (1977b), for example, has discussed "abstract modeling," in which various modeling experiences eventually result in the formation of consistent, rule-governed behaviors, such as language and moral behavior. Mischel (1968) has described experiments indicating that modeling influences children's ability to delay gratification in order to obtain a larger reward at a later time. Such findings have implications for an account of impulsive behavior. Firesetting has often been considered an impulsive behavior, and firesetters have often been depicted as having impulsive characters.

Thus far, we have described several possible modeling influences which may contribute to the development of firesetting and other delinquent behavior patterns. Some of these may operate directly to influence behavior. Examples previously cited are emotional reactions of parents to fire which are observed by the child, and the display of various deviant behavior patterns which the child may imitate. In such cases, parents may have characteristics of a powerful model and may often transmit behaviors to the child which are maladaptive. Other modeling influences may operate indirectly. For example, if parents are not powerful models for a child's behavior, then the probability is increased that primary influences on behavior may come from other sources, and some of these influences may be maladaptive. In such cases, the parent may model appropriate behavior, but is not perceived by the child as powerful and rewarding, and as a result may not be as influential in transmitting behavior to the child. Bandura et al. (1963) conceptualized this issue in the following manner: Children typically imitate behavior from a variety of models, but primarily from models who exhibit the greatest control over reinforcers. To the extent that parents have not established such control or power, then children can be expected to imitate to a greater extent the behavior of other models. Thus, the conception of the variety of modeled behaviors presented here goes hand in hand with the conception of reinforcement value and response variability presented earlier.

A case-by-case analysis of firesetting behavior would surely yield a variety of routes by which firesetting develops. One could expect to find a range of degrees of family disturbance, from apparently normal to highly disturbed. Likewise, a variety and range of other contributing factors might be observed. What must be the case, however, is that the risk of firesetting is increased with an increasing number and severity of contributing factors. Siegelman and Folkman (1971) made a similar statement when discussing the probability of a firesetting once a child had already set one fire, but the statement probably has more general applicability: "Having set one fire, a child coming from a disturbed family situation, who is having difficulties in school and shows some of the psychological or medical problems noted is a high risk candidate for recidivism" (p. 6).

An account of how some individuals vicariously exert a greater influence on the behavior of a person than do other individuals is in fact an account of the process of identification, a concept which is present in every major theory of personality (Bandura et al., 1963). What the studies of vicarious conditioning, particularly modeling, have shown is that the variables affecting identification can be discovered and even experimentally controlled in the laboratory. Children do not automatically identify with

one parent or another at one stage of development or another. Specifiable characteristics of parents as well as other individuals in a child's environment may greatly influence who a child observes and imitates, i.e. what a child learns or fails to learn.

This discussion has concentrated on vicarious influences on children's behavior. While children have been the subjects of all the studies reported here, there is every reason to assume that vicarious influences operate on individuals at every stage of life. In particular, vicarious influences may play an important role in arson-for-profit. While the profit incentive is an obvious factor, it makes sense to ask what other variables may make arson-for-profit more likely, especially in cases where the arson is a response to business or personal financial difficulties by an otherwise legitimate businessman. Certainly owners of businesses learn of the methods and potential reinforcers of arson-for-profit through the media and communications with other people. However, if the power analysis of modeling is generally applicable, then an even more important influence in arson-for-profit may come into play when the potential arsonist learns that someone known and respected in the business community has successfully liquidated unprofitable assets by burning them. Such an individual may be more influential in the decision to set fire to a business than someone unknown to the businessman, and it is this kind of process which likely contributes to the notion that arson-for-profit is somehow on the fringe of legitimate business. While it may be difficult to find early developmental experiences which contribute to arson in such cases, it is more reasonable to hypothesize that two major vicarious communications may immediately influence the setting of arson-for-profit fires: communications which influence the perceived probability of being caught and convicted, and communications which may dictate that arson-for-profit is somehow morally respectable.

COGNITIVE PROCESSES

Cognition has played an increasingly important role in social learning theories of behavior (Bandura, 1977b; Mischel, 1973), and has been emphasized in certain psychotherapeutic models (Ellis, 1973; Goldfried & Davison, 1976). People do not merely react to the objective properties of a situation, much like a weather vane reacts to prevailing winds. They can and often do show individual differences in the way they perceive and react to objectively similar situations. These individual differences are likely to be a result of the interaction between a person's natural abilities and previous learning experiences. A consideration of cognitive processes is an attempt to account for the way in which these interactions are represented in current functioning, which includes a consideration of perceptual processes, linguistic encoding systems, and value systems. The nature of these processes will become clearer as this discussion proceeds.

The discussion of cognitive processes will be organized around five major cognitive functions described by Mischel (1973). The following are brief descriptions of each of these functions:

1. Construction competencies may be best thought of as the limits of a person's natural abilities, both intellectual and social.
2. Encoding strategies and personal constructs represent the way in which people perceive events, behaviors, and people, including themselves.

3. Behavior-outcome and stimulus-outcome expectancies are the person's beliefs about the relationships between events in the environment which have developed on the basis of previous direct and vicarious learning experiences.

4. Subjective stimulus values are described by Mischel (1973, p. 275) as "motivating and arousing stimuli, incentives and aversions." They are the cognitive representations of a person's likes and dislikes.

5. Self-regulatory systems and plans represent systems of behavior rules, self-reinforcement and self-evaluation. This function might best be conceptualized as a translation of the other four cognitive functions into a behavior guidance system.

What follows is a more detailed consideration of these functions, with specific consideration given to the cognitive processes involved in firesetting behavior. It should be remembered that, although each of the proposed cognitive functions is considered separately, taken together they represent an interacting system.

Construction Competencies

Construction competencies refer to a person's abilities to generate various behavioral repertoires. These cannot be thought of as merely "native abilities" because abilities are a product of both constitutional factors and experience. They may best be conceptualized as composite skills, some specific and some more generalized. We have divided the discussion into a consideration of intellectual skills and social skills, but the two must actually have a great deal in common, as we will argue.

A consideration of competencies must also inevitably include a consideration of the age at which certain skill levels typically occur. Intellectual performances which are appropriate for one age would be considered subnormal for another. Likewise, social behavior which is considered acceptable for a person at one age might be evaluated quite differently at another age. These are factors which must be weighed when, for example, social and intellectual competencies are considered as factors contributing to various abnormal behavior patterns. When construction competencies differ greatly from those which are expected, not only will a person be considered deviant by those surrounding the person, but perhaps more importantly, by the person himself. This is a point which will appear again and again as this discussion of cognitive factors proceeds.

Intellectual Abilities

Vreeland and Waller (1978) reported that "the data concerning intellectual and academic performance of firesetters do not permit any clear-cut conclusions" (p. 27). This is especially true when tests of intellectual ability are considered as measures. Although the preponderance of data suggested that adult arsonists were lower than average in intellectual abilities (although not lower than comparison groups of individuals who had committed other types of crimes), an evaluation of results must be tempered by certain factors. Firstly, studies showing abnormal performances did not specify the conditions of testing and the types of tests employed. If tests were administered when individuals were under a great deal of stress (such as immediately after being apprehended), results might indeed be affected. Secondly, since arsonists in the past have been less likely to be apprehended

than other types of criminals, studies of firesetters may represent a biased sample of those arsonists least capable of avoiding detection, and thus the subgroup of arsonists with lowest intellectual abilities. The reader should bear in mind that these considerations do not warrant a rejection of the hypothesis that adult firesetters as a group are intellectually less capable than the population as a whole; they merely suggest that conclusions should be held in abeyance until more adequate data are available. These arguments are presented more completely in the review by Vreeland and Waller (1978).

There is little evidence that firesetting children, as a group, perform below average intellectually (Vreeland & Waller, 1978). However, among both children and adults, academic difficulties have been common. These findings may be considerably more significant than the results of intellectual testing, for measures of academic performance may be a more valid measure of intellectual skills than test performance. Many firesetters may have had what are now known as specific learning disabilities, a suggestion which was made, but not supported, by Yarnell (1940). Such learning disabilities may have had an effect on classroom intellectual performance which did not show up on traditional measures of intellectual abilities. Intellectual performance of firesetters may also be a function of the high incidence of father absence in the family during development, a factor which has been associated with intellectual and academic difficulties (Shinn, 1978).

The difficulty in making a definitive statement about the intellectual capacities of either adult or youthful firesetters underscores an issue that we have raised time and again: the need for adequate assessment. While we hesitate to be critical of previous studies in light of the exploratory nature of many of them, future studies should consider seriously the need for valid intellectual assessment data, if they consider them at all. Statements about intellectual ability which are unsupported or which rely on invalid assessments may be inferior to frank professions of ignorance.

Social Skills

Firesetters are likely to have a limited social repertoire, and hence the abilities to obtain rewards from the environment in socially appropriate ways. More specifically, we might hypothesize that, as a group, firesetters have a history of being socially dominated by others, and of being unable to control their environment. Firesetting may be one behavior which affords control over the environment in ways which the firesetter has not been able to do otherwise. At least among adults, for example, studies have consistently shown that firesetters have committed a greater number of offenses against property (excluding firesetting) and fewer crimes against people than have other types of criminals. It is thought, given conditions which maximize the risk of deviant behavior patterns, deviant behavior patterns which avoid confrontation with other people are most likely to be selected. Studies reviewed earlier which show a high incidence of difficulties in other aspects of firesetters' social lives also lend support to the notion that deficiencies in social abilities may play an important role in firesetting. Such deficiencies in social skills are the basis for Patterson's (1978) deviancy drift hypothesis.

There is likely to be a great deal of interaction between the development of social and intellectual competencies. The nature of such interactions has perhaps been expressed most elegantly and forcefully by Flavell (1977), in his discussion of the relationship between cognitive and social development:

> It is difficult to conceive how there could be any significant cognitive development at all if the amount and quality of the infant's social relations with other human beings fell below some unknown minimum. Human beings are intrinsically social beings, and human cognitive development requires human social relations.
>
> A little thought will indicate that something like the reverse also has to be true. Social behavior is always partly managed and mediated by cognitive processes, and the developmental level or quality of social behavior that an individual is capable of showing must be at least partly dependent on the developmental level of quality of his mental abilities. The latter is conceived as a necessary but definitely not sufficient condition for the former. That is, having achieved a certain general level of cognitive development does not ensure the occurrence of a particular kind of social behavior, or a particular kind of social cognition, either, for that matter; it only makes it possible. (pp. 52-53)

Flavell's statement reflects not only upon the interactional influence of the components which make up the construction competencies, but upon the meaning of the term "competency." As used here, the term does not refer to what ever was possible for a given individual, but rather to what is the individual's current performance capacity given his particular developmental experiences.

Encoding Strategies and Personal Constructs

The ways in which people perceive events and persons in the environment is an active, selective process, and depends on their construction capacities, expectancies, and values. These, in turn, may be affected by encoding strategies and personal constructs. Bandura (1977b) points out that a distinguishing feature of humans is their tremendous capacity to symbolize experience, and language plays an important role in this respect. People, either covertly or overtly, make statements about their experiences, and these statements may act as guides to the interpretation of future experiences (Ellis, 1973). Mischel (1968), for example, has stated that people naturally tend to be "trait" theorists when they evaluate other people. That is, even though other people may behave quite differently in different situations, it is a natural tendency of humans to attribute behavior in other persons to personal characteristics, or "traits," especially if there is no obvious circumstantial determinant of behavior. These statements of personal attributes may guide future evaluations of an individual's behavior. If the person behaves differently than originally conceived, then his behavior is "out of character." If behavior is consistent with preconceived notions, then the observation is consistent with the attributed trait label.

People may trait-label themselves also. Ellis has long contended (cf. Ellis, 1973) that when an essentially evaluative label is taken on by a person as a fundamental self-description, serious consequences can ensue. For example, if a person construes an undesirable outcome as a reflection of personal worth ("I failed because I am a failure"), this may greatly affect his attribution of the causes of events. It has been Ellis' position that disturbed individuals have embedded negative self-attribution in the very fabric of their thinking; either overtly or covertly, they make negative statements about themselves to themselves.

Negative self-attributions are not an uncommon feature of normal

cognitive processes. However, when they become predominant in an individual's thoughts and language, he may perceive that he no longer has control over his behavior, and he may abdicate responsibility as well. Many firesetters have described their acts as being impelled by some "irresistible impulse" which they are unable to control (Lewis & Yarnell, 1951; Warner, 1932), and clinicians have often labelled these individuals as impulsive. Such labels by the individual and others may strengthen the individual's belief that he has no control over his behavior, and thus increase the probability that in fact, he will not exercise control. The anxiety experienced prior to the setting of the fire, which has so often been considered a manifestation of the irresistible impulse, may actually reflect an emotional reaction to the conflict between the performance of a reinforcing activity (firesetting) and the social sanctions against that activity: an approach-avoidance conflict. Similar conflicts might be found in dieters, smokers who are trying to quit smoking, and alcoholics who are trying to quit drinking.

Behavior-Outcome and Stimulus-Outcome Expectancies

Based on direct and vicarious learning experiences, people develop expectancies about the relationship between stimulus events in the environment and between behavior and its consequences. Mischel (1973) equates these expectancies with "hypotheses" about the outcomes associated with various situations and behaviors. Bandura (1977b) observed that the tremendous capacity of humans to symbolize experience allows them to imagine stimulus-stimulus and response-consequence sequences. Presumably, this ability allows a person to symbolically sample a variety of such sequences in a given situation and to select behavior alternatives which optimize outcome values. The nature and variety of outcome expectancies sampled in a given situation will be a function of the person's construction competencies and encoding strategies, for these are the cognitive functions which play a large part in determining the cognitive representation of experience upon which the outcome expectancies in a given situation are based.

When consideration is given to the difficulties that "psychologically motivated" firesetters have had in coping with a variety of situations throughout their lives, there is good reason to believe that they have learned to expect negative outcomes in situations where most other individuals would have some reasonable expectation of success. The construction competencies and encoding strategies of firesetters have likely determined a rather narrow range of behavioral alternatives in situations which most people have mastered. Firesetters probably correctly perceive their lack of effective social skills, and thus they may participate only marginally in normal social situations, or avoid such situations altogether. Thus, in effect there is a kind of self-fulfilling prophecy which develops: By avoiding situations which the individual perceives he is unable to handle, he in fact does nothing to improve his skills, and hence he continues to be unable to handle himself effectively in the situation. Most people occasionally engage in such self-defeating behavior patterns, and these may sometimes present difficulties when they significantly interfere with a person's goals and plans. Nevertheless, most people possess a broad range of interpersonal skills which they can effectively employ in solving their difficulties. On the other hand, it is a lack of many basic interpersonal skills which narrows the range of effective behavioral alternatives for firesetters. Much of

their social behavior appears to be deviant, and eventually they engage in behavior which gets them into serious trouble.

Subjective Stimulus Values

Mischel (1973) points out that "Even if individuals have similar expectancies, they may select to perform different behaviors because of differences in subjective values of the outcomes they expect" (p. 272). Some outcomes may be quite naturally reinforcing, while others may be acquired. In either case, the values of outcomes cannot be entirely separated from the influence of experience and the other cognitive functions.

Some outcomes which are highly valued may not be reachable within an individual's construction competencies. Whether or not an outcome is attainable, an individual may value an outcome so highly that failure may be interpreted in terms of negative personal worth, and these negative trait labels may lead to behavior patterns which are counterproductive. Ellis (1973) calls the tendency to view negative outcomes as disastrous events "catastrophizing." A major goal of his "rational-emotive" therapy is to get clients to give less extreme labels to both positive and negative outcomes, and to disconnect a person's evaluation of outcomes from feelings of personal self-worth, so that the individual will be able to cope with setbacks while learning new skills for dealing with situations. Thus, instead of saying "If I don't get this job, it will be a catastrophe, and will show that I am worthless," a more appropriate statement would be "If I don't get this job, I will be disappointed, but I can live with that." Ellis contends that statements of the former type are typical of the thinking patterns of highly disturbed individuals, and we have suggested that such thinking patterns are highly developed in firesetters as well (Vreeland & Waller, 1978). Such individuals may come to avoid situations which ostensibly reflect on their self-worth if they believe that they will not perform adequately.

What constitutes success or failure for an individual may depend upon subjective and quite arbitrary standards. For example, children may learn from their parents at a very early age to set unreasonably high standards for success or failure. If the child's performance, though adequate by societal standards, does not meet the standards of the child's parents, he may receive negative feedback and ultimately come to view his own performance as inadequate. Thus, while certain outcomes within home and school situations may be highly valued, the situations themselves may not be valued or may even be aversive. Performance in these situations may not be adequately reinforced and so ultimately it deteriorates, and the child seeks situations which he can master and which are subjectively more highly valued.

Thus, the probability is increased that the child will come under the control of situations which lead to deviant behavior patterns over which parents and the school system have little control, and the "deviancy drift" described by Patterson (1978) may begin. A significant implication of the preceding analysis is that deviant behaviors such as firesetting need not be a product of an obviously deviant childhood environment. It may be relatively easy to draw inferences about the influence of the early environment on firesetting when the firesetter is seen to come from a large family of low socioeconomic status, and where the parents may be obviously deviant themselves. This may not always be the case, however, and the subtle influences may be harder to identify. Furthermore, the construction competencies may play an important role in determining behavior. A child who is able

to meet parental performance standards may encounter few difficulties, whereas for a sibling in the same family who is unable to perform as well, significant problems may develop.

How an individual construes possible outcomes determines the relative value of a given situation, and thus the relative probability of behavior associated with that situation. This is the cognitive equivalent of the matching law described earlier. However, the matching law is based on the relative value of obtained reinforcers, and not on potential reinforcers. The relative value of firesetting may be enhanced if the firesetter perceives other, more socially desirable outcomes as being unobtainable, or relatively less likely to be obtained. This is assumed to be the basis of economically motivated fires, where a businessman, for example, assesses the risks and values of the various alternatives, and decides that setting fire to his business represents the alternative with the highest payoff. A similar analysis may be seen to apply to the social economy of the so-called "pathologically motivated" firesetter as well. As the individual perceives his social skills and the resultant reinforcers to be rather limited, he opts for behaviors which are likely to lead to immediate rewards and he is attracted to situations in which those behaviors are most likely to be rewarded. It is perhaps in this way that firesetters are likely to be labelled as impulsive, and that their firesetting comes to be viewed as a displacement activity.

Self-Regulatory Systems and Plans

According to Mischel (1973), within the context of the other four cognitive functions, individuals develop self-regulatory systems:

> The essence of self-regulatory systems is the subject's adoption of contingency rules that guide his behavior in the absence of, and sometimes in spite of, immediate external situational pressures. Such rules specify the kinds of behavior appropriate (expected) under particular conditions, the performance levels (standards, goals) which the behavior must achieve, and the consequences (positive and negative) of attaining or failing to reach those standards. Each of these components of self-regulation may be different for different individuals, depending on their unique earlier histories or on more recently varied instructions or other situational information. (p. 274)

People do not always appear to be "testing the wind" and responding only to immediate situational demands. More to the point, immediate situational demands may be interpreted in the light of longer range goals and plans. Based on previous experience, individuals adopt rules for behavior in various situations, and evaluate immediate results of their behavior according to criteria for progress towards those goals. The learning of language is an example of the adoption of certain rules for the production of communicative speech and writing, and language itself is the likely vehicle for encoding other rules for self-regulatory behavior. Well-articulated rules are necessary for the completion of tasks when consequences are not immediate. For example, good students must learn to study when immediate situational demands support social behavior which is incompatible with studying. Similarly, successful dieters adopt specific rules for food intake which they must follow in spite of the immediate reinforcement of eating. Such self-regulatory rules play a crucial role in a variety of

human endeavors, including moral behaviors, career decisions, and numerous day-to-day activities. In many cases, when people fail to achieve desired goals, it is because they have failed to articulate and follow rules of conduct which will lead to the desired outcomes, and they fail to evaluate their behavior in light of progress toward those outcomes.

Again, it is worthwhile to point out that the failure to come under the control of self-regulatory systems is a common occurrence even in normal human beings. However, there must be some minimal level of self-regulation for a person to adapt to the demands of everyday life. Individuals who do not commonly rule-govern their behavior are likely to be insensitive to their capabilities and unable to effectively evaluate their conduct. Lewis and Yarnell (1951) have pointed out that firesetters often articulate goals and plans that are grandiose and unrealistic, given the limited cognitive and social skills they display. Thus even when they have overall positive expectancies, these individuals appear insensitive to the coordinated intervening tasks and outcomes necessary to achieve larger goals.

While Mischel (1968, 1973) rejects the existence of individual "traits," the cognitive processes he describes, and most particularly the formation of contingency rules, can result in autonomous behavior which has the appearance of a trait, similar to the functionally autonomous behaviors described by Allport (1961). But while Allport wishes to describe the tendencies residing within the individual, Mischel wishes to describe behavior as a result of various processes which interact with situational determinants. Behavioral consistencies are most likely to be observed across situations which are similar to one another or where demands of a situation are weak or unclear. Mischel admits that a degree of cross-situational consistency in behavior may be observed, but the importance of behavioral consistency has been overestimated by trait theorists. Consistency may be most obvious in individuals whose behavior is severely maladaptive, and it is the failure of behavior to adjust to situational demands which is maladaptive. In any case, such consistencies are to be viewed as behavioral outcomes of an interactional process, rather than as inferred determinants of behavior.

Some resolution to the disagreement between trait theory and social learning theory may lie in an understanding of the tendency of humans to use trait labels in describing themselves and others. Allport expended a great deal of effort in examining the large number of trait labels that appear in human language (Monte, 1977), and Mischel (1968) noted humans employ traits to explain behavior, especially when strong situational determinants are not apparent. We have suggested that it is precisely because firesetters often evaluate themselves in terms of negative trait labels that they fail to evaluate the relationship between behavior and its consequences. That is, the firesetter's attention to the relationship between his supposed negative traits and his difficulties shifts the focus away from behavior-outcome relationships which play a crucial role in his adaptation to his environment. It is by obscuring behavior-outcome relationships that employment of negative self-labels may be an important contributor to the persistence of maladaptive behavior.

SOCIAL LEARNING THEORY AND FIRESETTING: A SYNOPSIS

We have described three interacting systems involved in the development of firesetting behavior. At the behavioral level, the individual's behavior acts upon and is acted upon by the environment. The relative strength of various situations in controlling behavior, and hence the strength of the behaviors they control, is described by the matching law. Vicarious processes determine how behavior is influenced by other sources of information, including modeling and instructional influences. Cognitive processes select, encode and evaluate incoming information about the environment, and generate behavioral sequences in light of the person's expectations and abilities. A general model of these three components of behavior is depicted in Figure 4.

The bidirectional arrows in Figure 4 between the cognitive component and the behavioral and vicarious experience components indicate that cognitive behavior both affects and is affected by the experiential components. That is, how a person perceives, interprets, and evaluates current events is some cumulative function of previous direct and vicarious experiences given certain intellectual and social competencies. Cognitive functioning in turn influences how a person behaves in various situations and which vicarious learning experiences will be most salient. Many of the cognitive social learning processes described here have their counterparts in other personality theories, such as the interaction theory of Sullivan (cf. Monte, 1977) and the cognitive theory of Kelly (1963). Kelly, for example, proposed that humans form theories about the structure of the world around them, and they continually test those theories. The cognitive functions described above, while not the only set of functions which could be described, likewise represent a kind of theoretical structure from which the person derives testable hypotheses. These testable hypotheses are in the form of behavior-outcome and stimulus-outcome expectancies described by Mischel (1973).

The problem for the "psychologically motivated" firesetters, and hence for society, is that the "data" (his experiences) are likely to confirm his cognitive "theory" in the sense that social behavior based on a set of expectancies may in turn elicit behavior from others which is consistent with those expectancies. For example, an individual who believes that people in authority are always oppressive may exhibit hostile behavior towards people in authority (employers, teachers, law enforcement officers, etc.) in situations which in fact elicit behavior which might be considered oppressive. In another example, a person who believes that normal social interactions are boring may indeed lack effective social skills which ordinarily elicit social reinforcement from others. In this way, deviant behavior patterns such as firesetting may appear when the individual is clinging to an untenable "theory," one that accounts for a narrow band of real world events. Like scientific theories, strongly held systems of beliefs and expectations largely determine the actual "data" that are observed.

Also like scientific theories, a person's beliefs and expectations are not easily altered by a few disconfirming experiences. In situations where there is a strong expectancy of success, behavior will be likely to persist despite momentary setbacks. Conversely, when expectations for success are weak, behavior may fail to persist despite momentary successes, for when setbacks do occur the person may easily give up. This analysis is consistent with the view that response strength is a function of the correlation between behavior and its consequences rather than momentary changes in

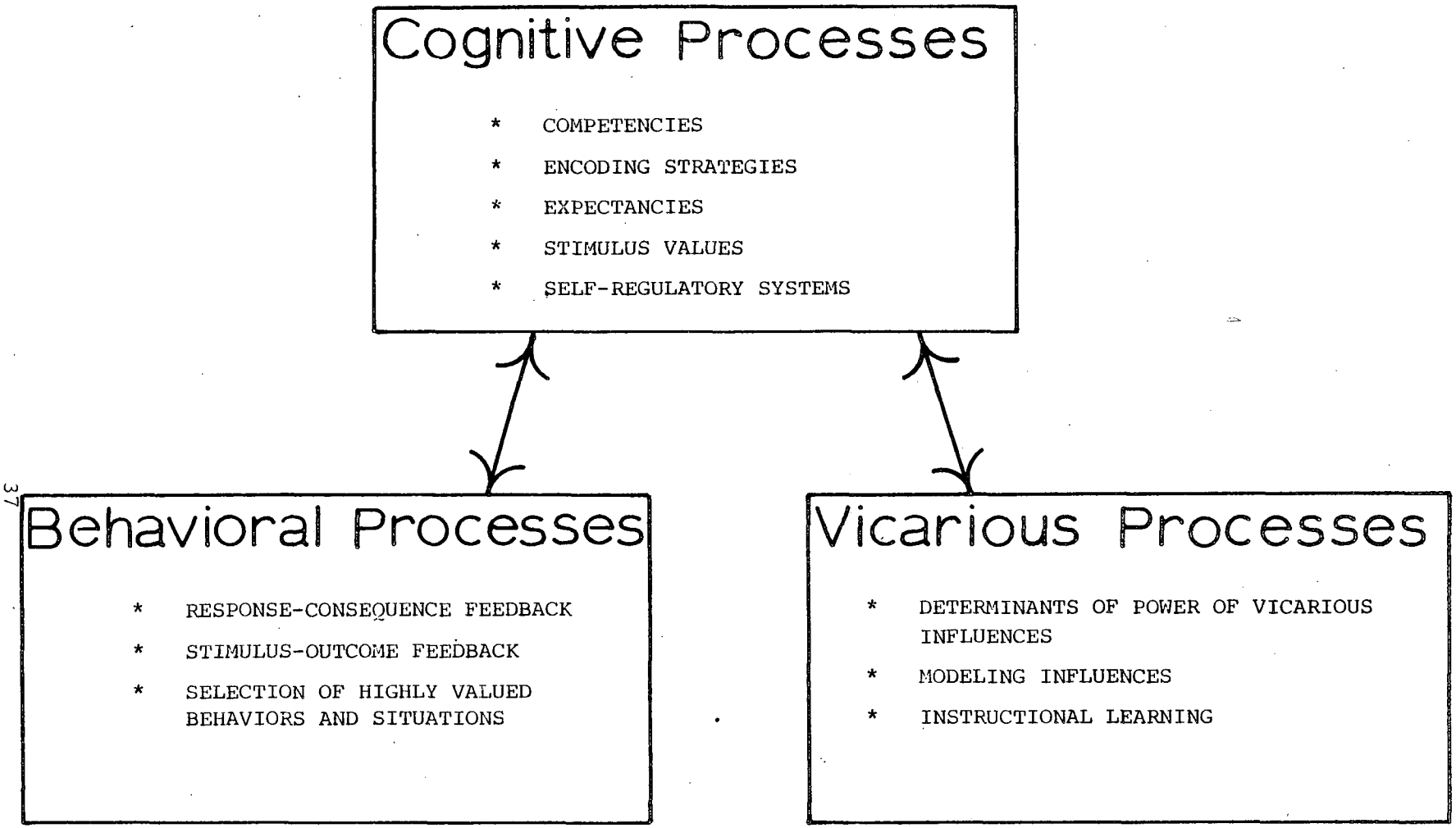

Figure 4. Schematic diagram of the interaction between cognitive, behavioral, and vicarious processes in determining behavior.

consequences (Baum, 1973). Momentary changes in response consequences are not likely to greatly affect perceived correlations between behavior and outcomes. Persistence has been conceptualized by Mischel (1973) in terms of self-regulatory systems. Bandura (1977a, 1977b) additionally offers the concept of self-efficacy as an account of behavioral persistence. He distinguishes between behavior-outcome expectancies, which are the person's estimates of the likelihood that a given behavior will produce a given outcome, and efficacy expectations, which are the person's estimates of his ability to execute required responses. Bandura sees the need to distinguish between these two types of expectancies because a person may correctly perceive behavior-outcome relationships but nevertheless have little confidence in his ability to carry out the behaviors leading to those consequences.

Yet while such distinctions may be clear for the performance of rather specific skills in a situation, it must be the case that efficacy expectations and behavior-outcome expectations are functionally interdependent across broadly defined social situations and cultural settings. For ultimately, self-efficacy must not only be tied to the relative reinforcement value associated with situations, but situations associated with relatively high reward value are those in which most new behaviors are likely to be learned. People adopt the values and behaviors of the subcultures they find most rewarding, and these in turn strengthen the individual's social effectiveness within those settings. Behavior persists precisely because individuals generally seek out situations with which they are most familiar and in which they operate effectively--that is, situations in which efficacy expectations and behavior-outcome expectations are somewhat congruent.

Normally, the factors contributing to behavioral persistence operate in an adaptive way, because behavior which is ultimately adaptive may persist in spite of various temporary situational demands. However, these same factors may also contribute to the persistence of patterns of social deviance. Having experienced great difficulty in dealing with normal home, school, and other social situations, social delinquents, including firesetters, may to one degree or another be attracted to social situations which maintain and strengthen their deviant social behavior. Since they have failed to come under the control of normal situational demands and self-regulatory systems, their efficacy expectations for deviant behaviors may exceed those for normal social functioning.

BEHAVIORAL TREATMENT OF FIRESETTING

Treatment of Adult Firesetting

Bandura (1977a, 1977b) has pointed out that, although explanations of behavior are increasingly emphasizing the role of cognitive factors, therapeutic procedures are increasingly geared towards direct modification of performance. Bandura suggests that this is because, although cognitive processes play an important role in the mediation of environment-behavior interactions, they may be most readily modified by actual changes in performance. According to this view, changes in self-efficacy are most easily produced when changes in performance lead to desirable outcomes, and the individual can observe that he is successfully coping with difficult problems more efficiently.

By "performance," Bandura refers to overt behavioral productions which

lead to successful outcomes. The cognitive processes modified by successful performance are mainly the client's efficacy expectations. Again, it must be pointed out that this approach is likely to have major applicability in situations where the client's difficulties are reasonably narrowly defined, such as with phobias (Bandura, 1977a; Bandura, Adams, & Beyer, 1977). When cognitive and behavioral disturbances are of a more general nature, as in the case of alcoholism or "psychologically motivated" adult firesetters, cognitive processes may actively interfere with therapy. The client may not realistically perceive the relationship between behavior and successful performance, or may not even value the successful performance itself. In such cases, techniques which promote changes in overt performance in the sense described by Bandura (1977a, 1977b) may not adequately change cognitive processes. Instead, they may be largely assimilated into the individual's current cognitive scheme.

One approach to therapy for these more generalized problems is to treat cognitive processes themselves as performance variables. The theoretical significance of this approach is the assumption that an important component of cognitive processes involves overt or covert verbal processes: Human behavior is mediated by things that people say to themselves (Ellis, 1962, 1973; Goldfried & Davison, 1976; Meichenbaum, 1977). The practical importance of the approach is threefold: (1) that cognitive processes are reflected in what people actually verbalize about their experiences; (2) that clients can be taught to specifically verbalize these cognitive processes; and (3) that a modification of these verbalizations can be effective in linking cognitive performance to successful behavioral performance. Verbalizing cognitive processes not only aids the therapist in assessing faulty or irrational thinking and in teaching the client alternative, more productive ways of thinking; it also aids the client in identifying irrational beliefs by making such beliefs more salient. Ellis (1962, 1973) stressed the importance of clients' learning to identify and make explicit their own irrational statements. These statements can then be challenged, first by the therapist and eventually by the client himself, and modified into more sensible guides to behavior.

The types of cognitive processes concentrated on by various cognitive-behavioral therapies correspond very nicely to Mischel's (1973) scheme. Much of Ellis' rational-emotive therapy (Ellis, 1962, 1973), for example, falls within two major aspects of Mischel's system. First, attempts by a therapist to change a disturbed individual's tendency to interpret success or failure as a reflection of personal self-worth deal mainly with Mischel's encoding systems and personal constructs. Second, Ellis concentrates heavily on clients' tendency to overly value certain outcomes (subjective stimulus values in Mischel's system) so that failure to attain some self-imposed standard of performance is viewed as catastrophic. One can see how the two types of irrational beliefs feed on each other. It is precisely because the client attaches such a strong connection between perceived performance and beliefs about self-worth that outcomes are so highly valued. Then, when outcomes fail to reach subjective standards, the perceived lack of self-worth is in turn confirmed. Furthermore, emotional reactions engendered by labelling of the self as worthless and of negative outcomes as catastrophic are likely to interfere with effective performance.

Specific therapeutic goals related to these difficulties involve teaching clients to maintain positive statements of self-worth independently

of success or failure, and to view success and failure in less extreme ways. Clients are taught to view successful outcomes as desirable rather than necessary, and unsuccessful outcomes as disappointing rather than catastrophic. Typically the therapist will invoke increasingly extreme examples in making the case for rational thinking to the client. Suppose, for example, that a male client's difficulties in social interactions with women center on fear of rejection and the consequent implications for the client's self-worth. The therapist might begin by pointing out that there are valid reasons that a woman might turn him down for a date which have nothing to do with the client, and so a priori there is no valid reason to take it personally. Having accepted this argument, the client might then be asked to suppose that in fact he was rejected by the woman because she did not like him. Is it necessary to a person's self-worth that he be liked by everyone all the time? Perhaps it is more realistic to interpret rejections as merely unfortunate or disappointing events that can be dealt with. The fact that some people don't like an individual is little reason to assume that he is somehow worth less as a person. Finally, the argument is extended to the most extreme and unlikely case of all: the possibility that no one likes the client. The client is persuaded that even in this case the circumstances are not disastrous, and that he is not a worthless person merely because of other people's opinions.

The use of successively more extreme examples serves a strengthening function. If the client can be persuaded to accept the logic of the therapist in these extreme examples, it may be easier for the client to cope with the objectively less difficult problems which are most likely to be encountered in actual social situations. Of course, as therapy proceeds the therapist shifts the burden of challenging and modifying irrational statements onto the client himself, for it is the client who will employ these new cognitive skills in situations where the therapist is not present. The ultimate power of cognitive-behavioral techniques lies not in the extent to which the client has positive feelings about himself and his prospects for the future (although this is certainly desirable), but the extent to which they are successfully used in solving real world problems. To this end, a great deal of therapist-client interactions involves an analysis of the client's reports of recent experiences and how he has handled them, so that actual employment of cognitive-behavioral techniques by the client is refined and improved upon.

These techniques which Ellis (1962, 1973) calls "rational-emotive" and which Goldfried and Davison (1976) have referred to as "cognitive relabelling" would appear on the face of it to have a great deal of applicability to treatment of adult firesetters. Given the record of failure in a variety of situations for many of these individuals, techniques designed to reduce fears of failure and increase persistence of adaptive behavior in the face of setbacks represent an important component of therapy. However, any successful therapist must also recognize the importance of actual success of the client in achieving desired outcomes. Here is where the relationship between successful performance and Bandura's concept of "efficacy expectations" (Bandura, 1977a, 1977b) must be stressed, as well as an increase in positive behavior-outcome and stimulus-outcome expectancies in Mischel's (1973) system. Therapeutic gains are likely to be short-lived unless the client ultimately sees an improvement in performance in situations where failure was once predominant, and it is likely that for many firesetters,

past failures were due in large part to actual social and behavioral deficits. Thus, successful therapy must link improvements in cognitive performance to improvements in what the client overtly does in a variety of situations for therapeutic gains to be maintained. For example, behavioral assignments are often given to the client with the instruction that they be practiced between therapy sessions (Ellis, 1962; Goldfried & Davison, 1976). These assignments are typically well within the client's current competency level so that the likelihood of successful performance is maximized. A variety of specific techniques might be used, depending on the client's needs. However, since many of a firesetter's difficulties appear to center around rather broad social deficits, it is likely that techniques designed to improve social performance, such as assertion training (Cotter & Guerra, 1976) or behavioral rehearsal (Goldfried & Davison, 1976) may prove most useful. With such techniques, social situations which the client is likely to encounter are simulated in the therapeutic situation. Clients learn by instruction and by observing models already skilled in the specific behaviors to be learned, they rehearse the appropriate responses, and receive feedback for performance. Practice and positive feedback are designed to increase the likelihood that the client will exhibit and be reinforced for the same behaviors in the natural environment.

Yet another general approach to treatment which is consistent with previously described approaches is called problem-solving therapy (Goldfried & Davison, 1976). This approach is related most directly to Mischel's (1973) category of self-regulatory systems and plans, because it attempts to reduce impulsive behavior and replace it with a system of adaptive, well-considered responses to everyday problems. Certainly, one aspect of the behavior of many adult firesetters is that, in addition to a lack of persistence in socially adaptive behavior, they often react to immediately stressful situations in ways which have long-term maladaptive consequences, without considering viable alternative responses. For example, a firesetter may view himself as compelled to seek revenge for some perceived wrong against him, or to respond to some perceived inner impulse to set fires, when alternative, more appropriate responses to whatever is causing the distress may be available. These behavior patterns may be most apparent in descriptions of the firesetting behavior itself, but they are also characteristic of behavior which firesetters display in other situations as well. They define the impulsive nature which is so characteristic of descriptions of firesetters in the literature.

The problem-solving approach, as described by Goldfried and Davison (1976), is a heuristic for developing a well-articulated system of self-control and rational decision-making. Clients are instructed in defining problem situations in operational terms, in generating alternative responses and analyzing probable outcomes, in devising plans of action based on problem analysis, and in verifying actual outcomes. In essence, their approach tries to develop a system of rules for decision-making which disrupt the ordinary course of reflex-like reactions to problem situations which these individuals display. When problem situations are defined and analyzed in a way which presents clear choices of actions and their associated consequences, the client should more readily perceive the relationship between behavior and its consequences, should more readily accept responsibility for the choice of actions, and should be in a better position to evaluate outcomes and correct mistakes. With the problem-solving approach, the excuse

that there was a compulsion to respond in a particular way becomes vacuous. While the particular circumstances which a client faces may not fall completely under his control, his belief that he must respond in a certain way is irrational. Like irrational beliefs described elsewhere, it is important that this one be challenged and modified into a productive sequence of responses. As a general approach, problem-solving therapy is appealing because it directly connects cognitive performance with overt actions. To the extent that the process culminates in effective actions frequently enough, the problem-solving process should be strengthened, and should become more firmly a part of the client's behavioral repertoire.

Cognitive-behavioral approaches to therapy, like other behavior therapies, focus primarily on current functioning rather than on the origins of behavior problems. This orientation follows from the basic premise that whatever the historical reasons for maladaptive behavior, a client's current difficulties center around the failure to adequately adapt to current circumstances. It follows that focusing on issues not relevant to current functioning may be counterproductive. For example, Yochelson and Samenow (1976) found that criminals would readily latch on to early impoverished environments (either real or fabricated), as they would any other excuse, to absolve themselves of responsibility for their criminal acts. After continuing failure at traditional forms of therapy, Yochelson and Samenow gradually adopted a set of therapeutic procedures designed to deal with problems of this sort which they had encountered in dealing with a criminal population. Much of their approach is consistent with cognitive-behavioral approaches described in this paper. Their therapy focused exclusively on current thoughts and actions, and on the challenging and modification of patterns of criminal "thinking errors."

Similarly, Borriello (1973), in conducting group psychotherapy with patients with "acting-out character disorders" which included arsonists, found it useful to introduce certain "group mores" to facilitate behavior change. These group mores served as guides to current behavior. Many were maxims consistent with a cognitive-behavioral approach: a consideration of the consequences of behavior, accepting responsibility for behavior, viewing behavior as choice rather than controlled by impulse, and tolerating the uncomfortable aspects of life.

The treatment approaches to adult firesetting considered in this section have involved only very general suggestions as to what approaches are likely to be effective. Systematic studies of treatment effectiveness have not been forthcoming, although several writers have suggested that effective treatment is possible (Lewis & Yarnell, 1951; Schmideberg, 1953; Warner, 1932). The choice of specific treatment methods, of course, depends on a careful assessment of client needs and available resources, but in any case treatment is likely to be an arduous process. Both Yochelson and Samenow (1976) and Borriello (1973) found criminal populations in general to require lengthy and intense treatment, and to the extent that firesetting shares common features with other criminal behavior, the same might be expected for firesetters as well. Hurley and Monahan (1969) provided an even less optimistic prognosis for arsonists than for non-arsonists in a criminal psychiatric facility. Arsonists showed poorer motivation for treatment, a greater tendency toward social isolation, and difficulties in forming and maintaining social relationships which interfered with treatment. More definitive statements of treatment effectiveness await the development of

well-controlled treatment procedures, as well as carefully planned, objective evaluation and outcome studies.

Therapy with Children

The examples of therapeutic treatment procedures with adults represent a diadic model of therapy, in which the therapist works directly with the client to effect behavior change. The basic premise of this therapeutic model is that what goes on in the therapeutic situation will effect positive, adaptive behavior changes in the client's natural environment, and these will in turn be maintained by the consequences they produce. There is a good reason for concentrating on this approach in therapy with adult firesetters. While it would also be desirable to directly effect changes in the way the natural environment responds to the client, this may be a difficult or impossible accomplishment in many cases. The constellation of surrounding people may be constantly changing or difficult to access, especially for those firesetters described by Inciardi (1970) as leading "a nomadic way of life" (p. 153).

In treating children and adolescents, on the other hand, a triadic model of therapy (Tharpe & Wetzel, 1969) may be more feasible and preferable. As distinguished from the diadic model, in the triadic model changes in client behavior are mediated by other people who have significant social contact with the client in the natural environment. In the case of treating deviant child behavior, the therapist is likely to work with parents and teachers of the child, teaching them new skills in interacting with the target child. Therapeutic effectiveness depends upon the consistent application of these skills.

The advantages of the triadic model of therapy are twofold. First, to the extent that features in the natural environment are used successfully to modify behavior in that environment, problems in generalization of treatment effects are minimized. Second, and perhaps more important, successful implementation of the triadic model modifies those factors in the environment which may in fact be strengthening deviant behavior patterns such as firesetting. In Patterson's (1978) conception of the deviancy drift hypothesis, behavior in problem children becomes increasingly deviant as social development proceeds because of cumulative skill deficits. It makes good sense for therapy to concentrate on producing an environment which encourages and responds to positive, adaptive behavior before the child develops beyond the confines of the home and family. The therapist may be able to create a therapeutic home environment given concerned and cooperative parents. Establishing effective therapeutic intervention extending beyond the home and school environments would be exceedingly difficult at best. It is therefore imperative that these environments be utilized while they continue to exert sufficient control over the child's behavior to make effective intervention possible.

Effective employment of parents as therapists should result in a reduction in the target child's distressing behavior and, also, in an improvement of social interactions between parents and the target child. Holland (1969), in using a procedure employing positive consequences administered by parents in modifying the firesetting behavior of a 7-year-old boy, stressed the importance of the procedure in improving the relationship between the child and his parents. Other therapists using various therapeutic techniques have stressed the importance of improving social relationships between family

members of firesetting children (Awad & Harrison, 1976; Eisler, 1972; Minuchin, 1974). The variety of procedures used in treating cases of firesetting children have been described in greater detail elsewhere (Vreeland & Waller, 1978), and need not be repeated here.

The point we wish to emphasize is that there is a two-way interaction between the effectiveness of behavior therapy in modifying firesetting behavior and on increasing the value of parent-child social interactions. To the extent that parent-child social interactions become more reinforcing for the child, the child should become more responsive to parental attempts at controlling the child and teaching new, more adaptive behavior. Conversely, as the child's behavior improves, parents are likely to emit a greater number of positive responses toward the child. Instead of a vicious circle we establish a beneficent circle. This analysis is consistent with the theory developed earlier. It stresses that the most effective treatment procedures are likely to be geared both towards reducing the target firesetting behavior directly and towards creating a more favorable learning environment.

Not all studies have concluded that treatment in the natural environment is the optimal way to proceed. Fine and Louie (1979) concluded that, because of social difficulties in most families of youthful firesetters, referral to foster homes or residential treatment facilities may be preferable to treatment in the home. McGrath, Marshall, and Prior (1979) found it necessary to begin treatment of an 11-year-old boy in a detention facility. The last of several fires he had set had gutted the group home in which he resided. After intensive treatment in the detention home, he was able to be transferred back to a group home, and a 2-year follow-up indicated that treatment had been successful. Other studies reviewed earlier by Vreeland and Waller (1978) have utilized with some success procedures outside the normal home environment at least at some point during treatment (Awad & Harrison, 1976; Denholtz, 1972; Welch, 1971).

Decisions about whether treatment should be carried out in the natural environment will depend heavily upon individual circumstances. Treatment in the home using parents as therapists is not likely to be effective when either the severity of the child's disturbing behavior or the severity of disturbed family interactions make it unlikely that treatment procedures will be properly carried out. There is some indication that these two factors covary in families of firesetting children (Siegelman, 1969; Siegelman & Folkman, 1971). The decision to provide treatment in a residential facility outside the home is a weighty decision, and again underscores the need for appropriate assessment procedures.

A significant aspect of the McGrath et al. (1979) study was that it employed procedures similar to those we have considered appropriate for adults. Their procedures were designed to modify directly the boy's social, cognitive, and verbal skills, that also included a program in fire safety. The social skills program consisted of role playing, modeling, and rehearsal of skills for dealing with stressful situations, as well as an attempt at modifying irrational self-statements. Covert sensitization (Cautela, 1967), in which the client was verbally guided through imagined scenes of firesetting and its disastrous consequences, was employed in order to make firesetting, and cognitions of firesetting, aversive. An overcorrection procedure was employed (Azrin & Foxx, 1971) in which the child was required, among other things, to light a small piece of paper and douse it with a

bucket of water, while repeating statements about the dangers of fire and the safe use of fire. Finally, a fire safety inspection program included a period in which the child received instruction from a number of sources on fire safety, and culminated in the presentation of a fire safety project by the child to the local fire chief.

It is of course impossible to independently assess the relative contributions of each of the above procedures to the success of the therapy in the McGrath et al. (1979) study. However, the procedures employed are consistent with findings that cognitive variables and self-produced verbal behavior may play an important role in the behavior of children (cf. Flavell, 1976; Meichenbaum, 1977; Mischel, 1979). The procedures are also consistent with suggestions that increased knowledge of fire safety and responsible fire use, rather than a suppression of cognition about fire, may be effective in reducing dangerous fireplay (Kafry, 1978; Vreeland & Waller, 1978). Furthermore, education in responsible fire behavior may provide further opportunities for establishment of a positive relationship between the firesetting child and his social world. Many of the procedures suggested by McGrath et al. could be employed in conjunction with the triadic therapy model, and indeed it is likely that effective therapy involves such procedures, even when they are not explicitly stated.

CONCLUSIONS AND RECOMMENDATIONS

Theory has value only insofar as it affects the way observations are collected, organized, interpreted, and applied. We have attempted to place firesetting in the context of current psychological theories of behavior and personality. Social learning theory, when given a broad congitive base, was especially helpful in allowing us to order existing information on firesetting. As a result we were able to offer insights into possible therapeutic interventions with both adult and child firesetters based on social learning theory. These are positive contributions to be expanded and clarified by work yet to be done.

Yet, by any objective criterion, most of the work on a psychological understanding of firesetting remains to be done. The present document is but a short step forward toward a goal still dimly perceived. We believe, however, that paths can be discerned that will guide future research into productive areas and also serve to motivate research effort and agency support.

It is only fitting that, in the final section of this paper, we should briefly summarize the findings of the present paper and of our earlier work (Vreeland & Waller, 1978) in light of their implications for further research. Many of the points that will appear here have already been made elsewhere in the text, sometimes repeatedly. However, summarizing them here may help lend some perspective to the direction of current and future research. We do not expect that all of the research goals here stated will prove practical or even possible to attain, nor do we think that they should be taken as immutable statements of research needs which, when met, will solve all of the problems and answer all of the questions we have raised. Rather, we are suggesting that they be taken as guidelines to research approaches which are likely to prove fruitful in understanding firesetting and to raise further relevant questions. Ultimately, a good scientific understanding and good problem-solving strategies should go hand in hand. We have

identified four broadly defined and interrelated areas which future research should address: classification systems, theory, treatment, and prevention.

Classification Systems

The ways in which events are classified both reflect and shape our understanding of those events. Failure to make important distinctions in classification of firesetting is likely to impede understanding of the act and lead to less than optimal remedial actions. Economic motives, jealousy, desire for revenge, and sexual frustration are virtually universal to the human condition. As a result these motives tell us very little about why some people set fires and others do not. Neither are these motives useful in distinguishing "types" of firesetters. They may be useful components of firesetting inasmuch as they reveal certain aspects of the firesetter's self-perception of his difficulties, but they do little to specify the determining factors involved: antecedent conditions, organismic variables, firesetting behavior, and its consequences. We have suggested that a detailed examination of such factors may produce clusters of behavioral symptoms which represent "types" of firesetters. Whether or not this is the case is a matter for further empirical research. Existing information simply cannot serve this purpose. It would be pleasantly surprising if the observations needed could be acquired easily. In any case a detailed examination of the determining factors is itself a form of classification which can lead to useful intervention strategies. In some cases, simpler but equally useful classification dimensions may evolve, such as seriousness of behavioral disturbance, which may lead to more optimal deployment of intervention resources (Kafry, 1978; Siegelman, 1969; Vreeland & Waller, 1978).

Theory

Many of the statements that apply to problems in classification apply equally well to a theoretical understanding of firesetting. This is no coincidence, since the social learning approach makes rather explicit the relationship between classification of events, theoretical understanding of the determinants of behavior, and the selection of appropriate intervention strategies. Much of what has been stated about cognitive processes, vicarious influences, and social reinforcement mechanisms which may operate in firesetting situations is based on sound research into fundamental behavioral processes. But very little empirical evidence has been gathered on the relative importance of these processes as determinants of firesetting. The theoretical statements outlined in this paper need to be empirically tested.

For example, the technology for detailed analysis of family interactions is now well developed (cf. Reid, 1978). A major study incorporating direct observation of social interactions in families of firesetting children would seem warranted, given the crucial role such interactions have been hypothesized to play in the development of childhood firesetting as well as in the development of deviant patterns of behavior leading to adult firesetting. In the context of theoretical statements made in the current paper, family interactions may not only be a critical determinant of deviant behaviors such as firesetting, but also a determinant of how readily adaptive prosocial skills are learned. According to recent data (Kafry, 1978), firesetting in children is apparently quite common. While any firesetting

behavior is serious because of the disastrous consequences it may have, firesetting may become a more serious and long-lasting problem when the family social environment does not promote the resolution of problems which may have led to firesetting in the first place. Studies of family interactions may serve to confirm theoretical hypotheses about the determinants of firesetting as well as aid in the development of assessment tools to determine when the risk of continued firesetting is high.

Treatment

Much of the firesetting research which has been conducted and which will be conducted in the future is likely to be carried out in a clinical context. The ultimate test of classification systems and theoretical frameworks is the extent to which they prove functional in changing behavior. Much of the material in the section on treatment of firesetting has been based on sound principles which have proven effective in other contexts and which are consistent with theoretical principles developed earlier. Again, however, these principles have not been adequately tested on clinical populations of firesetters, especially in the case of adult firesetters. Treatment studies on youthful firesetters have received a great deal more attention, but even these have been case studies which have not explored the generality of findings. Systematic studies of treatment effectiveness with adequate assessment and follow-up data would be a valuable addition to the literature on firesetting in both children and adults.

Prevention

A number of anti-arson programs sponsored by governmental agencies and insurance companies have been instituted in various cities, many with remarkable success. Such programs usually include massive public education programs along with stepped-up investigation and prosecution efforts. These measures are designed to have a two-pronged benefit. First, they may be successful in breaking up arson rings, which have operated for profit and have been responsible for high property losses. Second, by publicizing the increased risk of being detected, they may dissuade many potential arsonists from actually setting fires.

Despite these programs, very little attention has been paid to how the knowledge of behavior principles might be applied to firesetting prevention programs. One study we reviewed earlier (Vreeland & Waller, 1978) is very important in this regard, because it may have wider applicability than its original purpose. Doolittle and Welch (1974) reported on a program which was employed by the Louisiana Forestry Commission in an attempt to reduce wildfires in one ward where fires occurred at a high rate. Many of the fires were thought to be started by youngsters. A respected member of the community was chosen to contact and meet face to face with each family of the ward. The contact engaged in small talk with the families as well as talk of forest fires and forest management, and he gave coloring books or pencils to the children. He also discussed services available to the landowners through the commission, including a controlled burning service which subsequently proved to be very popular among the residents of the ward. Over the 5 years in which the program was in operation, wildfires decreased by 55%. The authors attributed this decrease to the cooperation which the contact elicited from the families in forest fire prevention, as well as to

the controlled burning service which may have acted as an incentive.

The choice of a well-known and respected member of the community in the Doolittle and Welch (1974) study seemed especially important in eliciting community cooperation, and the program very much resembled a larger scale example of the triadic model of intervention. Similar programs might be useful in other areas where youthful firesetting is a serious problem, and might also be applicable, with some modifications, to certain types of arson-for-profit. For example, it is reasonable to hypothesize that many potential arsonists do not find the decision to set fire to their business an easy one. Many might be readily persuaded to take another action to resolve their financial difficulties under the right circumstances. Working through the local chamber of commerce, for example, respected businessmen might be engaged to personally contact each local business and discuss the arson problem with its owners. A consulting service might be made available to aid businessmen in working out problems in finance, plant safety, and other difficult problems which businesses continually encounter and which might provide reasons for arson.

The use of personal contact by an influential community member is likely to be crucial in programs of this type, and is consistent with findings discussed earlier that vicarious influences on behavior are likely to be stronger, the stronger the perceived power of the instructing model. To the extent that the potential arsonist may already be strongly controlled by vicarious influences which promote arson, as well as the perceived economic gains, it may require an equally powerful model to dissuade him.

Programs of this type are likely to be expensive, since by design they are comprehensive. Costs could be reduced by identifying subgroups of high-risk businesses and applying a program only to that subgroup. In any case, expense should be measured in terms of reduction of loss due to fire. Such programs, even when comprehensive, may be highly cost effective when measured against the value of property saved. Whether these extensions of the triadic model will prove to be valuable additions to ongoing anti-arson programs is a matter for future research and program evaluation.

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16. ABSTRACT *(A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)*

This report attempts to develop a theoretical framework for understanding firesetting behavior in terms of social learning theory. An advantage of the social learning approach is that it provides a unified functional approach to classification, theory, and therapeutic change, and that there is some continuity between an understanding of firesetting and an understanding of the determinants of behavior in general. Three major aspects of the interaction between a person's behavior and the social environment are considered. (1) At the behavioral level, the individual's behavior acts upon and is acted upon by the environment, and aspects of the rearing environment which may lead to firesetting are considered. (2) Vicarious processes determine how behavior is influenced by other sources of information, including modeling and instructional influences. (3) Cognitive processes determine how a person selects, encodes, and evaluates incoming information about the social environment, and how behavioral sequences are determined in light of the person's expectations and abilities. These three components, which are considered basic processes in a person's successful adaptation to the environment, sometimes interact in ways which produce and maintain deviant behavior patterns, including firesetting. The implications of social learning theory for the treatment of firesetting in children and adults are discussed in detail. The present paper also provides a framework for future studies examining the social learning determinants of firesetting behavior.

17. KEY WORDS *(six to twelve entries; alphabetical order; capitalize only the first letter of the first key word unless a proper name; separated by semicolons)*

Arson; antisocial behavior; cognition; firesetters; human behavior; social environments; social learning theory

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