

THE NEGATIVE SIDE EFFECTS OF REWARD

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The negative side effects of aversive control have been extensively discussed in clinical literature and textbooks. The symmetry between aversive and appetitive control in basic experimental research implies that parallel negative side effects of reward exist. These negative side effects are described and their implications for clinical practice and research are discussed.

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A behavioral psychologist, Dr. B, once had a student, N, who was quiet and withdrawn. He decided to try to encourage N to participate in research discussions. He consulted all of the latest behavior therapy textbooks and designed an intervention program. Each time N spoke of research, Dr. B said enthusiastically how nice it was to hear N's opinion and what good points N was making (all of which were true). Soon N's rate of verbal behavior had increased enormously. Unfortunately, N also began talking about topics other than research. In fact, N's major topics of discussion were about the relative merits of different kinds of dog food and which city had the best mass transportation system. N spent several hours each day seeking out Dr. B at the office, the lab, and on the phone. N spent so much time looking for and talking to Dr. B that N's interaction with other students was virtually eliminated. Dr. B's life became miserable. This time Dr. B consulted a clinically oriented colleague who suggested that he punish N for all of the excessive verbal behavior. Dr. B, of course, abhorred the use of this method for

fear that the well-known negative side effects of punishment would be too devastating to N.

Like Dr. B, a number of other psychologists have been concerned with the iatrogenic problems associated with psychotherapy (Goldiamond, 1974; Stuart, 1970). This concern with negative side effects of therapy is reflected in the literature on "symptom substitution" and in more recent behavior therapy literature on negative side effects of various therapeutic procedures. Although some very recent attention has been paid to potential negative side effects of reward (Kazdin, 1982; Lepper & Greene, 1978), the behavior therapy literature has focused primarily on the negative side effects of treatments that use aversive control techniques (i.e., punishment, aversion therapy, overcorrection). From their inception, only qualified acceptance has been given to aversive control procedures because of the widespread belief in these side effects. In this paper we focus attention on the less acknowledged negative side effects of reward procedures.

In the first part of the paper, we review the negative side effects of aversive control and the extent to which these effects are emphasized in current clinical training. In the second section, we establish the symmetry of reinforcement and punishment and suggest historical reasons for the failure of psychologists to address the negative side effects of reward. In the third section

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of the paper, we argue that the symmetry between appetitive and aversive procedures includes negative side effects and document our arguments with clinical and experimental evidence. In the fourth and final section, we discuss the implications of our arguments for therapy and the training of psychotherapists.

NEGATIVE SIDE EFFECTS OF AVERSIVE CONTROL

Negative by-products of aversive control are widely acknowledged in the behavior therapy literature. Table 1 shows that most classic and current textbooks in behavior therapy do caution students and practitioners about a variety of problems associated with the use of punishment and avoidance contingencies. In general, these texts develop such statements about the negative side effects of aversive control by either referring to basic experimental research on punishment and avoidance with animals or by providing case study exemplars. In fact, with few exceptions (cf. Bellack & Hersen, 1977; Kanfer & Phillips, 1970; Kazdin, 1980), these texts do not refer to the clinical documentation of negative side effects, and only one (Kazdin, 1980) does so in a systematic fashion. There have, however, been over 30 clinical articles published that document the occurrence of these effects, the great majority of which have been published in the past decade (see Bitgood, Crowe, Suarez, & Peters, 1980; Kazdin, 1980, 1982). This growing empirical literature on negative side effects and the widespread belief in their existence are the impetus for examining in detail potential side effects in both aversive and appetitive conditioning. The potential negative side effects of aversive conditioning that have been described in the behavior therapy literature are presented below.

Elicited or Emotional Effects

The mere presentation of an aversive stimulus or the contingency between conditioned and unconditioned stimuli may induce behavior that

can be therapeutically inappropriate. This behavior may be inappropriate because it is itself problematic or because it interferes with the successful implementation of the therapeutic program. There seem to be four general classes of problems that appear to be potentially induced by the use of aversive control techniques:

Anger and aggression. Column 1 of Table 1 indicates that many authors caution that aggressive responses may be elicited by aversive stimuli. Aggression may be directed toward the punishing agent or toward another individual. In clinical cases, a child whose behavior has been punished may start to fight with siblings, peers, or other "safe" targets. Anger may be displayed by yelling or crying, again not necessarily directed toward the punisher.

Withdrawal and general suppression. Column 2 of Table 1 shows that many writers warn that punishment may lead to suppression of responses other than the specifically punished response. Postural freezing (Bolles, 1970), depression, and emotional withdrawal have all been postulated as potential side effects of punishment. The child who sulks following punishment may exemplify a mild form of this reaction.

Ritualistic or inflexible behavior. Several authors (Table 1, column 3) have noted that the application of aversive contingencies may lead to avoidance responses that are so emotion laden that they become intractable. Not only can the behavior appear ritualistic, but the responses may be insensitive to altered environmental contingencies. Bandura (1969) speculated that such ritualistic behavior is frequently associated with sexual acts following a history of severe punishment for childhood curiosity. Other obsessive-compulsive reactions may also result from a history of exposure to aversive stimuli (Haslam, 1965; Lazarus, 1965).

Additionally, sometimes when an avoidance response is punished especially when the intended punishing stimulus is specifically what is being avoided, the rate of the avoidance response may increase (Mikulas, 1972; Mowrer,

Table 1
Negative Side Effects of Aversive Control

	<i>Elicited Effects</i>			<i>Operant Effects</i>					<i>Imitation</i>	
	<i>Emotionality/Aggression</i>	<i>General Behavior Suppression</i>	<i>Inflexible Responses</i>	<i>Escape</i>	<i>Avoidance</i>	<i>Aggression</i>	<i>Generalization</i>	<i>Specificity</i>	<i>Correct Response Not Taught</i>	<i>Negative Modeling</i>
Bandura (1969)	X		X		X		X			X
Bellack & Hersen (1977)	X									
Blackham & Silberman (1979)				X	X	X	X			X
Bootzin (1975)		X			X	X				
Browning & Stover (1971)		X		X	X	X			X	X
Clarizio (1980)			X		X		X		X	X
Craighead, Kazdin, & Mahoney (1976)	X				X					X
Favell (1977)	X			X	X	X		X		
Gambrill (1977)	X				X			X	X	X
Kanfer & Phillips (1970)							X			X
Kazdin (1980)	X			X	X	X	X	X		X
Krumboltz & Krumboltz (1972)	X			X	X					
LeBow (1973)	X		X		X		X			X
Mikulas (1972)	X			X	X					X
Morris (1976)	X					X	X			
Nay (1976)	X	X	X				X			X
Rimm & Masters (1979)	X		X	X	X		X			X
Sundel & Sundel (1975)				X	X	X	X			
Tymchuk (1974)	X			X	X				X	X

1947). For example, a college student who worries about failing a test may begin to drink to reduce this anxiety. Subsequent inebriation interferes with studying. The student may then fail the exam. Under these circumstances failure on the exam may increase the frequency of drinking rather than suppress it. A similar problem may arise if we castigate a friend for being too

nervous and fidgety; the problem may be aggravated rather than alleviated. The suggested clinical danger here is that the avoidance may become even more difficult to alter.

Operant Effects

The instrumental contingencies between stimuli-responses and consequences can also give

rise to therapeutic difficulties. Four classes of problems are described below.

Escape and avoidance. Escape (Table 1, column 4) and avoidance (column 5) are two other outcomes that are of concern when using aversive control. Generally, escape refers to fleeing from the punishing agent following aversive stimulation, and avoidance refers to attempts to reduce all contacts with the punishing agent. Chronic truancy and class cutting are, at least in some instances, examples of escape or avoidance resulting from the aversive control used by an education institution. Of course, escape or avoidance may be controlled by a situation rather than a person. The pervasive avoidance of dental care may arise from this sort of contingency.

Generalization and discrimination. Here the concern is with the degree of stimulus control exerted by a person or situation. In using punishment procedures, various authors have cautioned that the effects of these procedures will be too specific (Table 1, column 7), whereas others have cautioned that the effects may be too general (column 6). The specificity of the situations in which punishment is effective has frequently been considered a problem for two reasons. First, the degree of behavioral change may not generalize to important situations outside of the therapeutic milieu. That is, the target response may be reduced in one context but not in another. For example, one spouse yells at the other spouse for writing letters to someone of the opposite sex. Letter writing ceases, but only at home, not at the office. In general, any circumstance in which the adage "when the cat's away, the mice will play" is applicable, appropriately illustrates this problem. The second problem is that of too broad a range of stimuli suppressing a response. Not only is the behavior suppressed when it would be inappropriate but also when it is appropriate or even required. For example, yelling at a child for talking out of turn may suppress all verbal behavior in the presence of the punishing agent, including answering questions.

Response induction. New inappropriate behavior may occur as a result of response generalization when aversive control is used. The consequence of a response affects all operant classes to which the response belongs. In the case of punishment, a particular target response might be suppressed but so might other responses that belong to the same operant class (Nay, 1976; Segal, 1972). For example, punishing fighting may lead to the suppression of appropriate assertive behavior. Similarly, if an avoidance response is conditioned, other perhaps less appropriate avoidance responses may be strengthened. For example, aggression directed at the punishing agent, i.e., punishing the punisher for having punished, might be strengthened. If aggression is successful, the retaliator avoids subsequent chances of receiving aversive consequences. This sequence is illustrated by the child who throws toys around the room when a parent tries to punish the child. This retaliation may lessen the likelihood of the parent punishing the child in the future. This type of sequence has been labeled "countercontrol" by some (Mahoney, 1974; Skinner, 1953).

Transient effects. Although punishment may suppress behavior while it is applied, the effects of this procedure are temporary. When punishment is discontinued, the target behavior will occur again, perhaps at greater frequency (Azrin, 1960). Two of the texts listed in Table 1 mention this as a problem associated with the use of punishment (Bandura, 1969; Tymchuk, 1974).

Imitation

Most therapeutic treatments using aversive control involve a social interaction. This gives rise to the possibility of the client modeling the behavior of the therapist. Some behavior acquired in this way may be inappropriate.

Little is known about how imitation procedures interact with other training procedures (Bondy, 1982); nevertheless, negative modeling has been of concern to those who question the efficacy of aversive control (Table 1, column

10). Individuals whose behavior is punished may observe and learn to control others in a similar manner. For example, if a young child is spanked for fighting with a sibling, then, although the child may not fight as frequently with siblings (especially when the parents are present), the child may learn that physical force (i.e., spanking) is an effective way of controlling people. Thus, the child observed the successful use of control techniques for which she or he is being punished. There has been some speculation that this might be the mechanism responsible for the relationship between the occurrence of child abuse by adults and their own history of having been abused as children (Steele & Pollock, 1968).

It is important to note that these problems rarely occur in isolation and may combine in a number of ways. Thus, a child whose behavior has been strongly punished by physical means may run away from home (escape/avoidance) or engage in aggression using the specific abusive language that had accompanied the child's own prior punishment episodes (negative modeling).

THE COMPARISON OF APPETITIVE AND AVERSIVE CONTROL

Historical Influences

The asymmetrical emphasis behavior modifiers place on the negative side effects of punishment can be traced back to the many learning theorists who have supported a nonsymmetrical view of the effects of reinforcement and punishment. Thorndike (1898) described in his Law of Effect that connections between stimuli and responses that were followed by a satisfying outcome would be strengthened and those connections not followed by satisfiers would be weakened. In later revisions, he substituted "annoyers" for "no satisfiers," but the symmetry was clear. Thus, Thorndike initially claimed that "stamping out" was as real and important as "stamping in." However, Thorndike (1931) changed his views on the Law of Effect substantially.

Reinforcement was still essential for learning,

but punishment no longer had a direct effect on behavior. Rather, any reduction in the strength of behavior was thought to be both temporary and due to the elicitation of competing responses by the aversive consequences. ". . . there is no evidence that it (an annoyer) takes away strength from the physiological basis of the connection in any way comparable to the way in which a satisfying after-effect adds strength to it" (Thorndike, 1932). Thorndike's reappraisal had a profound influence on the education, philosophy, and practices of his time.

Additional support for viewing punishment as a procedure of questionable effectiveness was provided by Estes (1944) and Skinner (1938). Their experiments appeared to demonstrate a relatively small and temporary effect of response contingent punishment. The practical implications of these works were elaborated and emphasized in Skinner's influential book, *Science and Human Behavior* (1953). Skinner also highlighted several "unfortunate by-products" of punishment, including the following negative side effects: (a) conflict between the punished response and those responses that avoided punishment (ritualistic behavior); (b) strong emotional reactions; and (c) repressed behavior due to the punishment of reflexive behavior that has no appropriate "opposite" response (general suppression). Behavior therapists readily adopted Skinner's cautions about the use of aversive control procedures and henceforth warned about these and other negative side effects.

The Symmetry of Reward and Punishment

The major argument put forth by those rejecting the direct effect of punishment on behavior was that aversive stimuli elicit responses that are incompatible with the punished response. Thus, the elicited competing responses occur in place of the punished response, leading to a reduction in the latter's rate. Estes (1944) found that response-dependent (punishment) and response-independent electric shocks had equally suppressive effects on a rat's bar-pressing behavior.

In general, however, evidence has not supported the competing-response hypothesis. Experiments by Azrin (1956) and Schuster and Rachlin (1968) demonstrated clearly superior response suppression following response-dependent aversive stimuli.

Presenting an aversive stimulus does have potential response-eliciting properties, but whether the elicited responses interfere with the punished response seems to be a function of arbitrary response selection and not an automatic suppressive effect. For example, Fowler and Miller (1963) shocked a rat in either the forepaws or hindpaws for running down an alleyway. In the former case, running was suppressed, but in the latter case running was facilitated. Fantino (1973) pointed out the difficulty in specifying the elicited competing response because the mere absence of the punished response cannot be viewed as support for the occurrence of a specific competing response.

Several theorists (Fantino, 1973; MacIntosh, 1974) have also pointed out that the eliciting properties of aversive stimuli are not unique to those stimuli. Indeed, appetitive stimuli, such as food, will also elicit responses, some of which may interfere with the reinforced response (Boakes, 1979; Breland & Breland, 1961). Therefore, the presentation of strong appetitive or aversive stimuli may elicit responses that enhance or detract from an intended outcome.

Further evidence for the symmetry of appetitive and aversive control is found at the empirical level. There is a substantial body of evidence showing that the parameters of both procedures affect behavior in symmetric ways. That is, consequence frequency, magnitude, schedule, and immediacy affect responding comparably in reward, punishment, and avoidance procedures (see Fantino, 1973; Fantino & Logan, 1979; MacIntosh, 1974 for reviews).

The empirical symmetry of the two procedures has been reflected in recent theories of reinforcement and performance which use the same principles in accounting for behavior con-

trolled by both appetitive and aversive consequences. DeVilliers (1977, 1980) and Himeline (1977) have shown that the performance generated by punishment and avoidance contingencies are described well by the matching law as stated for appetitive events (Herrnstein, 1970). Gibbon (1977, 1979) has shown that the same timing and performance rules can account for behavior on temporal schedules of both appetitive and aversive stimuli. Similarly, Premack (1971), Dunham (1977), and Timberlake and Allison (1974) have argued that the same underlying principles determine both the strengthening and suppressing effects of a contingency on instrumental performance. Thus, procedural, empirical, and theoretical arguments support a symmetric view of appetitive and aversive control.

THE NEGATIVE SIDE EFFECTS OF REWARD

In the preceding section we have pointed out that there is substantial agreement among researchers that the same processes underlie appetitive and aversive control and that these procedures produce symmetric effects on behavior. Both of these procedures not only influence the frequency of target behavior but they also affect the frequency of a variety of other responses. An implication of this position is that negative side effects parallel to those observed in aversive control should exist when reward procedures are used. In the following section, we will outline some of the potential (and parallel) side effects of appetitive control procedures. Examples will be supported by basic research with animals as well as by clinical illustrations.

Elicited or Emotional Effects

The presentation of an appetitive stimulus can produce behavior that is therapeutically inappropriate. As in the case of aversive control, this behavior may be inappropriate or it may interfere with the occurrence of the target response.

Aggression and ritualistic behavior. The periodic presentation of appetitive stimuli has been shown to induce a variety of stereotyped behavior. These responses have been called schedule induced, adjunctive, or interim behavior. They occur during the interval between reinforcer presentations and may be therapeutically inappropriate. In animals, behaviors such as pacing (Staddon & Simmelhag, 1971), wheel-running (Segal, 1969, 1972; Staddon, 1977), aggression (Cohen & Looney, 1973; Flory, 1969), and excessive eating (Cantor, Note 1), and drinking (Falk, 1971) have been induced by reward presentations. In humans, excessive drinking (Cantor, Note 2) and locomotor activity (Muller, Crow, & Cheney, 1979) have been induced by reinforcer presentations. Additionally, it has been suggested (Falk, 1977) that human addictions might be schedule-induced behavior. These highly stereotyped patterns of behavior appear to be particularly insensitive to manipulations that are designed to suppress them (Fitzgerald, Laplace, Bachorowski, & Lorcuto, Note 3).

Suppression of the target response. Powerful appetitive stimuli have the capacity to elicit behaviors that are incompatible with the response that a therapist is attempting to strengthen. For example, suppose that a young child's behavior is being shaped and ice cream is used as a potential reinforcer. The ice cream might elicit so much approach (i.e., staring, reaching) that it interferes with attending to the "relevant" stimuli. The presence of the reinforcer itself is not necessary for this sort of problem to arise. Reliable signals that precede reinforcer delivery can elicit responses that may be incompatible with the desired behavior. In the experimental literature, pigeons will peck keylights paired with grain (Brown & Jenkins, 1968) and continue to do so at substantial rates even when pecks result in grain omission (Williams & Williams, 1969). Even if no immediate external signal is presented, the same kind of effects can arise. (Boakes, 1979; Breland & Breland, 1961).

A practical example might occur in a classroom in which a teacher tells the class that if the children are good they will be allowed to go on a special trip at lunch time. The teacher's comment may elicit considerable disruptive behavior, and as the morning progresses the children may become increasingly fidgety and inattentive in anticipation of the reward. Similarly, if we tell a child that they will be rewarded if they take a nap, so much arousal may be elicited that sleep is impossible.

Approach to the reinforcing agent. A problem related to the preceding one stems from the fact that when a signal reliably precedes an appetitive event, approach and contact responses are conditioned to the signal. Hearst and Jenkins (1974) have called such behavior sign tracking. A person who receives substantial rewards may attempt to be near the rewarding agent with excessive frequency. Constant approaches to a parent, teacher, or therapist (e.g., clinging, holding on, hugging—literally and metaphorically) can interfere with the development of appropriate behavior. The extent to which a signal comes to control approaches depends on the contingency between the signal and the reinforcer (Hearst & Franklin, 1977; Wasserman, Franklin, & Hearst, 1974). That is, the approach tendency depends on whether alternative sources of reward are available in a given situation. To the extent that the reinforcing agent is the major source of reward for an individual, approaches to other people may be suppressed. For example, when an individual says (or, worse yet, sings), "I only have eyes for you," we can assume that the relative strength of the seen reinforcer is quite high.

Operant Effects

The introduction of a reinforcer contingent on a response not only increases the frequency of that response but it decreases the frequency of other responses as well. This effect is inherent in the basic principle of reinforcement. The rate of responding depends on the relative rate of

reinforcement (Herrnstein, 1970) rather than the absolute rate of reinforcement. For example, assume that there are only two response alternatives in a given situation and that each alternative is associated with an independent and equal schedule of reinforcement. Under these circumstances, equal amounts of time will be allocated to each of the alternatives. Now assume that the reinforcer frequency is increased for one schedule while the alternative schedule remains unchanged. Response rate on the changed schedule will, of course, increase. Response rate on the alternative schedule declines. Even though the absolute reinforcer frequency for that alternative has remained unchanged, the relative rate of reinforcement has declined. Thus, response rate is a function of the distribution of reinforcers among alternatives. Response rate is directly related to the frequency with which it is reinforced and inversely related to the frequency of reinforcement for all other alternative responses. This sensitivity to relative reinforcement rate holds both when alternatives are simultaneously and successively available.

A therapist and the therapeutic intervention can be highly rewarding relative to the other aspects of a client's life. Thus, there can be a strong tendency to engage in therapeutically related behavior and a simultaneous decrease in the strength of alternative responses. This decreased tendency to engage in alternative behavior can give rise to "dependence" on the therapist and the desire on the part of the client to interact only with the therapist or the client may relate to everyone as though they were part of a therapeutic interaction. To the extent that reinforcers are not provided by different people in different situations for different responses, the person's behavior may become quite withdrawn, obsessed, or monotonous.

A related potential negative side effect may occur at the termination of therapy, which ends an important source of reward. Until the relative value of consequences for alternative behavior has been increased, behavior may be depressed.

This condition may account for the "grief reaction" some clients experience at the end of therapy.

The relative reinforcement rate associated with an intervention program might interfere with the development of appropriate behavior in other ways. Some adolescents, on completion of a rehabilitation program which included access to reinforcers not usually available in their home environment (such as a gym or pool table) have become disruptive before a judge, thus guaranteeing their return to the program. Such actions indicate the relative strength of the reinforcers available in the special program.

Generalization and discrimination. The issue of generalization versus discrimination clearly is as critical for reinforcement procedures as it is for punishment. Behavior modifiers, however, have generally viewed such problems of reinforcement as procedural limitations while addressing the parallel effects of punishment as "negative side effects" (but see Stokes & Baer, 1977, for an integrated treatment of this issue).

The *sine qua non* of successful therapy is that behavior be generalized to situations other than the therapeutic one. It is not uncommon to find relapses, regression, recidivism, or only "partial cures" when clients return to a home environment after treatment in a therapeutic milieu. Even when therapy is carried out in the "natural" environment, it is not unusual to find that the improved behavior is under the control of the presence of the therapeutic agent or that the behavior does not generalize from one aspect of the environment to another. For example, when a token economy is introduced into a classroom, improved academic performance may be observed only during the portions of the day in which the program is in effect or when the usual teacher is in the room. Indeed, the students may be quite unruly and disruptive at other times of the day or in the presence of other adults.

Response induction. Particular responses are members of functional classes. As a result, the strengthening of a particular topography may

lead to the strengthening of other behavior that leads to the same consequence. Sometimes the other behavior may be quite problematic.

One group of responses that may increase with the advent of strong reinforcers includes "lying," "conniving," "stealing," or "cheating." Recall that with punishment, any behavior that successfully avoids or escapes punishment (including the reduction of the targeted response) may be strengthened. In similar fashion, the presentation of a reinforcer will selectively enhance all behavior that could result in the receipt of the reinforcer. That is why it is possible that when a reward such as candy is given following successful math work, candy-getting is the operant strengthened, with math work being only one member of that operant class. The implication is that behavior such as "Give me the candy!"; "I had no breakfast and I'm very hungry, so I'd like another candy"; "If you loved me you'd give me candy"; "Bozo's mother gives him candy all the time!" may also be likely to increase initially. Contingency contracts may generate what one parent called "the lawyer syndrome": looking for loopholes in a contract which will fulfill its literal but not intended meaning. The maintenance of such behavior will be largely a function of both the magnitude of the appetitive stimulus and the continued reinforcement of these behaviors. Therefore, instead of being surprised if they do increase, it might be more appropriate to be pleasantly surprised if they remain absent.

The behavior induced may not be as insidious as lying, cheating, stealing, and conniving, but nevertheless inappropriate. Imploring the reinforcing agent for more reward, albeit in a polite manner (e.g., "I would be especially appreciative if you would be so kind as to share your candy with me"), may interfere with the occurrence of the target response.

Under some circumstances, we can expect aggression to occur when reward procedures are instituted. Operant aggression may be directed at others in the vicinity of a reinforcing agent.

That is, if dispensing reinforcers to others reduces the availability (absolute number) of reinforcers for a particular individual, that individual will be rewarded for preventing the dispersal of the reinforcers. Similarly, if a group contingency is used, some members of the group may be aggressive in order to ensure that the group as a whole fulfills the reinforcement contingency.

In summary, some of the behavior that is strengthened by the use of strong rewards is not what was targeted for reinforcement. One might call such nontargeted responses examples of "countercontrol," as was the parallel case with punishment. However, it appears more appropriate to acknowledge that a whole operant class is influenced by a contingency rather than to label some members arbitrarily as "appropriately controlled" and others as "countercontrolled" (see also Bondy & Balsam, 1978).

Transient Effects

The effects of a reward procedure may be as short-lived as those of a punishment procedure. The reduction in response rate following the removal of a reinforcer is parallel to the increase in response rate following withdrawal of punishment. The rate of extinction will be a function of the prior magnitude and schedule of reinforcement. The probability of the target response may in fact decrease to a level lower than that which existed prior to any intervention (baseline). This change is analogous to the contrast effect sometimes observed when punishment is terminated. In the appetitive case, however, a whole area of research and theory has developed around this phenomenon.

The observation that the frequency of a behavior decreases below baseline levels following the withdrawal of a reinforcer has been interpreted as a demonstration that extrinsic rewards destroy intrinsic motivation (Lepper & Greene, 1978). The occurrence of behaviors prior to any explicit reward manipulation is attributed to intrinsic motivation. When extrinsic rewards are introduced and subsequently withdrawn,

the decline in response rate is said to reflect a decreased intrinsic motivation. Regardless of one's interpretation of these data, it is clear that temporal generalization of a target response may in fact be inhibited following the removal of reward.

Imitation

As in the case of aversive control, it is possible that the client will imitate the behavior of the therapist in inappropriate ways. If a client sees a therapeutic agent using arbitrary reinforcers to reward his or her own (or another's) behavior, the client may learn that such material rewards are necessary to control other people, an outcome many individuals would not value favorably. A child may observe a parent receiving friendly treatment following the parent's tipping waiters or doormen. The child may then attempt to "buy" his or her own friends. Additionally, the observation of someone else being reinforced may generate a "me too" reaction, especially where the behavior of two individuals is similar but the consequences are different. Such observations may result in "it's not fair," or "I want candy for sitting still too!" although positive reactions have been documented (cf. Kazdin, 1973).

DISCUSSION

We have summarized the empirical and theoretical arguments that point to a symmetric view of appetitive and aversive control. A consequence of this symmetry is that the introduction of either appetitive or aversive events will influence a wide variety of responses through common mechanisms. Thus in some instances we should expect to find negative side effects in appetitive procedures. These side effects are analogous to those that have been cited frequently in clinical literature relating to the use of aversive control. In the appetitive case, elicited outcomes such as aggression, ritualistic behavior, target-response suppression, and excessive approach can interfere with achieving a

therapeutic goal. Other potential problems arise from control by operant contingencies. The sensitivity of behavior to the relative rate of reinforcement can give rise to dependency on a therapist or therapeutic program. The strengthening of a particular response in one situation can result in a decreased frequency of that response in other situations. Additionally, the strengthening of a response increases the probability of all responses in the same functional class. Some of these induced responses may be inappropriate or interfere with the therapy. Finally, unintentional modeling may lead to an individual's attempting to control others' behavior through the inappropriate use of material rewards.

The prior arguments for the negative side effects of aversive control and the ones we present here for appetitive control are primarily rational ones based on analogies between basic animal research and clinical interventions. These arguments are given some support by a sparse empirical literature and plausible clinical illustrations. An extremely valuable line of future research would document the frequency with which one can expect various kinds of negative side effects. It is important to document which treatment procedures, under what circumstances, with what populations can be expected to generate a particular therapeutic outcome and a particular constellation of side effects.

The likelihood that appetitive control techniques may have negative side effects should not diminish concern about the use of aversive control. Nor should this point be taken to mean that reinforcement is too dangerous a procedure to be of therapeutic benefit. Rather, both procedures are effective but one must be aware of potential difficulties in the implementation of each. These difficulties are not necessarily of equal severity or detriment in a particular clinical program. For example, an aversive control procedure may lead to escape or avoidance whereas an appetitive procedure might lead to excessive approach. In the former case, the client is no longer a participant in therapy, and in the latter case, re-

mediation of this problem and continuation in therapy are more likely to occur.

Another kind of asymmetry in side effects has to do with potential effects on the therapist. Many of the client responses elicited by appetitive events are those associated with positive affect, whereas behavior elicited by aversive stimuli is typically associated with negative affect. This difference in client behavior can serve to maintain the behavior of the therapist, parent, or teacher in the former case and discourage their behavior in the latter case.

It has also been claimed that there is an asymmetry in how reward and punishment contingencies are specified. Some authors have stated that this asymmetry in the two contingencies is an additional disadvantage associated with the use of punishment in that the punishment contingency does not teach the client what to do (Table 1, column 9). However, it is equally true that reinforcement procedures do not teach which particular responses should not occur. This, of course, gives rise to the problems associated with response induction in both cases. It should be noted that these problems are not an inherent part of the use of reward or punishment; rather, they are a result of the way in which the response-reinforcer contingency is specified. For example, a differential reinforcement of other behavior (DRO) contingency uses appetitive stimuli but does not teach the client what to do. Similarly, an avoidance contingency teaches what to do but not what not to do. In both the appetitive and aversive cases, negative side effects resulting from generalization can be minimized by delineating all of the stimuli and responses that enter into the contingency. In the case of punishment, one must attempt to specify what behavior other than the target response may be expected to decrease, as well as specifying those responses that can be expected to increase. In designing an effective intervention, all of this information must be integrated into the design of the therapeutic contingencies.

The sensitivity of behavior to the relative rate of reinforcement applies to both appetitive

and aversive control procedures. That is, the effectiveness of a given reinforcer or punisher depends on the frequency and distribution of these stimuli at other times and in other situations. Should a problem related to this principle arise, there are two ways to deal with it. One can manipulate the parameters of the intended consequence or change the value of alternative consequences. For example, if a punishment procedure is ineffective, the effectiveness of the punisher can be increased in three ways—by increasing the magnitude or frequency of the punisher, by decreasing the aversiveness of alternatives, or by providing a positively reinforced alternative response. Likewise, the effectiveness of a reinforcer can be enhanced by increasing the value of a reinforcer or by decreasing the value of consequences associated with alternative responses.

It is difficult to anticipate all the behavior that might be elicited by appetitive or aversive stimuli in any particular case. These effects, however, are as much an outcome of an intervention as the desired behavior change. The therapist should be aware of their potential occurrence and be able to deal with them as they arise. For example, one might minimize elicited effects by attempting to use the stimulus of minimum magnitude that is effective in producing the desired result. Gradually increasing the magnitude of a stimulus might also eliminate some of the elicited effects, but this procedure might reduce the effectiveness of a stimulus of given magnitude. Alternatively, some combinations of appetitive and aversive treatment control techniques may induce side effects that counterbalance one another, thus minimizing inappropriate outcomes.

Methods of ensuring that therapeutic gains are sustained and generalized beyond the clinical intervention have been discussed extensively (Kazdin, 1980; Stokes & Baer, 1977). We reaffirm that contingencies that ensure this generalization should be an explicit part of a treatment program. Where beneficial gains have been sustained outside a treatment program even

though they were not explicitly programmed, one might refer to these as positive side effects of reinforcement or punishment.

There is a small literature on the positive side effects of punishment (Kazdin, 1982; Lovaas & Simmons, 1969; Risley, 1968) and reward (Bandura, 1969; Kazdin, 1982; O'Leary & Wilson, 1975). We would anticipate that as more is learned about these positive side effects, a symmetric relationship will become apparent. For example, any argument that points out that certain reinforcement procedures may ultimately lead a response to be "trapped by natural contingencies," should also note that similar natural punishment contingencies must also exist. Thus, there are likely to be symmetries between positive side effects of reinforcement and punishment as well as the outlined parallels for any negative side effects.

Similarly, Kazdin (1982) has argued on the basis of clinical research that in any treatment procedure changing one response will be likely to affect other related responses and that this covariation of responses may result in both positive and negative outcomes. We have speculated here about what some of the mechanisms that underlie response covariation might be. There are undoubtedly others. In particular, Kazdin (1982) has pointed out that cognitive processes may also generate response covariation. He notes that rules, plans, strategies, expectations, encoding, and subjective evaluations may all influence response organization. Attention to both verbal and nonverbal influences on response covariation is no doubt required for the design of effective treatment strategies.

Just as laboratory work dealing with punishment has led both to an increased awareness of its negative side effects and to procedural alterations to minimize such effects, so it will be beneficial for clinicians to be familiar with the nonclinical literature on reinforcement. The use of reinforcers, especially powerful ones, is not a simple procedure for which caution may be abandoned. Those who have been critical of be-

havior modifiers as too "mechanical" have often pointed to the limited awareness of the by-products of using strong rewards. There is an ever-growing body of data on nonstrengthening effects of reinforcers—their eliciting effects, contrast, relativity—which permit more accurate description of the total behavioral reaction to their use. It is our position that many of the reactions and cautions found in laboratory situations can be observed in many everyday and clinical interactions, if only we begin to look for outcomes beyond a simple "increased rate" for the target response.

As for Dr. B., he has learned a lesson that Emerson (1883) so aptly phrased, "Every sweet hath its sour; every evil its good" (p. 95).

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