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"Replacing" Problem Behavior: An Analysis of Tactical Alternatives

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A number of textbooks and professional volumes in applied behavior analysis suggest that interventions designed primarily to decrease a problem behavior should routinely be accompanied by efforts to increase the frequency of at least one appropriate behavior. Some sources describe the objective of this tactic as "replacing" the problem behavior. This paper considers rationales that might underlie this advice, as well as reasons why a general rule to this effect is inappropriate. This review reveals that although there may well be good reasons for considering this tactic, their rationales are often not well articulated and may even be unsound. It is also the case that there are good reasons why this tactic may not always be necessary, thus conflicting with an argument for a general rule.

Key words: replacement behavior, alternative behavior, punishment, reduction programs

In recent years, it has become routine, if not obligatory, to accompany efforts to reduce problem behaviors in individuals with developmental disabilities with auxiliary efforts to establish or strengthen one or more behaviors that are often intended to "replace" those targeted for reduction.[1] Some textbooks describe this tactic as an effort to replace the problem behavior with a desirable behavior (Alberto & Troutman, 1995; Cooper, Heron, & Heward, 1987; Kazdin, 2001; Miltenberger, 2004). Others refer to a broader need to strengthen alternative behaviors (Martin & Pear, 2003; Sarafino, 2001; Sulzer-Azaroff & Mayer, 1991).

The notion of establishing reinforcement contingencies for alternative or replacement behaviors as part of any program that targets inappropriate behavior is now ubiquitous in discussions of punishment or other approaches to reducing problem behavior (e.g., Carr, McConnachie, Levin, & Kemp, 1993; Horner, Sprague, & Flannery, 1993; Matson & DiLorenzo, 1984; Rolider & Van Houten, 1993). This approach is also found in state and local regulations and policies governing such interventions (e.g., Alabama Department of Mental Health and Mental Retardation, 1997). Furthermore, this type of supplement to reduction contingencies is often described in phraseology that implies it is a broadly accepted rule. For example, Cooper et al. (1987) call attention to White and Haring's "fair pair rule" (1980), which states that practitioners "should choose one or more alternatives to increase for every behavior targeted for reduction" (p. 423). Miltenberger (2004) indicates that "differential reinforcement of an alternative behavior (DRA) or the absence of the problem behavior (DRO) should *always* [italics added] be used in conjunction with punishment. In this way, the focus is on increasing desirable behavior to replace the behavior that is eliminated or decreased" (p. 401).

It is the thesis of this paper, however, that widely accepted notions regarding the appropriateness of strengthening alternative or replacement behaviors as part of re-

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[1] Throughout this paper, *reduction* programming or contingencies refers to all procedures that might be used in a manner that yields decreases in the occurrence of a targeted response class.

duction programs embody some oversimplifications and misunderstandings that may unnecessarily constrain or bias decision making about therapeutic options and even limit the effectiveness of interventions. More specifically, efforts to reduce the frequency of problem behaviors need not always be accompanied by attempts to establish or strengthen alternative or replacement behaviors. Decisions about whether or how to supplement reduction contingencies by strengthening other target behaviors should be reached only after considering varied rationales in the context of particular clinical features.

ORIGINS OF A THERAPEUTIC TACTIC

The earliest reference that may provide a rationale for the proposal that reduction procedures should be accompanied by reinforcement of specific alternative behaviors may be to a review of basic research on punishment written by Azrin and Holz (1966). In listing ways of maximizing the effectiveness of punishment, they wrote that "An alternative response should be available which will not be punished but which will produce the same or greater reinforcement as the punished response" (p. 427). They further noted that "If no alternative response is available, the subject should have access to a different situation in which he obtains the same reinforcement without being punished" (p. 427). These conclusions were based on laboratory studies by Holz, Azrin, and Ayllon (1963) and Herman and Azrin (1964) using human subjects and unpublished data from work done by Azrin and Holz using pigeons.

The findings of these early studies have usually been supported by other laboratory research over the years (Dunham, 1971, 1972, 1978; Dunham & Grantmyre, 1982; Dunham, Mariner, & Adams, 1969; Fantino, 1973). The applied literature has further accumulated substantial research involving procedures for strengthening desirable behavior (e.g., variations of differential reinforcement), and many studies have demonstrated the effectiveness of using such procedures as adjuncts to procedures involving punishment and other reduction contingencies (e.g., see the review of reinforcement-based procedures in punishment programs in Matson & DiLorenzo, 1984).

Given this guidance, it is reasonable that practitioners consider the usefulness of supplementing reduction contingencies with reinforcement contingencies designed to support the intended decrease in problem behavior. However, this consideration may have gradually earned the status of a general rule by oversimplification. Applied behavior analysts long ago realized that it was often necessary to deliver their technology through the efforts of individuals not formally trained in this field. This approach required transforming the complexities of operant conditioning and the technology of applied behavior analysis into a relatively simplified body of material that could be more easily taught to paraprofessionals and to individuals trained in other fields.

Although this approach has been successful in developing a broad service-delivery capability, one of its undesirable side effects has been the development of a body of materials and informal lore inculcating general rules that may oversimplify, sometimes to a fault, the complexity of the field and its technology. Over time, these simplifications can become established practices or even inviolate rules whose underlying rationales and complexities are no longer evident or included in professional curricula.

Another factor that seems to have contributed to the widespread conviction that reduction interventions must include efforts to strengthen alternative or replacement behavior

concerns the ascendancy of cultural values as an influence on design of therapeutic interventions (e.g., Anderson & Freeman, 2000). In the early years of applied behavior analysis, practitioners primarily considered the basic and applied research literature, in tandem with idiosyncratic clinical factors, in developing intervention procedures. However, the emergence of what is usually described as "the aversives controversy" in the 1970s (Johnston, 1991; Newsom & Kroeger, 2004) augmented the importance of cultural values in program design. Over the years, the influence of certain values (e.g., avoidance of aversive consequences in behavior-change procedures) related to the provision of behavior-change services to individuals with developmental disabilities has continued to grow. For some approaches (e.g., positive behavioral support, communication-based interventions, TEACCH, and gentle teaching), certain cultural values are a primary feature defining the style and particulars of interventions (e.g., Anderson & Freeman; Carr et al., 1993; McGee, 1987; Schopler & Olley, 1982).

Although the cultural values emphasized by these approaches vary somewhat from one to another, their net impact in the present context has been to deemphasize or even proscribe the use of interventions that focus on reducing problem behaviors in favor of a focus on teaching or strengthening alternative appropriate ways of behaving. This theme is one of the defining features of these approaches, and this tactic has become increasingly accepted in mainstream behavior analysis (e.g., Luiselli & Cameron, 1998). When a problem behavior is addressed with interventions that do not include explicit, contrived consequences for that behavior, the procedures often involve strengthening alternative behaviors, including those that may produce the same reinforcer as the problem behavior and therefore might "replace" that behavior. This increased focus on reducing problem behavior without arranging explicit consequences for the problem behavior may have therefore contributed to the assumption that a replacement tactic is required, even when explicit reduction contingencies for the problem behavior are included in an intervention (e.g., reinforcing an acceptable way of getting staff attention while concurrently punishing the inappropriate attention-getting behavior). Indeed, in an informal sense, the acquisition component often seems to be viewed as the primary feature of such programs, with the reduction component seen as a supplement, in contrast to the early research findings of Azrin and Holz (1966).

One way of viewing this history is in terms of the unavoidable conflict between scientific and cultural influences on applied behavior analysis. It is unavoidable because applied behavior analysis developed as a science-based technology. This is probably its most important characteristic and is unusual among human service models. Nevertheless, the influence of cultural values on the field and its procedures has been persistent and strong over the years. Although the fact of this influence is important for the evolution of the field, its potential impact must in each case always be examined in light of the scientific and conceptual foundations that are responsible for the effectiveness of the technology.

This inherent conflict has been, and must be, handled by filtering cultural values issues through the scientific and conceptual standards of the field. (The converse approach will only lead to a less effective technology.) This priority certainly does not mean that cultural values will not have powerful and valuable impacts on the field, however. The history of the aversives controversy, for example, shows a pervasive outcome (Johnston, 1991). In contrast to

early practices, it is now well accepted that reinforcement-based approaches to addressing behavior problems are preferred over punishment-based approaches as long as they can best meet the needs of the consumer. This transition in professional values had the important benefit of being accompanied by the evolution of a substantial research literature accommodating this priority that focused on new ways of investigating and treating such behavior (e.g., Iwata, Vollmer, Zarcone, & Rodgers, 1993; Luiselli & Cameron, 1998).

Although the aversives controversy was not always pretty, it should be noted that its effects on the field's treatment strategy and techniques for problem behavior may be seen in hindsight as part of the ongoing maturation of a scientific discipline. In this instance, Skinner had long expressed concerns about the use of punishment (Skinner, 1953), and Sidman (1989) published a persuasive volume detailing his concerns about the effects of punishment procedures. The aversives controversy may have merely facilitated if not accelerated changes that would have eventually occurred anyway.

ANALYSIS OF THERAPEUTIC RATIONALES

Nature of Behavioral Repertoires

It may be useful to begin an analysis of the reasons why reduction programs might, or might not, be usefully accompanied by efforts to strengthen other behavior with consideration of the general nature of response classes in the present context. It should be clear that when a single response class decreases in frequency, perhaps to the point that it is rarely observed, some other response classes must increase in frequency. An organism's repertoire is always "full," and therefore there is no such phenomenon as a behavioral void. In other words, when a problem behavior is targeted for removal from a repertoire, an objective that is probably infrequently attained in any complete sense, there is no hole in the repertoire that then needs to be filled. Time that previously was spent engaging in the problem behavior will now be spent engaging in other behavior that is most likely already in the repertoire.

Which of the many other response classes in a repertoire will occur more often as one occurs less often will depend on an admixture of influences in each case. These factors may include the history of these other behaviors, their relative strength in the repertoire, ongoing establishing operations relevant to the consequences produced by these behaviors, the contingencies presently associated with those behaviors, how the reduction contingencies may change these factors, and how changes in the target behavior influence the environment in ways that might affect particular behaviors.

For example, if a hypothetical individual with mental retardation engages in episodes of tantrums multiple times each day and this behavior decreases to an average of once a week as the result of an intervention, we may speculate about the other changes in his or her repertoire that might take place as this reduction develops. Certainly most of the time previously spent in tantrums will now be spent engaging in behaviors that result in reinforcement (otherwise he or she would not be engaging in them). These reinforcers will often be different from those that maintained the tantrums, and they will be contingent on other behavior, which will make such behavior more likely over time and which will in turn result in changes in the environment. The particular behaviors that occur instead of tantrums will depend on the relative strength of other behaviors in the repertoire, which is a result of their past and ongoing consequences. The ongoing consequences may well change, however,

particularly as the social environment is affected by decreases in tantrums (e.g., staff may now interact differently). These speculations may be taken in different directions, of course, but it should be clear that decreasing problem behavior does not leave a repertoire otherwise unchanged.

Influencing Unprogrammed Behavioral Changes

There may or may not be reasons for incorporating procedures into an intervention that will influence the redistribution of responding that occurs as a problem behavior decreases in frequency. The applied behavior analyst who designs the intervention should have already developed from the assessment process some confidence about the nature of the changes that might be observed in the client's repertoire when a reduction contingency is implemented. The available conclusions might include the following: (a) The possible changes in other behaviors are reasonably predictable and desirable, (b) the possible changes in other behaviors are reasonably predictable and undesirable, and (c) the possible changes in other behaviors are not reasonably predictable.

In the first instance, it may be appropriate merely to monitor changes in behaviors that are not targeted, remaining alert to the possibility that the anticipated changes do indeed transpire. Practitioners are generally reluctant to burden staff with programmatic obligations that are unnecessary. It may be that other behaviors in the client's repertoire are generally acceptable, increasing the odds that increases in other behaviors will be from among these alternatives. (For example, a client whose repertoire does not include a number of similarly problematic behaviors might be expected to exhibit desirable behaviors as a target behavior decreases.) It might also be that other ongoing formal programming or even informal contingencies are likely to increase particular, acceptable behaviors as the problem behavior decreases (e.g., staff may now look for more appropriate behavior that warrants reinforcing interactions).

In the second instance, expectations that the changes induced by decreases in the problem behavior will also result in increases in other problem behaviors will often require explicit procedures that prevent that outcome. In the not uncommon circumstance in which a client's repertoire includes multiple problem behaviors that have been effective in producing reinforcers, there may be good reason to include in the intervention contingencies that work against such changes by expanding the coverage of reduction contingencies, strengthening alternative acceptable behaviors, or some combination of these tactics. For instance, a client who is only physically aggressive when he or she does not get his or her way may be more likely to get verbally aggressive when the physical actions receive consequences. If this change is suspected, it may be wise to apply the consequences to verbal aggression from the outset, even though it is not an immediate problem, to prevent an increase in its occurrence.

In the third instance, the practitioner must balance the risk of unacceptable changes in untargeted behaviors and the burden of training and monitoring caregivers in ways required to implement an intervention of greater complexity. Requiring staff to observe, apply consequences, and record three behaviors even though only one of them presently requires intervention may lessen the likelihood that staff will fully comply with a program's requirements. A compromise might be to target only the problem behavior initially but be ready to adjust the procedures should unprogrammed changes be undesirable.

Strengthening Reduction Effects

Regardless of the outcome of the above analysis, one reason for designing reduction programs that include components intended to strengthen other behaviors has already been identified. When reduction procedures are in the form of punishment contingencies, both basic and applied research literatures suggest that providing reinforcement for one or more alternative behaviors will facilitate decreases in punished responding. Although laboratory research using nonhuman species has usually provided the same reinforcer for punished and alternative behaviors (Johnston, 1972), the more varied applied literature also supports this result when different reinforcers are used and even when different types of reduction procedures are employed (Matson & DiLorenzo, 1984).

Choosing to pursue these benefits requires the practitioner to decide which behavioral targets and procedures will facilitate decreases in the problem behavior. Perhaps the best place to start in making these decisions is with the nature of the problem behavior. In many circumstances, what is problematic about the behavior is not what might be termed its main effects but its side effects. From a selectionist perspective, the main effects of a behavior—its function—might be said to be the nature of its maintaining consequences. Its side effects might be said to be any remaining consequences that do not directly support the behavior. For example, disruptive behavior might be maintained by attention from staff (a main effect) but also cause injury to staff, property damage, and occasionally injury to the client (side effects). Although these other effects are often establishing operations for staff initiation of a therapeutic intervention, they do not necessarily contribute to maintaining the behavior in the repertoire.

The choices of behavioral targets and supporting procedures available to the practitioner depend on whether the consequences that maintain the behavior (its main effect) are problematic. When the maintaining consequences are not themselves problematic, arranging reinforcement contingencies for alternative behaviors that produce the same consequences as the problem behavior is a common tactic. The classic example involves a problem behavior maintained by attention from caregivers. Because caregiver attention is generally acceptable as a reinforcer, an intervention that targets the problem behavior might also involve teaching or otherwise strengthening appropriate ways of earning attention. In passing, it should be noted that distinguishing between two behaviors that yield the same consequences is inconsistent with the concept of a functional response class and requires a topographical approach to a definition (Johnston & Pennypacker, 1993).

On the other hand, when the problem behavior is maintained by an inappropriate consequence, it makes no sense to strengthen other behaviors that also produce that consequence. For example, if a client likes to play with matches, the resulting flame and its effects on flammable materials might be the reinforcer, which is obviously also inappropriate as a consequence for other behaviors. It may be especially important to consider this issue when the target behavior is maintained by negative reinforcement. The environmental condition from which escape is reinforcing may not always be in the client's best interest to avoid. For example, teaching an individual acceptable ways of escaping what are in some larger sense appropriate demands or useful activities may decrease a problematic escape behavior but at a cost that should be taken into account.

In other words, it is important to distinguish between replacement tar-

gets and alternative targets when selecting behaviors to strengthen as a way of enhancing reduction effects. It only makes sense to talk about intending to "replace" the problem behavior if the maintaining reinforcer is acceptable. (Even then, the connotations of *replacement* may be inconsistent with the nature of operant behavior and the concept of functional response classes.) Otherwise, reference should be made to strengthening alternative behaviors. This means that a statement that one should target reduction of problem behaviors only when implementing a collateral effort to strengthen a replacement behavior may be misleading, if not incorrect. It would be more appropriate to refer to strengthening specific alternative behaviors, with their selection made after careful analysis of individual circumstances.

Supplementing Deficits in Repertoires

Perhaps one reason that practitioners who work with individuals with developmental disabilities are attracted to accompanying reduction contingencies with efforts to strengthen alternative behaviors lies in the characteristics of many individuals in this population. Individuals with mental retardation, for example, are identified in part by the deficiencies in their repertoires compared to typical individuals, although politically correct phraseology now avoids this implication. The notion that we are taking a behavior out of an already limited repertoire might suggest that we should put something back as well.

Although this sentiment is understandable, it may be inappropriate to add this burden to reduction programs, especially as a general rule. When the nature of the problem behavior and its supporting contingencies suggests the complementary value of strengthening particular alternative behaviors, this tactic may be defended on the grounds discussed in the previous section. However, the general argument that reduction programs should include teaching new skills or improving existing skills merely because clients need more skills, although a worthy concern, has nothing to do with particular reduction interventions. Efforts to build a larger and more effective repertoire should be ongoing with individuals with mental retardation and other learning disabilities. Indeed, it is now the norm to look to such programming as a way of addressing problem behaviors because of the possibility of thereby avoiding the need for explicit reduction contingencies. If the need for a reduction program provides ideas for particular ways of developing an individual's repertoire, it might often be found that such an effort could already have been underway. For instance, if a client's tendency to consume foreign objects (pica) suggests a related need to more readily comply with staff requests to engage in other more acceptable behaviors, it could probably be argued that this need for a better compliance repertoire has a broader rationale that could have already justified making it a programmatic focus.

Increasing Generality

Another reason to accompany reduction contingencies with efforts to build the repertoire in some targeted way concerns the need to insure transfer of treatment effects from training to nontraining settings. The tactics for achieving transfer of reduction outcomes include various ways of increasing the likelihood of acceptable behaviors in other settings, often while concurrently extending reduction contingencies to these settings. For example, these possibilities may involve targeting a new or existing alternative behavior for strengthening because it is anticipated that environments in which

the individual will need to behave appropriately (i.e., not engage in the problem behavior) will support that behavior via natural (uncontrived) contingencies. However, the need to facilitate the transfer of reduction effects to secondary settings might not require supplementary efforts of this sort. For example, it may be sufficient to extend reduction contingencies, though perhaps in less intensive form, to other settings.

Cultural Values

It has already been noted that one reason for accompanying reduction interventions with an acquisition component is primarily based on cultural values rather than a science-based understanding of behavior, conditioning processes, and behavior-change technology. A common values-based argument is that it is better to address problem behaviors indirectly by establishing or strengthening appropriate alternative behavior than to focus on weakening inappropriate behavior. For some, this value is the result of an interest in avoiding the use of certain reduction procedures. This general position seems to be widely held among diverse professionals in the field of developmental disabilities and is even a defining value for some movements such as positive behavioral support (Horner et al., 1990).

It may be argued, however, that this rationale is not germane to a technical justification for using reinforcement contingencies to supplement reduction programs. This position may well be relevant to decisions about how to select intervention procedures in general, of course, and there is certainly no implication that cultural values are not important considerations in applying science-based technologies. The value that interventions motivated by a problem behavior should, if possible, be addressed by procedures that do not involve aversive consequences, or even reinforcement-based reduction contingencies, must be balanced by consideration of additional factors that are more technical in nature. These factors include the nature of the problem behavior, what procedures are likely to be most effective in the least time, and the capacity of staff to implement different types of procedures, among others.

ALTERNATIVE RATIONALES

Although the above rationales provide some sound reasons for supplementing reduction contingencies with a focus on establishing or strengthening specific alternative behaviors, it is clear that familiar arguments for doing so may be poorly articulated, oversimplified, or unsound. Nevertheless, it is certainly possible that this type of supplement will augment the effectiveness of a reduction contingency. There may also be good reasons to target alternative behavior with acquisition or response-strengthening contingencies in what is otherwise primarily a reduction program that have nothing to do with supplementing the effectiveness of the reduction component.

On the other hand, it may be argued that it is not necessary to strengthen an alternative behavior just because a problem behavior is the focus of a reduction effort. Perhaps the primary rationale in support of this position is that such supplements may simply not be necessary. Indeed, there is abundant evidence that many reduction procedures (including punishment procedures in particular) can be highly effective without supplemental procedures in the form of reinforcement-based procedures (e.g., Axelrod & Apsche, 1983; Matson & DiLorenzo, 1984). Furthermore, there is also substantial evidence that punishment procedures often generate desirable side effects (e.g., Newsom, Favell, & Rincover, 1983). If circumstances

make it reasonably clear that a planned reduction program will be effective on its own merits, then there may be no technical justification for adding additional features to the program. That is, if it is not reasonably clear that targeting appropriate behavior with an additional procedure will enhance the effectiveness of the reduction component, such a supplement might be justifiable only on grounds of certain values, which, though certainly legitimate, is a very different kind of justification.

If it is apparent that a reduction component might need or benefit from supplementary support to achieve desired decreases, however, increasing the frequency of a specific alternative behavior through positive reinforcement contingencies is certainly not the only option for practitioners. Making changes in antecedent variables often provides ways of facilitating the effectiveness of treatment contingencies, for example (see Luiselli & Cameron, 1998). Changing the environment to resemble more closely conditions under which the behavior does not occur may make the behavior less likely, lessening the burden on reduction contingencies. Alternatively, such changes may increase the likelihood of various unspecified alternative behaviors already in the repertoire, thereby facilitating a decrease in the problem behavior. The kinds of antecedent changes available to practitioners include arranging specific discriminative stimuli or establishing operations for target or other behavior and making relatively broad, multifaceted changes in the environment.

Even if it were possible that targeting a desirable behavior for strengthening might facilitate reduction of a problem behavior, it would probably be important that this benefit outweigh an important cost of increasing program complexity—a cost that will be appreciated by most behavior analysts who face the task of delivering programming services through paraprofessional staff. There is considerable advantage to keeping program as operationally simple and undemanding as possible. It is probably the case that the fewer programmatic elements on which staff must be trained and monitored and the less staff have to do to implement the program, the more likely it will be that the program is properly implemented and therefore effective. Even if strengthening an alternative behavior might provide some general benefit to the client (i.e., a benefit that does not involve directly increasing the effectiveness of the reduction program), it is reasonable to ask if it is necessary to target both the problem behavior and the alternative behavior at the same time.

CONCLUSION

There may be good reasons to design reduction programs that include efforts targeting increases in specific alternative behaviors. The reasons that might support this supplementary tactic may be technical in nature (based on specific mechanisms by which strengthening the alternative behavior might facilitate achieving the reduction objective) or based on cultural values. In either case, it is inappropriate to refer to the behavior targeted for increase as a "replacement" for the problem behavior unless the alternative behavior serves the same function (i.e., is maintained by the same reinforcer) as the problem behavior. (Under these conditions, the "replacement" behavior is by definition in the same functional class as the problem behavior, so any distinction can be made only in topographical terms.) The acceptability of such reinforcers may sometimes constrain this option.

Whether the rationale is technical or cultural, this tactic should not be viewed as a general rule for reduction programs. We should avoid describing this tactic as a general rule because there are sound reasons

why it may not be necessary to incorporate efforts to target specific alternative behaviors in a reduction program. The reduction program may require no supplementary contingencies to be effective, and even if it does there are ways of producing such benefits that do not involve strengthening a specific alternative behavior.

In summary, applied behavior analysts should approach the task of reducing the frequency of a problem behavior for an individual in an idiosyncratic manner. Instead of depending on general, often oversimplified rules, practitioners should be guided by an informed and thoughtful consideration of the unique features of the history and current circumstances of the problem behavior, the remainder of the repertoire, the resources available for an intervention, and the pertinent research literature.

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