The Role of Positive Programming in Behavioral Treatment

Gary W. LaVigna and Thomas J. Willis
Institute for Applied Behavior Analysis
Los Angeles

Anne M. Donnellan
University of Wisconsin, Madison

This chapter defines and describes the role of positive programming in the treatment of the severe behavior problems often exhibited by individuals who face the challenge of a severely handicapping condition. After discussing the context and need for positive programming within a conceptual framework for research and treatment based on outcome needs, variations within this strategy are delineated. Then, assessment and analysis are described as critical for comprehensive, positive, and effective treatment. A case study of severe aggression is then presented in detail to illustrate the process of assessment and analysis, the treatment program that follows from this process, and the long term results of this approach to intervention. Finally, conclusions are drawn that examine the implications of positive programming for the future role of aversive procedures in the behavioral treatment of children, adolescents, and adults and for the practice of applied behavior analysis in the field of developmental disabilities.

DEFINITION

Although the term positive programming can refer to the universe of nonaversive strategies, in this chapter it has a more specific meaning (Donnellan, LaVigna, Negri-Shoultz, & Fassbender, 1988; LaVigna & Donnellan, 1986). Positive programming is defined as a longitudinal, instructional program designed to give the learner greater skills and competencies for the purpose of controlling or eliminating problem behavior.

Acknowledgement. The authors wish to thank Don Fender, Joanne Duncan, Pat McCarthy, and the staff of the treatment home in Lexington, South Carolina, for their cooperation in the case study reported in this chapter.
in order to facilitate and enhance social integration. Positive programming, in this sense, is based on a functional analysis of the presenting problem and involves the systematic manipulation of stimulus conditions, consequences, instructional stimuli, and other variables in an effort to establish the new, more adaptive behavioral repertoire.

THE CONTEXT AND NEED FOR POSITIVE PROGRAMMING

While punitive procedures may produce rapid and sharp suppression of problematic behaviors, serious questions about the durability and generalization of treatment effects, side effects, and social validity suggest that the present punishment technology has narrow utility and is of little if any value for true community and social integration (LaVigna, 1987). For example, in an exemplary follow-up study of the original overcorrection reports, the findings were quite remarkable (Foxx & Livesay, 1984). Four of the original cases involved pica behavior. On follow-up 10 years later, three of the four had died, although the causes of death were not determined. While this is an unusual and extreme finding, generally, for all cases, the effects of treatment disappeared as the researcher left the setting. Foxx and Livesay concluded that the field should become less concerned with speed and degree of effects and become more concerned with duration of effects.

As suggested above, procedural efficacy is measured by a variety of outcome criteria. In addition to the traditional speed and degree of effects, these criteria also include the durability and generalization of effects and side effects, and the social validity of the procedures being implemented (Association for the Advancement of Behavior Therapy, 1982). This array of critical treatment outcomes makes it unlikely that any one procedure will produce all of the desired results. Rather, full results are likely to require multielement treatment plans the various components of which, in combination, address the full range of outcome requirements.

THE DESIGN OF TREATMENT PROGRAMS

The integration of these separate components into an organized treatment plan is illustrated in Figure 1. The first major distinction is between reactive strategies and proactive strategies. The main goal of a reactive strategy is to establish rapid control over a concrete situation to prevent injury or damage (Willis & LaVigna, 1983). Examples of reactive strategies include stimulus

<table>
<thead>
<tr>
<th>PROACTIVE STRATEGIES</th>
<th>POSITIVE PROGRAMMING</th>
<th>DIRECT TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecological Manipulation</td>
<td>Positive Programming</td>
<td>Direct Treatment</td>
</tr>
<tr>
<td>• Settings</td>
<td>• General Skills</td>
<td>Behavioral</td>
</tr>
<tr>
<td>• Interactions</td>
<td>• Development</td>
<td>• Differential Schedules of Reinforcement</td>
</tr>
<tr>
<td>• Instructional Methods</td>
<td>• Functional equivalent</td>
<td>• Stimulus Control</td>
</tr>
<tr>
<td>• Instructional Goals</td>
<td>• Functional related</td>
<td>• Instructional Control</td>
</tr>
<tr>
<td>• Environmental Pollutants (e.g., noise, crowding)</td>
<td>• Coping/Tolerance</td>
<td>• Stimulus Satiation</td>
</tr>
<tr>
<td>• Number and Characteristics of other people</td>
<td></td>
<td>• Etc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REACTIVE STRATEGIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Active Listening</td>
</tr>
<tr>
<td>• Stimulus Change</td>
</tr>
<tr>
<td>• Crisis Intervention</td>
</tr>
</tbody>
</table>

FIGURE 1: Organizational model for treatment planning.

change (defined as a novel and sudden but nonaversive change in ambient stimuli, producing immediate although transitory suppression in responding) (Azrin, 1958); active listening (defined as responding to the precursors or early elements in an escalating behavior problem in such a way as to remove the need for the person to continue the episode) (Gordon, 1970); and physical management procedures (Palotai, Mance, & Negri, 1982; Zivolich & Thvedt, 1983). Physical management procedures are used as a last resort.

Reactive Strategies

There are two risks in responding reactively. The first is that reactive strategy may unavoidably reinforce the target response and may therefore produce a countertherapeutic effect. Conversely, reactive strategy may contain an unavoidable aversive quality. The major danger here is that the very strategy being used to control the situation may actually contribute to its escalation through the well-documented phenomenon of punishment elicited aggression. A major goal of research should be to develop reactive strategies
that minimize the potential of either reinforcing (counter-therapeutic) or aversive qualities.

**Proactive Strategies**

In contrast to the immediate goal of a reactive strategy, proactive strategies are those designed to decrease the frequency and/or intensity of the problematic behavior over time. Included within this category are direct treatment procedures, ecological manipulation, and, most crucially, positive programming.

**Ecological Manipulation**

Behaviors occur within a context and often are a function of the person's physical and interpersonal environment. Ecological manipulation involves planned environmental changes that in turn produce a change in behavior. As illustrated in Figure 1, examples of ecological manipulations include changing the person's setting (Horner, 1980); changing the number and quality of interactions (Egel, Richman, & Koegel, 1981; Strain, 1983); changing the instructional methods being used (Koegel, Dunlap & Dyer, 1980; Winterling & Dunlap, 1987); changing instructional goals (Donnellan, 1980); and/or removing or controlling environmental pollutants such as noise or crowding (Adams, Tallon & Stangl, 1980; Rago, Parker, & Cleland, 1978). Ecological manipulations attempt to "smooth the fit" between the learner and his environment by modifying the environment (Rhodes, 1967). The effectiveness of such manipulations rests on the quality of information obtained during the assessment process. Ecological manipulations can contribute significantly to the durability of treatment effects; that is, durable changes in the ecology can produce durable changes in behavior.

**Direct Treatment Strategies**

Ecological manipulations, depending on their complexity and/or difficulty, may take time to arrange, and positive programming may require some time before new skills and competencies are mastered. Although these strategies are likely to be necessary to produce long term treatment effects, it may also be necessary to include behavioral or other direct treatment strategies for more rapid effects; hence the inclusion of these strategies in treatment.

Direct Behavioral Treatment Strategies. The direct behavioral treatment strategies comprise a powerful but underutilized technology (LaVigna & Donnellan, 1986). For example, two schedules of reinforcement have proved particularly useful in rapidly removing behavioral barriers to social integration: Differential Reinforcement of Other Behavior (DRO) and Differential Reinforcement of Low Rates of Responding (DR1). Although Differential Reinforcement of Incompatible Responses (DRI) and Differential Reinforcement of Alternative Responses (Alt-R) schedules are more widely used, they produce less consistent results for a variety of complex reasons (LaVigna & Donnellan, 1986; Sulzer-Azaroff & Mayer, 1977).

Within the operant paradigm, there are procedures in addition to differential schedules of reinforcement that can produce a rapid direct treatment effect (LaVigna & Donnellan, 1986). As illustrated in Figure 1, these include, but are not limited to, stimulus control (i.e., removing those stimuli that are discriminative for the problem behavior) (Touchette, 1983; Touchette, MacDonald, & Langer, 1985); instructional control (i.e., tapping rule governed behavior to establish rapid control over a problem) (Russo, Cataldo, & Cushing, 1981; Schlinger & Blakely, 1987); and stimulus satiation (i.e., reducing a behavior problem by increasing the noncontingent availability of the maintaining reinforcers) (Allyn, 1963).

Other Direct Treatment Strategies. There are, of course, treatment strategies other than the behavioral that could play an important direct treatment role in a comprehensive intervention plan. These could include, for example, neurophysiological techniques, medication adjustments, and dietary changes (Davidson, Kline, Carroll, & Rockowitz, 1983; Lozoff & Brittenham, 1986; Mizuno & Yugari, 1974). Direct treatment, accordingly, uses basic operant and nonoperant techniques to establish rapid control while the more permanent effect of ecological manipulations and positive programming are pursued.

**Positive Programming**

Ecological manipulations change the physical and interpersonal environments in which the person must interact in an effort to change those conditions associated with the problem behavior. Positive programming teaches more effective and socially acceptable ways of getting one's needs met and of coping with the realities of the physical and interpersonal environments in which the person must act and interact. If ecological manipulations can be described as changes in the environmental context to "smooth the fit" between the environment and the individual, positive programming can be described as
TREATMENT APPROACHES

changes in the person's repertoire to deal better with the environment. It is to a
detailed discussion of positive programming that we now turn.

VARIATIONS OF POSITIVE PROGRAMMING

There are four variations of positive programming. The first variation is
general skill development, which teaches general skills in the areas of
domestic, vocational, and community functioning. Two further variations of
positive programming involve specific skill development. The first of these
teaches specific skills that are functionally equivalent to the target behavior
and the second teaches skills that are functionally related but not equivalent to
the target behavior. The final variation of positive programming teaches
coping skills, that is, effective ways of tolerating the stresses of everyday life.

Teaching General Skills

While general skills development would have value as a component of any
habilitation program, it serves specific roles in a positive program to reduce
problem behavior. In the first place, it is neither desirable nor possible to
create non-behaving people. This factor is of critical importance when we are
working with individuals who have major skill deficits. When we eliminate a
problem behavior with such people, we may create a behavioral vacuum. If
the person does not have the repertoire to fill that void with a productive,
socially acceptable alternative, a dynamic is created that will act against efforts
toward the reduction of the problem and/or make it likely that other problems
will develop. If we wish our behavior reduction efforts to have long-term
success, treatment efforts require that the person have the opportunity both to
learn and to engage in a wide variety of meaningful tasks and activities.

The reality is that many people who are severely handicapped are in
settings where they have the opportunity neither to learn nor to engage in such
adaptive behaviors. These environments are often barren or at best contrived
and artificial. They are absent of those contingencies that make up the fabric
of challenge and reward found in the real world of natural, socially integrated
settings. What often passes for programming are staff-arranged opportunities
to learn and/or engage in such inappropriate and nonfunctional activities as
color or shape sorting, putting pegs in boards, simulated work activities, and
other repetitive, non-meaningful tasks. This "touch red" curriculum is so
removed from the needs, interests, and potential of the person that it itself
often produces problem behavior as the person's best expression of boredom,
protest, frustration, anger, and the like. In contrast, a positive program, with
instructional objectives that are functional and that give the person ample
opportunity to learn and engage in a wide variety of relevant and/or interesting
activities, would remove the conditions that are discriminative for many
problem behaviors.

Chronological Age Appropriateness

There are a number of attributes that should characterize positive
programming for general skill development. Tasks and materials should be
chronologically age appropriate and functional and instruction should be
designed to produce generalization. The suggestion that tasks and materials be
chronologically age appropriate means that in some cases we may have to
adapt a task to be developmentally age appropriate (Donnellan, Kosovoc, &
Clark, in press; Mirenda & Donnellan, 1987). For example, if we are working
with an adult learner who has not yet reached the Piagetian stage of object
permanence (Piaget & Inhelder, 1969), it may be necessary to have all of the
ingredients for a sandwich visible in a positive program teaching independent
lunch preparation. Of course, the issue of age appropriateness increases with
the disparity between chronological and developmental age. The importance
of this issue is two fold: the chronological age appropriateness of tasks and
materials increases both the learner's dignity and our expectations of the
learner. The direct and indirect effects of both of these results are very
supportive of behavior change efforts. Perhaps nowhere is this impact more
dramatically evident than for those of us who have had the opportunity to see
the change in a person who moves from the childlike tasks of a day activity
center to the adult requirements of a supported worksite in a real business
setting. This has been our experience at the Institute for Applied Behavior
Analysis, where we have placed over 100 adults with handicapping conditions
in unsheltered, competitive jobs.

Functionality

Functionality, as a desired attribute of positive programming, has two
meanings. The first is that the activity must serve a legitimate purpose
(Brown, Nietupski, & Homre-Nieupski, 1976). Brown has suggested an
informal but revealing way to evaluate this aspect of an activity. He suggested
asking: "If the person doesn't learn to do this, will someone else have to do it
for him?" For example, in many developmentally sequenced but functionally
irrelevant curricula in which the individual is supposed to "point to a circle,", "sort spoons from socks," or "match red felt squares and yellow felt apples," the answer would be "No." If the person did not learn such tasks, no one would have to complete the tasks for him. In asking this question about clearing the table of dirty dishes after dinner, putting the right change in the vending machine for a soda, or pointing to a picture or word card to order a hamburger at a restaurant, the answer would be "Yes!"

The second meaning of functionality in positive programming is that the activity must provide some reinforcing feedback or payoff for the person. Ideally, this payoff should be intrinsic to the task itself; if not, extrinsic reinforcement must be programmed. The implications for behavior control of a rich schedule of instruction and the opportunity to engage in activities that are both meaningful and reinforcing seem obvious. Yet rarely are such conditions available for the person exhibiting a severe behavior problem. Rather, there is an unfortunate and pervasive logic that says that behavior must be controlled before this kind of programming can begin. The suggestion here is that positive programming with the attribute of functionality is a critical strategy for behavior control itself and a necessary component of a comprehensive treatment plan.

Generalization

Finally, in addition to chronological age appropriateness and functionality, positive programming of general skill development should use low or zero inference strategies of training. Traditional training is based on a high inference model. That is, we infer that what a person learns in one setting will generalize to other settings, what a person learns on one set of materials will generalize to another set of materials, what a person learns in contrived, simulated situations and segregated settings will generalize to real situations in natural, community integrated settings. However, the more handicapped a person is, the less likely this generalization is to occur (Stokes & Baer, 1977). To avoid this problem, Donnellan and Mirenda (1983) suggested that training should occur with those tasks and materials with which and in those settings in which we want the person ultimately to perform. The same rationale applies to the control of behavior problems. Programming and intervention must take place in those settings in which we ultimately want the behavior to be under control.

To summarize, general skill development provides a general context of positive programming within which to carry our more directed efforts of behavior modification. It both increases the person's productive and socially acceptable skills and competencies and removes many of the conditions that are discriminative for problem behavior. Positive programming for general skill development characteristically employs tasks and materials that are chronologically age appropriate (recognizing that adaptations may be necessary to accommodate the person's developmental needs) and provides training in those settings in which the person must ultimately function.

Teaching Alternative, Functionally Equivalent Skills

A second variation of positive programming involves instruction and training to teach a specific skill that serves the same function as the problem behavior. A major example of this follows from the increasing characterization of aberrant behavior as a form of communication (Carr & Durand, 1985; Donnellan, Mirenda, Mesaros, & Fassbender, 1984). Positive programming in this mode attempts to identify the communicative function of the problem behavior and then to replace that behavior with an equally effective but more socially acceptable one.

Communication Training

The following are examples of this approach:

1. A person with profound mental impairments and multiple medical and physical problems would often engage in crying tantrums when alone in her bedroom. Analysis suggested that her tantrums served the function of calling staff into the room (to see what was wrong). A positive program was established to teach her to ring a bedside bell when she wanted somebody to come in (for any reason). She learned this method of calling staff and her tantrums stopped.

2. A 14-year-old teenager with the problem of autism and with no communicative speech would hit his teacher an average of six times during a 6-hour day. Typically, this would occur during a sit-down table activity. This behavior seemed to serve the communicative function of asking for a break from what he perceived as a boring activity. As an alternative, he was taught to present the teacher with a word card that said "May I have a 5-minute break please?" whenever he wanted to stop what he was doing. He was given 12 cards a day (six more opportunities for taking a break than what he was asking for during baseline conditions). He eventually used this new system of communication and stopped hitting the teacher, all
for the cost of an average 10 minutes break-time for every 50 minutes of work.

3. A 12-year-old student with a severe mental impairment but with some speech would become violently aggressive in school. This would occur 13 or more times a day. He was in a very positive and constructive environment; nevertheless, staff misunderstood how much he understood. Analysis suggested that his aggression might have been his way of expressing confusion when he did not understand what was being asked of him. First, in controlled instructional sessions he was taught to say "I'm confused, I don't understand" when the teacher made a nonsense request to him such as "gobbledygoock" or "scrooge the nod." Such requests were interspersed in a ratio of 1:3 with easily understandable requests such as "Would you get the pencil?" or "Pour the juice." Prompting and prompt fading (Donnellan et al., 1988) were used until he consistently responded without prompting to the nonsense requests with the prescribed statement. At this point of the positive program, he was told to be alert because he would be asked to do something he did not understand at various points throughout the school day. Ten randomly distributed nonsense requests were made each day and again prompt fading was used to assure his correct responding in the natural setting. As prompting was faded, he began to say "I'm confused, I don't understand" not only in response to the planned nonsense requests but also at various other times when school staff thought that they had made a perfectly reasonable and understandable request. However, each time they responded to his statements of confusion with clarification and/or simplification. He is no longer aggressive in the classroom.

In similar ways, an adolescent in a small group home was taught to say "No thank you, I would rather not" when asked to do something he did not want to do, instead of throwing a tantrum and throwing things, and a student was taught to hold up his hand when he needed help, rather than become self-injurious. In all of these examples, the communicative function of the problem behavior was identified and an alternative, more acceptable form was taught.

A major strategy for teaching an alternative form of communication to serve the function of a behavior problem is to use a communication system that will be easy and quick for the person to learn. This means taking into account the cognitive, sensory, and motor functioning of the person and the specific demands made by the different systems for discriminating and responding. There is increased awareness that traditional speech and even sign language have characteristics that make them less feasible choices in many cases, at least initially. Fortunately, the development of alternative and augmentative communication systems is becoming a field in its own right and an increasingly wide range of options is available. These options range from basic object word card and picture systems to sophisticated computerized systems.

Instructional strategies may also vary with the person or the situation. For example, if precursors to a problem behavior can be identified, their appearance may represent a teachable moment, and opportunity to introduce the new system and prompt its correct use. This strategy could take advantage of the naturally occurring, subsequent reinforcement to strengthen the new communication response. Or, the precursor behavior itself may represent a more desirable response that could be shaped even further by quickly responding to and reinforcing it before it escalates to the defined problem level.

Yet another strategy could take advantage of the routine response chains that become automatic for so many people. For example, if a person could be taught to routinely present a word card that said "I'm finished!" prior to transitioning from any activity to another, she could begin to use that card to indicate that she had had enough of a particular task, rather than to tantrum or exhibit some other more problematic response. Or, as described above in the example of the classroom student who became aggressive when he was confused, it may be feasible to use discrete trial prompt-fading procedures to establish the alternative communication response. These or other instructional strategies can be used to teach specifically defined messages that serve a function equivalent to the one served by the problem behavior. They may utilize a communication system that is dedicated to this purpose or one that serves a broader role of communication for the person.

**Independence Training**

Teaching other forms of communication is not the only strategy for replacing a problem behavior with a functionally equivalent alternative. Implicit in the communication approach is reliance on another person. That is, to the extent that a problem behavior serves a communication role, it is maintained by the effectiveness with which it gets other people to respond to the expressed needs. We may reduce the problem behavior to the extent that we can teach a person to satisfy his or her own needs independently.
ability to perform such functionally equivalent responses would reduce the motivation for problem behavior.

An example of this is provided by one case involving a 6-year-old boy living in a small group home. He had severe intellectual impairment and exhibited high rate pica behavior (i.e., he ate inedible items, to the point that it seriously endangered his health and general well being). Among other things, a comprehensive assessment and functional analysis determined that he was not able to discriminate between edible and inedible objects and that his pica behavior was maintained by the increased opportunity to ingest. A communication strategy in this case would have inferred that his pica behavior was equivalent to his saying "I want something to eat" or "I'm hungry," and might have taught him some better way to say this. For example, pointing to a picture of various food items would allow staff to feed him something nutritious. Based on the analysis, however, the decision was made to design a positive program to increase his independence in this area.

There were two major thrusts to the positive program. The first was to teach him to discriminate between edible and inedible objects. This was accomplished through the use of a two-way forced choice, discrete trial format in which he was presented with a pebble, pencil, cotton ball, button and so forth, paired with an almond, pretzel, marshmallow, M&M, and so forth. Ten trials per day were scheduled. If he selected the edible object, he was allowed to eat it; if he selected the inedible object, the trial was discontinued. Although learning was very gradual, he eventually would select the edible item exclusively, even when presented with items that were not used in training. He was also observed to pick an inedible object off the floor (e.g., a dust ball), look at it closely and put it down again.

The second thrust of this positive program was to teach him to prepare his own snack any time he wanted one. A special floor-level cabinet in the kitchen was kept stocked with fresh fruit, dried fruit, peanuts, and other healthy items. He was the only one to receive training on how to open the latch. He eventually learned to go to his cabinet whenever he wanted to eat something. Once he learned this and could discriminate between edible and inedible items, there was no longer any reason for him to engage in pica behavior and it dropped out of his repertoire. After 4 years, the pica behavior has still not returned. (Incidentally, this youngster did not have, nor has he developed, a weight problem. He has a hollow leg.

Teaching Alternative, Functionally Related Skills

Teaching someone to fix a sandwich when hungry, to leave a noisy, chaotic area when upset, or to put on a jacket when cold are additional examples of positive programming to teach functionally equivalent replacement behaviors for problematic behaviors that may have previously represented the person's best strategy for dealing with these situations. Positive programming can also develop alternative, functionally related although not directly equivalent skills. Examples of this approach include teaching choice making, schedule building, the introduction of contingency specifying stimuli, and establishing stimulus control.

We often, whether by design or accident, establish environments for our clients that are totally under staff control. We decide who will do what, where, and when. The lack of self-determined options may contribute to many behavior problems to an extent that we are only now beginning to appreciate. One justification for staff-directed activities is that many people who have severe or profound handicaps have not learned to make choices, nor do they typically have the breadth of experience that would allow them to make informed choices. In such cases, however, positive programming can be directed toward teaching choice making behavior and, as this skill is established, giving the person more and more control over his or her day-to-day existence.

In cases of profound intellectual impairment, this would begin at a very concrete level, using a two-way, forced choice format (as described earlier) to select from among a presented pair of items, with one clearly having reinforcement value and the other, neutral value. One choice might involve a selection between a gumdrop and a copy of Shakespeare's sonnets. As a person's choice making abilities increase, choice making opportunities may be presented at increasingly abstract levels. One example of a choice making hierarchy might begin at the concrete object level, move up to pictures representing objects, then to objects representing activities, and finally to pictures representing activities.

Once a person can choose an activity by selecting an object or a picture, she can also participate in scheduling her own day. Organizing a day around a concrete schedule (represented by objects or pictures) is, in its own right, a positive programming strategy to reduce behavior problems. If choosing an activity provides control, the ability to use a concrete schedule provides predictability. For example, the afternoon schedule might be conveyed by a
sequence of pictures or objects. The person can be oriented to the schedule and shown what activities are planned. He or she might also be reoriented to the schedule at each point of transition, with staff indicating what activity has just been finished, what is about to start, and what will follow. In addition to the person being given choices to insert at different points of the sequence, the person may also be taught to follow such a schedule independently or it can be integrated with teaching choice making.

Another strategy for establishing alternative behavior related to the identified problem involves the introduction of contingency specifying stimuli (Schlinger & Blakely, 1987). Some behaviors occur not because they are learned or conditioned but rather because they are under the control of some rule or statement of contingencies. Establishing new rule-governed behavior may rapidly produce new patterns of responding. For example, an adolescent boy with autism was essentially fully integrated into a regular school program and was generally doing quite well. His one remaining significant problem was his hoarding of inappropriate items in his school locker. This problem was resistant to solution until staff took advantage of the fact that he considered the student handbook his "bible." They simply typed in a new student rule: "Students are not allowed to hoard things in their lockers." The problem disappeared.

Yet another example involved an adult who had severe intellectual impairment. In his case, it was necessary to communicate the rule through a picture series. The problem behavior involved hitting his mother when she asked him to return something to the shelves in the supermarket. In fact, to avoid being hit she would end up with a bill of over $300 whenever they went shopping together. Although the intervention program for this person had many components, it included imagery-based role play practice (Groden & Cautela, 1984) to communicate to him the rule we wanted him to follow. Five times a day he was told a story about his trip to the store. The story was accompanied by a sequential series of pictures that portrayed his being in the store with his mother; his taking something off the shelf; his mother asking and pointing for him to put it back; his taking a deep breath and holding it for a count of three; his slowly releasing his breath and putting the item back as requested; and he and his mother sharing a pizza at his favorite restaurant. Other problematic situations were dealt with in a similar way. This positive programming strategy contributed to his learning new rules for behaving.

A final example of this form of positive programming involves bringing the behavior under the control of a new set of stimulus conditions. In one case, the problem behavior of a young boy involved his spitting and smearing his saliva over virtually any shiny surface, including furniture, cars, and windows. Rather than trying to eliminate this response, he was taught to engage in it only with a specially specified hand mirror. Initially, these opportunities were given to him frequently. He received differential reinforcement for engaging in this behavior under these conditions. At other times, he was simply reminded to wait for the mirror. Eventually, he learned to spit and smear his saliva only when he was given access to his mirror. At this point, staff were able to control when and where it happened. This was considered sufficient. One would not establish stimulus control over dangerous behaviors such as aggression or self-injury using this strategy, but it certainly holds promise of inappropriate verbal or other undesired but nondangerous behaviors (LaVigna & Donnellan, 1986).

Teaching Coping and Tolerance

Thus far, three varieties of positive programming have been described. The first has the aim of increasing the person's general skills and competencies across all domains; the second teaches alternative behaviors (either communicative or otherwise) that are functionally equivalent to the problem behavior; the third teaches alternative behaviors that, while not equivalent, are functionally related to the behavior we wish to decrease or eliminate. All three variations establish new behavioral repertoires that empower the individual either to influence the environment more competently or to get his or her needs met in a more socially acceptable manner. The fourth and final variation of positive programming to be discussed here teaches the person to cope with and tolerate an environment that cannot be changed and/or one in which, at least for a time, his or her needs cannot be met.

Three strategies exemplify this positive programming approach to teaching tolerance for the unavoidable stressors and naturally occurring aversive events in one's life. The first involves teaching a generalized relaxation response. Cautela and Groden (1978) have developed a particularly useful guide for teaching people with developmental disabilities how to relax when they are feeling stressed or upset. At the Groden Center, relaxation training is a standard part of the curriculum and is taught as a self-control strategy. It is not unusual to see a student guiding himself through a relaxation exercise in order to calm down when he or she is becoming tense or agitated. This self-control, stress management behavior replaces the previous repertoire of tantrums, aggression or other undesired responding.
TREATMENT APPROACHES

Another strategy for teaching tolerance is to desensitize a person to those stimulus conditions that have been associated with the problem behavior (Wolpe, 1973). For example, in one case an adult who had a severely handicapping condition would often exhibit tantrum aggression whenever in close proximity to loud noises such as another person's screaming, vacuum cleaners, floor polishers, automatic dishwashers, and so forth. The initial target was to desensitize her to screaming. A cassette tape recording was made of one of her housemate's screaming tantrums (a problem that was also being addressed). During the initial sessions, she was first guided to a state of calm and relaxation. Once this state had been achieved, the tape recorder was turned on, but at extremely low volume. To further assure that she remained calm, she was given some of her favorite food to eat. Over subsequent sessions, the volume of the tape was very gradually turned up until she could tolerate it at full volume and still stay calm and relaxed.

At this point, a similar strategy was followed to desensitize her to the vacuum cleaner. For example, in the initial session, once she was calm and relaxed the vacuum cleaner was turned on in the next room with the intervening door closed. Over subsequent sessions the door was very gradually opened and the vacuum cleaner was moved closer and closer until she could tolerate it when it was right next to her and still stay calm and relaxed. At this point, the effects of treatment spontaneously generalized and noise no longer elicited problem behavior.

Desensitization can be programmed for criticism, crowds, or any other stimuli functionally related to the problem behavior. Another example of this variation of positive programming involves delay in reinforcement, which often is discriminative for problem behavior. How can we teach a person to be tolerant of waiting for something? In the case study presented later in this chapter, just that was taught to a young adult who previously was aggressive at least some of the time when he had to wait. Teaching him to tolerate delays contributed significantly to the treatment of his aggressive behavior.

Variations on a Theme

To summarize this section on the variations of positive programming, each variation will be illustrated as it might be applied to the same problem. For the purposes of this summary example, let us assume that the client is an adolescent who has severe handicaps and who tantrums when he is hungry. While there would very likely be other components to his treatment program, the different variations of positive programming might be as follows:

1. He could have a rich schedule of competing activities. For example, he could be taught to participate in organized recreational activities or to perform an after-school job to help him bridge the gap from school to dinnertime.
2. He could be taught to ask for a snack when he is hungry.
3. He could be taught to fix a snack for himself when he is hungry.
4. He could be taught to schedule two to three snacks a day on his daily schedule and/or he could be oriented from time to time as to when snacks and meals will occur.
5. He could be taught to turn on the radio and listen to music to help him relax and pass the time when he has to wait for a meal.
6. Any or all of the above could be pursued simultaneously.

ASSESSMENT

The design of positive programs as described above obviously requires the most thorough and comprehensive assessment process and analysis of the presenting problem. The role of positive programming in behavioral intervention is to produce durable treatment effects. For this to occur, it is necessary to know the conditions under which the behavior occurs, the operant role it serves the person, the person's current relevant behavioral repertoire, the strengths and weaknesses of the mediating system available to implement treatment, and many other things. The fundamental role of assessment and functional analysis in behavioral intervention has strong roots in the field of applied behavior analysis (Kanfer & Saslow, 1969; Schwartz, Goldiamond, & Howe, 1975). The chapter on Behavioral Diagnostics in this volume illustrates the renewed appreciation of the role that assessment and analysis can play in the design of treatment programs.

At the Institute for Applied Behavior Analysis, we have developed a records abstraction form and information gathering instrument that serves as a comprehensive guide to the assessment process (Willis, LaVigna & Donellan, 1987). An outline of the topics covered in this guide is presented in Table 1. Once this information is gathered, it is summarized in an assessment report following a preset format (LaVigna & Donnellan, 1986). The full application of this process is, admittedly, time consuming. However, it is justified when
problems have not been solved with procedures based on less thorough information, when the problems seriously interfere with the quality of the person's life and his or her community access, and/or before aversive intervention is considered. However, even in cases that are being approached less formally, we would recommend that an effort be made to identify the communicative functions of the aberrant behavior. Donnellan et al. (1984) have developed a particularly useful and easy tool to use for this purpose.

### TABLE 1
OUTLINE OF ASSESSMENT CONTENT

<table>
<thead>
<tr>
<th>Section</th>
<th>Subsections</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Referral Information.</td>
<td>1. General information.</td>
</tr>
<tr>
<td></td>
<td>2. Referral problems.</td>
</tr>
<tr>
<td></td>
<td>3. Treatment priority.</td>
</tr>
<tr>
<td></td>
<td>4. Client's or careprovider's reasons for referral.</td>
</tr>
<tr>
<td></td>
<td>5. Referral discrepancies.</td>
</tr>
<tr>
<td>B. Background Information.</td>
<td>1. Client characteristics.</td>
</tr>
<tr>
<td></td>
<td>a. Physical description.</td>
</tr>
<tr>
<td></td>
<td>b. Cognitive abilities.</td>
</tr>
<tr>
<td></td>
<td>c. Communicative abilities.</td>
</tr>
<tr>
<td></td>
<td>d. Motor/perceptual abilities.</td>
</tr>
<tr>
<td></td>
<td>e. Self-care skills.</td>
</tr>
<tr>
<td></td>
<td>f. Social skills.</td>
</tr>
<tr>
<td></td>
<td>g. Community skills.</td>
</tr>
<tr>
<td></td>
<td>h. Domestic skills.</td>
</tr>
<tr>
<td></td>
<td>i. Leisure/recreation skills.</td>
</tr>
<tr>
<td></td>
<td>2. Family history and background.</td>
</tr>
<tr>
<td></td>
<td>3. Living arrangements and placement history.</td>
</tr>
<tr>
<td></td>
<td>4. Program placement.</td>
</tr>
<tr>
<td></td>
<td>5. Health and medical status.</td>
</tr>
<tr>
<td>C. Functional Analysis of Behavior.</td>
<td>1. Specification and measurement of the target behavior:</td>
</tr>
<tr>
<td></td>
<td>a. Topography or physical description.</td>
</tr>
<tr>
<td></td>
<td>b. Cycle or criteria for the beginning and ending of a response.</td>
</tr>
<tr>
<td></td>
<td>c. Course or typical sequence of an episode (including possible precursors which may or may not be scored in and of themselves as a response).</td>
</tr>
<tr>
<td></td>
<td>d. Strength, rate, duration, or other measures of intensity.</td>
</tr>
<tr>
<td></td>
<td>b. Course over time.</td>
</tr>
<tr>
<td></td>
<td>c. Recent increases and decreases.</td>
</tr>
<tr>
<td></td>
<td>d. Cycles and other patterns.</td>
</tr>
<tr>
<td></td>
<td>e. Major contributing factors.</td>
</tr>
<tr>
<td></td>
<td>f. Significant contributing factors.</td>
</tr>
<tr>
<td></td>
<td>g. Family factors.</td>
</tr>
<tr>
<td></td>
<td>h. Medical factors.</td>
</tr>
<tr>
<td>3. Antecedent analysis:</td>
<td>a. Occurrence:</td>
</tr>
<tr>
<td></td>
<td>1) Settings.</td>
</tr>
<tr>
<td></td>
<td>2) Situations.</td>
</tr>
<tr>
<td></td>
<td>3) Places.</td>
</tr>
<tr>
<td></td>
<td>4) People.</td>
</tr>
<tr>
<td></td>
<td>5) Time of day, week, month, and year.</td>
</tr>
<tr>
<td></td>
<td>6) Immediate preceding activities, events, and interactions.</td>
</tr>
<tr>
<td></td>
<td>7) Exacerbating events.</td>
</tr>
<tr>
<td></td>
<td>b. Non-occurrence or absence:</td>
</tr>
<tr>
<td></td>
<td>1) Settings.</td>
</tr>
<tr>
<td></td>
<td>2) Situations.</td>
</tr>
<tr>
<td></td>
<td>3) Places.</td>
</tr>
<tr>
<td></td>
<td>4) People.</td>
</tr>
<tr>
<td></td>
<td>5) Time of day, week, month, or year.</td>
</tr>
<tr>
<td></td>
<td>6) Immediate preceding activities, events and interactions.</td>
</tr>
<tr>
<td></td>
<td>7) Ameliorating events.</td>
</tr>
<tr>
<td></td>
<td>b. Current management methods.</td>
</tr>
<tr>
<td></td>
<td>c. Effects of management methods.</td>
</tr>
<tr>
<td></td>
<td>d. Effects of behavior on others.</td>
</tr>
<tr>
<td></td>
<td>e. Effects on the environment.</td>
</tr>
<tr>
<td></td>
<td>f. Reactions that exacerbate or ameliorate situation.</td>
</tr>
</tbody>
</table>
TABLE 1  Continued

5. Analysis of meaning:
   a. Hypothesis regarding functions of the behavior, e.g., communication, escape, or coercion.
   b. Hypothesis regarding maintaining payoffs or events.
   c. Hypothesis regarding what events may be suppressing alternative, more acceptable behavior.
   d. Hypothesis regarding stimuli and events discriminative for the behavior.

D. Mediator Analysis.
   1. Identify mediators.
   3. Cooperation.
   4. Views of the problem.
   5. Emotional, physical, and technical abilities to carry out programming.
   6. Staffing resources.
   7. Factors adding to and detracting from ability to carry out programs.
   8. Estimate of resources to carry out programs.

E. Motivational Analysis.
   1. Predictable occurring behaviors.
   2. Likes and dislikes.
   3. Verbal requests.
   4. Survey of preferences for:
      a. Food and beverage items.
      b. Toys and playthings (as age-appropriate).
      c. Entertainment.
      e. Music, arts, and crafts.
      f. Excursions and community events.
      g. Social events and interactions with others.
      h. Academic and classroom activity.
      i. Domestic activities.
      j. Work activities.
      k. Personal appearance, etc.

POSITIVE PROGRAMMING

CASE STUDY

The following case study illustrates the development and implementation of a comprehensive treatment program based on a thorough assessment and functional analysis and the role that positive programming plays in such an approach.

Subject

This case involved an 18-year-old young man who had the problems of autism and moderate mental retardation. He had also been previously labeled as emotionally disturbed and socially retarded. He was 6 feet tall and weighed 185 pounds. His communication system consisted primarily of gestures and short phrases, although he was difficult to understand even when he used the short phrases. He was independent in self-care. He had a variety of stereotypic behaviors, such as arm flapping, jumping, and patting himself on the chest, which he engaged in at high rates.

Setting

The setting he resided in and within which we worked was a small group home with a staff to client ratio of 1:2, which is typical in many group homes working with adults with autism who exhibit severe behavior problems (LaVigna, 1983). There also were five other adult male residents. The setting provided community-based programming, sophisticated instructional procedures, and strictly non-aversive behavior management.

Target Behavior

The behavior problem was defined as hitting, kicking, or biting another person or throwing an object in their direction. Hitting typically involved striking the other person with a downward, whole-arm movement, possibly with an object such as a broom, a knife, or whatever happened to be in his hand at the time. The seriousness of this behavior was reflected in the fact that staff were discouraged and seemed unable to continue their efforts because of a sense of failure, frustration, and resentment attributable to this person's disruption of the overall program. Further, they felt that this behavior was unpredictable and, as a result, doubly dangerous. Other evidence of the social
validity of this problem was that the State Department of Mental Health had taken the position that if the problem could not be rapidly resolved, the person was going to be removed and placed in a state institution.

Past Treatment

When this person was younger, a national expert was consulted to develop a treatment program. The main thrust of the intervention at that time was over-correction, which was successful in suppressing the behavior for a period of time. However, as he got older and bigger, this was no longer a practical intervention strategy and it had to be discontinued because of the staff’s concerns for their safety. They and we also attempted to solve this problem with fairly sophisticated and carefully designed schedules of reinforcement. However, this approach also failed. It was at this point that a comprehensive assessment was initiated.

Functional Analysis

The analysis identified two situations that were clearly discriminative for this behavior. One category involved delays, such as when he was asked to wait for something that he wanted (e.g., a reinforcer or a desired activity). A second category of antecedents involved interruptions of his routines. In fact, these kinds of antecedents accounted for approximately 85% of his aggressive behavior.

Treatment Program

The four-part intervention program included an ecological component, in which staff developed a comprehensive, 15-minute-by-15-minute structured schedule for him for the entire day. This schedule was communicated to him concretely through a sequence of pictures to which he was oriented at each change in activity. A token economy also was established to help motivate him through this schedule of activities. Further, staff planned for a diversity of tasks in settings involving functional and chronologically age appropriate activities.

Positive programming involved discrete trial to strengthen instructional control using differential reinforcement for compliance to staff requests to engage in a variety of activities. In addition, discrete trial and free operant shaping was designed to give him a greater tolerance of situations involving delays and interruptions. For example, the beginning of a discrete trial was to say, “Would you please wait for your French fries? Don’t they look delicious? Would you please wait for them?” [brief pause] Thank you for waiting for them. Here they are. You may eat them now.” Staff scheduled five discrete trials a day in which the subject was asked to wait longer and longer periods for a variety of favored reinforcers. When the delay was long enough, staff also inserted requests to engage in certain tasks and activities (e.g., setting the table, sweeping the floor, etc.). The key here was errorless training and only gradually increasing the requirement. Free operant shaping was also implemented parallel with the discrete trial shaping (i.e., staff were to catch him waiting spontaneously for this brief period of time and to then reinforce him). There was a similar discrete trial and free operant approach to teaching him to tolerate interruptions in his routines. Finally, staff used communication training to teach him to label his emotions, his frustrations and feelings about having to wait or having something interrupted.

For direct treatment, there was a continuation of some of the progressive DRO schedules that had been in place in the past but that had not by themselves been effective in reducing the problem. The staff felt that these were important in terms of giving him some positive reinforcement and feedback for his success on a daily and progressive basis. For reactive strategies, when he was aggressive the goal was immediate control over the problem. If he were firmly told to sit down or to go somewhere when he was being aggressive, he would listen 50% of the time. Another 35 or 40% of the time, the problem could be dealt with by utilizing a combination of redirection and inter-positioning and object such as a sofa pillow between him and the mediator as he was being redirected. Occasionally those methods failed and a state approved system of physical management had to be used to prevent injury. This occurred in the beginning of intervention and was virtually unnecessary toward the end.

Results

Figure 2 presents 4-week blocks of data for 200 weeks. It portrays the cumulative frequency of aggressive acts over this period of time. During baseline, the slope represents an average rate of approximately 1.71 episodes per week. To mediate the treatment program, we recommended an intensive intervention team (Donnellan, LaVigna, Zambito, & Thvedt, 1985). The first phase of treatment was therefore implemented by a 1:1 intervention team.
During that phase of intervention, there was an average rate of occurrence of 0.61 times per week, a more than 50% decrease from baseline. The second phase of intervention was implemented by the regular group home staff without any special staff in the home environment. During this phase, the average rate of occurrence was 0.26 times per week. During a 3-month follow-up period, the behavior occurred only once. This represents a rate of 0.08 times per week.

To summarize, there was an immediate two-thirds reduction. The durability of treatment effects is reflected in that there was continuing reduction over the 4-year period of treatment and follow-up. Data were collected 24 hours a day across all settings. No formal measures have been taken of side effects, so we cannot formally report whether there were any side effects associated with this treatment. In terms of social validity, however, this person currently participates in all activities scheduled in the community (e.g., grocery shopping, bowling, eating out, banking, etc.) and he has been placed in a supported employment position in the community. In fact, group home staff now feel that he should have the same access to the community as do the others who live in the home, and many now prefer his company to the company of others.

CONCLUSIONS

In conclusion, there seem to be a number of implications of positive programming. The first is that positive programming offers promise for producing the durable treatment effects that have been so elusive with other behavior reduction strategies. It does so because it is based on an analysis of the role the aberrant behavior serves the person and aims to establish a new behavioral repertoire that legitimizes that role and teaches the person more effective and more socially acceptable ways of dealing with the environment. A second implication is that no single treatment procedure, including a positive program, is likely to be fully effective by itself, requiring instead multielement treatment packages. It may be that it is only through the careful design of complex treatment packages that we can accomplish socially valid rapid, durable, and generalized treatment effects without negative side effects.

This discussion of positive programming also has implications for the use of aversive procedures in behavioral treatment. Clearly, aversive procedures do not teach adaptive behavior. As a result, as a sole strategy and at best, they may produce only short term suppression. As part of a treatment package, aversive procedures may also be contraindicated because they may produce effects that interfere with positive programming, such as elicited aggression. Further, the use of punishment may preclude access to environments that are necessary for a full application of positive programming strategies.

There is increasing concern about the field's possible overuse, misuse, and abuse of aversive procedures. This concern is reflected in the recent positions taken against aversive treatment by leading professional and advocacy organizations such as The Association for Persons with Severe Handicaps (TASH) and the Association for Retarded Citizens (ARC). It is also reflected in increasing legislation and regulation at federal, state and agency levels. However, the largest implication of this concern for professional practice may not be for sanctions against the use of aversive procedures. Rather, standards may more importantly have to address mandatory requirements for positive programming, the sophisticated instructional techniques that are often required for their implementation, ecological manipulation strategies, non-aversive direct treatment strategies, reactive strategies, and the assessment strategies on which these approaches are based.

The researcher's role is clear: to further develop and validate treatment procedures that demonstrably improve the quality of life and full community presence and participation for all individuals, regardless of handicapping condition or associated problem behaviors.
REFERENCES

Association for the Advancement of Behavior Therapy Task Force Report (1982). The

Adams, G.L., Tallon, R.J., & Stangl, J.M. (1980). Environmental influences on self-
stimulatory behavior. American Journal of Mental Deficiency, 85, 171-175.

food reinforcement. Behavior Research and Therapy, 1, 53-61.

Experimental Analysis of Behavior, 1, 183-200.

functioning and public school services for severely handicapped students. In L.
Brown, N. Certo, & T. Crowner (Eds.), Papers and programs related to public
school services for secondary age severely handicapped students. (Vol. VI, Part

communication training. Journal of Applied Behavior Analysis, 18, 111-126.

Cautela, J.R., & Groden, J. (1978). Relaxation: A comprehensive manual for adults,
children, and children with special needs. Champaign, IL: Research Press.

Davidson, P.W., Kleene, B.M., Carroll, M., & Rockowitz, R.J. (1983). Effects of naloxone
on self-injurious behavior: A case study. Applied Research in Mental
Retardation, 4, 1-4.

Donnellan, A.M. (1980). An educational perspective of autism: Implications,
curriculum development and personnel preparation. In B. Wilcox & A.
Thompson (Eds.), Critical issues in educating autistic children and youth.

challenges presented by individuals with dual sensory impairments. Seattle, WA:
The Association for Persons with Severe Handicaps, Technical Assistance
Project.

Progress without punishment. New York: Teachers College Press.

intensive intervention program model to support community placement for
persons with severe behavior problems. Journal of the Association for Persons
with Severe Handicaps, 10(3), 123-131.

components to facilitate generalization for severely handicapped students.
Journal of Special Education 17, 319-331.

Analyzing the communicative functions of aberrant behavior. Journal of the
Association for Persons with Severe Handicaps, 3, 201-212.


overcorrection: A 10-year retrospective examination of eight cases. Analysis and


”trainable retarded.” Psychological Reports, 54, 595-605.

Horner, R.D. (1980). The effects of an environmental "enrichment" program on the
behavior of institutionalized profoundly retarded children. Journal of Applied
Behavior Analysis, 13, 473-491.


Schopler & G.B. Mesibou (Eds.), Autism in adolescents and adults. New York:
Plenum Publishing Corporation.

empirical evidence. An invited paper presented at the 13th Annual Convention of
the Association for Behavior Analysis, May 25-28, 1987, Nashville, TN.

LaVigna, G.W., & Donnellan, A.M. (1986). Alternatives to punishment: Solving
behavior problems with non-aversive strategies. New York: Irvington
Publishers.

Progress in Hematology, 16, 23-53.

Cohen & A.M. Donnellan (Eds.), Handbook of autism and pervasive
developmental disorders (pp. 211-226). New York: John Wiley.

Lancer, 1, 76.

behavior. Columbia, SC: South Carolina Department of Mental Health.


Rago, W.V., Jr., Parker, R.M., & Cleland, C.C. (1978). Effects of increased space in
the social behavior of institutionalized profoundly retarded male adults.
American Journal of Mental Deficiency, 82, 554-558.

Exceptional Children, 33, 449-455.

Russo, D.C., Cataldo, M. F., & Cushing, P.J. (1981). Compliance training and
behavioral covariation in the treatment of multiple problems Journal of Applied
Behavior Analysis, 14, 209-222.


specifying stimuli. The Behavior Analyst, 10, 41-45.
TREATMENT APPROACHES

REFERENCES continued


