How to Teach Children with Autism and Other Severe Disabilities

By
Robert L. Koegel, Ph.D.
Laura Schreibman, Ph.D.

Revised by
H. Michael Day, Ph.D.

© Permission granted only for use in conjunction with the Idaho Training Cooperative IBI Training (2008).
Contents

Forward ................................................................................................................................. ii
Behavioral Approach to Autism .......................................................................................... 1
Selection of Target Behaviors ............................................................................................. 2
  Behavioral Excesses ........................................................................................................ 3
  Behavioral Delays ............................................................................................................ 3
Procedural Rules to Follow in Defining Target Behaviors ............................................... 4
Structuring the Teaching Situation .................................................................................... 12
Presenting Instructions and Questions ............................................................................. 13
  Child Attending ................................................................................................................ 13
  Easily Discriminable ......................................................................................................... 13
  Task Variation .................................................................................................................. 16
Prompts .............................................................................................................................. 17
The Use of Shaping and Chaining ...................................................................................... 25
  Shaping .............................................................................................................................. 25
  Chaining ............................................................................................................................ 27
Consequences ...................................................................................................................... 30
  Types of Consequences .................................................................................................. 30
  Manner of Presenting Consequences ............................................................................. 37
  Other Helpful Hints ......................................................................................................... 39
Inter-trial Interval (ITI) ...................................................................................................... 41
Generalization and Maintenance of Behavior Change ....................................................... 43
  Stimulus Generalization .................................................................................................. 43
  Response Generalization ................................................................................................. 45
  Maintenance of Behavior Change .................................................................................... 46
Final Exercise ....................................................................................................................... 49
Pivotal Response Treatment ............................................................................................... 50
  Pivotal Response Treatment Resources ......................................................................... 51
References .......................................................................................................................... 52
Forward

The most serious problem faced by any individual with a disability is the inability to perform the many skills necessary to function independently in the community. Delays in self-care, socialization, and language skills are among the most significant problems for teachers and parents who live and work with individuals with disabilities.

This manual provides parents, teachers and therapists with a step-by-step approach to teaching new skills that are important to independent living. Each of the procedures discussed in this manual is effective with individuals with autism and other disabilities.

Robert L. Koegel received his Ph.D. in Developmental Psychology from the University of California, Los Angeles in 1971 and is presently Professor of Autism at the Speech and Hearing Center, University of California, Santa Barbara. He is an associate editor of the Journal of Applied Behavior Analysis and serves on the board of editors of the Journal of Autism and Developmental Disorders, Education and Treatment of Children, and Analysis and Intervention in Developmental Disabilities. Dr. Koegel is a coeditor of Educating and Understanding Autistic Children (with A. Rincover and A. L. Engel, 1982) and a coauthor of Experimental Analysis of Autistic Behavior (with O. I. Lovaas, E. G. Carr, L. Schreibman, C. Newsom, A. Rincover, and D. C. Russo, in press). He has also written many book chapters and numerous articles for professional journals.

Laura Schreibman received her Ph. D. in Developmental Psychology from the University of California, Los Angeles in 1972 and is presently Professor of Psychology at Claremont McKenna College, Claremont, California. She is an associate editor of the Journal of Applied Behavior Analysis and has served on the editorial boards of a number of journals, including Journal of Autism and Developmental Assessment. Dr. Schreibman is coauthor of the forthcoming book Experimental Analysis of Autistic Behavior (with O. I. Lovaas, R. L. Koegel, E. G. Carr, C. Newsom, A. Rincover, and D. C. Russo, in press) and has written many book chapters and numerous articles for professional journals.

S. C. L. & W. P. C.
This book was originally published in 1982 and probably conceived and written several years earlier. Given today’s perspective, some of the wording and examples may be dated and feel out of place to you. However, the principles and insights provided in the book about the instructional process are still very relevant and important. We were unable to find a substitute for this book with the same content presented so precisely and succinctly.

The authors Koegel and Schreibman are leading experts and researchers in the design of instructional programs and advocates for children with autism. Their current research and work uses a naturalistic approach that builds upon the basic principles expressed in this manual (e.g. increasing motivation, responding to multiple cues, generalization, etc.) The approach they have developed, Pivotal Response Treatment is an evidence-based practice that has been widely adopted. A brief description of the major features of PRT is provided at the end of this manual as well as a list of resources which explain the approach. I encourage you to explore them. In addition, when Pivotal Response Treatment makes a recommendation regarding how to use of a specific behavioral strategy that recommendation has been embedded within the reading as a “Note”.

H.M.D.

January 2008
How to Teach Children with Autism and other Severe Disabilities
Robert L. Koegel and Laura Schreibman

Introduction

This manual contains empirically based teaching procedures for individuals with autism and other severe disabilities who present a unique challenge to treatment providers. The behavior of children with autism and other severe disabilities is often so disruptive and their delays so unique and pervasive, that most traditional teaching techniques are completely ineffective. In fact, many persons believe that children with autism cannot learn. The truth is that such children can learn, but may do so only if great care is taken in designing and implementing their learning environment. Children with autism do not learn much unless specific rules, identified by research, are closely followed. Slight deviations in the therapist’s procedures may produce major disruptions in the child’s learning. Hence the need for this specialized manual. The procedures in this manual are based on a systematic behavior analysis of variables influencing learning in children with autism. The procedures have been thoroughly documented as effective (Schreibman & Koegel, 1981). Further, the procedures provide a technology to affect a variety of behavior changes in children with autism (Koegel, Russo, & Rincover, 1977; Koegel, Glahn, & Nieminen, 1978).

The behavioral view of autism differs from the more traditional views and has influenced the development of the procedures in this manual.
Behavioral Approach to Autism

Trying to treat autism can be an impossible task if one begins by viewing autism as a specific diagnostic entity (Schreibman & Koegel, 1981). If we look carefully at the diagnosis of autism, it is apparent that there is a tremendous amount of heterogeneity among children with autism. There is more than one definition of autism, and the definitions are not in complete agreement (cf. Churchill, Alpern, & DeMyer, 1971; Ritvo & Freeman, 1978; Rutter, 1978; Schopler, 1978). Also, within any one of the existing definitions there is variability in the diagnosis. That is, the term autism usually refers to a syndrome comprising several symptoms from a list of specific delays. Not all symptoms need to be present. One child may exhibit an almost totally different set of behaviors from another child, and yet both children may be diagnosed as having autism because both exhibit most of the symptoms.

The differences among children with a diagnosis of autism lead to at least three major problems. First, the diagnosis does not facilitate communication. Professionals often disagree about whose definition should be used. Even when professionals agree on a given definition, the definition only summarizes the behaviors of a group and does not describe the behaviors of an individual child. Second, the diagnosis of autism does not suggest a treatment. There is no consensus among professionals as to what specific treatment to use for autism. Where there is occasional agreement on a treatment technique, the technique is usually for a specific symptom (e.g., self-destructive behavior) and not for the syndrome as a whole. The term autism by itself, does not suggest a treatment procedure. Third, the term autism does not suggest a prognosis. A few children with autism improve without treatment (Rutter, 1968). But without treatment most children with autism do not improve. With treatment, some improve a great deal, others not much at all (Lovaas, Koegel, Simmons, & Long, 1973). Thus the term autism, by itself, does not indicate which children will improve and which will not. Many researchers do not attach much importance to defining the entire syndrome but instead focus on assessing individual behaviors (Schreibman & Koegel, 1981). Individual behaviors (e.g., self-stimulation) are identified and studied to help gain an understanding of the variables controlling the behavior. This approach
leads to a functional definition of autism as the individual behaviors accompanying the disorder become understood in each child.

In addition to providing a more functional approach to diagnosis, the behavioral approach provides a functional aid to the treatment of any individual, with or without autism, who shows particular behaviors or delays or excesses. If the therapist is able to identify and alter the variables controlling the behavior they can change the behavior in the desired and predictable direction. If on the other hand the variables controlling the behavior are unknown, the ability to alter the behavior is severely limited and the prognosis for the behavior is extremely guarded. Thus, the techniques discussed in this manual are applicable to many children with severe disabilities, including many who have not been diagnosed with autism.

Questions

- Diagnosis of autism always includes a statement of the child’s prognosis.
  True or False

- The Procedures in this manual were derived from:
  __________________________________________
  __________________________________________
  __________________________________________
  __________________________________________
  __________________________________________

Selection of Target Behaviors

There are a number of rules to follow when selecting target behaviors for treatment. However, before going through these rules, it is necessary to understand the characteristics of “autistic behaviors” and what differentiates those behaviors from “typical behaviors”. Many “autistic behaviors” differ from typical behaviors primarily because they are excessive or because they are so deficient that they are almost non-existent (Schreibman & Koegel, 1981). Let’s consider these two categories separately.


**Behavioral Excesses**

Certain behaviors exhibited by children with autism are abnormal primarily because of their excessive rates or intensities. These include tantrums and self-stimulatory behavior. Because of their excessive intensity and frequency, these behaviors are troublesome at home, and are disruptive when the parents take the children into public places. Tantrums, for example, may result when even minimal demands are placed on some children. Asking them to walk quietly through a supermarket, to sit in a restaurant, or stand in a line at a ticket booth may result in screaming, kicking, biting and scratching. In the more extreme cases, tantrums may become so violent that the child may inflict personal physical injury. These children are described as exhibiting self-destructive, self-injurious, or self-mutilatory behavior.

Self-stimulatory behaviors provide little other than sensory input for the child. These behaviors include rhythmic body rocking, arm or hand flapping, and gazing intently at their hands. The primary problems presented by such behaviors are that they look bizarre and frequently intimidate strangers in public places. In addition, some of these behaviors interfere with learning.

**Behavioral Delays**

At the other extreme of the behavioral excesses described above, children with autism may exhibit various behavioral limitations.

1. They typically lack appropriate speech. They may be nonverbal, expressing some sounds but very few, if any, words. Other children are echolalic and repeat words they have heard (either immediately or after a delay), but they do not use these words to communicate in the typical manner. For example, in immediate echolalia, when asked, “What is your name?” the child may respond by saying, “What is your name?” rather than giving the appropriate answer. In delayed echolalia, a child seated at the dinner table may repeat his teacher’s requests verbatim from earlier in the day at school.

2. The children may lack appropriate social behavior. They may react to persons as if they were objects. For example, a child may climb into his mother’s lap, not for affection, but in order to reach a cookie jar.
3. The children may show **apparent sensory deficits** and thus be incorrectly suspected of being blind or deaf. The children respond quite normally some times, but not at all at others (cf. Koegel & Schreibman, 1976). Hearing and vision examinations of children with autism do not usually reveal sensory impairment (at least at the receptor level).

4. The children often lack appropriate **play**. For example, instead of driving a toy truck along the ground a child with autism may ignore the truck, or turn it upside down and spin one wheel for hours.

5. The children often show inappropriate **emotions**. Some scream or laugh with little or no provocation. Others show almost no emotional behavior. For example, a child may simply sit and stare into space if someone attempts to tickle him.

**Exercise**

- For a child with autism that you know, list one excessive behavior and one delayed behavior:

  **Excessive:** _____________________________________________________________
  ______________________________________________________________________
  ______________________________________________________________________
  ______________________________________________________________________

  **Delayed:** _____________________________________________________________
  ______________________________________________________________________
  ______________________________________________________________________
  ______________________________________________________________________

**Procedural Rules to Follow in Defining Target Behaviors**

There are several rules to follow to develop a list of specific target behaviors for treatment.

1. **Operationally define the target behavior.** Instead of saying that the child exhibits self-stimulatory behavior, the behavior is described so others can observe and reliably record it. For example, instead of saying Johnny
engages in self-stimulation, say that Johnny rhythmically rocks his upper torso, crosses his eyes, mouths objects, and wiggles his fingers in front of his eyes.

2. **Measurement.** The test of an adequate definition is its measurability. The ability to adequately measure behavior is critical to behavioral treatment. Accurate measurement quantifies the initial severity of the target behavior and allows daily evaluation of teaching effectiveness.

   The approach to measurement is determined by the type of response being measured and the type of information desired (Sulzer & Mayer, 1972; Hall, 1971). Discrete events, such as isolated vocalizations, or instances of eye contact, can be tallied to provide a **frequency** count. If you want to measure the length or **duration** of a response, such as a tantrum, or social interaction, a stopwatch or the second hand of a watch or clock will provide accurate measures. Other measurement procedures, including **trial-by-trial** recording and measurement of **permanent product**, such as the number of arithmetic problems completed (Rincover & Koegel, 1977), can also be used to quantify child improvement during treatment programs. For more information on the measurement of behavior see Houten & Hall (2001) *The Measurement of Behavior: Behavior Modification*

3. **Assess the behavior in a functional context.** We can select behaviors for a child by asking:
   
   - What is the function of the behavioral excess?
     a) When, where and with whom does the behavior predictably occur?
     b) What immediately follows the behavior, what does the child gain when they behave?
   
   - Will this student have the opportunity to use this new behavior in his daily functioning?
     a) How many opportunities will arise for application of the behavior in natural settings, relative to other possible target behaviors?
     b) Can learning situations be tailored to increase the chances of the behavior being performed by the student in the natural environment?
Does the student look natural performing this new behavior or skill, or, conversely, does the student look unnatural because he cannot perform this behavior or skill?

a) Will this target behavior help the student associate with age-appropriate peers?

b) Will this behavior, skill, or concept promote successive approximations of age-appropriate independent functioning?

Exercises

- Define one target behavior for the child you identified earlier.

  Name of behavior: __________________________________________________________

  __________________________________________________________

  Operational Definition: _________________________________________________

  __________________________________________________________

- For the behavior defined above, go through the above steps to assess functional context (apply the assessment questions to the behavior you have selected).

  __________________________________________________________

  __________________________________________________________

  __________________________________________________________

  __________________________________________________________

  If the above assessment leads you to conclude that you have selected an important and functional target behavior for the child, congratulations. You are on the right track! If, on the other hand, the above assessment leads you to conclude that this particular target behavior is not functional, then go back and repeat the two exercises until you have selected a functional target behavior.

  Let us consider some specific target behaviors. Through parental interviews and direct observations of the child in the home, school, classroom, future classroom or any other location, a therapist assesses the current environmental demands placed on the
child and those demands that will be present in the child’s future. Parents can also provide valuable information about the skills the child does and does not exhibit, and the skills the child will need to learn for the future. Direct observations are useful in defining the activities and precise tasks that will teach the student those important skills. The behavioral assessment systematically assess the behaviors the child does and does not exhibit and establishes the beginning of the pre-treatment baseline that will be used later to measure the child’s progress.

A functional, chronological, age-appropriate skill delineation can be facilitated by placing the child with a disability in the present and future environments and defining and measuring the behaviors that person will need for independent functioning (see Johnson & Koegel, 1982). For example, an important aspect of independent school functioning is the ability to negotiate the school lunch room. This is a skill that could be used throughout the child’s school career but also generalized to community settings. Other environments within the school would include hallways and lockers areas, bus area, playground, classroom etc. By accompanying the student in the lunch room, the therapist can make an analysis such as that described above. The sub-environments in which the student will be required to function will include the entrance to the lunch room, the cashier’s station, the food service bar, tables where the student eats and finally the clean up area. The activities required in each sub-environment can now be delineated. For instance, at the cashier station, the student should be able to stand quietly awaiting their turn, make a selection and pay for their lunch. The student should greet the cashier, tell them their selection, count the money and pay the cashier. Some activities will require very specific skills. The exact skills necessary will be evident from the baseline or untreated responding in each sub-environment. For instance, when the student approaches the cashier, the student needs communication skills to greet the cashier and tell them their selection. He needs some arithmetic skills to count the change, and fine motor coordination to manipulate the money. Each required skill can be specified in this way. The design and the implementation of instructional programs to teach these skills follow from the principles of teaching simple discriminations, expressive language, and mathematics. Behaviors are built upon each other through shaping and chaining. Other environments the therapist might consider
would include the community (the grocery store, the YMCA, the library, a job, the arcade, the theatre, a friend’s house, etc.) and the home (the bathroom, the living room, the family room, the kitchen, etc.)

An example of using functional abilities and delays in the determination of treatment programs is provided by Russo and Koegel (1977). In this study, the placement of a child with autism in an inclusive kindergarten was in jeopardy because of her inappropriate behaviors. The experimenters assessed the target behaviors in terms of which behaviors were necessary for that child to remain in the classroom. The activities were similar to those in any kindergarten class, including group and individual activities, story time, and peer playtime. The three behaviors targeted in this study were increased social interaction, decreased self-stimulation, and increased verbal response to the teacher’s questions and instructions. The important consideration is that the evaluation of the child took place in the actual environment and situation in which she needed to develop appropriate functioning. This assured a selection of target tasks that were functional, age-appropriate and pertinent to the goal of keeping her place in the general education classroom.

**Exercise**

- Think of a typical environment a child would encounter. For that environment identify possible sub-environments, activities within a sub-environment and the skills required for the activity:
  
  Environment: __________________________________________________________
  
  Sub-environment: ____________________________________________________
  
  Activity: ______________________________________________________________
  
  Skills: ________________________________________________________________

  Such examples demonstrate the principles of interspersing many instructional tasks within larger target behaviors or activities. For instance, with the target behavior of “table setting,” one skill that might be embedded is counting the numbers of plates needed. Similarly, to learn to use the school lunchroom, the individual may also need to learn to serve themselves and carry their tray to the table. Note how the principle of
partial participation applies to this example. This means that the child can participate, with adaptations and accommodations, even if it is only partially. There would be no reason to withhold training to use the lunchroom until serving themselves is learned. There are many lunchroom skills that could be trained while teaching the student to serve themselves and manipulate the lunch tray. By working through a behavior cluster and prompting when necessary, the individual gains experience with the entire skill cluster, gradually taking more responsibility for more and more complex steps.

The behaviors we often find ourselves working on as adjuncts to more comprehensive or complicated living tasks are listed in Table 1. Within any treatment program, we first find ourselves controlling the disruptive behavioral excesses (including self-abusive behaviors, aggression, tantrums, messing things up and self-stimulatory behaviors).

Table 1. Examples of Incidental Target Behaviors

<table>
<thead>
<tr>
<th>Categories</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behavioral Excesses</strong></td>
<td></td>
</tr>
<tr>
<td>Self-abusive behaviors</td>
<td>Eliminate hitting, biting, scratching oneself, and so forth</td>
</tr>
<tr>
<td>Aggression towards others</td>
<td>Eliminate kicking, hitting, biting, pinching, and so forth</td>
</tr>
<tr>
<td>Tantrums</td>
<td>Eliminate yelling, crying, jumping up and down, and so forth</td>
</tr>
<tr>
<td>Getting into or messing up things</td>
<td>Eliminate getting into cabinets, scattering books and toys, playing in water, and so forth</td>
</tr>
<tr>
<td>Self-stimulatory behaviors</td>
<td>Eliminate staring at fingers, rocking, hand-flapping, and so forth</td>
</tr>
<tr>
<td><strong>Behavioral Delays</strong></td>
<td></td>
</tr>
<tr>
<td>Learning readiness</td>
<td>Eye contact on request; follows simple commands such as “Close the door,” “Sit down,” and so forth</td>
</tr>
<tr>
<td>Gross motor skills</td>
<td>Plays ball; rides tricycle; and so forth</td>
</tr>
<tr>
<td>Fine motor skills</td>
<td>Copies lines; colors; uses scissors; prints; and so forth</td>
</tr>
<tr>
<td>Nonverbal imitation</td>
<td>Claps hands; points to body parts; imitates mouth movements or positions; and so forth</td>
</tr>
<tr>
<td>Verbal imitation</td>
<td>Emits speech sounds spontaneously; imitates vowels and</td>
</tr>
<tr>
<td>Simple functional speech</td>
<td>Answers questions with at least one word; asks for things with one or more words; answers “I don’t know” to questions he does not know; is able to request and transfer information; and so forth</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Identifying, labeling, and describing (receptive and expressive)</td>
<td>Follows commands; identifies familiar persons; labels body parts; labels colors; labels common objects; labels alphabet; labels numbers 1 to 20; labels different money values; labels big and little; describes shape of object: describes objects by size and color; identifies emotions; and so forth</td>
</tr>
<tr>
<td>Using general concepts and relationships</td>
<td>Matches alike (similar) versus dissimilar; identifies many action verbs; uses prepositions; uses genitive pronouns; uses nominal case pronouns; uses pronouns to describe personal characteristics; uses “and”; understands “don’t”; understands the order command of “then”; understands relationship of “first” and “last”; understands relationship of “before” and “after”; answers “yes” or “no” to questions involving desires; recalls what’s missing when an object is removed from a group; recalls what he did in the immediate past; recalls a few things from the remote past; discriminates right and left; discriminates singular and plural; counts up to 10 objects; relates a written number to a number of objects; understands simple money exchange; tells time; knows days of week in order; and so forth</td>
</tr>
<tr>
<td>Using functional concepts</td>
<td>Identifies function of many personal objects; describes function of many personal objects; identifies function of different body parts; identifies function of many common objects; describes function of common objects; identifies pairs of objects that belong together; understands concepts cold, tired, hungry; answers “why” questions with “because”; and so forth</td>
</tr>
<tr>
<td>Story telling</td>
<td>Comprehends sentences; describes picture of an activity; makes up story with beginning, middle, and end; makes up story about a topic or subject; and so forth</td>
</tr>
<tr>
<td>School readiness</td>
<td>Works independently on a task for at least 5 minutes without being distracted; participates in small group</td>
</tr>
</tbody>
</table>
Likewise, we must often teach skills that are incidental to a functional curricular program. The most common example occurs in the incidental teaching of language in almost every program for students with autism (cf. Hart & Risley, 1980, 1982). Language concepts incidental to other programs include relationships (such as same/different, first/last, before/after), use of pronouns and possessives, responding to questions relating to the student’s desires (Are you cold? Hungry? Tired? Why are you Happy? Sad? Angry? Frustrated?), and language concepts extending beyond the here and now (“What’s missing?” “What did you do last week?” “Make up a story.”). Finally, we try to present many opportunities for learning socialization skills, especially concerning the student’s initiating and responding in peer interactions.

Questions

- Which of the following is an operational definition?
  b. Child is autistic.
  c. Child appears “in his own world.”
  d. Child stares at lights and spinning objects.

- What is an incidental skill that could be taught in conjunction with getting lunch?

- Which of the following is not a behavioral excess shown by many children with autism?
  a. Self stimulation.
  b. Social behavior.
  c. Tantrums.
  d. Self-injurious behavior.
• Name two behavioral delays frequently observed in children with autism.

________________________________________________________________
________________________________________________________________

Exercise

For a target behavior you have selected, think of two natural contexts in which it would be valuable to assess and teach the behavior.

Context 1: __________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

Context 2: ___________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

Structuring the Teaching Situation

To provide a generalized therapy program, it is necessary to train therapists in general principles of Applied Behavior Analysis rather than in many individual treatment programs (Koegel, Glahn, & Nieminen, 1978; Schreibman & Koegel, 1975). When implementing a treatment program for children with autism, it is important to deliver
clear stimuli. The format followed in executing clinical programs helps present things in a clear manner and maximizes the rate at which children acquire new skills.

The general format for a training trial is as follows:

1. The teacher (parent) presents a clear stimulus (instruction or question) to the child who is quietly attending to the teacher or the task at hand.
2. This stimulus may be followed by a prompting cue to evoke the desired response.
3. The child responds correctly or incorrectly.
4. The teacher responds (with feedback a reward or correction).
5. There is a brief interval before the next trial begins.

**Presenting Instructions and Questions**

A trial begins by presenting a signal for the child to respond. Questions and requests are both examples. When therapists say, “Touch your nose,” or ask, “What color is this?” they are presenting a signal or cue for the child to respond. In order for the child to learn, cues should be presented when the child is attending; should be easily discriminable; and should be varied to increase motivation and prevent boredom.

**Child Attending**

A child with autism may be jumping around on his chair, pulling the therapist’s hair, screaming, and so forth. In many cases it is useless to present an instruction while the child is not attending. All off-task, nonattending behavior must be eliminated before the target instruction is presented. In other words, before attempting to teach the child the instruction “Touch red,” make sure that the child responds appropriately to the instructions “Look at me,” “Hands down,” “Sit quietly,” “Get Ready”, or some other attending signal. The instruction should not be presented if the child is engaging in self-stimulatory or other off-task behavior (Koegel & Covert, 1972; Risley, 1968).

**Easily Discriminable**

The instruction must be presented so that it stands out from everything else because it is the stimulus that is to acquire control over the child’s behavior. In the case of children with autism, it is frequently necessary for the therapist to take precautions to
ensure that the child discriminates the specific word(s) that are intended to become meaningful.

Children with autism have difficulty responding appropriately when multiple stimuli are presented. They respond to only a restricted portion of the total stimulus complex. This characteristic has been called stimulus overselectivity (Lovaas, Schreibman, Koegel, & Rehm, 1971). The finding that children with autism respond overselectively has been replicated with auditory and visual cues (Koegel & Schreibman, 1977; Lovaas & Schreibman, 1971; Rincover & Koegel, 1975), with multiple visual cues (Koegel & Rincover, 1976; Koegel & Wilhelm, 1973; Schreibman, 1975; Schreibman & Lovass, 1973), and with multiple auditory cues (Kogel & Rincover, 1976; Reynolds, Newsom, & Lovaas, 1974; Schreibman, 1975).

While responding to selective aspects of a complex situation is a normal adaptive response, stimulus overselectivity is much more restrictive in children with autism. Stimulus overselectivity is possibly a basis for much of the limited behavioral repertoire of children with autism and for the difficulty they have learning new behaviors.

For example, restrictions on the number of stimuli that acquire control over behavior can cause serious problems in stimulus generalization. Generalization is the extent to which a behavior learned in one environment transfers to new environments. This relates to the familiar problem of under generalization of therapeutic gains—the failure of a behavior acquired in a therapeutic setting to transfer to a new environment.

This problem of limited generalization was shown in a study by Rincover and Koegel (1975) where stimulus overselectivity limited generalization. In this experiment, one teacher taught children with autism to perform a simple behavior upon request (e.g., “Touch your nose”). Immediately after each child had learned this behavior, a second teacher took the child into another environment and made the same request. Four of the 10 children with autism did not perform the relatively simple behavior in the new environment. Tests showed that the children failed to generalize the learned behavior because they had selectively responded to irrelevant stimuli during training. In one case, the child’s responding was controlled by incidental movements of the first teacher’s hand. Subsequently, when the second teacher simply raised his hand in a similar way in the outside setting, the child responded appropriately. That is,
generalized responding occurred only after the systematic exploration and isolation of relevant stimuli in the treatment environment and the introduction of these stimuli to new (outside) environments.

To prevent such problems from occurring in the first place, it is necessary to reduce the number of irrelevant stimuli present in the teaching environment. We do this even when presenting verbal instructions. This is easily done if the instruction is short and has a clear beginning and end. Examples of such discriminable instructions are “Touch red,” and “Sit down.”

The following instructions would be difficult for any child to follow. “Okay, now we are going to learn all about colors. What you are supposed to do is touch the color I name. Don’t touch any color, only the one I name. If I say touch red, then you touch red, not green or blue. Okay? Now touch red. Remember what I told you, now.”

Questions

- What is wrong with the above example? ________________________________
  ___________________________________________________________________

In this example, the words that are supposed to signal the child’s response (touch red) are lost in the barrage of other words. That is, one might readily expect the child with autism to “overselect” on the wrong word(s). A much better instruction is simply to say “Touch red.”

Another example: “First I’m going to put down a square block, and then I’m going to put down a round block. Now you tell me which block I put down first.”

- What is wrong with this example? ________________________________
  ___________________________________________________________________

This instruction also contains too many cues and again is likely to result in overselectivity.

- What might be a better instruction? ________________________________
  ___________________________________________________________________

A better instruction would be to say “Which is first?” or with a nonverbal child, the instruction might be “Touch first.”
Exercises

- List the characteristics of a good instruction.

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

Task Variation

Dunlap and Koegel (1980) evaluated the differential effectiveness of two methods of presenting discrimination tasks when teaching children with autism. In a constant task condition, the common method of presenting a single task throughout a session was used. In a varied task condition, the same task was interspersed with other maintenance tasks from the children’s curricula (i.e., a particular task was never presented more than two trials in succession). Results showed declining trends in correct responding during the constant task condition, with substantially improved and stable responding during the varied task condition. In addition, naïve observers judged the children to be more enthusiastic, interested, happier, and better behaved during the varied task sessions. Thus “boredom” may be a particularly important variable to control in the treatment of children with autism, and particular care may be necessary when defining criteria for task acquisition.

Exercise

- For a child with autism you are working with, list four successive trials as they would be presented in a varied task approach.

1. _____________________________________________________________
   _____________________________________________________________
Prompts

There are many occasions when a therapist wishes to teach a behavior that is not elicited by the question or instruction being presented, nor is this behavior likely to occur spontaneously. On these occasions a prompt may bring about the correct response. A prompt, as used here, is a stimulus presented along with the instruction or question that guides the child to the correct response. For example, if the instruction “Touch your nose” is presented and the child does not respond, the therapist may prompt the response by manually moving the child’s hand while presenting the instruction “Touch your nose.” Or, if the therapist is trying to teach the child to imitate the sound “mm” but the child is not responding correctly, the therapist may prompt by holding the child’s lips together as the instruction “Say mm” is presented. Let’s consider another example. The therapist holds up a red block and asks an echolalic child “What color is this?” The child may echo the question saying “What color is this?” In this case the therapist can prompt a correct response by holding a finger up to the child’s mouth during the presentation of the instruction, preventing the echo. Then, immediately after the instruction, the therapist can say “red” and pulls his hand away from the child’s mouth permitting the echo “red.” Thus the prompt would look like this: Therapist (with finger up to child’s mouth): “What color is this?” One second pause, “Red.” (Therapist then removes hand from the child’s mouth.) Child’s response: “Red.” Now that we have considered these examples, let us consider two major points.

1. A prompt is only a prompt if it works. That is, it must bring about a correct response. In the examples above, if the child pulls away when the therapist attempts to place their finger up to the child’s lips, or if the echolalic child
echoes the entire sequence “What color is this? Red,” then the prompts are ineffective and must be abandoned in favor of more effective prompts. One of the most common errors therapists make is to try an ineffective prompt repeatedly merely because it seems logical, or because it worked with another child. Thus, variety and creativity are important when planning prompts.

2. The second major point to remember in prompting is that the prompt must eventually be removed. Once the prompted response has been established, the therapist must reduce the child’s dependency on the prompt by gradually fading the prompt until the child responds solely on the basis of the instruction. When a therapist manually places the child’s hand on his nose to prompt the response to “Touch your nose,” the prompt may be faded by gradually reducing the manual guidance. Thus, the therapist may lift the child’s hand halfway to the nose while saying “Touch your nose” so the child completes the response on his own. When the child does this reliably, the therapist may merely lift the child’s arm slightly. Then he may just touch the child’s arm and so on. The therapist is constantly doing less guiding and the child is doing more and more on his own. Eventually the prompt is completely faded and the child touches his nose when the verbal instruction is presented. It is important to fade the prompt slowly enough that the child makes few errors (cf. Terrace, 1963). Yet, it is important to fade the prompt completely so that the child’s response comes under control of the instruction and does not remain under the control of the prompt.

Question

- What are the two main points to consider when selecting a prompt?

  a. __________________________________________________
  and
  b. __________________________________________________


Special Points to Remember When Prompting Children with Autism

Total removal of the prompt can be troublesome in the case of children with autism. Whereas prompt-fading procedures have proven effective with typically developing children (e.g., Cheney & Stein, 1974; Storm & Robinson, 1973; Taber & Glaser, 1962), children with cognitive delays (e.g., Dorey & Zeaman, 1973; Sidman & Stoddard, 1966, 1967; Touchette, 1968, 1969, 1971); and children with autism (e.g., Ferster & DeMyer, 1962; Koegel & Rincover, 1974; Metz, 1965; Risley & Wolf, 1967), many studies have pointed out difficulties encountered when trying to fade the prompt completely with children with autism (e.g., Acker, 1966; Koegel & Rincover, 1976; Lovaas, Schreibman, Koegel, & Rehm, 1971; Schreibman, 1975).

Many children with autism do not learn from typical prompt-fading procedures, perhaps because of the stimulus overselectivity phenomenon discussed earlier. A prompt requires a response to two simultaneous cues, the prompt stimulus and the training stimulus or instruction (Fields, Bruno, & Keller, 1976). The child must shift responding from the prompt to the training stimulus and in doing so he or she must associate the two cues. If the child responds to only one cue, the necessary association of the two cues will not take place. More likely, because the prompt is the only reliable cue for reinforcement at the start of the training, the child with autism will overselectively respond to this cue and fail to respond to the training stimulus. Several investigators have found that children with autism, when presented with a discrimination task involving prompt-fading, typically respond only to the prompts and do not learn the discrimination (e.g., Koegel & Rincover, 1976; Rincover, 1978; Schreibman, 1975). For example, if the therapist first teaches the child to respond to the color blue, and then prompts responding to a particular word by underlining the word with a blue line, the child may continue to respond to very faded color cues as the prompt is faded, but never respond to the word when the colored line is completely absent.

Prompt-fading is a tool the therapist cannot do without. Thus, some investigators (Rincover, 1978; Schreibman, 1975) have developed prompts that allow the child to be overselective, yet transfer from the prompt to the training stimulus when the prompt is removed. These are within-stimulus and distinctive-feature prompt-fading
procedures. The advantage of these procedures is in allowing the child to experience success by teaching complex discriminations in a nearly errorless series of trials.

These procedures can be discussed together. Rather than providing an extra stimulus as a prompt (thus requiring response to two cues), the therapist exaggerates the one stimulus component that is relevant for distinguishing the task. This exaggeration is then slowly faded until the child can reliably respond correctly to the final discrimination. Figure 1 below and on the next page illustrates fading steps for such a prompt. First, the stimulus that is relevant for distinguishing the S+ from the S- is isolated. Once the child is responding to the S+ the S- is gradually faded in.

Second, the exaggerated stimulus, (i.e. size of the dots and distance between the dots) is gradually altered (i.e. S+ move closer together and S- move farther apart) to their criterion size and distance.
Finally, the irrelevant feature (the feature the child should ignore) is slowly faded in.

**Figure 1: Within-Stimulus Prompt Procedure**

The strength of this within-stimulus prompting procedure is that the child is never required to respond to more than one cue. Response to the distinctive feature (in this case, dot orientation) is guaranteed by the initial prompt steps. With this procedure the children were able to learn the discrimination they had failed to learn earlier with an extra-stimulus prompt (therapist pointing to the S+ card).
Rincover (1978) expanded this procedure and pointed out the necessity of exaggerating a distinctive feature within the discrimination. Figure 2 presents a possible fading progression for teaching the discrimination “JAR” versus “SON” using this technique. Note the emphasis on:

1. First, identifying a distinctive feature within the discrimination, the difference between S+ and S-, (here there is a cross bar on “J” and none on “S” while the bottom curve on both letters is similar);
2. Then prompting the correct response by superimposing an exaggeration of the distinctive feature within the stimulus (i.e. the cross bar on the “J”) and then fading that component.
Figure 2: Within-Stimulus Distinctive Feature

While within-stimulus and distinctive-feature fading are effective in teaching children with autism certain types of discriminations, their use is limited. They cannot be used to teach all discriminations. In a discrimination involving multiple modalities, a within-stimulus, distinctive-feature prompt may be impossible. Another limitation is that although the children with autism are learning with the prompts, they are still
overselective. Thus, the basic learning deficit is unchanged. The children still fail to learn from the average environment as do children who are not overselective.

Children with autism can learn to respond to discriminations on the basis of multiple cues (Koegel & Schreibman, 1977; Schreibman, Charlop & Koegel, 1982). In the first study, children were presented with a conditional discrimination task necessitating response to two cues. All of the children learned the task (although it took them much longer than it did for the typically developing children who served as controls). Further, preliminary data for one child suggested that after training on a series of successive conditional discriminations, this child ceased to be overselective on new tasks. Thus, the child learned to approach new tasks on the basis of multiple cues. If we teach a child with autism to respond on the basis of multiple cues, then the child should learn with traditional (extra-stimulus) prompting procedures, such as pointing (Schreibman et al., 1982).

**Note:** It is recommended when using *Pivotal Response Treatment* that if appropriate to the developmental level of the child, the question or instruction should involve the use of multiple cues (i.e. asking the child if he wants the “blue ball” or the “big red ball” versus “ball”). This procedure will teach children to respond to multiple cues in their environment in much the same manner as typical children.

**Questions**

1. What is a prompt? __________________________________________________________

2. How can overselectivity interfere with prompting children with autism?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Exercises

1. Design a within-stimulus prompt procedure for teaching a child to discriminate a large vs. small circle.
2. Design a within-stimulus prompt procedure for a task you are working on with a child with autism.

The Use of Shaping and Chaining

Many behaviors do not lend themselves to the teaching techniques discussed thus far. Some behaviors are unlikely to occur spontaneously and the frequency of their occurrence cannot be increased by differential reinforcement of the response. An example of such a behavior is putting on a pair of pants. One could wait forever for the child to emit this response spontaneously. Putting on pants includes many complex behaviors that can best be taught by breaking down the target behavior into smaller, gradual steps. This is called shaping (if the therapist breaks a response into rough approximations that are emitted by the child) and chaining (if the therapist breaks down a complex response into a series of component responses that, when performed in sequence, lead to the target behavior).

Shaping

Shaping is a procedure whereby a response is taught by rewarding successive approximations to that response. At the start, even the smallest approximation to the desired behavior is reinforced. Gradually, reinforcement is withheld until the child emits a response that more closely approximates the target response. When the child reliably performs this response, reinforcement is again withheld until the child emits an even closer approximation, and so on. With this approach the child is rewarded only for responses that are at least as good as those made on previous trials. This guarantees forward progress. If the child seems to perseverate for several trials at a particular level without progress, the therapist should not back up and reward a less-accurate response. Instead, switch to a more familiar task for a few trials to allow the child to receive reinforcement and thus remain motivated, then return to the shaping sequence.
Shaping can best be illustrated by an example. If a therapist wants a child to imitate the vocalization "ba" (as a first step toward the word “ball”), the response would be shaped in the following manner:

The child, seated opposite the therapist, is exhibiting no off-task behavior, and is attending to the therapist’s face. The therapist then says “ba.” Initially the child will probably make no response. Because we begin by reinforcing even the smallest approximation to the target behavior, we may wish to begin by reinforcing any vocalization, even if it is a grunt or babble. Initial vocalizations can be prompted or elicited by tickling or fondling. As soon as a sound is emitted, the child is reinforced. This rewarding of sounds is continued until the child’s rate of spontaneous vocalization is about one every five seconds. When the child reliably vocalizes, reinforcement can be withheld until only vocalizations occurring right after the therapist’s vocalization (“ba”) are reinforced. Other vocalizations are not reinforced. When the child reliably vocalizes (with any sound) only after the therapist’s “ba,” the demands can be increased so reinforcement is withheld until the child’s vocalization more closely resembles “ba.” For example, if the child has been saying “gee,” reinforcement might be withheld until the child’s vocalization is closer to the sound “ba.” This procedure is continued until the child says “ba” after the therapist’s “ba.”

**Note:** When using Pivotal Response Treatment it is recommended that any goal-directed attempt to respond should be reinforced. Although an attempt does not need to be correct, it has to be a reasonable approximation. This is in contrast to traditional shaping procedures that strictly require a better approximation for reinforcement and withhold reinforcement for any poorer approximation. This is particularly important for speech attempts. Using a “looser” shaping procedure, by rewarding attempts, helps to keep the child motivated and engaged. Keep in mind, strictly adhering to the shaping procedure by reinforcing only better approximations and withholding rewards for poorer approximations could result in the child “shutting down” and withdrawing.
Exercises

1. For the child you are teaching, identify two target behaviors to teach using shaping or chaining.

________________________________________________________________
________________________________________________________________

2. Describe a shaping procedure to teach a child to give you a hug.

1. ____________________________________________________________
2. ____________________________________________________________
3. ____________________________________________________________
4. ____________________________________________________________
5. ____________________________________________________________
6. ____________________________________________________________

Chaining

Any complex target behavior is made up of a chain of simpler responses. To teach a behavior using chaining we break down a complex behavior into smaller progressive component parts and teach the parts one at a time. We begin by teaching the first response in the chain, selecting a first response that is so simple that the child can successfully perform it and be reinforced. The first step may be a long way from the target behavior. Once the child reliably performs the first response, we slightly increase the demand by progressing to the next step. Reinforcement is now available only for successful performance on the next step. Ideally, the next step should be simple enough that the child is likely to be successful. (We break the behavior down into these small steps to minimize the number of errors the child makes during the chaining procedure.) When the child is successful at this step, the therapist uses the same method to advance to the next step.

The success of the chaining procedure lies in the determination of when the child is proficient enough to progress to the next level. A good rule of thumb is to make certain the child can consistently perform correctly on a step before advancing. If the child happens to emit a response that is a closer approximation than the present level, the child should be immediately reinforced. As with shaping, the emphasis is always on
forward progress because only responses that are at least as good as those made previously are reinforced.

**Example of Chaining.** Dressing is a behavior that is unlikely to be spontaneously emitted by a child and one frequently taught with a forward chaining procedure. Only a very simple response is required as the first step in the chain. For example, in teaching a child to put on a pullover shirt the child may be presented with the instruction “shirt on” while being handed the shirt. If the first step in the chain is “holding the shirt,” the child is rewarded for taking the shirt from the therapist and holding it. When he will hold the shirt each time, the therapist increases the requirement so the child must hold the shirt with both hands before he is reinforced. The next step may be to hold the shirt right side up. Further steps in the chain might include: a) putting shirt on top of head, b) putting head through neck hole of shirt, c) putting one arm through sleeve, d) putting the other arm through other sleeve, e) pulling bottom of shirt down to mid-chest level, f) pulling shirt down to waist.

**Total task** chaining is a variation of forward chaining. When using a total task procedure the child completes all of the steps in the chain with assistance each trial. The assistance will vary for each step depending on the child’s skills. The assistance is gradually reduced on each step as the child becomes more independent on subsequent repetitions of the sequence.

If a backward chaining procedure is used, the steps are taken in reverse order so that the last step in the behavior sequence is the first trained. The same behavior (shirt on) could be taught using backward chaining by placing the shirt on the child and reinforcing him for touching the bottom of the shirt when the instruction “shirt on” is presented. After the child has successfully mastered this step, the therapist may pull the shirt up to the mid-chest level and require the child to pull the shirt all the way down when the instruction “shirt on” is presented. Next, the child may be required to pull the shirt down from the neck level, and so forth. The steps may be identical to those in forward chaining.

There are two things the therapist must remember when using a chaining procedure. First, each step is cumulative. To receive reinforcement at Step 7, the child must correctly perform Steps 1 through 6. Second, the size of step increments is
determined by the child’s performance. If the child is having great difficulty, the step increments will be smaller than if he is progressing rapidly. If the child begins to make errors (which are not due to inattention or lack of motivation) it will be necessary to back up to the last step at which the child was successful. After the child performs correctly at this level, he should be advanced, but at smaller step increments.

Questions

- The procedure whereby the therapist breaks a complex target behavior into a series of component responses that, when performed in sequence, lead to the target behavior is called ____________________________________________________________

- The emphasis in shaping and chaining is on ______________ progress.

- The procedure whereby a therapist begins training at the end of a behavior sequence and works toward the beginning of the sequence is called __________________________ chaining.

Exercises

- With the person you are teaching:

  1. Identify a complex behavior to teach
     __________________________________________________
     and

  2. List the steps involved in teaching the behavior through chaining:
     1. __________________________
     2. __________________________
     3. __________________________
     4. __________________________
     5. __________________________
     6. __________________________
     7. __________________________
     8. __________________________

- What are six steps you might include in a chaining procedure to teach a child to put on a shoe?
  1. __________________________
  2. __________________________
  3. __________________________
  4. __________________________
  5. __________________________
  6. __________________________
Consequences

The most important determinant of an individual’s behavior may be the consequences the environment presents for that behavior (cf. Skinner & Ferster, 1957). Thus, the therapist’s most powerful tool for accomplishing behavior change is the effective use of consequences. The therapist must possess a sophisticated knowledge of consequating behavior. This knowledge is particularly important with children with autism because the typical “rewards and punishments” that are effective with typically developing children may be ineffective with children with disabilities. In fact, the use of typical motivating strategies relied upon by parents and teachers of typically developing children may exaggerate problems behavior.

Consequences have two important dimensions. First, is the type of consequence. Second, is the manner in which the consequence is presented.

Types of Consequences

Types of consequences are defined by their effects on the behavior they follow (Skinner & Ferster, 1957). If a therapist knows what to expect from each type, it is simpler to decide which consequence is most appropriate for a given situation.

Positive reinforcement is a procedure whereby a behavior is followed by a stimulus and the behavior is strengthened. Typically we see the use of positive reinforcement when someone says “Good girl” or gives the child a cookie when the child does something desirable. In working with children with disabilities the therapist needs to be particularly resourceful and imaginative in selecting positive reinforcers. Typical social reinforcers such as “good boy/girl” or a hug may be ineffective. The therapist may find it necessary to resort to primary reinforcers such as food (Lovaas, Freitag, Kinder, Rubenstein, Schaeffer, & Simmons, 1966). Sometimes even food is not potent enough and the therapist must seek alternatives (cf. Rincover, Newsom, Lovaas, & Koegel, 1977). This process can be difficult. For example, one boy with whom the authors worked was not socially responsive and rejected any attempts to use social approval as a positive reinforcer. He was also a poor eater and would not work for food. He did not play, thus ruling out the use of toys as a reward. We discovered that he loved a particular song and reasoned that the song might serve as a reinforcer. During
therapy sessions, 5-second intervals of the song were presented to the child contingent upon correct responding. Correct responding increased dramatically using this procedure. Another child would work for whipped cream which the therapist would squirt into her mouth from a can of refrigerated whipped cream. **Resourcefulness** is the key word when identifying positive reinforcers.

A therapist must also be able to identify positive reinforcers that are not obvious and, indeed, may seem very unlikely. With children with autism, stimuli others may consider aversive or unpleasant have reinforcing effects on the child’s behavior. For example, verbally chastising a child (e.g. “no,” “stop that”) may lead to an increase in the undesirable behavior even though the opposite effect is intended. The therapist is providing attention to the child and attention can be reinforcing, particularly if the child has few other sources of reinforcement, or if the child has minimal social behavior. A particularly good example of an unexpected positive reinforcer was demonstrated by Favell, McGimsey, and Jones (1978). These investigators reported on three self-abusive subjects for whom physical restraint was a positive reinforcer. When physical restrain was contingent upon increasing periods of time with no self-abuse, the self-abuse was eliminated.

**Note:** When using Pivotal Response Treatment it is recommended that reinforcers be natural and directly related to the desired behavior (e.g. If the therapist holds up ball and says “What’s that?” and the child says “ball” the reinforcer should be that the child gains access to the ball and uses it in play. This is in contrast to the child receiving an edible reward for saying “ball”. Using directly related functional reinforcers require the therapist to select teaching targets and activities based upon the child’s interests and preferences. In other words, when possible follow the child’s lead.

**Exercise**

- Identify two potentially effective positive reinforcers for the person you are teaching.

________________________________________________________________

________________________________________________________________
Negative Reinforcement occurs when an aversive or unpleasant stimulus is removed following the occurrence of a behavior. In everyday language, the child “escapes” the situation. The strength of the behavior, which precedes the removal of the unpleasant stimulus, is thus increased. A familiar example might be when you put on sunglasses in the presence of bright sunlight. You get relief by reducing the brightness of the sun. You are negatively reinforced for putting on your sunglasses. Negative reinforcement often maintains undesirable behavior. Carr, Newsom, and Binkoff (1976) report the case of a boy diagnosed with psychosis, Tim, with a long history of severe self-abuse. His self-abuse was interfering with his treatment. During his treatment sessions, he would slap his face repeatedly. The teacher, being careful not to give attention (positive reinforcement) to him when he self-abused, immediately stopped speaking to him and turned away. Tim would stop hitting himself. But when the teacher resumed her instruction (which consisted of having Tim respond to requests and questions) his self-abuse returned. Carr et. al. (1976) hypothesized that the requests and questions constituted an aversive situation that Tim was escaping by engaging in self-abuse. A systematic analysis conducted by the authors confirmed the hypothesis. Tim avoided having to work by hitting himself. The teacher had (inadvertently) negatively reinforced the self-abuse.

Sometimes a therapist can use a negative reinforcer to increase desirable behavior. Since children with autism often have a long history of failure in instructional situations, many find any adult requests or questions aversive. To avoid requests, children often learn to tantrum. In some cases even when they are approached by an adult. As in the report by Carr et al. (1976), if a child is allowed to leave therapy when they “act out”, acting out is negatively reinforced by “escape” from the request (remember requests are aversive or unpleasant to the child). In this case, you may turn the behavior around by choosing to let the child leave when they are calm and cooperating. This would result in negatively reinforcing the appropriate behavior (cooperation) by removing the task.

Combining this strategy with the shaping procedure by beginning with a very easy or simple request can be very effective. You may only ask the child to approach the therapist and then let the child leave (or the therapist may leave) without making any
other requests. Once the child successfully approaches the therapist, the therapist could introduce a single easy request and then let the child leave. Gradually, the therapist would increase the requirement for participation before ending the session. This would allow the child to be successful and allow the therapist to reinforce (negatively) cooperation. The therapist could introduce a positive reinforcer, for participating, as well to make the strategy even more powerful.

**Exercises**

- Give an example (from your own experience) in which a person’s disruptive behavior was maintained by negative reinforcement. ______________________

________________________________________________________________

________________________________________________________________

- Give an example of how you might use negative reinforcement with the person you are teaching. ______________________

________________________________________________________________

Extinction is one of the most effective tools in a therapist’s repertoire. Extinction means that a stimulus known to be a reinforcer is no longer presented contingent upon a behavior. If a child has been receiving attention for tantrums, and if the attention has been maintaining the tantrums as a positive reinforcer, an effective way to eliminate the tantrums is to no longer provide attention. This is sometimes referred to as “planned ignoring” (Hall & Hall, 1998). Because reinforcement is no longer forthcoming for the disruptive behavior, the child will cease the tantrums. In the Carr et al. (1976) study, Tim’s self-abuse was maintained by the negative reinforcement of avoiding the teacher’s requests. One might predict that this behavior could be put on extinction by no longer presenting the negative reinforcer (teacher stopping the requests) when self-abuse occurred. A potentially effective treatment procedure would be to continue the instruction when the child self-abused so that he would learn that hitting himself would not lead to escape from the work situation. This would remove the pay-off for such behavior. This is called escape extinction.
There are three important characteristics of extinction. **First, extinction is effective but typically involves a gradual reduction in the strength of the behavior rather than a sharp, dramatic drop** (as is characteristic of punishment). In the case of Tim, his self-abuse was fairly mild and extinction could be used because he would not really do serious damage to himself during the extinction procedure. However, a child with more severe self-abuse might not be a good candidate for extinction because of the harm that might be inflicted during the extinction process. **Second, at the onset of extinction there is usually an initial increase in the strength of the target behavior as the child “tries harder” to reinstate the reinforcer.** It often gets worse before it gets better. Thus the child might cry harder during a tantrum or nag harder for a cookie. After this initial burst the behavior gradually extinguishes. It is important that the therapist expect this initial increase in the strength of the behavior or he or she may prematurely abandon an effective treatment procedure. **Third, the therapist can expect an increase in the variability of the response at the onset of extinction.** Thus the child may be more creative in his attempts to gain attention for his tantrum. He may now kick the door or throw himself on the floor. Again, it is important to anticipate the occurrence of these effects during the initial stages of extinction. For more information on extinction see Hall & Hall (1998) *How to Use Planned Ignoring* (Extinction) and Rincover (1981) *How to Use Sensory Extinction.*

**Exercises**

- Identify a behavior you wish to reduce that might be susceptible to an extinction procedure. ________________________________________________________________

- From your experience, identify an instance where a behavior has temporarily increased when an extinction procedure has been started (e.g., when you began ignoring a child for nagging). ________________________________________________________________
**Punishment** is the presentation of an aversive stimulus contingent upon a behavior with the effect of reducing the strength of that behavior. Punishment occurs frequently in everyday life, for example, if you eat soup that is too hot, you may burn your mouth. Eating is punished by the hot soup and you are likely to stop eating and wait for the soup to cool. In another instance you might look at the bright sun and it hurts your eyes. Looking directly at the sun is punished and you won’t look directly at sun in the future. Some examples of punishment you might have seen or tried in an attempt to change a child’s behavior are a disapproving look or frown, a mild “no”, a disapproving comment or reprimand. Punishment is a technical term and does not refer to the layman’s use of the word, as in “harsh treatment” or “to inflict pain”. Punishment is a controversial issue because it has been misused and can lead to mistreatment. We would like to emphasize that the use of punishment is not a procedure we advocate. There are ethical reasons as well as practical reasons for avoiding the use of punishment. We support the use of Reinforcement-Based interventions whenever possible as promoted by **Positive Behavioral Support Technology**.

However, it is important to understand that punishment is a basic behavioral principle that governs behavior. Often punishment may occur accidentally. Such can be the case during instruction when the therapist increases the difficulty of the task. The therapist is attempting to stretch or expand the child’s skill, taking advantage of an opportunity when the child appears to be engaged and working hard. At this point the child might be a little tired and the presentation of more difficult requests may be aversive to the child. Inadvertently, the child is punished. When the child works hard they are given more difficult work. Therefore, next time the child might be reluctant to work hard.

In another situation, the child initiates a request and the therapist uses the opportunity to require the child to make a better response before granting the request. If the therapist is not careful, they may accidentally punish the child for initiating. If the requirement or demand placed on the child is too great, the child may stop initiating and withdraw. Remember, punishment is the presentation of a stimulus following the behavior that decreases the future probability of the behavior, it does not mean harsh
treatment. A therapist can accidentally and unintentionally punish a child. If the child is withdrawing, trying to escape or avoiding there must be a punisher nearby.

The child’s behavior also influences and effects the therapist and/or parent. The adult may be punished by the child who tantrums and acts out when requests are made of him. In this case, the child’s behavior may become so aversive and unpleasant to the adult that they avoid making the requests of the child that evoked the tantrum, or worse yet, they may even avoid the child altogether. Understanding the role of punishment will help you explain the child’s behavior and response to various situations and it may help you understand your response to the child as well.

Again, we want to emphasize we do not support punishment procedures instead advocate the use of Reinforcement-Based interventions.

Exercises

- Name a punisher you have seen used. Identify a reinforcement based alternative. ____________________________________________
  ____________________________________________
  ____________________________________________

  **Time out or Time away** involves removing a child from the opportunity to receive reinforcement. For example, if a child is engaging in disruptive behavior in a classroom or therapy setting, the therapist immediately moves the child to an area away from people, toys or any other potentially reinforcing objects or activities. The child is kept from the treatment environment where reinforcement is available until he or she has ceased the undesirable behavior.

  Time out can be a very effective procedure, but it is only effective when the time out environment is less reinforcing than the environment from which the child is removed (cf. Solnick, Rincover & Peterson, 1977). For example, moving the child from the classroom to the playroom will probably not be effective because the child may prefer to be in the playroom rather than in the classroom. In fact, the child might engage in the undesirable behavior just to get to the playroom. Remember, in some cases, a time away procedure may act to negatively reinforce the child. If a child acts up
when the therapist makes a request if the therapist using a time out procedure it will negatively reinforce the behavior of acting up. The child is reinforced by having the request removed as reported in the example of the self abusive boy by Carr et al. (1976).

When using consequences, the therapist must remember that an effective consequence may not always be obvious beforehand. A consequence is defined by the effect it has on the behavior and by no other condition or characteristic.

Exercise

- Parents often consequate their children’s inappropriate behavior by sending them to their room. This consequence often proves ineffective in reducing the behavior. Why do you think this is so? ________________________________
  __________________________________________________________________
  __________________________________________________________________
  __________________________________________________________________
  __________________________________________________________________

Manner of Presenting Consequences

The manner in which a consequence is delivered is as important as the type of consequence. There are four basic rules to follow when applying consequences (Schreibman & Koegel, 1981).

1. **The consequence must be contingent upon the behavior.** This means that to be effective a consequence must follow only the specific target behavior and must be presented *immediately* upon the behavior’s occurrence. Thus, in using candy to reinforce a child positively for saying “mama,” the therapist should be careful to present the candy immediately after the child says “mama” and not after other responses.

2. **The delivery must be consistent.** If a consequence is to be effective it must be presented in the same manner and contingent upon the same behavior each time. It is possible to “time out” or redirect some instances of a behavior while allowing the child to “get away” with the behavior on other occasions if the therapist becomes tired or preoccupied.
3. **The consequence must be delivered in an unambiguous manner.** The nature of the consequence must always be clear to the child. If the reinforcer is positive, it should be delivered in a positive fashion. If the child gives a correct response, the therapist should say “Good boy!” smile, present a piece of candy, and sound happy. Several positive cues are thus delivered. Even if the child is responding to only one cue, he will know it was positive. On the other hand, an example of an ambiguous positive consequence would be where the child has made several errors and finally responds correctly only to have the therapist feed him and angrily state “Well, it’s about time!” The food is positive but the affect and verbal statement are negative. Similarly, another ambiguous consequence would be one in which a punisher is delivered simultaneously with a sympathetic statement (e.g., “No, no, no, but I know you’re trying, you cutie, you”).

4. **The consequence should be easily discriminable.** The therapist must make the consequence obvious to the child. The best way to do this is to present the stimulus strongly and to minimize extraneous cues. For example, if the consequence “Good boy” is presented amid a running conversation, it is unlikely the child will discriminate it as a consequence. Again, this may be because of stimulus overselectivity. A good idea is to keep the consequence short, present it in a stronger tone than the regular conversation, and minimize other interactions at that time.

**Exercise**

- A therapist is working with a boy with a severe disability, Billy, who is being disruptive. He yanks her sweater and she sends him to the time away area. After his return, he does well for several minutes while working on some very difficult material. Billy becomes frustrated and again yanks the therapist’s sweater. Since he is doing well, the therapist decides to ignore the disruptive behavior. Within a few minutes, Billy is again yanking the therapist’s sweater.
1. What mistake has the therapist made here? __________________________
________________________________________________________________
________________________________________________________________

2. How would you have handled the situation? __________________________
________________________________________________________________
________________________________________________________________

Other Helpful Hints

There are some recently developed procedures that enhance the effectiveness of consequences in changing behavior.

Children with autism seem to remain motivated to work in a learning situation when the reinforcers are varied as opposed to constant across trials (Egel, 1980). That is, rather than using only raisins as positive reinforcers during a training session, it is better if the therapist mixes the reinforcers so the child gets a raisin on some trials and peanuts or cookies on other trials. How often the reinforcers should be varied is, of course, determined by the individual child. The therapist should soon develop a feel for how much variation produces the best results in each child.

Children with autism learn more effectively with stimulus-specific reinforcement (Litt & Schreibman, 1981). This procedure involves pairing a stimulus (e.g., red) with a reinforcer (e.g., potato chip). Thus, if a therapist were attempting to teach the child to discriminate the colors red and blue, stimulus-specific reinforcement would involve rewarding the child with a potato chip for each correct identification of the color red and piece of candy for every correct identification of the color blue. This procedure provides varied reinforcement (as described above) and allows the child to predict what reinforcer is forthcoming.

Another procedure involves the use of functional reinforcers (Koegel & Williams, 1980; Williams, Koegel & Egel, 1981). Functional relationships between the reinforcer and other portions of a trial make teaching especially effective. For example, Saunders and Sailor (1979) found that children acquired object labels for toys much faster when the toys were also used as the reinforcer. Similarly, Koegel and Williams (1980) found a functional relationship between the target behavior and the reinforcer.
For example, locating a reward inside a container is a more efficient way to teach a child to open the container than to hand the child a reward for opening an empty container. They also found that allowing the child to blow a pinwheel was an effective way to teach a child to produce a “wh” sound. Here the therapist structures the situation so the correct response is part of the sequence of obtaining the reinforcer. In another example, if the therapist is trying to teach a child to discriminate a red block from a blue block, the therapist could ask the child to “give me red” while a reinforcer (e.g., a potato chip) is under the red block. Thus, giving the therapist the correct stimulus is part of the sequence for the child to obtain the reward. Similarly, a child who likes to be tickled might be taught the correct response to “raise you arms.” When the child responds correctly, he or she receives a tickle under the arms. Thus, again, raising arms is a part of the sequences required for begin tickled under the arms.

Questions

- Name three types of consequences.
  1. ____________________________________________
  2. ____________________________________________
  3. ____________________________________________

- What are three types of consequences that reduce the strength of a behavior?
  1. ____________________________________________
  2. ____________________________________________
  3. ____________________________________________

- What are two consequences that increase the strength of a behavior?
  1. ____________________________________________
  2. ____________________________________________

- Name two important characteristics of the extinction procedure.
  1. ____________________________________________
  2. ____________________________________________
Which of the following is not a good way to present a consequence to a child with autism?

1. It should be contingent upon a behavior.
2. It should be presented in an unambiguous manner.
3. Smile encouragingly even though the child is incorrect.
4. Make sure the consequence stands out from other cues.
5. It should be consistent on the same behavior across trials.

Exercises

For the person with whom you are working, design a teaching situation using a stimulus-specific reinforcement.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Identify a functional reinforcer you might use with this person.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Inter-trial Interval (ITI)

A study by Koegel, Dunlap and Dyer (1980) showed that relatively short (approximately one second) inter-trial intervals (ITI’s) led to improved learning as compared to intervals that were relatively long (over four seconds). The inter-trial interval durations produced differential results in the percentage of correct responding of children with autism. The inter-trial interval was defined as the period between the termination of the verbal consequence (e.g., “good”) for one trial, and the onset of an instruction (e.g., “Say ‘ah’”) for the following trial. In certain instances with one child (who received primary reinforces, such as juice, in additional to verbal consequences),
the child continued to consume the reinforcer (swallow the juice) during the inter-trial interval. Consumption was always completed before introduction of the next instruction. The important point is that reinforcers that take a long time to consume tend to prolong intervals. Thus, pieces of hard candy or large mouthfuls of food should be avoided.

This is a very new area of research, and it is possible that for some children, or some tasks, long ITI's may be superior even though short ITI's now seem superior. The variables that influence a more precise determination of optimal ITI durations are numerous.

For example, children with autism often display mental ages (MA's) in the lower ranges, and are very distractible. In addition, many authors (e.g., Hingten & Bryson, 1972) have found that short-term memory impairments may contribute to the poor performance.

Similarly, optimal ITI duration may be related to the extent of off-task (e.g., self-stimulatory) behavior produced by particular children. With children known to display high rates of off-task behavior (e.g., most children with autism), it is possible that short ITI's may reduce the opportunity for such behaviors to occur (cf. Koegel & Covert, 1972; Risley, 1968). For some child/task combinations, the shorter ITI's produce a much lower level of self-stimulatory behavior.

Questions

- What length inter-trial interval is typically most effective?

- What are two considerations a therapist might employ when deciding upon the best inter-trial interval?
  1. 
  2. 
Exercise

- For a child you are working with, what length inter-trial interval do you think would be most appropriate? Why?

________________________________________________________________
________________________________________________________________

Generalization and Maintenance of Behavior Change

The procedures described so far are very useful in producing desired behavior changes in children with autism and other severe disabilities, but they are not enough. No matter how effective we may be in changing behavior, the treatment is of limited benefit if it does not lead to generalized behavior change. There are three types of generalization. **Stimulus generalization** is when a behavior taught in one situation (e.g., the classroom) is also performed in other situations (e.g., home, the park). **Response generalization** is when we teach one behavior (e.g., identify an item) and in doing so we cause other changes (e.g., requesting an item) as well. **Generalization over time, maintenance,** refers to the effects of treatment holding up over time. Each of these types of generalization is crucial for effective treatment.

**Stimulus Generalization**

Anyone who has worked with children with autism knows that they often fail to show stimulus generalization. A therapist can teach a child a behavior in a therapy room only to find that the child will not perform the behavior for another therapist or in another room. As one study (Rincover & Koegel, 1975) showed, children with autism may learn to respond to some idiosyncratic feature of the original teaching situation (e.g., teacher’s hand movement) and because this feature is not in other settings, the behavior does not generalize. To combat this problem, specific strategies have been developed. Those are described by Carr (1980) and Stokes & Baer (1977).

1. **Program Common Stimuli.** This strategy involves making sure that the original training setting and the new (generalization) setting contains common stimuli. If your goal is to have the children perform a behavior such as mathematics in a school setting, you should gradually teach the child to do
math in settings containing the stimuli he will encounter in a school setting. You should provide the instruction in a setting with desks, other children, and a blackboard, rather than only in a one-to-one situation in a therapy room. The one-to-one, therapy room situation has few stimuli in common with a classroom.

2. **Sequential Modification of Behavior.** This strategy requires taking the treatment procedure and applying it in all situations in which we want generalization to occur. Thus, if we want a child to touch his nose on command in school, at home, at the park, at his aunt’s house, we would train the child to do so in each of these environments. While this is not a very efficient procedure, it may be the only effective one for children whose generalization problems cannot be otherwise remediated.

3. **Training Multiple Exemplars.** This frequently used strategy involves programming generalization by training a behavior in the presence of a sufficient number of adults, or in a sufficient number of settings, or to a sufficient number of instructional stimuli until generalization is produced to untrained exemplars (i.e., other adults, settings, and instructional material). For example, Stokes, Baer, and Jackson (1974) found that after teaching a child with a disability to greet two adults, the child generalized this greeting to many other adults who had not been involved in the original training. Similarly, if you are trying to teach the concept of yellow, you would train the child to discriminate yellow versus another color object (e.g., block) and do so with new objects (cars, buttons, hats, etc.) until the child could immediately respond to the color yellow regardless of the type of object.

**Exercises**

- List three different settings and therapists that could be used with the person you are teaching.

<table>
<thead>
<tr>
<th>Settings</th>
<th>Therapists</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>
• If you are teaching appropriate table (dining) behaviors at school, how would you program common stimuli to maximize stimulus generalization to the home setting?

Response Generalization
Response Generalization occurs when, after the modification of one behavior, other behaviors that have not been trained also change. Obviously, a treatment would be very efficient if it modified a pivotal behavior that led to widespread behavior change. While we do not always know which specific behavior might be pivotal for a given child, and thus a good target for modification, we know from research which types of behavior change lead to more generalized improvements (Carr, 1980).

1. **Language**. Language is an excellent behavior to choose for modification because improvements in language are correlated with increases in I.Q. (Lovaas, Koegel, Simmons, & Long, 1973), decrease in self-stimulation (Carr, 1980) and reduction in aggressive behavior that may be due to an inability to express frustration (Carr, 1977). Being able to use language influences the way one deals with the environment.

2. **Imitation and Observational Learning**. While typical children learn by observing the behaviors of others, children with autism and other severe disabilities typically fail to imitate and do not benefit from this important source of learning. It has been demonstrated (Baer, Peterson, & Sherman, 1967; Lovaas, Freitag, Nelson, & Whalen, 1967) that teaching children with autism to imitate facilitates widespread behavior change. Training children with autism to learn by observing the behavior of others holds great promise for response generalization.

3. **Cooperation**. Teaching a child to comply with requests produces behaviors evoked by the requests and simultaneously competes with the emission of inappropriate behaviors (Carr, 1980). This also leads to widespread behavior change.
4. **Reduction of Problem Behavior.** Problem behaviors, such as self-stimulation, interfere with appropriate behavior (e.g., Koegel & Covert, 1972; Lovaas, Litrownik, & Mann, 1971). Thus reduction of self-stimulation results in improved discrimination learning (Koegel & Covert, 1972) and increased appropriate play (Koegel, Firestone, Kramme, & Dunlap, 1974). A therapist should reduce behaviors that are inappropriate, thus increasing the likelihood of appropriate behavior.

**Exercise**

- For the person you are teaching, identify two inappropriate behaviors that you should reduce and two appropriate behaviors that you should increase to increase response generalization.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Maintenance of Behavior Change**

Maintenance is the durability of treatment effects over time.

1. **Intermittent Reinforcement.** The most commonly used strategy to increase durability of treatment effects is to use an intermittent schedule of reinforcement. Suppose a therapist has trained a child to point to a dog when asked to do so. During the initial stage of training, the child is reinforced for every correct response. As the child becomes proficient at this task, the therapist gradually fades out the reinforcement until only every second or third response is reinforced; then every fifth or sixth; then every tenth, etc., until the child can go for several trials without reinforcement. Because the child has now learned that there will be many non-reinforced trials, it is likely that his behavior will be maintained in the typical real-life situation where the behavior is only intermittently reinforced. Thus a therapist should wean a child from a continuous to an intermittent schedule, which, in turn, will aid in the maintenance of the behavior.
2. **Teach Functional Behaviors.** Another strategy for improving maintenance is to teach the child behaviors that will be reinforced in the child’s natural environment. Teaching a child to say “I want” is a functional behavior because it will be consequated with the desired object or event. This teaches the child that language is a tool for acquiring reinforcers. Conversely, teaching a child to say “horse” will have little utility for the child outside the therapy setting and will probably not be maintained because the word “horse” will not prompt other people to provide reinforcers.

**Exercise**
- Give four examples of functional responses you might teach a child who is just learning to talk.
  1. _________________________________________
  2. _________________________________________
  3. _________________________________________
  4. _________________________________________

3. **Training others in the Child’s Environment.** Another way to promote maintenance of behavior change is to program other facets of the child’s environment. This involves ensuring that the child spends as much time as possible in a treatment environment. Parents, teachers, and siblings should all be trained to provide treatment contingencies to give the child an expanded therapy setting. Several studies show the effectiveness of parent training (e.g., Koegel, Schreibman, Britten, Burke, and O’Neill, 1981), and teacher training (Koegel et. al., 1977; Russo and Koegel, 1977).

**Questions**
- What are the three kinds of generalization?
  1. _________________________________________
  2. _________________________________________
  3. _________________________________________
- Training multiple exemplars is used to increase ______________________ generalization.
- The use of intermittent reinforcement is a strategy to increase

Exercises
- From your own experience identify an instance where a child’s behavior has not generalized. Can you tell why? Can you develop a program to increase generalization?
Final Exercise

For your child, design a final project. List the name of a target behavior, its definition, the method of measurement, the final intervention strategy, and the generalization and maintenance strategies you will use.

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
**Pivotal Response Treatment**

**Pivotal Response Treatment** (PRT) was designed by Koegel et al. and is an outgrowth of the procedures described in this manual. A good understanding of the procedures in this manual will help you implement and understand PRT. Pivotal areas (also known as pivotal behaviors & pivotal responses) are areas that, when targeted, seem to be central to wide areas of functioning. Positive changes in pivotal areas should have widespread positive effects on many other behaviors and therefore constitute an efficient way to produce generalized improvements in the behavior of children with autism. Thus far there are five pivotal areas that have been studied and addressed by PRT: motivation, responsivity to multiple cues, self-management, self-initiations and empathy. The following summarizes the key features to the PRT procedures:

1) To a large extent, tasks should be chosen and/or preferred by the child;
2) The question/instruction/opportunity should be clear, appropriate to the task, uninterrupted and presented when the child is attending;
3) The instruction/question should include multiple components, if developmentally appropriate;
4) Maintenance tasks (tasks the child can already perform) should be interspersed with acquisition (new) tasks.
5) Reinforcement must be immediate and contingent upon the behavior;
6) Any reasonable goal-directed attempt to respond to the question, instruction or opportunity that are clear and unambiguous should be reinforced;
7) The reinforcer should be functional and have a specific relationship to the desired behavior.
For further reading and information on this technique see the references listed below.

**Pivotal Response Treatment Resources**


See following link: to Dr. Koegel’s website
http://www.education.ucsb.edu/autism/teachingchildren.html
References


