OVERVIEW OF THE STAR PROGRAM

The STAR program is a comprehensive behavioral program for young children with autism. The program was designed to give teachers many of the instructional plans and some of the materials needed to implement the program as part of the child's Individualized Family Service Plan (IFSP) or Individualized Education Program (IEP).

Instructional Strategies That Meet Curriculum Needs

Curriculum needs of children with autism are extensively documented in the literature and summarized in the 2001 National Research Council report (Lord & McGee, 2001). The STAR program addresses many of the critical curriculum needs identified for young children with autism. The instructional strategies of discrete trial training, pivotal response training, and functional routines instruction have been identified by the literature as being effective with children with autism (Arick et al., 2003; Green, 2001; Koegel, 1995; Krug, Rosenblum, Almond, & Arick, 1981; Lord & McGee, 2001; Lovaas, 1981, 1987; Marcus, Schopler, & Lord, 2000). These instructional methods are incorporated into the STAR program and are described in detail in Table 1.1.

The STAR program uses applied behavioral analysis (ABA) methodology to provide an instructional base for teaching. The three behavioral instructional strategies are used in combination with specific appropriately matched curriculum content areas. This type of individualized curriculum approach was suggested by Prizant and Ruben (1999) and should address the needs of many children with autism. The STAR program provides teachers with a detailed curriculum based on this individualized approach. Lesson plans and materials teach each skill identified by the curriculum across six content areas. The curriculum content areas addressed by the STAR program are shown in Table 1.2.

Implementation

The STAR program is intended to be implemented initially through one-to-one instruction with a teacher or instructional assistant who has read and practiced the methods described in
The STAR Program

Discrete trial training (DT)
Skills are taught in a logical sequence building on previously learned skills. Concepts to be taught are identified and then broken down into specific elements for instruction. Each instructional session consists of a series of discrete trials. A discrete trial consists of a four-step sequence: (a) instructional cue, (b) child response, (c) consequence (generally a positive reinforcer), and (d) pause. Data are collected to monitor the child’s progress and to help determine when a pre-set criterion has been reached. Chapter 6 provides a detailed guide to implementation of the DT strategy. The STAR program includes DT lesson plans and data sheets to guide the specific implementation of this strategy to teach each appropriate skill. DT is used to teach receptive language concepts, preacademic concepts, and some expressive language concepts.


Pivotal response training (PRT)
PRT is also based on the four-step sequence: cue, child response, consequence, and pause. However, trials within PRT are incorporated into the environment in a functional context. During PRT the child chooses the activity or object, and the reinforcer is a natural consequence to the behavior being rewarded. The nature of this strategy makes it possible to engage the child throughout all activities and locations throughout the day. The STAR program also suggests the use of PRT sessions that incorporate massed trials. Chapter 7 provides PRT implementation information. PRT is primarily used by the STAR program to teach and generalize expressive language and play and social interaction skills.


Functional routines instruction (FR)
Functional routines are predictable events that involve a chain of behaviors. Routines are generally associated with a functional outcome for the child. Some common routines in which all children engage are using the restroom, arriving, and eating a snack. The functional outcome of a routine usually serves as the reinforcer for typically developing children. The STAR program provides the teacher with the necessary lessons to systematically teach children to independently participate in most common school and self-care routines. Chapter 8 provides implementation information for the FR strategy. The STAR program also provides the teacher with a system to integrate and generalize the use of skills taught in DT and PRT lessons.


this manual. As the child develops new skills, various aspects of the STAR program can be implemented with groups of children, and instruction may occur in the community preschool or general education classroom. The STAR program is designed for three instructional levels, Levels I, II, and III, to meet the various developmental and educational needs of children with autism, particularly those children who function below the third-grade level and are between the chronological ages of 2 and 12. Some of the lessons included in the STAR program are also appropriate for older children, but their use should be individually assessed to ensure that age-appropriate skills are being taught.
Introduction

• Expressive language
• Receptive language
• Spontaneous language
• Functional routines
• Preacademic skills
• Play and social interaction concepts

History of the STAR Program

The STAR program was developed by the authors through their hands-on work with children with autism since 1972. The book *Autism and Severely Handicapped in the Classroom* (1981) by Krug et al. documented some of the authors' early work. Arick, Loos, and Falco began working together in 1997 to provide consultation services to programs for children with autism in the Pacific Northwest. Many of the procedures described in the STAR program have been successfully used with more than 100 children in Oregon under the direction of the authors. A report completed by a county agency in Oregon evaluated the use of the curriculum methods and instructional strategies of the STAR program. The report monitored the progress of 25 children with autism from five classroom settings in which the authors provided consultation services. The report documents the progress made by these children over the 2001–2002 school year using the assessment methods described in an article by Arick et al. (2003). Children engaged in the STAR curriculum, on average, gained more than 1 month of language age for every month of instruction. In addition, their functional communication and social skills increased.

A more widespread study of the use of the STAR program was conducted as part of the Autism Outcome Study in the state of Oregon. Arick et al. (2003) described how teachers throughout the state of Oregon were provided training in the use of the STAR curriculum. The progress of 67 children with autism was monitored. That study showed that the majority of the children made significant progress in the areas of social interaction, expressive speech, and use of language concepts. In addition, they displayed significant decreases in behaviors associated with autism spectrum disorders.

The development of the STAR program has been guided by the national research on effective practices identified in the literature. The curriculum content and the instructional methods used in the STAR program are often described in the literature as effective with children with autism. Chapters 1 through 3 of this manual provide the background information and literature support for the STAR program.

Using This Manual

This manual provides basic information for understanding the STAR program and includes specific guidelines for implementing instruction. This chapter presents a general description of autism, learning characteristics described in research, and effective instructional strategies used in the STAR program. Chapter 2 provides an overview of the instructional methods for working with children with autism. Chapter 3 gives a detailed description of the curriculum and explains the use of the STAR materials. Chapter 4 details use of the Student Learning Profile,
a curriculum-based assessment provided with the STAR program. Chapter 5 provides a brief overview of basic behavioral principles and defines common behavioral terms used in this manual. Chapters 6, 7, and 8 describe in detail how to implement the three instructional strategies of discrete trial training, pivotal response training, and functional routines. These three chapters use a common 10-component system to instruct the reader. Chapter 9 provides specific guidelines for implementing a positive behavior plan, and Chapter 10 offers specific suggestions for putting it all together and implementing the STAR program in a variety of settings.

WHAT IS AUTISM?

Autism is a disorder that is present from very early in development. It affects essential human behaviors such as social interaction, communication of ideas and feelings, and development of relationships with others. Autism typically has life-long effects on an individual's ability to participate in the community (Lord & McGee, 2001). Because autism is a collection of behavioral symptoms, it is not identifiable as a specific disease (DeMyer, Hintgen, & Jackson, 1981) and is best characterized as a spectrum of disorders, or an autism spectrum disorder (ASD). ASDs include not only classical autism but also related disorders, such as Asperger's disorder. Although biochemical and structural abnormalities are identifiable in many individuals with autism, no cause of autism is yet known, and many researchers believe that various factors combine to cause autism (Nash, 2002).

ASDs include diverse syndromes, but some characteristics tend to appear in the majority of individuals with autism. These characteristics include the following:

- Disturbances in the rate of appearance of social and language skills
- Abnormal responses to sensations such as sight, hearing, touch, balance, smell, taste, and reaction to pain
- Abnormal ways of relating to people, objects, and desires
- Interference with normal development in the areas of reasoning, social interaction, and communication skills
- Deficiencies in verbal and nonverbal communication, social interactions, and leisure or play activities
- Difficulty communicating with others and relating to the outside world
- Unusual responses to people (e.g., repeated body movements such as hand flapping or rocking) or attachments to objects
- Resistance to any changes in routines
- In some cases, aggressive or self-injurious behavior

Table 1.3 shows the major characteristics of children with autism. Although all children with autism do not have the same characteristics, some of these characteristics are present in most children with autism.

Several assessment instruments have been developed and standardized to assist in the diagnosis of autism. The *Autism Screening Instrument for Educational Planning–Second Edition* (ASIEP–2) is one of these instruments (Krug, Arick, & Almond, 1993). However, the ASIEP–2 not only helps with diagnosis: Several subtests of the ASIEP–2 help monitor the progress of young children with autism over time (Frye & Walker, 1998). The ASIEP–2 subtests have been shown to have reliability and validity with this population of children (Olmi, 1998). An autism spectrum disorder outcome study conducted in Oregon (Arick et al., 2003) is a good example of progress monitoring using the ASIEP–2. In this study, students with autism were followed intensely for more than 3 years. One nationally standardized subtest of
The ASIEP-2 is called the Autism Behavior Checklist (Krug et al., 1993). Table 1.4 shows the 16 items from the Autism Behavior Checklist that have been found to effectively discriminate autism from other disabilities.

Although autism may sometimes be difficult to diagnose, experienced professionals who use such instruments as the ASIEP-2 and who work closely with parents and caregivers are able to identify and make reliable diagnoses (Bagnato, Neisworth, & Munson, 1997). The results of almost 50 years of national and international research, educational interventions, and our own observations have led to four conclusions: (a) autism is generally a lifelong condition; (b) autism is a biologically based trauma and is not caused by the parents; (c) autism has multiple causes, yet no causes have been scientifically isolated and confirmed; and (d) many education and treatment programs are effective—some are very effective with certain individuals—and dramatic gains have repeatedly been demonstrated when these quality programs are used (McEachin, Smith, & Lovaas, 1993; Nash, 2002).

Ongoing and future research will indicate more about the effectiveness of a variety of interventions, but the work of practitioners and researchers over the past 50 years has demonstrated that ABA provides an effective set of principles for teaching students who have autism spectrum disorder (Koegel, Koegel, Harower, & Carter, 1999; Lovaas, 1987; Schreibman, 2000). However, the technology of ABA provides instructional techniques, not a curriculum for working with children with autism.
The STAR Program

**TABLE 1.4** Common Behavioral Characteristics of Children with Autism

<table>
<thead>
<tr>
<th>Category</th>
<th>Behavioral characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory</td>
<td>1. Sometimes painful stimuli such as bruises, cuts, and injections evoke no reaction.</td>
</tr>
<tr>
<td></td>
<td>2. Child covers ears at many sounds.</td>
</tr>
<tr>
<td></td>
<td>3. Child stares into space for long periods of time.</td>
</tr>
<tr>
<td>Relating</td>
<td>4. Child frequently does not attend to social or environmental stimuli.</td>
</tr>
<tr>
<td></td>
<td>5. Child resists being touched or held.</td>
</tr>
<tr>
<td></td>
<td>6. Child has not developed any friendships.</td>
</tr>
<tr>
<td></td>
<td>7. Child &quot;looks through&quot; people.</td>
</tr>
<tr>
<td>Body and object use</td>
<td>8. Child darts about, spins, walks on toes, flaps hands, and so on.</td>
</tr>
<tr>
<td></td>
<td>10. Child twirls, spins, and bangs objects a lot.</td>
</tr>
<tr>
<td></td>
<td>11. Child gets involved in complicated rituals such as lining things up.</td>
</tr>
<tr>
<td>Language</td>
<td>12. Speech is atonal and arrhythmic.</td>
</tr>
<tr>
<td></td>
<td>13. Child echoes questions or statements made by others.</td>
</tr>
<tr>
<td>Social and self-help</td>
<td>14. Child has special abilities that seem to rule out mental retardation.</td>
</tr>
<tr>
<td></td>
<td>15. Child engages in severe temper tantrums or frequent minor tantrums.</td>
</tr>
<tr>
<td></td>
<td>16. Child prefers to manipulate and be occupied with inanimate things.</td>
</tr>
</tbody>
</table>


ABA refers to the basic theories of behavior developed by Watson (1913), Thorndike (1921), Skinner (1938), and others. In the 1960s, these theories were refined into a general method of instruction for individuals with autism (Baer, Wolf, & Risley, 1968). The general teaching methods based on ABA include the research-based instructional strategies used in the STAR program: discrete trial training, pivotal response training, and functional routines instruction.

The ABA process includes conducting a baseline assessment, implementing a behavioral intervention such as discrete trial training or pivotal response training, collecting ongoing data during intervention, making intervention changes based on data collected, reassessing the effect on the target behavior, generalizing the application of the target behavior, and repeating the process as necessary (Baer et al., 1968; Green, 2001).

Initially, most ABA applications were experimental studies with an empirical research orientation. Emphasis was placed on careful data collection so the effectiveness of intervention approaches could be supported or refuted by data analysis. Most of this early research focused on the elimination of problem behaviors (Carr et al., 1999; Schroeder, Bickel, & Richmond, 1986). Educators today use these ABA strategies with children with autism. When used in combination with an appropriate curriculum sequence, these strategies can provide a powerful tool for enabling children with autism to meet important educational goals. Often an important missing link in the field of special education is a comprehensive, researched-based curriculum that includes the full range of instructional and behavioral techniques available to the educator. The STAR program provides that range.
LEARNING CHARACTERISTICS OF CHILDREN WITH AUTISM SPECTRUM DISORDER

In the behavioral view, autism is a syndrome of behavioral deficits and excesses that have a biological basis but can be changed through structured interactions with the environment. A combination of ABA intervention techniques can provide multiple planned opportunities for the learner to develop and practice skills so learning can occur and be generalized to a variety of environments. ABA provides a powerful technology of instruction. Precision in the instructional process and intervention procedures is required to meet the challenge of effectively teaching children with autism. The STAR program uses a planned combination of ABA techniques and appropriate curriculum content to provide an individualized educational program for young children with autism. The effectiveness of the program is monitored using daily data and standardized measures. Data from these measures are used to make ongoing programming decisions. The need for this type of program can be shown by reviewing learning characteristics of children with autism.

A particularly challenging learning characteristic of children with autism is the failure to make critical discriminations when exposed to new learning. For instance, problems with auditory discrimination can make it difficult for the child to connect words to objects and people. This difficulty is sometimes present when the child performs very simple auditory or visual discriminations. Because of this learning characteristic, most behavior-analytic curricula developed since the 1960s have included techniques for teaching learners with autism to discriminate among various types of stimuli. These techniques include such discrimination teaching methods as match-to-sample trials, use of a distractor stimulus, extra-stimulus prompting, and within-stimulus prompting (Arick & Krug, 1978; Green, 2001; Shreibman, 1975). Discrimination teaching procedures are commonly used in the STAR discrete trial programs to teach learners with autism to discriminate both visual and auditory stimuli. Through this process the discrete trial programs teach the child to associate words with objects, people, actions, and events. Although various ABA paradigms (e.g., discrete trial training, pivotal response training) can be used to deliver antecedents and consequences, and most have discrimination learning as an element of their methodology, it is primarily discrete trial training that focuses on this aspect of learning. The STAR program focuses on discrimination issues through discrete trial training strategies, which (a) carefully present stimuli in a systematic manner and with planned repetition; (b) provide a planned process for teaching the relationship of words to functional objects, people, and other important concepts; and (c) use systematic visual stimuli to help teach important functional auditory discriminations.

A second and fundamental core learning deficit that is exhibited by children with autism and specifically impedes language development is joint attention deficit (Mundy, Sigman, & Kasari, 1990; Stone, Ousley, Yoder, Hogan, & Hepburn, 1997; Wetherby, Prizant, & Hutchinson, 1998). Joint attention is the ability to coordinate attention between people and objects. It involves advanced gesturing such as showing, waving, and pointing. Children with autism who have deficits in joint attention have difficulty coordinating attention between people and objects, orienting and attending, and following the gaze and pointing gesture of another person. Acquiring gestural joint attention appears to be a critical developmental milestone in early normal language development and has been found to be a common deficit in preschool children with autism (Mundy et al., 1990). The STAR program addresses these issues by using pivotal response training and functional routine strategies to teach children to use language in naturalistic settings and to teach joint play activities. Using these strategies, children develop understanding of the relationship between people and objects and how to interact with others.

Another learning characteristic that is apparent in children with autism is their difficulty in generalizing newly learned skills. Discrete trial training has been used to teach new skills. This could be called acquisition learning. In many cases when a new skill, such as matching
colors, is learned in discrete trial training, the skill may not be used functionally by the child without planning for generalization and teaching the child to use this skill within a variety of contexts. Generalization of skills has been identified by many researchers as an important consideration in designing any instruction for children with autism (Prizant & Wetherby, 1998; Smith, 2001). Smith indicated that incidental teaching and other instructional approaches may be more effective than discrete trial training for helping children transfer skills to new settings. He also noted that incidental teaching approaches and discrete trial training often complement each other. The STAR program uses several methods to teach the generalization of skills. First, the discrete trial lessons teach functional skills that can be used in multiple settings. Second, each new skill learned is practiced in a more student-directed setting using pivotal response training. Third, newly learned skills are taught during the student's normal activities by embedding the skills into functional routines.

INSTRUCTIONAL STRATEGIES THAT WORK WITH CHILDREN WITH AUTISM

The STAR program uses a combination of instructional approaches (see Chapter 2 of this manual) that work together with the six curriculum areas (see Chapter 3 of this manual) to provide the student with an individualized educational program. As described earlier, the three primary instructional strategies used by the STAR program are discrete trial training (see Chapter 6 of this manual), pivotal response training (see Chapter 7 of this manual), and functional routines instruction (see Chapter 8 of this manual).

All of these methods use the ABA approach. However, each of these instructional methods has a slightly different presentation style and matches up to slightly different curriculum areas. These methods were selected for use in the STAR program for several reasons. First, research-based evidence supports each method's effectiveness. On the basis of a review of the research literature about the use of instructional approaches with children with autism, Prizant and Rubin (1999) suggested that research supports three conclusions:

1. Research has supported the effectiveness of a range of approaches that differ in both underlying philosophy and practice.
2. No evidence exists that any one approach is more effective than others.
3. No one approach is equally effective for all children. Not all children in outcome studies have benefited to the same degree from a specific approach.

Prizant and Rubin (1999) listed five tenets of practice that must be addressed in intervention approaches for young children with ASD. The instructional strategies used in the STAR program meet the basic premise of these five tenets. These tenets and how they relate to the instructional and curriculum approaches of the STAR program are shown in Table 1.5.

A major contribution of ABA has been the large number of interventions derived from its procedures over the past 50 years. The foundation of behavioral principles established by the ABA model include attention to motivation; systematic task analyses; generalized techniques for building new skills through prompting, shaping, chaining, and fading; and strategies of self-management (Green, 2001; Schreibman, 2000). Important instructional systems that are based on these principles of ABA include the three primary instructional techniques used in the STAR program: discrete trial training, pivotal response training, and functional routines instruction.
### TABLE 1.5 Tenets of Effective Practice

<table>
<thead>
<tr>
<th>Tenets of effective practice</th>
<th>How the STAR program relates to this perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Intervention approaches should be individualized to match a child's current developmental level and his or her profile of learning strengths and weaknesses.</td>
<td>Both instructional strategies and curriculum content in the STAR program can be individualized to meet the student's current level of performance and learning characteristics.</td>
</tr>
<tr>
<td>2. Intervention for young children should be based on current knowledge of child development.</td>
<td>The curriculum content of the STAR program is based on developmentally appropriate communication and social skills. All lessons are designed for young children with autism and are age appropriate.</td>
</tr>
<tr>
<td>3. An intervention approach should directly address the predominant core characteristics of autism spectrum disorders (ASD).</td>
<td>The curriculum areas addressed by the STAR program match up with the core characteristics needed for ASD students. The instructional approaches use methods appropriate for ASD learning characteristics.</td>
</tr>
<tr>
<td>4. Intervention approaches should demonstrate a logical consistency with their long-term goals and teaching protocols.</td>
<td>Each lesson in the STAR program builds on the previous lesson, and all lessons are functional and lead to more independent, spontaneous student performance. The instructional strategies are designed to provide for teaching generalization.</td>
</tr>
<tr>
<td>5. Intervention approaches should be derived from a range of sources.</td>
<td>The instructional strategies used in the STAR program are derived from three very different sources. However, all three approaches are grounded in the applied behavioral analysis methodology, and their effectiveness has been reported in previous research (see Table 1.1).</td>
</tr>
</tbody>
</table>