Communication and Language Intervention Series

Treatment of Autism Spectrum Disorders

Evidence-Based Intervention Strategies for Communication and Social Interactions

edited by

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Introduction to *Treatment of Autism Spectrum Disorders*

Patricia A. Prelock and Rebecca J. McCauley

This book is intended to introduce readers who are familiar with **autism spectrum disorders** (ASDs) and their core impairments to a group of interventions focused on communication and social interaction. Because ASDs represent a range of deficits in social interaction, verbal and nonverbal communication, and behavior, it is important to consider evidence-based interventions that address these core deficits. Therefore, the interventions selected for review in this book emphasize both established and emerging methods that are frequently used to support the communication and social interaction of individuals typically diagnosed with autism, Asperger syndrome, and pervasive developmental disorder-not otherwise specified (PDD-NOS).

BACKGROUND ON INTERVENTION STRATEGIES FOR COMMUNICATION AND SOCIAL INTERACTION

Over the last 15 years, thinking has evolved about which intervention approaches are most appropriate for supporting the social interaction and communication needs of children with ASDs. Although **traditional behavioral interventions** are well represented in the literature (e.g., Cooper, Heron, & Heward, 2007) and tremendously influential in a variety of settings (Downs, Downs, Johansen, & Fossum, 2007; Lafasakis & Sturmey, 2007; Taubman et al., 2001), **social-pragmatic developmental interventions** are gaining traction, at least in part because they emphasize opportunities for people with ASDs to establish positive social connections and generalize their skills in the natural environment. Interest in these approaches has also arisen in response to limitations identified in traditional behavioral approaches to ASDs, specifically in terms of generalization of targeted behaviors, particularly those related to the social use of communication and language (Wetherby & Woods, 2006, 2008). Social-pragmatic developmental interventions are the primary focus of this book because they offer a special promise in addressing communication and social interaction challenges at the core of ASDs and have the potential to minimize barriers to the functional application of learning.

In the traditional behavioral approach, skills are taught one to one with a predetermined correct response (Karsten & Carr, 2009; Newman, Reinecke, & Ramos, 2009; Prelock & Nelson, 2011) and a highly prescribed teaching structure, such as that characterized by discrete trial instruction (Cooper et al., 2007). In contrast, in a social-pragmatic developmental approach, the interventionist follows the child's lead, fosters initiation and spontaneity, and reinforces contingent responses. Similar strategies have been implemented for more than 15 years as part of naturalistic communication and language interventions for children with a variety of communication and language challenges (Girolametto, Pearce, & Weitzman, 1996; Kaiser, Hancock, & Nietfeld, 2000; Kaiser & Hester, 1994) and have, in the last 10 years, been elaborated upon and modified to address the special challenges presented by ASDs.

Several of the interventions described in this book capitalize on the value of combining the best aspects of behavioral and developmental approaches to achieve functional and relevant social and communicative outcomes for children, adolescents, and adults with ASDs. For example, Prizant and Wetherby (1998) recognized the contributions of both traditional behavioral approaches to intervention and older developmental ones and proposed middle-ground **contemporary behavioral interventions** to support the communication and social interaction needs of children with ASDs. In particular, they described the value of giving children choices, sharing teaching opportunities between the interventionist and the child, and using preferred activities and materials—strategies that characterize Pivotal Response Training (Koegel, Koegel, Harrower, & Carter, 1999; Koegel, Koegel, Shoshan, & McNerney, 1999).

As intervention approaches have evolved, so too have comprehensive guidelines for best practices. In 2001, the National Research Council (NRC) offered a description of best practices for children with ASDs through the early childhood years. A number of intervention guidelines emerged from the NRC's comprehensive review of the literature, including

- Initiating treatment as soon as possible
- Ensuring active engagement during intensive instruction
- Using developmentally appropriate, goal-based, systematically planned activities
- Implementing planned teaching opportunities throughout the day
- Involving families and peers in the intervention to facilitate generalized skill learning

Many early intervention programs have used these best practices to design comprehensive educational programs for young children with ASDs.

As a follow-up to the NRC's work (National Research Council, 2001), Iovannone, Dunlap, and Kincaid (2003) proposed six educational practices as appropriate and effective for school-age children with ASDs. These practices included

- Providing individualized supports and services that match a student's profile, as defined through the individualized education program process
- Offering systematic, carefully planned, and defined instructional procedures to achieve valid goals, with a process for measuring outcomes
- Creating a structured learning environment

- Adding specialized curriculum content in the areas of social engagement and recreation and leisure skills
- Defining a functional approach to problem behaviors
- Engaging the family in the student's educational success

In spite of these defined best practices, challenges remained in determining the most effective instructional procedures for children of varying ages, language abilities, and cognitive levels with diagnoses of autism and subthreshold diagnoses, such as Asperger syndrome and PDD-NOS.

In 2009, to address the gaps in the intervention effectiveness literature for the large, heterogeneous group of children with ASDs, the National Autism Center (NAC) released the report of its National Standards Project, a comprehensive review of 775 intervention studies conducted from 1957 to 2007. Overall, behavioral treatments were identified as having the strongest support, and nonbehavioral approaches were identified as making a significant contribution but requiring more research. In its review, the NAC categorized the level of evidence for several interventions typically used in the treatment of individuals with ASDs. The interventions fell into one of four categories: established, emerging, unestablished, and ineffective/harmful. Table 1.1 lists the 12 interventions included in this book according to their level of evidence at the time of the report's publication (NAC, 2009).

Established treatments were those identified with sufficient evidence leading to positive outcomes. Emerging treatments were those with one or more studies yielding positive outcomes but for which study quality and results were inconsistent. Unestablished treatments offered little evidence and required additional research (e.g., academic interventions, auditory integration training, sensory integration package). No treatments were judged to be ineffective or harmful. The interventions described in this book fall primarily within the top two categories of evidence—established and emerging. Using the National Standards Project as a guide for evidence-based practice with children and youth affected by ASDs, this timely book emphasizes key established and emerging interventions used to facilitate the communication and social interaction of individuals with ASDs.

PURPOSE OF THIS BOOK

This book describes and critically analyzes specific treatment approaches used to address the communication and social interaction challenges of children, adolescents, and adults with ASDs. Although these challenges are of specific interest to speech-language pathologists, providers across disciplines have a stake in using evidence-based intervention to respond to these core areas of impairment for individuals with ASDs. Each approach in this book was selected for inclusion because of empirical evidence of its efficacy as established by systematic review or by the presence of at least two peer-reviewed articles indicating that the approach is a well established and probably efficacious or promising emerging intervention (e.g., Chambless et al., 1998; Chorpita et al., 2002; NAC, 2009).

Traditionally, randomized control trials have been considered the gold standard for evaluating treatment efficacy. However, such trials are rare in many clinical fields, including treatment for autism. Single-subject experimental designs have provided the majority of credible evidence in the intervention research in autism (Odom et al.,

Table 1.1. Levels of evidence for interventions included in this book, based on the National Standards Project

Level of evidence	Level description	Chapter in book	Intervention
Established (11 interventions identified[a])	Sufficient evidence that the intervention leads to positive outcomes	4	Discrete trial instruction
		6	Functional communication training
		7	Joint attention intervention
		8	Enhanced milieu teaching
		9	Early Social Interaction Project
		10	Peer mediation
		12	Pivotal Response Treatment
		13	Social Stories™
		14	Video modeling
Emerging (22 interventions identified)	One or more studies yielding positive outcomes, but study quality and results are inconsistent	3	Augmentative and alternative communication
		5	Developmental, Individual-Difference, Relationship-Based (DIR) Model/Floortime
		11	Picture Exchange Communication System (PECS)
Unestablished (five interventions identified)	Little evidence available; requiring additional research	—	—
Ineffective/harmful (no interventions identified)	Interventions that have been studied and found to be ineffective or to have negative outcomes	—	—

From National Autism Center (2009). *National Standards Project—findings and conclusions: Addressing the needs for evidence-based practice guidelines for autism spectrum disorders*. Randolph, MA: Author; adapted by permission.

[a]Number of interventions as identified in National Standards Project report. Only selected interventions are discussed in this book.

2003), yet they are underacknowledged in evaluating treatment efficacy (Barlow, Nock, & Hersen, 2009; Perdices & Tate, 2009). Single-subject designs make important contributions to the research on treatment when they are replicated across behaviors, participants, and contexts; measure change reliably and systematically; have established implementation fidelity; and are socially valid. In fact, results from many single-subject designs indicate that specific interventions are associated with positive learning outcomes for individuals with ASDs (Lord et al., 2005). Therefore, the effectiveness of the treatments included in this book has been established primarily through single-subject experimental designs.

To facilitate the reader's understanding of the similarities and differences among the interventions in this book—in terms of basic principles, techniques, teaching methods, treatment targets, and ages for which evidence has been established—a summary table has been provided (see Table 1.2). This table also identifies the evidence rating provided by the NAC (2009) for each of the included interventions.

Table 1.2. Characteristics of each intervention reviewed in the book

Intervention	National Standards Project rating[a]	Basic principles	Methods	Targets	Ages
Augmentative and alternative communication (AAC) strategies (Chapter 3)	Emerging	Social-pragmatic	Assessment of partner and environmental influence AAC system and target vocabulary selection Meaningful contexts Responsive partners Natural environment Family- and person-centered	Enhancement of existing communication skills Expanded language Substitute for inadequate speech Structure to support language development	Toddler through adult
Discrete trial instruction (Chapter 4)	Established	Behavioral	Adult-directed Individualized one-to-one instruction Predetermined correct responses Contingent or differential reinforcement Shaping behaviors Operant conditioning Massed trials Maintenance trials Mand-model techniques	Communication, social, and adaptive skills Use of verbal operants (e.g., mands, tacts, echoics, intraverbals)	3–21 years
Developmental, Individual-Difference, Relationship-Based (DIR) Model/Floortime (Chapter 5)	Emerging	Developmental	Family-based Child-directed Interpersonal development Individual differences Caregiver–child relationships Parent- and clinician-implemented	Shared attention and regulation Engagement and relating Two-way intentional communication Complex problem-solving Creative representations and elaboration Representational and emotional thinking	18 months to 9 years
Functional communication training (Chapter 6)	Established	Behavioral	Functional behavioral assessment Selection of an alternative behavior Fading prompts Response match, success, efficiency, acceptability, recognizability, and milieu Natural communities of reinforcement	Replacement of aggression, self-injury, elopement, and inappropriate sexual behavior with functional communication forms	3–21 years

(continued)

Table 1.2. *(continued)*

Intervention	National Standards Project rating[a]	Basic principles	Methods	Targets	Ages
Joint attention intervention (Chapter 7)	Established	Behavioral and developmental	Directed instruction Individualized Intensive Milieu teaching Parent- and clinician-implemented	Response to and spontaneous initiation of joint attention	3–5 years
Enhanced milieu teaching (Chapter 8)	Established	Behavioral and developmental	Environmental arrangement Responsive interaction Language modeling Milieu teaching Parent- and clinician-implemented	Productive, spontaneous, and meaningful use of new language forms Initiations and responses	3–9 years
Early Social Interaction Project (Chapter 9)	Established	Developmental	Family-based Child directed Environmental arrangement Responsive interactions Preferred activities and materials Routine-based Natural environment	Social communication from preverbal to multiword stage Gesture use Initiation of and response to joint attention Word knowledge Reciprocity	18 months to 3 years
Peer mediation (Chapter 10)	Established	Behavioral	Peer interaction training Peer network strategies Regular opportunities to interact within and outside instructional settings Adult coaching, guidance, and support Inclusive environment Communities of reinforcement Instructional arrangements (e.g., co-operative groups, peer support arrangements)	Initiating and maintaining conversation Exchanging compliments Taking turns Helping behaviors Sharing materials Collaborating on assignments Making introductions Conversing about shared interests	3–14 years
Picture Exchange Communication System (PECS) (Chapter 11)	Emerging	Behavioral	Systematic teaching Time delay Direct, natural reinforcement Shaping Modeling Prompting Visually based	Spontaneous initiation of requests Requests for reinforcing items/activities, help, break Rejecting offers for undesired items or activities Affirming offers for desired items or activities Following a direction to wait Responding to directions Following transitional cues and visual schedules	3–17 years

Pivotal Response Treatment (Chapter 12)	Established	Behavioral and developmental	Play-based Family-based Natural environment Routine-based Child choice Taking turns Shared control of teaching opportunities Direct and natural reinforcement Reinforcing communication attempts Preferred activities and materials Interspersing maintenance tasks within teaching sessions	First words Basic social skills Sophisticated language and social skills Pivotal behaviors (e.g., motivation, responsivity to multiple cues, self-management, self-initiations)	3–9 years
Social Stories™ (Chapter 13)	Established	Social-pragmatic	Visually based Situation-specific Individualized instructional strategy (e.g., determine topic, gather information, develop the story, consider additional supports, critical review, introduce story, generalization training, maintenance, fading)	Reduction of disruptive behaviors (e.g., tantrums, aggression, self-injurious acts) Establish routines Introduce changes in routines Understanding of a new or unfamiliar event Social skills (e.g., getting a peer's attention, making choices, playing independently, peer engagement, participation) Communication (e.g., reduction of echolalia, interrupting, loud talking)	6–14 years
Video modeling (Chapter 14)	Established	Behavioral and developmental	Visually based Viewing positive video models Adult and peer modeling Point-of-view modeling Self-modeling, including feed forward and positive self-review	Teach new skills or improve existing skills across developmental domains (e.g., self-help skills: dressing, feeding, washing) Cognitive skills (e.g., play, perspective-taking, attention) Social skills (e.g., conversation, prosody, taking turns) Language skills (e.g., question asking and answering, greeting, comprehending stories) Replace or extinguish maladaptive behavior	3–18 years

[a]From National Autism Center (2009). *National Standards Project—findings and conclusions: Addressing the needs for evidence-based practice guidelines for autism spectrum disorders*. Randolph, MA: Author; adapted by permission.

Each chapter in this book focuses on one treatment. To make the treatments more accessible to the reader and to facilitate their comparison, the chapters have been standardized using a structure similar to the one used in McCauley and Fey (2006), in which critical features of each treatment are consistently highlighted across chapters. Treatments in several of the chapters are illustrated in short videos provided on an accompanying DVD.

If a chapter offers a video example, a DVD icon appears next to the chapter title in the table of contents.

The interventions emphasize somewhat different principles, techniques, and teaching methods to foster communication and social development in children, adolescents, and adults with ASDs; therefore, there is not one "best" approach for all individuals. Instead, there are profiles of individuals with ASDs who are likely to benefit most from each intervention, as guided by the evidence. Early and intensive structured intervention and a collaborative approach to working in home, educational, and community settings appear to be critical features of effective treatment. Also emphasized is the importance of addressing the core impairments of social interaction and communication.

HOW TREATMENTS ARE DESCRIBED

As previously mentioned, each chapter in this book follows a consistent structure (see Table 1.3). Each chapter begins with a brief introduction in which the authors summarize the treatment and define the subgroups of individuals with ASDs for whom the treatment is designed. The authors also detail the age, developmental level, language level, and service delivery model the treatment entails, including the treatment's basic focus and methods. In describing the subgroups for whom the intervention is appropriate, the authors consider not only the specific diagnoses (i.e., autistic spectrum disorder, Asperger syndrome, PDD-NOS, Rett syndrome, childhood disintegrative disorder) but also the individual's level of verbal skills and cognitive abilities. Assessment methods used to establish the appropriateness of the treatment for an individual child, adolescent, or adult with an ASD are also presented.

The next section of each chapter provides the theoretical basis for the treatment approach. Here, the authors discuss four main components. The first component is the theoretical rationale for the treatment. The second component is the underlying assumptions regarding the nature of the communication and social interaction impairment being addressed by the treatment. The third component is the functional outcomes or desired consequences being addressed (e.g., increasing joint attention, facilitating social interaction, fostering communication, increasing symbol use). The final component is the treatment target (e.g., language or social functioning).

In the next section of each chapter, the authors summarize and interpret research studies that provide the evidence supporting use of the treatment. When possible, the authors distinguish among exploratory studies (e.g., observational or feasibility studies), efficacy studies (i.e., studies illustrating the usefulness of the treatment under conditions allowing for greater experimental control), and studies of effectiveness (i.e., studies illustrating the treatment's usefulness under the conditions of everyday practice) (Fey & Finestack, 2009; Olswang, 1998; Robey & Schultz,

Table 1.3. Description of content associated with chapter sections in this book

Section	Content
Introduction	Overview of the intervention, including the specific individuals for which it is designed, identified by age (i.e., infants/toddlers, children, adolescents, adults), developmental level, and language level. The service delivery model involved, the intervention's basic focus, and its primary methods are highlighted.
Target populations and assessments for determining treatment relevance and goals	Description of the subgroups on the autism spectrum (i.e., autistic disorder, Asperger syndrome, pervasive developmental disorder-not otherwise specified, Rett syndrome, childhood disintegrative disorder) for whom the intervention is primarily designed and for whom there is empirical support for its use. Addresses levels of verbal skills and cognitive abilities, and assessment methods used to establish the appropriateness of the treatment for an individual child, adolescent, or adult with an autism spectrum disorder (ASD).
Theoretical basis	Description of the dominant theoretical rationale for the treatment approach. Covers the underlying assumptions regarding the nature of the communication and social interaction impairment being addressed by the treatment, the functional outcomes being addressed, and the area of treatment being targeted.
Empirical basis	Comprehensive summary and interpretation of studies providing evidence that supports the use of the intervention. Describes the experimental design and treatment effects for both group and single-subject research, the nature of outcome data reported (e.g., standardized testing versus naturalistic probes), intervention fidelity, maintenance and generalization of treatment effects, and social validity.
Practical requirements	Description of the time and personnel demands for the primary clinician and other participants. Addresses whether or not a team approach is used, what training is required of personnel involved, and what materials are required.
Key components	Description of the goals addressed by the intervention, how multiple goals are addressed over time (sequentially, simultaneously, cyclically), the activities used to address the goals, and the participants beyond the clinician and child who are involved in the intervention (e.g., peers, siblings, teachers, primary caregivers).
Data collection to support decision making	Description of the data collection procedures used to make decisions within the intervention method, such as how data are collected, ways to evaluate progress, strategies for determining when and how adjustments should be made, and when to end the intervention approach.
Considerations for children from culturally and linguistically diverse backgrounds	Discussion of the applicability of the intervention approach to children from linguistically and culturally diverse backgrounds and of the ways in which the intervention might be modified to be more appropriate.
Application to a child	A description of a real or hypothetical case of a child that illustrates the implementation and effectiveness of the treatment.
Application to an adolescent or adult	A description of a real or hypothetical case of an adolescent or adult that illustrates the implementation and effectiveness of the treatment.
Future directions	Discussion of additional research needed to advance the refinement or ongoing validation of the intervention approach across populations of individuals with ASDs and related neurodevelopmental disabilities.
Suggested readings	Summary of a few readings of greatest use to readers who might want to know more about the specific intervention.
Learning activities	Topics for further discussion, ideas for projects, questions to test comprehension of the reading material, and possible writing assignments to facilitate the readers' learning.

1998). In many of the chapters, the authors provide tables that summarize key research examining the intervention. These tables highlight the following aspects:

- Participant characteristics (e.g., age, diagnoses, sample size), the experimental design, the treatment effects for both group and single-subject research
- Nature of the outcome data reported (e.g., standardized testing versus naturalistic probes)
- Intervention fidelity
- Maintenance and generalization of treatment effects
- Social validity

When possible, effect sizes are reported as originally published; otherwise, they were computed by the authors when means and standard deviations were provided.

To support practitioners' use of an intervention in their specific settings, the authors outline, in the next section of the chapter, practical requirements for implementing the treatment. They discuss time demands, training or expertise required by clinicians wishing to use the intervention, and any materials or equipment needed.

These practical requirements are followed by a description of the key components of the intervention approach. The goal of this section is to ensure that the reader has a strong preliminary understanding of the procedures. The authors provide information about the nature of the goals addressed by the intervention, how multiple goals are addressed over time (e.g., sequentially, simultaneously, cyclically), a procedural or operational description of activities within which the goals are addressed, and the nature of involvement of participants beyond the clinician and child (e.g., peers, siblings, teachers, primary caregivers). Several of the authors also reference training manuals that can be used to support a more thorough understanding of the procedures involved in the intervention they describe.

Recognizing the critical role of data in guiding practice, the authors next describe methods of collecting data to support decision making. The authors detail how data may be collected, ways to evaluate progress, strategies for determining when and how adjustments should be made, and when the intervention approach should be terminated. In addition, the authors explain how data collection is used to guide decision making in ongoing treatment and to assess immediate and long-term outcomes.

Next is a section that focuses on considerations for implementing the intervention for children from culturally and linguistically diverse backgrounds. The authors offer guidance in planning modifications related to the particular cultural and personal factors affecting an individual child, adolescent, or adult, while ensuring consistency in the treatment approach.

In the next two sections, the authors present specific examples of applications of the intervention to a child and to an adolescent or an adult. They offer a case study of a younger individual with an ASD for whom the treatment is considered appropriate and effective and a case study of an adolescent or an adult for whom the treatment is considered appropriate and effective (if, in fact, the intervention is appropriate for older individuals).

Each chapter concludes with a description of further research that is needed to advance the development or ongoing validation of the intervention across populations of individuals with ASDs and related neurodevelopmental disabilities. The

authors then suggest three to five readings that they believe present important further details or background about the intervention, as well as learning activities to facilitate further discussion, generate ideas for projects, offer questions to test integration of the reading material, and serve as possible writing assignments. In addition to a comprehensive set of references at the end of each chapter, a glossary of key terms is provided at the end of the book; the first instance of each term is bolded in each chapter that discusses that topic.

SUMMARY COMMENTS

To enhance the usefulness of this book for as many readers as possible, two additional chapters have been included. Chapter 2 is a reader's guide that provides tutorial information tailored to the needs of individual audiences (i.e., students, clinicians, general and special educators, families). Readers from these various audiences are advised about chapters and sections of chapters that may prove of greatest interest to them, as well as where they can go for additional information to help them in their use of material addressed in the book. Chapter 15 provides a detailed discussion of the strengths and weaknesses of the treatment approaches covered in the book and includes tables summarizing shared characteristics and social communication outcomes of the treatments. Recommendations for future directions in treatment development and studies of treatment effectiveness also are provided. The book ends with a series of exercises and recommendations designed to encourage readers to use the book's content in their clinical decision making as well as in their design of future research studies.

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