

# The SCERTS Model

## A Transactional, Family-Centered Approach to Enhancing Communication and Socioemotional Abilities of Children With Autism Spectrum Disorder

**Barry M. Prizant, PhD; Amy M. Wetherby, PhD;  
Emily Rubin, MS; Amy C. Laurent, OTR-L**

A range of educational/treatment approaches is currently available for young children with autism spectrum disorders (ASD). A recent comprehensive review by an expert panel on ASD (National Research Council, 2001) concluded that a number of approaches have demonstrated positive outcomes, but nonetheless, not all children benefit equally from any one approach. Efforts to increase communicative and socioemotional abilities are widely regarded as among the most critical priorities, and growth in these areas is closely related to prognosis and long-term positive outcomes. However, some widely disseminated approaches are not based on the most contemporary developmental research on social and communication development in children with and without disabilities, nor do they draw from current understanding of the learning style of children with ASD. This article describes the SCERTS Model, which prioritizes Social Communication, Emotional Regulation, and Transactional Support as the primary developmental dimensions that must be addressed in a comprehensive program designed to support the development of young children with ASD and their families. The SCERTS Model has been derived from a theoretical as well as empirically based foundation and addresses core challenges of children with ASD as they relate to social communication, emotional regulation, and transactional support. The SCERTS Model also is consistent with empirically supported interventions and it reflects current and emerging "recommended practices" (National Research Council, 2001). **Key words:** *autistic spectrum disorder, autism, developmental, early intervention, education, communication, emotional regulation, family support, social*

**A**UTISM SPECTRUM DISORDER (ASD) or Pervasive Developmental Disorder (PDD) (APA, 1994) is a category of developmental

disability characterized by qualitative impairments in social interaction and social relatedness, difficulties in acquiring and using conventional communication and language abilities, and a restricted range of interests often co-occurring with an extreme need for consistency and predictability in daily living routines. Frequently co-occurring and associated characteristics include problems in sensory processing (Anzalone & Williamson, 2000; Greenspan & Wieder, 1997), motor planning (Anzalone & Williamson, 2000; Prizant, 1996), emotional regulation and arousal modulation (Cole, Michel, & Teti, 1994; Dawson and Lewy, 1989; Prizant, Schuler, Wetherby, & Rydell, 1997), and behavioral organization

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*From Childhood Communication Services and the Center for the Study of Human Development, Brown University, Providence, RI (Dr Prizant); the Department of Communication Disorders, Center for Autism and Related Disorders, Florida State University, Tallahassee, Fla (Dr Wetherby); the Communication Crossroads, Monterey, Calif (Ms Rubin and Laurent); and the Yale University Child Study Center, New Haven, Conn (Ms Rubin).*

*Corresponding author: Barry M. Prizant, PhD, Childhood Communication Services, 2024 Broad St, Cranston, RI 02905 (e-mail: Barry.Prizant@brown.edu).*

(Ornitz, 1989). The learning profile of children with ASD is typically uneven and inflexible, with relative strengths in “object knowledge,” rote memory, and visual-spatial processing, and weaknesses in “social knowledge,” semantic and conceptual memory, and abstract problem-solving (Prizant, 1983; Wetherby, Prizant, & Schuler, 1997). ASD is now understood to be of neurogenic origin and is generally considered to be a lifelong disability that can dramatically impact family members. Advances in research on early identification have resulted in earlier diagnosis of ASD (Lord & Risi, 2000). As a result, there is a great demand for current information on education and treatment for young children.

A variety of treatment approaches currently are available, ranging from educational to clinical to biomedical (eg, psychopharmacological, nutritional) (National Research Council [NRC], 2001). Within the category of educational and clinical strategies, efforts to increase communication and socioemotional abilities are widely regarded as among the most critical priorities (NRC, 2001; Wetherby & Prizant, 2000). These difficulties virtually define ASD, and progress in communication and socioemotional development is closely related to outcome and independent functioning. However, approaches to enhancing these abilities vary greatly, resulting in confusion for caregivers and some professionals. One source of this variability is the extent to which educational/treatment approaches are based (1) on current understanding of the learning style and the nature of the disability of ASD, and (2) on the most contemporary research on communication and socioemotional development in children with and without disabilities. On the one end of the continuum, approaches that are developmentally based draw heavily from the knowledge base on typical child development (eg, Greenspan & Wieder, 1997; Gutstein, 2000; Prizant, Wetherby, & Rydell, 2000; Rogers & Lewis, 1989; Wetherby et al., 1997). On the other end of the continuum are more traditional ABA (applied behavior analysis) approaches, which are based primarily on teaching prac-

tices derived from tenets of learning theory and operant conditioning (Lovaas, 1981; Maurice, Green, & Luce, 1996) (see Prizant & Wetherby, 1998, for further discussion of the continuum of educational/treatment approaches and the debate on efficacy of intervention).

Over the past 2 decades, there have been increased attempts at “cross-fertilization,” with developmental research and “family-centered” and “child-centered” practice influencing the content and teaching practices of traditional ABA approaches (Strain et al., 1992), resulting in a clear distinction between contemporary ABA practice and traditional ABA practice. Similarly, developmental approaches are increasingly infusing tenets of ABA approaches to address the need for consistency, intensity, and accountability, which have been strengths of ABA practice (Prizant & Wetherby, 1998). However, in our recent experience, current educational/treatment programs tend to fall into 1 of 2 categories. First, some programs continue to adhere to only 1 or 2 approaches, with little integration of practices from different perspectives. In contrast, other programs use a “patchwork quilt” strategy borrowing from different practices along the continuum, even when such practices are not easily integrated, resulting in a fragmented approach to programming. For example, a young child may receive services in an integrated developmental preschool setting focusing on communication, play, and peer interaction, but also receive traditional ABA treatment in additional home-based therapy focusing on readiness skills and “compliance training,” with little coordination between settings. Such fragmentation may cause confusion for children who are exposed simultaneously to highly structured, directive approaches based on repetitive teaching drills, as well as more loosely structured, child-centered approaches using more natural activities for teaching. It may also result in considerable confusion for parents and frustration for professionals who come from different, and sometimes diametrically opposed, orientations. Thus, there remains

a great need for a comprehensive educational/treatment model with the following features: (1) the model is based on the most current research in child development and ASD; (2) it is flexible enough to incorporate different perspectives (ie, developmental and contemporary ABA); (3) it can be applied in an individualized manner while addressing the “core deficits” of ASD; and (4) it is family-centered, taking into account critical individual differences across families in reference to their priorities, and their involvement in critical programmatic decision-making.

This article provides an overview of the SCERTS Model, a comprehensive, multidisciplinary approach to enhancing communication and socioemotional abilities of children from early intervention to the early school years. The SCERTS Model was developed to directly address the limitations of available approaches noted above. The model prioritizes Social Communication, Emotional Regulation, and Transactional Support as the primary developmental dimensions that must be addressed in a comprehensive program designed to support the development of children with ASD. Because the model addresses core deficits or challenges definitive of ASD, it can be applied flexibly to a range of children who have varying degrees of disability (ie, mild to severe) in cognitive, communicative, sensory processing, and regulatory capacities.

The SCERTS Model is derived from over 2 decades of empirical and clinical work, and is consistent with recommended tenets of “evidence-based” practice espoused by researchers and clinical scholars in ASD and related disabilities (NRC, 2001; Prizant & Rubin, 1999). More specifically, the developmental, social-pragmatic focus of the model has been the hallmark of our work for many years (Prizant, 1982a; Prizant et al., 1997; Prizant & Wetherby, 1985, 1987; Wetherby et al., 1997; Wetherby & Prutting, 1984) and has been influenced by other developmentally based communication intervention models outside of ASD (Bricker, Pretti-Frontczak, & McComas, 1998; McLean & Snyder-McLean, 1978). The model reflects and integrates

our previous empirical research and clinical investigation in understanding conventional and unconventional communication in ASD including communicative functions and intentions of behavior (Prizant & Duchan, 1981; Prizant & Rydell, 1984; Prizant & Wetherby, 1987; Rydell & Prizant, 1985; Schuler & Prizant, 1985; Wetherby, 1986; Wetherby & Prutting, 1984) and is philosophically consistent with tenets of recent work in positive behavior supports (Fox, Dunlap, & Buschbacher, 2000; Koegel, Koegel, & Dunlap, 1996; Lucyshyn, Dunlap, & Albin, 2002). The model also is built upon our work addressing the relationships among communication, socioemotional development, and emotional regulation (Prizant, 1999; Prizant et al., 1990; Prizant & Meyer, 1993; Prizant & Wetherby, 1990) and is consistent with the work of Rogers and Lewis (1989) and Greenspan and Wieder (1998, 2000) addressing socioemotional factors, and DeGangi (2000) and Tronick (1989) addressing arousal modulation and emotional regulation.

The SCERTS Model also integrates contemporary understanding of the learning style of persons with ASD as addressed in our previous work (Prizant, 1982b, 1983; Prizant & Wetherby, 1998; Wetherby et al., 1997), and as reflected in the current emphasis on the use of visual supports in educational programming (Hodgdon, 1995; Quill, 1998). Finally, the family-centered philosophy espoused in the model draws from the work of Bailey and colleagues (Bailey & Simeonsson, 1988) and Dunst and colleagues in early intervention (Dunst, Trivette, & Deal, 1988), and has been greatly influenced by the Hanen Early Language Centre Model for supporting parents of children with language disabilities (Manolson, 1992) and ASD (Sussman, 1999). Our previous work that addresses our interpretation and application of family-centered research and practice, both within and outside the ASD literature (Prizant & Bailey, 1992; Prizant & Meyer, 1993; Prizant, Meyer, & Lobato, 1997; Prizant & Wetherby, 1993), is infused in all aspects of the model.

Thus, the SCERTS Model clearly is consistent with, or has been directly influenced

by, contemporary practices and education/treatment approaches noted above. However, we believe it offers an important and novel contribution to currently available approaches by establishing clear priorities in the areas of social communication, emotional regulation, and transactional support, in a manner that addresses the complex interdependencies among these most crucial areas. In this manner, the model reflects a new conceptualization of education/treatment that most closely addresses the core deficits observed in ASD, and therefore represents an example of what we believe to be the “next generation” of treatment approaches for ASD. In the following discussion, we will define the core components of the SCERTS Model (see Table 1 for

an overview), provide sample goals for each component, and conclude by considering the overriding importance of ecological validity in programs for young children with ASD.

**SOCIAL COMMUNICATION**

It is now well documented that positive long-term outcomes for children with ASD are strongly correlated with the achievement of communicative competence (Garfin & Lord, 1986; Koegel, Koegel, Yoshen, & McNeerney, 1999, NRC, 2001; Venter, Lord, & Schopler, 1992). Additionally, those children who display a greater capacity to establish and follow the attentional focus of their communicative partners are more likely to initiate bids for

**Table 1.** SCERTS Model—Summary of education/treatment priority goals

<p>I. Social communication</p> <p>A. Enhance capacities for joint attention</p> <ol style="list-style-type: none"> <li>1. Expression of communicative intent</li> <li>2. Expand range of communicative functions</li> <li>3. Enhance social reciprocity (rate of communication, repair, persistence)</li> <li>4. Enhance communicative gaze, sharing emotional states</li> </ol> <p>B. Enhance capacities for symbol use (symbolic behavior)</p> <ol style="list-style-type: none"> <li>1. Movement from unconventional to conventional means of communication</li> <li>2. Movement from presymbolic to symbolic behavior in communication and play</li> <li>3. Movement from echolalia to creative language</li> <li>4. Enhance comprehension of language and other symbolic systems</li> </ol> <p>II. Emotional regulation</p> <p>A. Enhance capacities for self-regulation—Ability to independently use sensory motor and/or cognitive/linguistic strategies to regulate emotional arousal, and support attention and engagement</p> <p>B. Enhance capacities for mutual regulation—Ability to seek support from others or respond to partners’ efforts to regulation of emotional arousal in the context of social transaction through sensory motor and/or cognitive/linguistic strategies</p> <p>C. Enhance capacity to recover from dysregulation—Ability to recover from extreme states of dysregulation either independently or with support from partners</p> <p>III. Transactional support</p> <p>A. Educational and learning supports—Use of visuals and other organizational supports; environmental modification; curriculum modification</p> <p>B. Interpersonal supports—Calibrate partner language and interactive style, and developmental support to enable child to attend, communicate, engage, and play at more sophisticated levels. Design opportunities for learning with and developing relationships with peers</p> <p>C. Family support—Emotional and educational support provided to parents to enhance their confidence and abilities in supporting their child’s development</p> <p>D. Support among professionals—Provide opportunities for enhancing educational and therapeutic skills, and for emotional support to cope with work-related challenges</p>
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communication, use more contingent language and acquire conversational skills, use more sophisticated gestures and symbolic language, recognize and repair communicative breakdowns, and respond to contextual and interpersonal cues (Carpenter & Tomasello, 2000; Wetherby, Prizant, & Hutchinson, 1998). The “SC” component of the SCERTS Model directly addresses the core challenges in social communication faced by children with ASD. Although there is great heterogeneity in children with ASD, research over the past 2 decades has identified core challenges that fall into 2 major areas: (1) the *capacity for joint attention*, which underlies a child’s ability to coordinate and share attention, share emotions, express intentions, and engage in reciprocal social interactions, and (2) the *capacity for symbol use*, which underlies a child’s understanding of meaning expressed through conventional gestures, words, and more advanced linguistic forms, and the ability to engage in appropriate use of objects leading to imaginative play (Wetherby, Prizant, & Schuler, 2000). The educational/treatment goals within the social-communication dimension of the SCERTS Model have been derived to enhance these core capacities.

### Capacity for joint attention

A child’s ability to consider the attentional focus of another and to draw another’s attention toward objects and events of mutual interest is a foundation for the development of language, social-conversational skills, and social relationships. Moreover, these early capacities are strongly related to the ability to interpret and share emotional states and intentions, and to consider another’s prior experiences and perspective in relation to events or conversational topics (Carpenter & Tomasello, 2000; NRC, 2001).

At prelinguistic stages of language acquisition, joint attentional capacities are manifest in the ability to orient to a social partner, to coordinate and shift attention between people and objects, to share and interpret affect or emotional states, and ultimately, to use gestures and vocalizations paired with physical

contact or gaze to deliberately affect (ie, communicate with) another person. A child’s ability to monitor the social environment through social referencing (ie, shifting gaze) and to share affect typically precedes the developmental milestone of *intentional communication*, which is then followed by an expanded ability to express intentions across communicative partners and for a range of communicative functions or purposes. Prior to the development of language, a child’s capacity for joint attention also underlies the ability to communicate not only for need-based instrumental purposes (eg, requesting or protesting by using push away or giving gestures), but also for more social purposes (eg, commenting in order to share observations and experiences by using showing or pointing gestures).

As a child makes the transition to language, the capacity for joint attention facilitates the development of a more sophisticated and explicit system of communication. There is a rapid expansion of vocabulary and linguistic concepts, and emergence of more sophisticated sentence structures for the purposes of sharing intentions and emotions (Wetherby et al., 2000). At more advanced stages of language acquisition, the emergence of more sophisticated joint attention capacities supports communication about past and future events and enables children to consider what is novel, interesting, and important to their listener based on their listener’s attentional focus, interests, and knowledge of prior events (Carpenter & Tomasello, 2000).

The core challenge in the capacity for joint attention impacts 4 critical developmental capacities in the social-communicative profile of children with ASD, resulting in a number of significant developmental challenges and limitations:

1. *Limitations in coordinating attention and affect* result in difficulties in (a) orienting and attending to a social partner; (b) shifting gaze between people and objects in order to monitor another’s attentional focus and intentions; (c) sharing emotional states with another person; (d) following and drawing another person’s attention toward objects or

events for the purpose of sharing experiences; and (e) participating in reciprocal interactions over multiple turns in social exchange.

2. *Limitations in sharing intent* (Prizant & Wetherby, 1987) result in difficulties in (a) directing signals to others to express intentions, (b) gaining another's attention when initiating either gestural, vocal, or linguistic communication, (c) communicating intentionally at a rate necessary to maintain reciprocal interaction, and (d) persisting and repairing communicative breakdowns when they occur.
3. *A restricted range of communicative functions* resulting in a reduced frequency of communication for more social purposes (Wetherby, 1986) such as for social interaction or calling attention to oneself, or for joint attention such as commenting on and sharing experiences, and expressing emotions; and
4. *Difficulties inferring another's perspective or emotional state*—resulting in (a) problems in monitoring the appropriateness of verbal and nonverbal discourse; (b) selecting appropriate topics; (c) providing sufficient background information; and (d) reading and responding appropriately to others' emotional expressions.

These difficulties may be manifest differently across children, thus creating a picture of great heterogeneity in the ASD population. However, they reflect each child's struggle to establish and maintain shared attention, and to interpret and express intentions at the prelinguistic, emerging language, and advanced language stages (Carpenter & Tomasello, 2000; Wetherby et al., 2000).

### Capacity for symbol use

In the SCERTS Model, the basis for understanding and addressing the symbolic deficits in children with ASD is derived from the literature on typical developmental processes in language acquisition and play development. Language learning is an active process in

which children “construct” knowledge and shared meanings based on interactions with people and experiences in their environment (Bates, 1979; Bloom, 1993; Lifter & Bloom, 1998). Children typically progress through 3 major transitions en route to developing more sophisticated symbolic language skills to effectively communicate shared meaning with communicative partners. First, at the prelinguistic stage of language acquisition, a child typically makes a transition to *intentional communication*, a developmental shift toward the systematic use of conventional gestures (eg, giving, waving, showing, and pointing) and/or vocalizations to deliberately affect another person; second, at the emerging language stage, a child makes the transition to early *symbolic communication*, a shift toward the acquisition of single word vocabulary (eg, first words, signs, or picture symbols) marked by the acquisition of vocabulary that serves a variety of communicative functions; and third, a child at more advanced language stages makes the transition to *linguistic communication* (eg, the construction of multiword combinations, grammar, and discourse). Parallel development during the transition to symbolic and linguistic communication is evident in a child's use of objects, initially for conventional, functional purposes, then in symbolic play, and later in sociodramatic, cooperative play. Capacities in joint attention contribute to and interact with the development of more conventional and sophisticated linguistic knowledge, as observed in the ability to modify linguistic structure and style in order to clarify intent for one's listener (NRC, 2001; Wetherby et al., 2000). In addition to serving important communicative functions, language also comes to serve as an increasingly important tool in problem-solving, planning and regulating behavior, and in regulating arousal and emotional state (Prizant et al., 2000) (see next section on Emotional Regulation for further discussion).

Challenges in the capacity for symbol use impact 3 critical developmental capacities in the social-communicative profile of children with ASD, resulting in a number of significant limitations:

1. *Limitations in the use of conventional hand gestures* (eg, showing, waving, and pointing) and other nonverbal conventional communicative means (eg, head nods and headshakes) resulting in a reliance on primarily concrete, presymbolic motor-based gestures (eg, manipulating a caregiver's hand, leading another toward a desired item, and re-enacting desired actions). Additionally, the use of socially undesirable communicative means or challenging behaviors for communication (eg, screaming, aggression, tantrums), often observed in children with ASD, may be a direct consequence of these limitations, as they are used in lieu of more conventional gestures for protesting or establishing social control;
2. *Unconventional vocal development*, which may be marked by a paucity of vocal communication or the use of difficult to read, unconventional sounds;
3. *Unconventional verbal behavior* such as the use of immediate or delayed forms of echolalia, perseverative speech, or incessant questioning (Rydell & Prizant, 1995; Schuler & Prizant, 1985; and
4. *Limitations in functional object use and symbolic play*, as marked by difficulties using objects appropriately, which may be due in part to limitations in motor planning and in imitating the nonverbal behaviors of others, as well as limitations in the underlying symbolic capacity to represent social events, to "role-play," and to elaborate on play schemes (Wolfberg, 1999).

### **Addressing core social-communication challenges**

A child initially develops communicative competence through experiences with different partners in the social environment over time and across contexts (Sameroff & Fiese, 1990). Newly acquired capacities are practiced as a child learns to share his or her intentions and emotional states with others within natural contexts and recurring activi-

ties. An essential component of the SCERTS Model is to profile a child's strengths and weaknesses in abilities related to the capacity for joint attention, by documenting abilities to express a range of intentions, to engage in reciprocal interactions and shared activities with adults and peers, and to use social-affective signals such as gaze shifting for social referencing and affect sharing. Abilities related to the capacity for symbol use are assessed by documenting presymbolic (e.g., types of gestures), quasi-symbolic (eg, picture or other nonspeech systems), and symbolic means (eg, spoken and signed language) to communicate, as well as types and complexity of play. Specific goals and a plan for supporting social communicative and symbolic capacities across contexts are then formulated. Thus, in the SCERTS Model, a developmental sequence of social-pragmatic competencies is addressed within a variety of settings and across natural environments. Table 2 provides sample educational/treatment goals in social communication as children progress through prelinguistic, emerging language, and more advanced language stages.

In the majority of cases, modifications and adaptations in environments and activities are often necessary to support optimal learning (to be discussed in the upcoming section on Transactional Supports). However, we agree with Strain, McGee, and Kohler (2001) that most children with ASD are capable of learning in natural activities and inclusive environments as long as the environmental and interpersonal contexts are modified to match the unique learning style and social-communicative needs of the child. There is little, if any, empirical evidence supporting the "myths" for segregating young children with ASD from natural activities and interactions (eg, children with ASD can only learn in 1:1 instruction, more natural activities and environments are too overly stimulating). However, there is much empirical support for the efficacy of educating young children with ASD with typical peers in well-designed natural activities with appropriate transactional supports (Strain et al., 2001).

**Table 2.** SCERTS Model: Sample social communication goals\*

Goals for joint attention	Goals for symbol use
<p>Prelinguistic level</p> <ul style="list-style-type: none"> <li>● Establish anticipatory behaviors (eg, orienting to social stimuli, social referencing, following another's gaze and gestures)</li> <li>● Establish shared affect (eg, smiling and looking)</li> <li>● Establish early intentional behaviors (eg, coordinating gestures/vocalizations with physical contact or gaze)</li> <li>● Increase frequency or rate of communicative bids</li> <li>● Expand range of communicative functions beyond instrumental functions (eg, nonverbal attempts to greet, show, and/or request social routines)</li> <li>● Develop strategies to persist and repair communicative breakdowns</li> <li>● Develop ability to communicate intent across familiar persons, environments, and activities</li> </ul>	<ul style="list-style-type: none"> <li>● Establish a consistent means for expressing intent (eg, conventional gestures, signs, picture communication)</li> <li>● Replace earlier developing or unacceptable communicative means with socially acceptable forms</li> <li>● Develop a child's ability to use multiple gestural and vocal means (eg, a give gesture, a contact and distal point, a push away, a head nod, a head shake, and adding vocalizations to nonvocal means)</li> <li>● Develop the use of nonverbal strategies for the purpose of sharing and calling attention to oneself (eg, a wave gesture, a show gesture, and declarative pointing)</li> <li>● Establish functional use of familiar objects and early play schemes directed toward self</li> <li>● Develop the use of more formal augmentative/alternative systems to communicate intentions</li> </ul>
<p>Emerging language level</p> <ul style="list-style-type: none"> <li>● Expand ability to communicate intent across more varied persons, environments, and activities</li> <li>● Expand ability to coordinate attention and affect through shifting gaze and shared affect</li> <li>● Develop ability to secure attention to one's self prior to expressing intentions (eg, a verbal calling function)</li> <li>● Expand range of communicative functions to include more social purposes (eg, greetings, requesting social games or routines, showing off, commenting, and requesting information)</li> <li>● Increase reciprocity (ie, turntaking and contingent use of language) to establish early conversational abilities</li> </ul>	<ul style="list-style-type: none"> <li>● Acquire core vocabulary to serve a range of communicative functions (eg, requesting, protesting, greeting, commenting, and expressing emotional states)</li> <li>● Expand vocabulary to express more varied semantic relations</li> <li>● Expand ability to combine words/signs/pictures to express a fuller range of semantic relationships (eg, 2- and 3-word combinations)</li> <li>● Generalize unconventional verbal forms (immediate or delayed echolalia) to express a variety of functions</li> <li>● Facilitate segmentation of echolalic forms with rule induction allowing for greater creativity in language production, and movement to more conventional forms</li> <li>● Expand representational play themes that involve basic role-play in familiar and unfamiliar settings</li> </ul>
<p>Advanced language level</p> <ul style="list-style-type: none"> <li>● Increase ability to communicate about past and future events</li> <li>● Facilitate awareness of another's intentions, preferences, and experiences</li> <li>● Develop ability to modify topic selections based on a listener's attentional focus, preferences, and emotional state</li> <li>● Increase ability to interpret and use language flexibly depending upon the social context and the nonverbal cues of one's communicative partner (eg, drawing inferences, multiple meaning words, figurative language, and sarcasm)</li> </ul>	<ul style="list-style-type: none"> <li>● Acquire higher level linguistic forms that express differences in meaning (eg, tense markers, pronouns, etc)</li> <li>● Support the acquisition of verbal conventions for initiating, exchanging turns, and terminating interactions</li> <li>● Increase ability to use and interpret nonverbal behavior to support language use and social interaction (eg, body posture and orientation, communicative gaze, facial expressions, gestures, and intonation)</li> <li>● Acquire ability to use language as a tool for emotional regulation             <ol style="list-style-type: none"> <li>a. develop vocabulary to express emotions and share experiences with others</li> <li>b. use language to prepare for changes in routine</li> <li>c. discuss potentially problematic emotionally dysregulating situations</li> <li>d. use language to request assistance and comfort</li> </ol> </li> </ul>

\*Actual goals will vary depending on child's needs and family priorities.

In the SCERTS Model, all who interact with a child with ASD on a regular basis (eg, parents, other caregivers, siblings, peers, educators, and therapists) are viewed as potential developmental facilitators and may benefit from guidance and support in enhancing specific competencies in joint attention and symbol use. However, a child's ability and "availability" for social engagement and communication, and learning in general, is greatly determined by the capacity for maintaining well-regulated emotional and arousal states. We now turn to this second critical component, the "ER" of the SCERTS Model.

## EMOTIONAL REGULATION

### Emotional regulation defined

Emotional regulation is a core process underlying attention and social engagement, and is believed to be essential for optimal socioemotional and communication development, and the development of relationships for children with and without disabilities (Prizant & Meyer, 1993). Cicchetti, Ganiban, and Barnett (1991) defined emotional regulation as "the intra and extra organismic factors by which emotional arousal is redirected, controlled, modulated, and modified to enable an individual to function adaptively" (p. 15). Tronick (1989) distinguished between emotional *self*-regulatory capacities, and *mutual* regulatory capacities, which both serve to aid in modulating emotional arousal. Self-regulatory strategies are self-initiated and self-directed; mutual regulatory strategies occur in the context of social interaction and involve a child's ability to respond to assistance from others in helping to maintain a state of optimal arousal. In early stages of development, mutual regulation is characterized by a caregiver sensitively reading and responding to a child's behaviors, which are not directed purposefully to the caregiver, but nonetheless signal to the caregiver the child's emotional state and level of arousal. A partner must interpret a child's signals and provide appropriate support if and when needed. Therefore, this type of mutual

regulation may be referred to as *respondent* mutual regulation. For example, a child's facial expression or bodily tension may signal fear or anxiety, to which a caregiver responds with verbal or nonverbal comfort. With the development of greater social awareness and communicative abilities, children begin to use *initiated* mutual regulation strategies. That is, they are able to intentionally communicate their needs (eg, for assistance, comfort) to their caregivers through verbal and/or nonverbal means. For example, to request comfort, a preverbal child may purposefully reach out to be held, and a verbal child may request comfort by saying "I'm scared."

### Emotional regulation and arousal

Through the process of emotional regulation children strive to maintain an optimal state of arousal that matches the social and physical demands of their environments and that allows them to respond adaptively (DeGangi, 2000). Arousal has been defined as a continuum of physiological states or biobehavioral states ranging from sleep to wakeful (Lester, Freier, & LeGasse, 1995). Modulation abilities (ie, the efficient and appropriate transition along the continuum of arousal states) enable children to transition along this continuum in accordance with internal and external factors. Factors influencing the ability to transition along the continuum include, but are not limited to, environmental characteristics (eg, types and intensity of environmental stimulation), social context, (eg, availability of familiar communicative partners), and internal or constitutional variables (eg, illness, level of fatigue, and pain). Pert (1997) argued that physiological state and emotional state are interdependent: "Every change in the physiological state is accompanied by an appropriate change in the mental emotional state, and every change in the mental emotional state (conscious or unconscious) is accompanied by a change in the physiological state."

It has been well documented that children with ASD have significant difficulties with arousal modulation, and therefore, emotional regulation, due to neurophysiological factors

(Anzalone & Williamson, 2000; Dawson & Lewy, 1989; DeGangi, 2000; Kientz & Dunn, 1997; Ornitz, 1989). This may take the form of a low threshold for physiological and emotional reactivity, resulting in being “at risk” for experiencing heightened states of arousal and emotion (ie, hyperreactivity), causing anxiety, agitation, and a limited ability to be “available” for learning and interacting. In these heightened states of arousal, children often exhibit flight, fright, and fight reactions, which are frequently misinterpreted and treated as “behavior problems.” Thus, when a child exhibits these reactions, he or she may be described as being aggressive, noncompliant, or intentionally manipulative. For instance, a child with a hyperreactive response to tactile stimulation may push or hit other children in a defensive reaction to being inadvertently touched or in anticipation of being touched. A child who is hyperreactive to visual and auditory stimulation may attempt to “escape” from overly stimulating environments or activities. For other children, persistent states of underarousal (ie, hyporeactivity) secondary to high thresholds for physiological and emotional reactivity may result in passivity, lethargy, and a similar inability to be available for processing social and environmental experiences. These children are often described as unmotivated, self-absorbed, nonfocused, or “spacey.” Some children may experience shifting states of over- or underarousal that occur cyclically (eg, according to time of day), or unpredictably, resulting in a complex pattern that is challenging to both families and professionals (see Anzalone & Williamson, 2000, for further discussion).

### **Communication, arousal, and emotional regulation**

Social-communicative and language difficulties experienced by children with ASD significantly impact their arousal modulation abilities and behavioral organization, and therefore, their emotional regulation, in reference to the development of both self- and mutual regulatory abilities. Regarding self-regulation, difficulties with symbolic capacities, as described earlier, may impact nega-

tively on the development of “inner language.” It has long been understood that inner language (Vygotsky, 1978), or the ability to represent events in memory and problem solve through inner symbolic means, serves an important cognitive function of organizing experience and behavior, thinking about and learning from past events, and planning for future events. With limited ability to use inner language for these cognitive functions, it is less possible to plan for dysregulating and potentially threatening events, or to reflect on past events in a manner that supports emotional regulation when faced with stressful events. These difficulties may contribute to the unpredictable reactions to daily events observed in many children with ASD.

Mutual regulation may be compromised because of difficulties with joint attention, which is considered to underlie the development of secure relationships (Stern, 1985), and related social-communication difficulties. A caregiver may not be viewed as a potential source for mutual regulation, thus limiting the strategies a child develops and employs to maintain a well-regulated emotional state. For example, a child may not “know,” that another person can provide comfort through physical or verbal means, and therefore, does not seek others out. Even for a child with this “knowledge” mutual regulatory strategies may be significantly compromised or absent at higher levels of arousal because of a more limited ability to engage in communicative interactions in states of high arousal and emotional dysregulation. In addition to the impact of limitations in expressive communication, limitations in receptive language and communication may also detrimentally affect the capacity to maintain a well-regulated state. For example, a child’s emotional reaction to problems in comprehending gestures or language may cause confusion and/or frustration, resulting in an increase in arousal.

In summary, there is a clear interdependent relationship among the development of mutual and self-regulatory capacities, communication, language, and other aspects of socioemotional development (Prizant & Meyer,

1993; Prizant & Wetherby, 1990). While self- and mutual-regulatory capacities support development in these related domains, increasing abilities in language and communication, in turn, are considered to play an important role in the development of more sophisticated strategies for emotional regulation.

### **Addressing emotional regulation challenges in the SCERTS model**

Because of the interdependency between social communication and emotional regulation, the SCERTS Model incorporates an integrative approach when difficulties are present in both developmental domains as is commonly observed in ASD. The SCERTS Model directly addresses emotional regulation by targeting goals for the development of self-regulatory and mutual-regulatory capacities. In determining individualized goals, these capacities must be understood from a developmental perspective. That is, emotional regulation may be facilitated through presymbolic sensory-motor means, or through higher level cognitive-linguistic means, consistent with a child's developmental profile and skill acquisition (DeGangi, 2000; Prizant & Meyer, 1993). For instance, an infant first develops sensory motor, self-regulating abilities, such as sucking a thumb, averting gaze, or engaging in repetitive motor activity. Likewise, as a child matures and develops greater cognitive and linguistic skills, the ability to employ these skills for emotional regulatory functions develops as well (eg, the ability to use "self talk" to regulate one's arousal during an anxiety arousing situation). Therefore, while the regulatory abilities of a young child are limited based on his or her developmental level (eg, a presymbolic child cannot use language-based or other symbolic strategies), the abilities of an older more able child consist of both earlier developing sensory-motor strategies and higher level cognitive-linguistic strategies (eg, a symbolic child can use language as well as engage in repetitive motor activity to remain well-regulated). State of arousal and environmental demands often contribute to which of these specific types of strategies, or com-

binations of strategies, an individual child employs.

An essential component of the SCERTS Model is initially to assess a child's capacities to maintain well-regulated states of arousal across contexts, by documenting the primary factors supporting or interfering with emotional regulation, and the specific signals that a child gives when he or she needs support. Different behavioral signals are categorized according to different levels of arousal, ranging from calm and well-regulated to extremely dysregulated, with gradations in between. Next, specific goals and a plan are developed for supporting a child in acquiring and applying self-regulatory or mutual-regulatory strategies that are indexed to each level of arousal. As emotional regulatory strategies are implemented, the efficacy of such strategies are documented with adjustments made to the plan as needed.

Table 3 provides sample goals at sensory motor and cognitive-linguistic levels for self- and mutual regulation. Self-regulatory strategies may include helping a child to discover ways to maintain an organized state in which he or she is available for active learning. For instance, self-regulatory, sensory motor strategies for self-soothing when a child is in a heightened state of arousal may include focusing on a particular calming activity (eg, listening to music, holding a favorite toy), or, for more able children, taking a break from an activity. Self-regulatory strategies may also include initiating and engaging in alerting sensory motor activities, such as increased physical activity, when a child is in a low state of arousal and not optimally engaged in activities and interactions. At a cognitive level, helping children to develop an awareness of the activity schedule, steps within activities or the duration of activities, transitions between activities, and unexpected changes in routines may preclude negative reactions due to confusion or a lack of predictability, and therefore promote greater self-regulation abilities. Helping to develop an awareness of time concepts as well as the ability to understand language about past and future events

**Table 3.** SCERTS Model: Emotional regulation goals\*

<b>Goals for self-regulation</b>	<b>Goals for mutual regulation</b>
<p>Prelinguistic/sensory-motor level goals</p> <ul style="list-style-type: none"> <li>● Increase child’s ability to acquire and use sensory-motor strategies to support engagement and attention to daily activities (eg, for a child who is typically in a low state of arousal, expand his/her repertoire of alerting strategies—jumping, random movement, etc; for a child who is typically in a high state of arousal, expand his/her repertoire of calming strategies—holding favorite object, rhythmic motion, etc)</li> <li>● Expand the child’s use of sensory-motor strategies to support transitions within daily routines (eg, use of transition objects, embed organizing sensory-motor supports within transition activities)</li> </ul> <p>Cognitive-linguistic level goals</p> <ul style="list-style-type: none"> <li>● Increase the child’s ability to initiate and utilize cognitive-linguistic strategies to support his/her attention to activities and daily routines (eg, through the use of rehearsal and self-regulatory language)</li> <li>● Expand the child’s use of cognitive-linguistic strategies to support transitions throughout daily routines (eg, introduce visual schedules to symbolize activity sequence and transitions, increase the child’s awareness of temporal concepts, etc)</li> </ul>	<ul style="list-style-type: none"> <li>● Increase child’s ability to maintain engagement and attention to activities by responding to behavioral signs of dysregulation (eg, decrease the amount of environmental stimulation when a child exhibits “fright and flight” reactions; increase the amount of stimulation embedded in activities when a child appears hyporesponsive to the environment)</li> <li>● Increase child’s ability to use socially acceptable gestures for social control functions requesting and protesting (eg, head nod, head shake, push away, point, etc)</li> <li>● Develop strategies through nonspeech transactional supports to assist the child with expression of arousal and emotional state (eg, visual supports)</li> <li>● Increase the child’s acquisition of vocabulary to be able to request assistance and organizing supports when he/she experiences dysregulating events (eg, requesting “help,” a break from an activity, etc)</li> <li>● Increase the child’s ability to use specific vocabulary to express emotional state and arousal level</li> <li>● Increase ability to identify and express emotional state and arousal level as well as use regulating strategies with and without the use of visual supports</li> </ul>

\*Actual goals will vary depending on child’s needs and family priorities.

also contribute to cognitive self-regulation strategies.

In addition to self-regulatory capacities, the SCERTS Model targets the development of mutual-regulatory strategies. When a child is experiencing a high degree of arousal, or is underaroused, partners need to read those signals indicative of different states, and then support mutual regulation by responding in ways that promote a child’s ability to focus, engage, and be in a state more conducive to relating, learning, and processing information. This is consistent with a respondent form of mutual-regulation discussed earlier.

In the SCERTS Model, capacities for initiated mutual-regulation strategies are also fostered in ways that best fit a child’s developmental profile and needs. Children may be taught to request assistance or protest in socially acceptable ways through nonverbal means (eg, acquiring and using early developing gestures to request, protest, or reject) or verbal means (eg, acquiring and using specific vocabulary for expressing emotions, or to indicate refusal). These abilities have been demonstrated to be effective preventive measures to preclude problem behaviors precipitated by emotional dysregulation (Carr et al., 1994).

The plan also includes proactive and preventative measures to support emotional regulation (eg, alternating sedentary activities with movement activities, reducing the level of sensory input), as well as reactive strategies when faced with potentially dysregulating experiences (eg, allowing a child access to a quiet space or calming activity, simplifying a task, reducing the duration of an activity). Dysregulating experiences may include overwhelming sensory input, changes in routine, inappropriate task demands related to difficulty or duration of an activity, and disorganizing social and linguistic input. The use of transactional supports, such as nonspeech communication systems and visual supports, play important roles in these efforts, and thus, we now will shift our attention to the “TS” of the SCERTS Model.

### **TRANSACTIONAL SUPPORT**

Due in large part to the difficulties in social communication and emotional regulation, the majority of children with ASD require a variety of supports to participate optimally in interpersonal interactions and relationships, and to understand and derive enjoyment from everyday activities. Supports are also needed to maximize learning in educational settings and participation in daily living activities and events. The notion of transactional support in the SCERTS Model emphasizes that supports must be flexible and responsive to different social contexts and learning environments, and to the changing needs of children and families. Most important, however, is that both children and family members develop a sense of confidence and competence in utilizing and responding to supports. Transactional support is addressed in 3 major domains in the SCERTS Model—interpersonal support, educational support, and family support (see Table 4).

#### **Interpersonal support**

The daily experiences of professionals and family members (Domingue et al., 2000), as well as empirical research (Bristol & Schopler,

1984) underscore the challenges experienced by children with ASD in engaging successfully in interpersonal interactions, and developing emotionally fulfilling relationships. It is now understood that these challenges are among the core, definitive characteristics of ASD. That is, children are not “choosing” to be disengaged from social interaction and relationships due to a primary lack of interest or desire. Because of challenges in social-communicative, social-cognitive, and emotional-regulatory capacities, they are limited in the requisite abilities and skills to be more successful, active participants. Additionally, some communicative partners who regularly interact with children may also lack the knowledge and skills to support their efforts. Therefore, children with ASD are at risk for developing a sense of interpersonal interaction as overwhelming, confusing, and stressful based on a history of repeated unsuccessful experiences, while others are at risk for limited engagement and low motivation to participate in social interactions secondary to processing difficulties and hyporesponsive bias toward interpersonal events. In the SCERTS Model, there is a priority placed on supporting children to be as successful as possible in experiencing a sense of efficacy in communicating their intentions, and in participating in affectively charged and emotionally fulfilling social engagement with a variety of partners. We believe an important key to such success is interpersonal support.

The greater the abilities in social communication and emotional regulation, the greater the potential for a youngster to experience frequent successful and joyful interactions, which provide the foundation for the development of emotionally satisfying relationships. Interwoven throughout interpersonal exchange and sharing of experiences is the communication of emotional states through the medium of verbal and nonverbal signals. Sensitive partners attune affectively and calibrate their emotional tone to that of the less able partner, in order (1) to acknowledge their appreciation of the subjective emotional state of the child, (2) to attempt to motivate further

**Table 4.** SCERTS Model: Transactional support goals

<p>I. Interpersonal support</p> <ol style="list-style-type: none"> <li>1. Identify specific features of communicative partners' interactive styles and language use that either support or are barriers to successful interactions (eg, expression of emotion, language complexity and style, vocal volume, rate, physical proximity, physical contact, use of visual supports). An optimal style is one that provides enough structure to support a child's attentional focus, situational understanding, emotional regulation, and positive emotional experience, but that also fosters initiation, spontaneity, flexibility and self-determination</li> <li>2. Coordinate efforts across different partners in developing strategies to use more those specific features that support more successful interaction</li> <li>3. Design and implement learning experiences with peers so that the child with ASD may benefit optimally from good language, social, and play models. Design motivating activities, organize supportive environments, and incorporate visual supports. Teach both typical children and children with ASD specific strategies for success in daily interactions</li> </ol> <p>II. Educational and learning supports</p> <ol style="list-style-type: none"> <li>1. Design and implement visual and organizational supports for <ol style="list-style-type: none"> <li>a. expanding and enhancing the development of a child's expressive communication system, either as a primary modality or as an augmentative system that is one part of a child's multimodal communication system;</li> <li>b. supporting a child's understanding of language as well as others' nonverbal behavior;</li> <li>c. supporting a child's sense of organization, activity structure, and understanding of time; and</li> <li>d. supporting the development and use of cognitive-linguistic emotional regulatory strategies.</li> <li>e. Adapt and/or modify curriculum goals that are primarily language-based to enable the child to succeed to the extent possible.</li> </ol> </li> <li>2. Design living and learning environments to support social communication and emotional regulation.</li> </ol> <p>III. Family support (ie, support to parents, siblings, extended family members)</p> <ol style="list-style-type: none"> <li>1. Provide families with educational support including information, knowledge, and skills to understand the nature of their child's disability and to support their child's development. Support that is provided, must be based on family priorities, and offered through a variety of options such as educational support activities (eg, lectures, discussion groups), direct training of skills, observation of educational/treatment programming, and interactive guidance in natural activities</li> <li>2. Provide emotional support in one to one and group settings to <ol style="list-style-type: none"> <li>a. enhance family members abilities to cope with the stresses and challenges of raising a child with ASD</li> <li>b. help parents to identify their priorities, and develop appropriate expectations and realistic, achievable goals for their child's development and for family life</li> </ol> </li> </ol>
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social and emotional engagement, and (3) to attempt to support the child during disorganizing and emotionally arousing experiences (Greenspan & Wieder, 1997; Stern, 1985).

Interpersonal support is addressed in a variety of ways in the SCERTS Model. First, the interactive styles and language use of commu-

nicative partners are assessed for the qualities that enhance or inhibit successful interactions. Interaction style variables that warrant assessment are those that may influence a child's response to others' attempts to engage in social exchange. These include, but are not limited to, expression of emotion,

language complexity and style, volume and rate of speech, physical proximity, and physical contact. For example, a well-intentioned partner may use too loud a voice and exaggerated facial expression to express delight to a hyperreactive child, or another partner may use language that is too complex, resulting in confusion or nonresponsiveness. An interactive style that is too directive and controlling (eg, excessive physical prompting or correcting) may result in a hyporeactive child developing an even more passive and respondent style of relating or communicating. Conversely, a child with a bias toward sensory hyperreactivity may respond by frequent attempts to protest or escape from a highly directive partner. On the other end of the continuum, a partner who provides too little consistency, structure, or clarity of expectations through language or other means may not be able to support a child who needs a greater degree of external scaffolding for emotional regulation and social participation. Based on an assessment of partners' styles across contexts, and a child's reaction to different styles, educational/treatment goals may include determining the features of communicative and interactive styles most supportive for a child in different settings. In the SCERTS Model, an optimal style is one that provides enough structure to support a child's attentional focus, situational understanding, emotional regulation, and positive emotional experience, but that also fosters initiation, spontaneity, flexibility, problem-solving, and self-determination. With the important priorities of building self-determination and initiation, a predominant behavioral pattern of passive compliance in a child is as undesirable as "difficult to control" behavior. Efforts must be coordinated across different partners in developing strategies to use more optimal styles of interaction, to support children's independence and development of a sense of self. Although some degree of variability across partners is natural and is to be expected, too great a discrepancy may result in confusion for a child trying to learn the very rudiments of social engagement, and social expectations.

Second, opportunities for play interactions with other children (including siblings) are assessed, with the goal of designing and implementing learning experiences so that the child with ASD may benefit optimally from good language, social, and play models. The goal is to develop a history of successful experiences for a child with ASD to further motivate a child to seek out other children, leading to the development of positive relationships and increased social motivation. Because children tend to be less predictable than adults, it is commonly observed that interactions with other children may be avoided by children with ASD. Supporting successful peer interactions involves designing motivating activities, organizing supportive environments, and teaching both typical children and children with ASD specific strategies for success.

### **Educational and environmental supports**

Because of the nature of learning differences in ASD and the complexity of learning environments, a variety of educational supports are typically needed to optimize success in school, and other learning environments. Although it is acknowledged some children with the most extreme challenges may require significant modifications to support active learning, the SCERTS Model prioritizes learning in a variety of settings from the outset. The justification is that generalization of abilities is best accomplished when children learn skills in settings that occur naturally as part of their daily routine. Additionally, different social settings provide more varied learning opportunities that cannot be replicated in highly repetitive one-to-one drill practice. For example, treatment limited primarily to adult-child 1:1 interaction cannot address the goal of enhancing a child's capacity to shift attention to follow the flow of interaction in a small group, to tolerate proximity to other children, and/or to anticipate one's turn in ongoing reciprocal interactions. These goals not only require well-designed, semistructured activities, but also more varied social contexts.

In the SCERTS Model, educational and environmental supports are developed and utilized to enable children to be more actively engaged by supporting social communication, emotional regulation, and learning. First, it is necessary to assess the barriers to active engagement in reference to the learning style of children with ASD. For example, it is well accepted that most children with ASD are more effective at processing and retrieving visual information than auditory information (Prizant, 1983; Wetherby et al., 1997). Therefore, visual supports may be helpful in

1. expanding and enhancing a child's expressive communication system, either as a primary modality or as an augmentative system comprising one component of a child's multimodal communication system (eg, pictures, gestures, signs, speech);
2. supporting children's understanding of language as well as others' nonverbal behavior through the use of topic boards, cue cards, etc;
3. supporting a child's sense of organization, activity structure, and understanding of time through the use of picture schedules and activity sequences; and
4. supporting the development and use of cognitive-linguistic emotional regulatory strategies through the use of picture sequences, break cards, personal organizers, and so forth (Grodén & LeVasseur, 1995; Quill, 1998; Schuler, Wetherby, & Prizant, 1997).

In the SCERTS Model it is essential to specifically identify the types of visual and organizational supports that may be helpful based on a child's developmental capacities and needs, and relative to activities and social contexts in a child's life. Furthermore, efforts are made to modify and calibrate supports as a child develops, with the goal of greater efficiency and functionality in the use of supports over time.

In educational environments, another essential transactional support is curriculum modification. Although this is not as crucial for children in the preschool and early childhood years as it is for older children,

curriculum modification also is often necessary to support a preschool child's success. For preschool children with more significant language processing limitations, curriculum goals that are primarily language-based may have to be adjusted and or modified, with appropriate supports (eg, visual supports) added to enable the child to succeed to the extent possible in the preschool curriculum.

### **Support to families**

Support to families can be conceptualized in reference to educational support (ie, providing families with the information, knowledge, and skills to support their child's development) and emotional support (ie, enhancing family members abilities to cope with the inevitable stresses and challenges of raising a child with ASD). In the SCERTS Model, it also is recognized that many stresses and challenges experienced by family members may not be attributed directly to the child's behavior or needs. Great stress may be induced by systems of service delivery that parents experience as nonsupportive, disorganized, and in general, not helpful (Domingue, Cutler, & McTarnaghan, 2000).

The great majority of caregivers of children with ASD have had little formal training in child development. However, the most critical social-communicative and socioemotional experiences for most children occur in their interactions with family members, when youngsters are developing the foundations of relationships, are learning the basic elements of communicative exchange, and, eventually, are acquiring more sophisticated socioemotional and communicative abilities. Daily routines and family events provide the experiential opportunities in which children learn and practice these abilities and develop secure and trusting relationships (Prizant & Meyer, 1993). As noted, however, children with ASD are greatly challenged in socioemotional and communicative development, despite the best efforts of loving and well-intentioned family members. Thus, family members are likely to experience frustration and confusion as they try their intuitive best to

engage their children. In the SCERTS Model, efforts are made to mitigate these challenges to family members by addressing causal factors related to limitations in social communication and emotional regulation directly through supportive education/treatment and sharing of resources with families.

In the SCERTS Model, it is emphasized that clinicians and educators must be cognizant of the whole range of possible reactions that family members may experience in raising a child with ASD, in order to best support their efforts. The SCERTS Model is a developmental model for caregivers as well as for children, as it is recognized that the nature and types of emotional support will need to change as caregivers progress in their understanding of and ability to support their child. Parents and caregivers are encouraged to discuss their child's strengths and difficulties, and to articulate the primary concerns and expectations regarding their child's development. When appropriate, caregivers may be asked to share their sense of competence as well as limitations in fostering communicative and socioemotional development. Successful and unsuccessful strategies that family members may have employed to promote social and communicative interactions must also be explored. Information about a child and family's strengths and needs, and family priorities, as gathered in assessment, form the basis from which specific educational/treatment goals are derived. Caregivers are supported in reference to communicative and interactive styles that are most appropriate in enhancing their child's development. Issues discussed earlier such as degree of directiveness and developmentally appropriate language and communicative modeling in everyday routines are important considerations in ongoing support of caregivers. In addition to assistance addressing social communication skills, caregivers are supported in helping their children to develop emotional regulation capabilities. Ongoing assessment of and dialogue with caregivers about a child's reactive style to physiological and emotional factors is crucial. Strategies for the development of self- and

mutual-regulatory capacities within the context of the family structure and routine are also addressed.

In the SCERTS Model, it also is emphasized that clinicians and educators understand various family structures and functions, and how these can be influenced by economic, ethnic, and cultural factors. For example, because of cultural and pragmatic factors, biological parents may not necessarily be the primary caregivers in some families, and thus, other family members such as grandparents or older siblings may play a more active role in education/treatment. When designing educational/treatment strategies to be utilized by family members and integrated into daily family routines, it is critical that recommendations must be compatible with the family's belief systems and sociocultural characteristics (Lynch & Hanson, 1998).

Another important dimension of transactional support in the SCERTS Model is helping parents to think clearly about their priorities, and develop appropriate expectations and realistic, achievable goals for their child's development. Parents are not dictated to, they are respected as having ultimate "ownership" of the decisions that must be made for both the child and family. Professionals have the responsibility of "keeping hope alive" by emphasizing a child's strengths as well as needs, highlighting the potential for positive development and change, and helping to identify developmentally appropriate "next steps." This involves helping parents to learn to recognize and celebrate even the smallest meaningful gains in social-communicative and socioemotional development. The more caregivers are attuned to positive change, the more they are likely to become invested in being actively involved in educational/treatment efforts.

In summary, transactional supports addressed in the SCERTS Model are designed to enhance children's communication and socioemotional abilities in everyday social contexts that a child experiences. Supports may include interpersonal supports, educational supports, and support to family members,

who play such an important role in fostering a child's development. Because of the transactional nature of development (Sameroff & Fiese, 1990), the crucial role played by all caregivers and partners is recognized, with specific efforts directed to development of mutually satisfying and effective social-emotional experiences based on an understanding of a child's and family's needs.

### **ASSURING ECOLOGICAL VALIDITY IN SERVICE DELIVERY**

In the SCERTS Model, it is recognized that a primary challenge for service delivery providers is to address the complex relationships among the acquisition of communicative abilities, socioemotional factors (eg, emotional regulation, development of relationships), and types of transactional supports that predict better social-communicative outcomes for children with ASD. On the basis of a comprehensive review of intervention research on children with ASD, the NRC (2001) concluded that research has demonstrated substantial changes in large numbers of children receiving a variety of educational/treatment approaches, ranging from behavioral to developmental. However, even in treatment studies with the strongest gains, children's outcomes were variable. Service providers are thus faced with the need to determine which educational/treatment approaches or combinations of educational/treatment strategies may be most effective for particular children and families (Prizant & Wetherby, 1998).

The most common reported outcome measures for children with ASD are changes in IQ scores and postintervention placement (NRC, 2001). These measures may not be ecologically valid, because they do not measure changes within natural environments, do not address the core "deficits" in ASD, and are particularly problematic for infants and young children. In determining if an educational/treatment approach is effective, it is important to go beyond traditional "static" measures such as improvement on standardized

tests or school placement, to include broader and more dynamic measures, such as degree of success in communicative exchange, related dimensions of emotional expression and regulation, social-communicative motivation, social competence, peer relationships, and the child's competence and active participation in natural activities and environments. Therefore, assessment cannot be limited to the evaluation of child variables only; it should be extended to contextual and interactional variables (see Prizant & Wetherby, 1998, for further discussion). Service providers need to gather meaningful measures of a child's abilities in order to guide educational/treatment decisions and to determine whether educational/treatment effects are being achieved. This need for more meaningful outcome measures in research on children with ASD was recently recognized by the NRC (2001). It recommended that as priorities, such measures should include (1) gains in initiation of spontaneous communication in functional activities and (2) generalization of gains across activities, interactants, and environments. In other words, enhancing communication and socioemotional abilities for children with ASD entails not only increasing vocal and verbal repertoires, but also increasing many of the dynamic aspects of social communication and social relationships that are targeted as high priorities in the SCERTS Model, so that children are able to participate more successfully in developmentally appropriate activities with caregivers and peers in a variety of contexts.

In summary, the SCERTS Model offers a framework to directly address the core challenges of ASD, focusing on building a child's capacity to initiate communication with a conventional, symbolic system, and to develop self- and mutual-regulatory capacities to regulate attention, arousal, and emotional state. The model provides individualized education/treatment based on a child's strengths and weaknesses guided by research on the development of children with and without disabilities. It incorporates educational/treatment strategies derived from

evidence-based practice of contemporary behavioral and developmental social-pragmatic approaches. Transactional supports are identified and implemented to support young children and their caregivers and to promote generalization of acquired abilities. Progress is measured in functional activities with a variety of partners in the SCERTS Model; thus, the broader context of a child's development is recognized, including family involvement,

and the absolute necessity for supporting communication and socioemotional development in everyday activities and routines. It is hoped that the SCERTS Model will provide a vehicle to motivate professionals to focus efforts on the core challenges faced by children with ASD and their caregivers, and to help to move the field to a new generation of more integrated, comprehensive programs.

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