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## Clinical Implications of Temperamental Characteristics in Young Children with Developmental Disabilities

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### Abstract

Temperament refers to the behavioral style of an individual, or the tendency to behave in a certain way in a certain situation. Although temperament has been studied extensively in typically developing children, relatively little research concerning individual differences in the behavioral styles of young children with developmental disabilities has been conducted. The purposes of this article are: (1) to provide a brief review of the literature with regard to temperament and outcomes for children with developmental disabilities and, (2) to explore methods for integrating temperament information into early intervention practice. Consistent with the research on temperament and goodness of fit (Chess & Thomas, 1996), this article proposes that children with developmental disabilities who present with extreme scores in specific domains of temperament may benefit from specific early intervention practices. Ideas for linking practice with child temperament are presented, particularly for children who are resistant to change, non-persistent, or difficult to distract.

### Keywords

child temperament; developmental disabilities; temperamental characteristics

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The importance of individualizing interventions for children with developmental disabilities has long been a core philosophical value of special education practice. Best practice guidelines in early intervention frequently emphasize comprehensive assessment of a child's strengths, needs, preferences and areas of deficit in order to devise an appropriate and functional individual service plan (Wachs & Sheehan, 1988). Assessment for early intervention is primarily skills-based, providing estimates of developmental functioning across various domains as well as describing the absence or presence of pivotal adaptive behaviors.

What is often missing from early childhood assessments is a mechanism for describing the child as a psychologically complex individual, with a unique behavioral style and personality. Practitioners and parents often discuss a child's tendency to behave in certain ways in certain situations; however, a shared vocabulary of objective behavioral characteristics is sometimes lacking. For example, a child who resists changes in his activities may be described as "stubborn," or a child who has difficulty sustaining

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engagement in activities may be called “a wanderer.” These behavioral labels are not particularly helpful and tend to promote attributions of intentionality to children for behaviors that may arise from a neurobiological predisposition (Affleck, McGrade, Allen, & McQueeney, 1985; Chavira, Lopez, Blacher, & Shapiro, 2000).

How parents, teachers, and therapists think about a child’s behavior strongly influences their interactions with the child (Dix & Grusec, 1985; Mills & Rubin, 1990). Research suggests that when adults view a child’s misbehaviors as intentional, then their response is more likely to be punitive in nature (Miller, 1995; Weiner, 1979). Conversely, when an adult views a child’s misbehaviors as unintentional, then their response is more instructive (Baden & Howe, 1992). What is needed in early intervention assessment is a way of describing child behavior that captures relevant sources of individual differences, recognizes the role of biological and environmental influences on behavior, and provides a common vocabulary for individualizing interventions.

Techniques to accomplish this objective have already been clearly described and extensively studied in typically developing children under the construct of “temperament.”

Temperament refers to an individual’s behavioral style, or tendency to act in certain ways, given certain environmental presses (Chess & Thomas, 1996; Rutter, 1989). Commonly regarded as a result of an interaction between biological predispositions and environmental experience, temperament is also viewed as a basis of later personality development (Buss & Plomin, 1984; Goldsmith & Campos, 1982; Rothbart, 1986; Thomas & Chess, 1977). For children with developmental disabilities, temperament has also been viewed as a key component of social competence (Bailey & Simeonsson, 1985).

Temperament is conceptualized in different ways by different theorists (for a comprehensive review, see Goldsmith et al., 1987); however, most models of temperament include several dimensions of interest including: activity level, persistence, adaptability, approach-withdrawal, distractibility, and emotionality. See Table 1 for definitions of temperament dimensions commonly used in pediatric practice.

## RESEARCH ON TEMPERAMENT AND TYPICALLY DEVELOPING CHILDREN

Temperamental styles have been studied intensively since the 1950s by developmental psychologists, psychiatrists, and pediatricians. Many studies on temperament in typically developing children have been published. There is much evidence of stability of temperament across developmental periods (Caspi et al., 1995; Chess & Thomas, 1996; Matheny, Wilson, & Nuss, 1984). Temperament has been linked to many significant physical, psychological, and social outcomes for the child. In the physical realm, temperament has been shown to be a significant predictor of the general health of the child (Carey, 1985), the frequency of sleep problems (Weissbluth, 1987), and the tendency for accidental injury (Nyman, 1987; Schwebel & Plumert, 1999). In the psychological realm, temperament has been associated with the child’s resiliency under stress (Rutter & Quinton, 1984; Smith & Prior, 1995), development of specific problem behaviors (Cameron, 1978; Chess & Thomas, 1996), delinquency (Brier, 1995), and academic achievement (Keogh, 1986). Socially, temperament has been related to the quality of mother-child attachment

(Lerner & Lerner, 1986), quality of teacher-student interactions (Paget, Nagel, & Martin, 1984), and child-caregiver interaction (Crockenberg, 1986). Temperament has also been shown to be related to acceptance by peers in preschool (Eisenberg et al., 1993) and early adolescence (Nitz, Lerner, Lerner, & Talwar, 1988).

Several anticipatory guidance programs have been developed by pediatricians, psychologists, and social workers with the purpose of assisting parents of challenging children to prevent and manage problem behaviors (Cameron & Rice, 1986; Carey, 1985). Within these programs, information about a child's temperament is used to identify situations that may be especially challenging to the child. The caregivers are provided with various strategies for preventing problem behaviors in these high-risk situations. For more information on anticipatory guidance programs, see Cameron et al. (1994) and Carey & McDevitt (1995).

## **RESEARCH ON TEMPERAMENT AND CHILDREN WITH DEVELOPMENTAL DISABILITIES**

Relatively little work has been conducted regarding the clinical applications of temperament assessment in children with developmental disabilities. Chess and Korn (1970) suggested over three decades ago that child temperament was associated with the development of behavior disorders in children with developmental disabilities; however, the area has received relatively little attention. The reader is referred to Goldberg and Marcovitch (1989) and McDevitt (1988) for reviews of temperament research in developmental disabilities.

Most research in temperament and developmental disabilities has focused upon describing the temperamental characteristics observed or reported within special populations. Extensive variability in temperament characteristics within diagnostic subgroups has been shown in infants who were born prematurely (Washington, Minde, & Goldberg, 1987), infants who present with mild developmental delays (Van Tassel, 1984), young children with neurological impairments (Heffernan, Black, & Poche, 1982), and children with autism (DiLavore, 1990; Hepburn, 2000). Some tendencies towards extreme temperament scores in specific dimensions are noted in some diagnostic groups. For example, two-year old children with autism were reported to be significantly less adaptable than age-matched peers with other developmental disabilities (Hepburn & Rogers, 2001). Children with learning disabilities are often perceived by their teachers as being non-persistent and somewhat withdrawn, although this is also a very heterogeneous group with regards to temperament (Bender, 1987; Cardell & Parmar, 1988).

In contrast to the individual variability in temperament scores within the above groups, other developmental disabilities with a specific genetic etiology have been shown to be associated with specific temperament profiles. For example, compared to individuals with nonspecific mental retardation, individuals with Rubinstein-Taybi syndrome have been shown to present with significantly low persistence and positive mood (Hennekam, Baselier, Bayaet, Bos, et al., 1992). As a group, children with Fragile X Syndrome tend to be more distractible, active, slow to adapt, and non-persistent than children with typical development (Bailey et al., 2000; Hepburn & Rogers, 2001). Studies of children with Down syndrome are somewhat

contradictory with some studies reporting descriptions of children with Down syndrome as more approachable, more positive in mood, and less persistent than typically developing children (Gunn & Cuskelly, 1991; Ratekin, 1996), and other studies suggesting that these infants are more difficult in temperament than has been previously noted (Gunn & Berry, 1986).

A more limited body of work has examined the apparent impact of child temperament on social and behavioral adjustment in children with developmental disabilities. Keogh and Burstein (1988) found that positive temperament characteristics were associated with increased peer interactions for preschoolers with developmental disabilities; however negative temperament characteristics were associated with higher frequency of teacher interactions. Low adaptability and low persistence have been related to the development of aggressive and disruptive behaviors in young children who were born prematurely (Schraeder, Heverly, & Rappaport, 1990). LaVigne, Nolan, & McLone (1989) reported a strong association between overall problem behavior scores and difficult temperament in children with spina bifida. Many writers have theorized that child temperament may be an important factor in the behavioral variability observed in children with autism spectrum disorders (Eaves, Ho, & Eaves, 1994; Konstantareas & Homatidis, 1989; Kasari & Sigman, 1997); however, there are few empirical investigations in this area. In one longitudinal study of 38 preschoolers with autism, mothers' ratings of low adaptability were associated with child behavior problems during the preschool years as well as at the approximate age of school entry (Hepburn, 2001). In another study of child characteristics and outcomes, adaptability and emotionality (as measured by the Childhood Autism Rating Scale) were strongly related to response to treatment in preschool children with autism (DiLalla & Rogers, 1994). Kasari and Sigman (1997) reported that children with autism who presented with a more difficult temperament style were less responsive to their parents in social interactions. In addition, parents of these children reported more parenting stress.

There is substantial evidence that child temperament influences parenting stress in families of children with developmental disabilities (Bristol & Schopler, 1984; Beckman-Bell, 1981). In a study of over 100 preschool children with autism, low ratings of adaptability, persistence, and distractibility were strongly related to increased parenting stress (Hepburn, 2001). Mothers of children with Down syndrome who are rated as low in persistence also reported increased parenting stress (Gunn & Cuskelly, 1991). For fathers of children with developmental disabilities, increased parenting stress was more strongly associated with the child's temperament than with other factors, such as social support or general demands of parenting (Krauss, 1993).

## **CLINICAL RELEVANCE OF CHILD TEMPERAMENT IN SPECIAL EDUCATION PRACTICE**

For practitioners in the area of developmental disabilities, the clinical relevance of child temperament has been underemphasized and warrants more attention than it has thus far received for several reasons. First, research demonstrates that children with developmental disabilities are at equal or even greater risk of developing problem behaviors than typically-developing children (Borthwick-Duffy, 1994; Jacobson, 1982). Therefore, the anticipatory

guidance approaches recommended by pediatricians to parents of typically developing children may have even greater potential for assisting parents of children with special needs.

Second, child temperament has been shown to influence parental responsivity in families of typically developing children (Bates, Maslin, & Frankel, 1985). Parental responsivity is very important in the development of early social and communicative skills for children with disabilities, particularly those with significant impairments in social relating (Kasari & Sigman, 1997). Therefore, helping parents to understand how their own behaviors are affected by the behavioral styles of their children may be very important for promoting consistent, supportive responsivity within parent-child interactions.

Third, in families with a child with a disability, a difficult child temperament has been shown to be related to increased parenting stress (Hepburn, 2000; Konstantareas & Homatidis, 1989). Considering that child temperament is at least partially biologically driven, parenting stress may be reduced by recognizing that some problem behaviors are related to the biological predisposition of the child.

Fourth, understanding a child's temperament may be very useful in determining the type of services, instructional format, intensity, and demand level that are appropriate for a specific child. Many writers have discussed the importance of "goodness of fit" between child and environmental demands in promoting self-esteem, learning, and social adjustment (Carey, 1998; Keogh, 1986; Martin, 1992). For children with developmental disabilities, temperament-related classroom strategies (such as providing exercise to children with high activity levels) can be very helpful in promoting active participation in school activities (Rothbart & Jones, 1999). Child temperament has also been shown to be an important factor in teacher recommendations regarding placement, educational modifications, and inclusion (Pullis, 1985).

## IMPLICATIONS FOR PRACTICE

The remainder of this article will focus on specific implications of assessing child temperament for early intervention practice. Beginning with a brief section on how to assess and interpret a child's temperament, the discussion will then focus upon recommendations for working with children with developmental disabilities who demonstrate extreme scores in three dimensions: low adaptability, low persistence, and low distractibility. These three dimensions were chosen for emphasis due to their prevalence as problem areas for parents of children with a variety of developmental disabilities including: autism, Down syndrome, language delays, Fragile X syndrome, and idiopathic developmental delay, as described above.

### Assessing Child Temperament

Several assessment tools have been validated with typically developing children; however, only a few have been empirically examined in children with developmental disabilities. The reader is referred to Kohnstamm, Bates and Rothbart (1989) for a review of measures. Two measures emerge as particularly relevant for clinical applications for children with developmental disabilities, including the Carey Temperament Scales (Carey & McDevitt,

1996) and the Temperament and Atypical Behavior Scales; TABS (Neisworth, Bagnato, Salvia, & Hunt, 1999). Both measures rely on parental report, thus capturing a large sample of observations of child behavior across many different situations. Both measures also provide normative data and cut-offs for atypical scores on dimensions of temperament. Dimensions in the Carey system are based upon the work of Thomas and Chess (1977; 1986; 1996) in their landmark longitudinal study of child temperament and include: activity level, approach/withdrawal, adaptability, distractibility, and persistence (see Table 1). Factors of the TABS focus upon atypical styles and include: detached, hyper-sensitive/active, underreactive, and dysregulated. The focus on typical versus atypical patterns of behavior is the most important distinguishing characteristic of the two assessment tools. The Carey Scales were developed for use with typically developing children and subsequent independent studies have supported their use with special populations (Hepburn, 2000; Ratekin, 1996; Vaughn et al., 1987). In contrast, the TABS was developed specifically to screen children for self-regulatory difficulties which may be associated with developmental disabilities. The goals of these two tools are also somewhat distinct. The Carey Scales were devised to describe a child's behavioral propensities in an effort to promote a "goodness of fit" between the child and the environment, whereas the TABS was designed to support a behavioral classification system for regulatory disorders and to help describe neurobehavioral phenotypes in early childhood (Bagnato & Neisworth, 1999). Both tools have been shown to be easy to administer, interpret, and apply to clinical challenges. Recommendations in this paper refer to the temperament model developed by Thomas and Chess and assessed via the Carey Scales; however, these ideas could be generalized to other temperament measures.

Assessing child temperament does not need to be labor-intensive. Valid and reliable information can be gathered via parental interview, which requires scoring the questions and interpreting the profile. Computerized scoring programs are often available. Discussing the findings with parents, caregivers, teachers, and therapists is an important part of the assessment process. The evaluator generally describes the child's behavioral style by focusing on extreme scores (first by highlighting strengths, then by describing areas of difficulty). For example, a common profile for a young child with autism includes low adaptability and high persistence. The evaluator might present an interpretation of the persistence dimension first by saying "From your report, it seems like your child is able to persist—or keep trying—especially during his favorite activities. This is a real strength." Then, the evaluator highlights a dimension that reflects difficulty: "What we also see is that your child tends to resist changes in activities and often has trouble with transitions. We call that "low adaptability" and we can discuss some ways to help your child with that."

In interpreting child temperament with a parent or teacher, it is very important to rely on their words or observations to describe the behavioral style of the child. It is also important to discuss the biological aspects of temperament: the child may be predisposed to respond to certain situations in certain ways. Thus, intervention approaches incorporate two avenues of change: (1) *accommodations*, or preventative strategies the adults use to reduce the impact of a certain behavioral propensity; and (2) *acquisition of coping skills*, involving educational approaches to teaching the child to manage or modify his or her behavioral propensity. By

simultaneously aiming to change adult behavior (accommodations) and child behavior (acquiring coping skills), developmentally appropriate and individually sensitive behavioral gains can be fostered and generalized. Helping parents to determine when to accept their child's behavior at a particular developmental stage and when to actively attempt to remediate the behavioral difficulty is an important part of early intervention.

### **Clinical Implications of Extreme Temperament Scores**

**Working With Children Who Are Low in Adaptability**—Adaptability refers to an individual's ability to adjust his or her behavior to fit a change in the environmental context—new people, new activities, new expectations, new situations. It has long been recognized that many children with autism have difficulty adapting to changes (Kanner, 1943); however there is evidence that many children with other developmental disabilities and language impairments also present with low adaptability (Rapin, 1996). Problems with adaptability appear to relate to difficulties in executive functions or cognitive planning abilities, which are actively involved in integrating new information to formulate goal-directed behaviors (Ozonoff, 1995). The executive function most closely related to adaptability is probably cognitive flexibility or set-shifting.

Many intervention approaches that are commonly used to educate children with autism are particularly effective for children with difficulties adapting to changes in routines, activities, social context, or demand level. The TEACCH model (see Mesibov, Schopler, & Hearsey, 1994) incorporates many interventions that promote adaptability, including: visual schedules, transition routines, advance warnings of changes, and work-break routines. Structured teaching, an important instructional component of the TEACCH model, is designed to provide predictability for the student, thereby reducing anxiety and frustration and facilitating engagement in learning activities. For more detail on the intervention approaches utilized in TEACCH, see Lord & Schopler (1994). Flannery & Horner (1994) also describe interventions aimed toward promoting predictability for children who have difficulty with adaptability. Here are a few suggestions for working effectively with children who present with low adaptability:

**Use Visual Schedules**—Post a visual representation (e.g., pictures, words) of the order of activities in the day and review it with the child each day. This provides predictability and facilitates transitions. Make the schedule interactive, so that the child marks the next activity in some physical manner (i.e., taking a card down or sliding a pointer to a particular card). There are several creative ways to use visual schedules and the reader is referred to Hogdon (1995), Krantz & McClanahan (1998), and Quill (1997).

**Provide Advance Warnings**—Develop a routine to provide a warning to the child in advance of a change. This allows the child some time to adjust to the impending change, which may include being a little distressed. However, once the child recognizes the routine, some of the anxiety around transitions often reduces significantly. An example: Approach the child, holding two fingers up (like a peace sign) and say “Two minutes. We will stop in two minutes.” Walk away and allow the child to adjust. Return to the child and say “It's

time to...” and provide a gentle motor prompt if necessary to initiate the transition. Always follow through once you say the words “it’s time to.”

**Use Key Words to Signal Changes**—Particularly for children with receptive language difficulties, using the same word to signal a change can be helpful. For example, saying: “this is *new*,” pausing for the child to process the information as you introduce the new object or activity.

**Teach the Child a “Finished” Routine**—A finished routine often involves specific physical behaviors (such as placing materials in a “finished box” to indicate completion of a project) as well as communicative behaviors (such as signing “all done”). Graduated guidance, or a systematic approach to fading physical prompts while avoiding verbal prompting, is a very helpful way to teach a child the component behaviors of a finished routine. Once the child masters the routine, he or she can initiate the completion of activities, which is the first part of mastering a transition. In addition, add a visual cue depicting the activity that comes next so that the child may be eased into the transition to the next activity more easily. Considering that many interfering behaviors may occur because children do not know what else to do, teaching specific appropriate transition behaviors can fill the vacuum that may otherwise inspire dysregulated behavior.

**Frequently Introduce New Materials, Activities, and People**—Contrary to the tendency to “protect” children from distress, it is very important to present lots of opportunities for changes and transitions to young children who have low adaptability *within a clear and predictable routine*. The idea is to provide practice in lots of small ways so that the children begin to develop strategies for regulating the arousal that may come with changes. For example, if a child is overly attached to one particular teacher, it will be very important to introduce other adults, pairing them with the “familiar” teacher, and then fading the “familiar” teacher out of the situation for small amounts of time. (To prevent this dependence from occurring, be careful not to dedicate specific personnel to specific children, as this narrows the child’s scope of social interaction and reinforces behavioral inflexibility.) In addition, it can be helpful for some children to change settings, (e.g., parts of a classroom or rooms in the house) when you change activities. This is particularly important when your expectations for child behavior are different for the new activity. The new setting helps to establish a new starting point for the child and can be associated with different contingencies than the previous setting.

**Teach Functional Communication**—For children who have low adaptability, one can hypothesize that they may be intrinsically motivated to communicate a few key concepts, such as: “I like what I’m doing, I don’t want to change.” Basically, this communication can be interpreted as a rejection. Teaching children to appropriately reject a transition or an activity is a very functional goal, as transitions and task avoidance are often reported by parents as precipitators of behavioral outbursts in children with disabilities (Dunlap, Robbins, & Darrow, 1994). Appropriate rejections include: shaking head to indicate “no,” verbalizing “no,” gently pushing an object away, or handing the object back to an adult. As with all efforts to teach communication, adults must begin by honoring each and every



appropriate rejection. Once the child demonstrates mastery of the communication, the adult should acknowledge the child's intent and then vary whether or not the child can veto the change or end the activity (depending upon the adult's discretion). For more information on teaching functional communication to decrease problem behavior, see Carr & Durand (1985).

**Anticipate Potential Problem Behaviors**—One of the most effective ways of preventing problem behaviors from occurring is to identify specific situations which may be particularly challenging for the child and therefore pose a relatively high risk for maladaptive responding (Koegel, Koegel, Frea, & Smith, 1996). Clinicians can then formulate a prevention plan for these specific events, avoiding the expression of unwanted behaviors and increasing the likelihood that the child will use adaptive behaviors that can be reinforced. Recognition that a child is slow to adapt leads to some hypotheses concerning potentially difficult situations for maintaining appropriate behavior. These situations include: transitions between activities, introduction of new people, changes in routines, special occasions or events, violations of rules or expectations, and inconsistent adult responses. In addition to the ideas listed above, other prevention strategies include: distracting the child, increasing the reinforcement prior to and during the change, decreasing expectations during expected stressors, and allowing time for the child to re-establish an emotional equilibrium before responding.

**Provide Transition Objects**—Many children negotiate transitions much more effectively when given the opportunity to carry a favorite object from activity to activity. Transition objects (such as blankets or favorite objects) are often recommended for typically developing children due to the emotional security that comes from holding something familiar (Carey, 1985). For children who resist "giving up" their transitional objects at the appropriate time, it might be helpful to place a special container in a specific spot at each activity site. As part of their transition routine, these children are encouraged to place their transitional object in the special container, where they will retrieve it upon completion of the activity. Given consistent implementation of this routine, anxiety about putting the object down should decrease over time. In addition to using transition objects, transition cards or pictures can also be used to ease transitions and clarify the child's schedule of activities.

## WORKING WITH CHILDREN WHO ARE LOW IN PERSISTENCE

Persistence is defined as the ability to sustain attention and effort on a task or activity, even in the face of obstacles (Chess & Thomas, 1996). Persistence has been linked with mastery motivation, which has been shown to be associated with acquiring new skills and practicing skills in various environments without explicit external reinforcement. Persistence sometimes invokes problem-solving behaviors; when one reaches an obstacle, one needs a strategy for managing the obstacle. Therefore, teaching the child some basic problem-solving strategies that can apply to numerous situations (such as asking for help) can be extremely useful. Here are some specific recommendations for working with children who are low in persistence:

## Teach Functional Communication

As eluded to above, young children with disabilities may abandon a task or activity when it becomes difficult; therefore, it will be helpful to teach them a functional way to ask for help. Nonverbal methods can be quite useful, as the adult can prompt the child through the request and then immediately provide the assistance. Examples of nonverbal ways to ask for help include: giving an object to someone (ideally, paired with coordinated eye gaze), making a sign for “help,” or pointing to the object or activity. When the child demonstrates the request (prompted or spontaneous), the adult should say, “Help. You want help” and immediately assist so that the communication is reinforced naturally. To effectively teach this concept, the adult may need to sabotage the environment in several ways so that the child is motivated to ask for help and practice the skill across many different contexts. Prizant, Wetherby & Rydell (2000) clearly describe this “communicative temptations” approach to fostering communication in young children with autism.

## Develop Tasks and Activities with Clear Endpoints

Provide a visual cue to indicate when the task is finished or when the activity will be over. Examples for particular activity times are described below.

**Circle time**—(1) Use a dry erase board to draw an empty circle and gradually color it in as the child attends in a group situation (once the circle is full, the child can leave); or (2) design a “time strip,” which is a series of 5 velcro dots across a piece of construction paper, place the child’s photo on the far left and a picture of the next activity on the far right, as the child participates in the current activity, move his or her picture closer to the next activity; or (3) use a visual or auditory timer; when the timer indicates the end of the activity, say “we are finished” (and for some children provide a sign or gesture) and guide the child to leave the activity. A set routine is very helpful for promoting predictability and encouraging participation.

**Art, pre-academic, fine motor activities**—(1) Make open-ended tasks closed-ended (for example, give the child just enough materials to do an activity and when the materials are gone, the task is over; or provide choices between two items instead of multiple items); (2) give the child a visual model of a completed task; (3) use a finished box for completed work; (4) use visual templates to guide the child through each step of the activity.

## Provide a Hands-On Component to Language-Based Activities

Often, young children who have difficulty understanding language have difficulty engaging in group interactions, such as circle time. Providing these children with a nonverbal means of participating in group time can facilitate participation. Examples:

- a. Use feltboard characters for story time and take turns placing them on the board.
- b. Guide child through a matching activity using the concepts covered in group
- c. Give the child a puzzle with a theme similar to the story’s theme
- d. Include many active and object-oriented activities in group

- e. Vary the physical position across activities (e.g., standing, sitting in a chair, sitting on the floor)

### **Reinforce the Child for Attention and Effort More Frequently**

Children who are low in persistence may not have intrinsic motivation to participate in certain activities; additional reinforcement may be necessary to sustain their involvement. It is important that the reinforcement be as natural to the situation as possible and that it be delivered frequently and immediately following appropriate engagement. For children who demonstrate a lot of social interest and pleasure in social interactions, the clinician can utilize his or her interaction style to motivate the child to remain focused on the task at hand. For children who demonstrate less social interest, it can be helpful to discover what they are interested in and to incorporate those interests into the educational tasks. For example, a young child who is fascinated by trains may demonstrate more persistence in a cooperative play activity involving trains than farm animals. If you are uncertain as to the child's interests or what kinds of activities may motivate him or her, consider conducting brief reinforcer assessments as described by Leaf & McEachin (1999).

### **Analyze the Child's Persistence Across Various Activities**

Try to identify the activities within which the child sustains engagement, determine the features that encourage the child's involvement, and try to insert these features into other activities. For example, if the child is more persistent in activities with a hands-on component, then build this aspect into other activities. For some children, the social context affects persistence and they may sustain their efforts when other children are doing the same activity.

### **Present Activities That Are Developmentally Appropriate**

Children need to feel successful in order to keep trying; therefore, if a task is too difficult, they may abandon it quickly. Choosing skills that are either mastered or are emerging for children (as opposed to completely absent from their repertoire) is important. In addition, each child's daily curriculum should include lots of practice on mastered tasks and relatively less exposure to tasks of greater difficulty.

### **Provide the Child with Enough Support to Practice Skills Correctly**

Using errorless teaching techniques (which provide prompting and support so that the child succeeds with each attempt) is a good way to sustain engagement and promote persistence (Colvin & Horner, 1983; Duffy & Wishart, 1994). Techniques such as silent physical prompting, back-chaining, and setting up materials so that the child's response is likely to be correct are examples of errorless learning techniques (Howard & Williams, 1991). The idea is to increase the child's exposure to correct responses and to decrease his or her experience with failure. Repeated practice of the correct response builds sequencing skills and decreases frustration. Supports can be faded over time as the child demonstrates progress with the task.

### **Keep Activities Brief and Institute a Work-Break Routine**

Understanding how long a child usually engages in an activity before losing interest is an important beginning to expanding persistence. Most young children with developmental disabilities need help mastering a “work set,” or the basic behaviors needed to attend to instruction. To build these skills, begin with a work period that is less than the amount of time a child usually attends and develop a routine of focused effort (i.e., work) followed by unfocused activity (i.e., break). Use visual cues, gestures, and simple language to signal the transition between “work” and “break.” Employ a predictable routine wherein the child alternates between work and break and gradually expand the amount of time in “work” before transitioning to “break.” It is important for the adult to read the child’s cues in order to initiate a transition to break before the child spontaneously ends the task. It is also helpful to teach the child to communicate his/her desire for a break, perhaps by signaling “all done” (via sign language, gesture, or verbalization). Sometimes providing the child with an appropriate escape route through communication is enough to encourage a more sustained effort in the learning activities at hand.

### **Anticipate Potential Problem Behaviors**

Recognition that a child is not very persistent in the face of obstacles leads to some hypotheses concerning potentially difficult situations for maintaining appropriate behavior. These situations include: long activities, difficult tasks, group work, activities that require waiting, open-ended activities, broken or lost materials, and unclear expectations. In addition to the ideas listed above, other prevention strategies include: taking frequent breaks, having back-up materials available, adding structure to the task, distracting the child during waiting periods.

### **Establish Predictability**

Many of the techniques described in the previous section on adaptability are also relevant for children with low persistence. Use of a visual schedule, development of specific routines for specific activities, and establishing clear expectations within each activity can help to promote persistence.

## **WORKING WITH CHILDREN WHO ARE LOW IN DISTRACTIBILITY**

“Distractibility” describes a child’s propensity to shift attention within activities and to engage in social interactions rather than the task at hand. Interestingly, most of the pediatric literature describing anticipatory guidance approaches addresses children who are highly distractible, or tend to move quickly from one activity or interaction to another (Carey, 1985). The pediatric literature neglects describing how to interact with children who are extremely low in distractibility, or are so overly focused as to be socially disengaged. In our research on temperament and developmental disabilities, we’ve observed that children who are extremely low in distractibility (notably children with autism and children who are developmentally very young) are among the most challenging to teach and to parent (Hepburn, 2001; Hepburn & Rogers, 2001).

The following recommendations are offered as techniques for gaining the attention of a child who is overly persistent or intensely focused on objects.

### **Build Your Relationship with the Child**

Ensure that your bids for the child's attention do not all focus upon task demands or difficult transitions. Spend time developing a repertoire of pleasurable and fun activities within which to engage the child. Consider building a greeting routine, or a social game that you play in the first few minutes of interaction (see Rogers, 1999). Also, consider imitating the child's actions with identical materials in order to engage his/her attention in a pleasant, reciprocal manner (Dawson & Galpert, 1991).

### **Use Sensory-Social Routines to Initiate Interactions**

Sensory-social routines are predictable, pleasurable interactive routines wherein both the child and the adult have a specific role in the routine, thus facilitating an opportunity to scaffold increased child involvement over time (Rogers, 1999). Examples of sensory-social routines include: tickle games, movement routines, songs, and high-five routines. Sensory-social routines are very useful for obtaining the attention of the child as well as helping to regulate the child's overall arousal level.

### **Insert Yourself into the Child's Ongoing Activity**

One effective way of gaining a child's attention is to join him/her in play and make yourself an integral part of the scheme. For example, if the child is building with legos, pull the blocks into your lap so that the child needs to communicate with you to obtain more blocks. If the child is not engaged in any functional activity, approach the child with a favorite toy or activity and develop a give-and-take routine with the object. Or, place the object in a clear container so that the child can see it, but needs you to open the box. Then, you can prompt some nonverbal communication from the child prior to opening the box. Another option is to present a toy or activity that requires your help to make it work; for example, a cause and effect toy with a difficult switch.

### **Introduce Yourself Gradually**

Some children require a longer "warm up time" than others, and for particularly timid children, consider sitting nearby and not doing anything for a few minutes but watching the child with interest. Keep verbal interaction to a minimum in the beginning of the interaction and respond to any social bids from the child, no matter how subtle or ambiguous. For example, some children initiate socially by placing an object near an adult, or by handing an adult something without looking at him or her. Accept these overtures and gradually require better and better attempts to interact.

### **Do Something Fun in View of the Child**

A common sense, but often neglected approach to engaging children, is to initiate an activity that is compelling for them and wait for them to come to you. Examples include: bubble play, water play, and other age-appropriate, stimulating activities. Joining in others' activities is an early form of social initiation which is very important for young children with

developmental disabilities to master. Give the child a few minutes to join you; if the activity is not interesting enough to warrant exploration, try another.

### **Provide More 1:1 Instruction and Less Group Instruction**

For children who have difficulty shifting attention, minimizing distractions can help to appropriately focus engagement on a specific task or activity. More adult involvement may be necessary initially to promote active engagement; therefore, 1:1 instruction may be critical for developing appropriate attending behaviors to one event before requiring the child to simultaneously attend to the multiple events inherent to group work.

### **Anticipate Potential Problem Behaviors**

Recognition that a child is overly focused (i.e., “in his own world”) leads to some hypotheses concerning potentially difficult situations for maintaining appropriate behavior. These situations include: interrupting the child from a favorite activity, transitioning a child from break to work, redirecting repetitive behaviors, and engaging in or sustaining peer interactions. In addition to the ideas listed above, other prevention strategies include: giving advance warnings, work-break routines, visual schedules, and peer training in maintaining interactions.

### **Limit Extraneous Social Bids**

It is very important not to flood the child with prompts, requests, or bids for interaction. Behavioral theory would suggest that each time an adult makes a social bid that is ignored by the child, the strength of the connection between adult prompts and child responses weakens. It is far better to initiate fewer bids and prompt appropriate responses from the child, thus strengthening the behavior chain underlying adult-child interaction. The main idea is to give the child more practice responding appropriately to adult bids and to provide fewer opportunities for the child to practice ignoring the adult.

## **OTHER DIMENSIONS OF TEMPERAMENT TO CONSIDER**

Although it is beyond the scope of this article to explore in depth each aspect of temperament and corresponding intervention strategies, it may be helpful to mention a few key principles inherent to other dimensions.

### **Activity Level**

**High (or very active child)**—Interventions we have found useful include: (1) creating specific areas for physical activity and providing frequent and predictable access to those areas; (2) incorporating long walks, runs, or other forms of exercise into the daily routine, particularly before and after sedentary activities; (3) consultation with an occupational therapist to construct a schedule of activities that optimizes arousal and attention (Osaki, 2000).

**Low (or very passive)**—Same as above, but for different reasons. Whereas exercise is provided as a release for children with high activity, it functions to aid in activation of children with low activity levels. Exercise and movement can serve as forms of behavioral

momentum, which help to bring the child's arousal level "up" to optimal levels (Osaki, 2000).

### Rhythmicity

**Low (bodily Junctions are dysregulated)**—This dimension is particularly relevant for children who have sleep problems, do not eat at regular times, and do not have bowel movements at predictable intervals. Interventions for these behaviors are very child-specific, but may include the following elements: (1) establishing consistent routines around bedtimes, mealtimes, and toileting opportunities (when training begins); (2) paying attention to lifestyle issues, such as availability of regular exercise and provision of a healthy diet; (3) seeking medical consultation to determine possible physical conditions that are interfering with the establishment of regulated bodily functions. For more information on sleep problems and children with developmental disabilities, see Durand (1999).

### Approach/Withdrawal

**Low Approach/High Withdrawal (avoiding novelty)**—Many children appear shy, or initially resistant, to meeting new people, being in a new place, or playing with new toys. For most children, this avoidance disappears as they become better acquainted with the novel event. Intervention, therefore, often focuses on allowing a temperamentally shy child to observe novel events from afar and to slowly "warm-up" before asking them to actively engage with the new activity or person. A gentle, reassuring style can be very helpful in encouraging the child to get physically closer to the new toy (or person), with no demands for actual engagement. For some children, new toys, foods, and tasks will need to be presented many times before the child attempts to use them. Similarly, new people may need to be introduced very slowly, first as observers and then as playmates. Presenting one new toy at a time and providing access to a familiar toy after the unfamiliar toy can be helpful.

**High Approach/Low Withdrawal**—For many other children, interest in new people and activities is an area of strength and can be very helpful in fostering the learning of new skills. This may be particularly apparent in working with young children with Down syndrome, for whom social interest is often a strength. The pleasure of interacting with the clinician may be sufficient for motivating some children to engage in learning activities, which can help considerably with instruction in both classroom and home environments. However, some children who are high in approach can become distracted by their interest in people and neglect to attend to other aspects of the teaching situation (Kasari & Freeman, 2001). For these children, low persistence and high distractibility may be observed as a consequence of their attentiveness to the social aspects of a teaching interaction (Ruskin et al., 1994; Wishart, 1996.) For these children, it can be helpful to minimize language use during teaching activities, provide graduated physical prompts to teach new skills, and alternate non-social activities with socially rich interactions.

### Intensity

**High (very emotionally reactive)**—Emotionality is one of the temperament dimensions that has been strongly associated with biology (Goldsmith et al., 1987) and children who are rated as high in intensity may have particularly explosive and excessive tantrums (Chess &

Thomas, 1996). Recognizing that the intensity of a child's emotional reactions may be biologically influenced can help parents and teachers to cope with the explosions of emotion such children can exhibit. Interventions for emotionally intense young children include: (1) identifying antecedents for their outbursts via functional analysis of behavior and using positive behavioral support strategies; (2) responding in a neutral manner during tantrums and focusing on maintaining the child's safety; (3) minimizing language when the child is upset and not attempting to actively teach during emotionally intense displays; (4) developing a consistent response to explosive behaviors via functional analysis and positive behavioral supports. As children grow older, interventions can include teaching specific coping skills, focusing on impulse control, and developing problem-solving strategies for managing extreme emotional experiences.

## Mood

**Negative (irritable or unhappy)**—Mood is another aspect of emotionality, but, in contrast to intensity, mood refers to the child's predominant emotional state or overall disposition. Assessment of situations or events that are associated with positive and negative moods is an important step in devising interventions, which can include: (1) increasing the child's experience of situations and events that appear to contribute to a positive mood; (2) modifying situations associated with negative affective displays; (3) alternating activities by child's affective response; (4) keeping activities brief and predictable; (5) teaching the child an appropriate communication for rejecting an activity; and (6) consideration of possible environmental, medical, or physical conditions that may be contributing to the child's mood.

## Threshold of Responsiveness<sup>1</sup>

**High (child is under-responsive to sensory input)**—Occupational therapists are particularly helpful in designing interventions for children with extreme scores on this dimension. In general, children who are hypo-responders (i.e., under-responsive), may not feel pain like other children and may seek stimulation in somewhat extreme ways. Low scores in this dimension have been related to self-injury in 4–6 year old children with autism (Hepburn, 2000). Possible interventions include: (1) provision of appropriate sensory input which meets the child's needs in a consistent, predictable manner (i.e., a sensory diet); (2) functional assessment of the conditions under which inappropriate sensory-seeking behaviors occur; (3) development of a plan to prevent inappropriate sensory-seeking behaviors which includes: communication training, replacing inappropriate behaviors with appropriate behaviors, and rewarding the child for appropriate behaviors.

**Low (child is overly responsive to sensory input)**—Children who are hyper-responders may avoid specific sensory experiences. Intervention often requires functional assessment and careful creation of a plan aimed toward preventing overstimulation while also teaching the child to cope with various kinds of stimulation (Myles, et al., 2000; Osaki, 2000). Specific interventions may include: (1) desensitization, or gradually exposing the child to more and more of the stimulus while supporting him/her to cope with it effectively;

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<sup>1</sup>This dimension has limited reliability of measurement in young children with and without disabilities (Carey & McDevitt, 1998; Hepburn, 2000)



(2) prevention, or attempting to limit the intensity of the child's exposure to the aversive stimulus (for example, for a child affected by loud noises, giving her headphones to wear during loud activities).

## CONCLUSION

Clinicians and educators recognize that understanding the preferences, dislikes, and learning style of a child with a disability is an important precursor for planning interventions. Temperamental information is another way of providing the information needed to modify learning environments, set reasonable expectations, anticipate potential problems, and choose appropriate teaching strategies. Understanding a child's temperament has many clinical implications for various clinical contexts, including assessment and diagnosis, direct interventions with the child, and family-focused interventions. For example, given temperamental information, evaluators can estimate the appropriate duration of testing activities, determine the amount of structure and scaffolding needed to complete developmental testing, and develop an interactive style that helps the child to feel comfortable. For those who provide direct therapy or instruction to young children, temperamental information is especially useful for designing interventions to incorporate appropriate amounts of support and challenge to promote progress. For families, understanding a child's temperament can help them to formulate accurate attributions for the child's behavior, as well as to devise specific prevention strategies aimed towards reducing problem behaviors.

It is also important to consider the limitations of temperamental information. First, parental report of temperament is not an unbiased report of child functioning; however, as Bates (1980) suggested, the deficits in objectivity may be less important than understanding the influences of subjectivity. Understanding how a parent views a child's behavior can be very helpful in practice. Second, temperament is not purely independent of behavior, but refers to behavioral propensities, or behavioral tendencies. Measuring temperament should not, therefore, replace taking objective data on specific behaviors. Temperamental information is useful for developing a broad understanding of a child's behavioral style; it does not reflect small changes in specific behaviors. Temperamental information, therefore, would not be useful in an ongoing assessment of the effectiveness of a specific intervention.

The emphasis of this article is to introduce a temperament framework as a means of considering important individual differences among children who have developmental disabilities. It presents one way of conceptualizing the individualization of interventions and certainly does not account for all of the variability between children with similar conditions. For families of children with disabilities, discussing child temperament may be a way of focusing on strengths and emphasizing the uniqueness of individual children. According to one parent who participated in a temperament-focused parent training intervention for families of children with autism, "It's refreshing to talk about who my Nathan is as a person and not as a kid with autism."

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## References

- Affleck H, McGrade BJ, Allen DA, McQueeney M. Mothers' beliefs about behavioral causes for their developmentally disabled infant's condition: What do they signify? *Journal of Pediatric Psychology*. 1985; 10(3):293–303. [PubMed: 2416899]
- Baden AD, Howe GW. Mother's attributions and expectancies regarding their conduct-disordered children. *Journal of Abnormal Child Psychology*. 1992; 20(5):467–485. [PubMed: 1487591]
- Bagnato SJ, Neisworth JT. Normative detection of early regulatory disorders and autism: Empirical confirmation of DC: 0–3. *Infants and Young Children*. 1999; 12(2):98–106.
- Bailey DB, Simeonsson RJ. A functional model of social competence. *Topics in Early Childhood Special Education*. 1985; 4(4):20–31.
- Bailey DB, Hatton DD, Mesibov GB, Amnet N, Skinner M. Early development, temperament and functional impairment in autism and fragile X syndrome. *Journal of Autism and Developmental Disorders*. 2000; 30:49–59.
- Bates JR. The concept of difficult temperament. *Merrill-Palmer Quarterly*. 1980; 26:299–319.
- Bates, JR.; Maslin, CA.; Frankel, KA. Attachment security, mother-child interaction and temperament as predictors of behavior problem ratings at age three years. In: Bretherton, I.; Waters, E., editors. *Growing points of attachment theory and research*. Monographs of the Society for Research in Child Development. Vol. 50. 1985. Serial No. 209
- Beckman-Bell P. Child-related stress in families of handicapped children. *Exceptional Children*. 1981; 3:45–53.
- Bender WN. Behavioral indicators of temperament and personality in the inactive learner. *Journal of Learning Disabilities*. 1987; 20:301–305. [PubMed: 3598376]
- Brier N. Predicting antisocial behavior in youngsters displaying poor academic achievement: A review of risk factors. *Journal of Developmental and Behavioral Pediatrics*. 1995; 16(4):271–276. [PubMed: 7593663]
- Borthwick-Duffy, S. Prevalence of destructive behaviors: A study of aggression, self-injury, and property destruction. In: Thompson, T.; Gray, DB., editors. *Destructive behavior in developmental disabilities: Diagnosis and treatment*. Thousand Oaks, CA: Sage Focus Publications; 1994. p. 3-23.
- Bristol, M.; Schopler, E. A developmental perspective on stress and coping in families of autistic children. In: Blacher, J., editor. *Severely handicapped children and their families*. New York: Academic Press; 1984. p. 91-141.
- Buss, AH.; Plomin, R. *Temperament: Early developing personality traits*. Hillsdale, NJ: Erlbaum; 1984.
- Cameron J. Parental treatment, children's temperament and risk of childhood behavior problems. II: Initial temperament, parent attitudes, and their incidence and form of behavioral problems. *American Journal of Orthopsychiatry*. 1978; 48:140–147. [PubMed: 623213]
- Cameron JR, Rice DC. Developing anticipatory guidance programs based on early assessment of infant temperament: Two tests of a prevention model. *Journal of Pediatric Psychology*. 1986; 11:221–234. [PubMed: 3723284]
- Cameron, JR.; Rice, D.; Hansen, R.; Rosen, D. Developing temperament guidance programs within pediatric practice. In: Carey, WB.; McDevitt, SC., editors. *Prevention and early intervention*. New York: Bruner-Mazel; 1994. p. 226-234.
- Cardell CD, Parmar R. Teacher perceptions of temperament characteristics of children classified as learning disabled. *Journal of Learning Disabilities*. 1988; 21:497–502. [PubMed: 3183505]
- Carey WB. Temperament and behavior problems in the classroom. *School Psychology Review*. 1998; 27:522–533.

- Carey, WB. Temperament and clinical practice. In: Chess, S.; Thomas, A., editors. *Temperament in clinical practice*. New York: Guilford; 1986. p. 239-246.
- Carey WB. Clinical use of temperament data in pediatrics. *Journal of Developmental and Behavioral Pediatrics*. 1985; 6:137-142. [PubMed: 4008658]
- Carey, WB.; McDevitt, SC. *Coping with children's temperament*. New York: Basic Books; 1995.
- Carey, WB.; McDevitt, SC. *Clinical and educational applications of temperament research*. Berwyn, PA: Swets North America; 1989.
- Carr, EG.; Durand, VM. The social communicative basis of severe behavior problems in children. In: Reiss, S.; Bootzin, R., editors. *Theoretical issues in behavior therapy*. New York: Academic Press; 1985. p. 219-254.
- Caspi A, Henry B, McGee RO, Moffitt TE, Silva PA. Temperamental origins of child and adolescent behavior problems: From age three to age fifteen. *Child Development*. 1995; 66:55-68. [PubMed: 7497829]
- Chavira V, Lopez SR, Blacher J, Shapiro J. Latina mothers' attributions, emotions, and reactions to problem behaviors of their children with developmental disabilities. *Journal of Child Psychology & Psychiatry & Allied Disciplines*. 2000; 41(2):245-252.
- Chess S, Korn S. Temperament and behavior; Disorders in mentally retarded children. *Archives of General Psychiatry*. 1970; 23:122-130. [PubMed: 5428296]
- Chess, S.; Thomas, A. *Temperament: Theory and practice*. New York: Bruner-Mazel; 1996.
- Colvin, GT.; Horner, RH. Experimental analysis of generalization: An evaluation of a general case program for teaching motor skills to severely handicapped learners. In: Hogg, D.; Mittler, P., editors. *Advances in mental handicap research: Vol. II, Aspects of competence in mentally handicapped people*. Winchester, England: John Wiley and Sons; 1993. p. 309-345.
- Crockenberg, SB. Are temperamental differences in babies associated with predictable differences in caregiving?. In: Lerner, JV.; Lerner, RM., editors. *Temperament and social interaction during infancy and childhood. New directions for child development*. San Francisco: Jossey-Bass; 1986. p. 53-73.
- Dawson G, Galpert L. Mothers' use of imitative play for facilitating social responsiveness and toy play in young autistic children. *Development and Psychopathology*. 1991; 2(2):151-162.
- DiLalla DL, Rogers SJ. Domains of the Childhood Autism Rating Scale: Relevance for Diagnosis and Treatment. *Journal of Autism and Developmental Disorders*. 1994; 24:115-128. [PubMed: 8040157]
- DiLavore, PC. Unpublished doctoral dissertation. University of North Carolina; Chapel Hill: 1991. Maternal ratings of temperament in children with autism and children with Down syndrome: A comparative study.
- Dix, TH.; Grusec, JE. Parent attribution process in the socialization of children. In: Sigel, I., editor. *Parental belief systems*. Hillsdale, NJ: Lawrence Erlbaum; 1985. p. 201-233.
- Duffy L, Wishart JG. The stability and transferability of errorless learning in children with Down's syndrome. *Down's syndrome: Research and Practice*. 1994; 2:51-58.
- Dunlap G, Robbins FR, Darrow MA. Parents' reports of their children's challenging behaviors: Results of a statewide survey. *Mental Retardation*. 1994; 32(3):206-212. [PubMed: 8084272]
- Durand, VM. *Sleep better! A guide to improving sleep for children with special needs*. Baltimore, MD: Paul H. Brookes Publishing; 1998.
- Eaves LC, Ho HH, Eaves DM. Subtypes of autism by cluster analysis. *Journal of Autism and Developmental Disorders*. 1994; 24(1):3-22. [PubMed: 8188572]
- Eisenberg N, Fabes RA, Bernzweig J, Karbon M. The relations of emotionality and regulation to preschoolers' social skills and socioeconomic status. *Child Development*. 1994; 64(5):1418-1438. [PubMed: 8222881]
- Flannery KB, Horner RH. The relationship between predictability and problem behavior for students with severe disabilities. *Journal of Behavioral Education*. 1994; 4:157-176.
- Goldberg, S.; Marcovitch, S. Temperament in developmentally disabled children. In: Kohnstamm, GA.; Bates, JE.; Rothbart, MK., editors. *Temperament in childhood*. New York: John Wiley and Sons; 1989. p. 387-403.

- Goldsmith HH, Buss AH, Plomin R, Rothbart MK, Thomas A, Chess S, Hinde RA, McCall RB. Roundtable: What is temperament? Four approaches. *Child Development*. 1987; 58:505–529. [PubMed: 3829791]
- Goldsmith, HH.; Campos, JJ. Toward a theory of infant temperament. In: Emde, RN.; Harmon, J., editors. *The development of attachment and affiliative systems*. New York: Plenum; 1982. p. 161-193.
- Gunn P, Berry P. The temperament of Down's syndrome toddlers and their siblings. *Journal of Child Psychology and Psychiatry and Allied Disciplines*. 1985; 26(6):973–979.
- Gunn P, Cuskelly M. Down syndrome temperament: The stereotype at middle childhood and adolescence. *International Journal of Disability, Development, & Education*. 1991; 38:59–70.
- Heffernan L, Black FW, Poche P. Temperament patterns in young neurologically impaired children. *Journal of Pediatric Psychology*. 1982; 7:415–423. [PubMed: 6218266]
- Hennekam RC, Baselier AC, Beyaert E, Bos A, et al. Psychological and speech studies in Rubinstein-Taybi syndrome. *American Journal on Mental Retardation*. 1992; 96:645–660. [PubMed: 1344941]
- Hepburn, SL. Unpublished doctoral dissertation. Vanderbilt University; Nashville, TN: 2000. Parental report of temperament of children with autism spectrum disorders.
- Hepburn, SL. Temperament and parenting stress in families of children with autism. Paper presented at the International Meeting of the Association of Mental Retardation; Denver, CO. 2001.
- Hepburn, SL.; Rogers, SJ. Temperament in young children with fragile x syndrome. Paper presented at the Annual Meeting of the Gatlinburg Conference on Research in Developmental Disabilities; Charleston, SC. 2001.
- Hogdon, LA. *Visual strategies for improving communication: Practical supports for school and home*. Troy, MI: QuirkRoberts Publishing; 1995.
- Howard VF, Williams RL. Advances in education for persons with severe handicaps. *Psychology in the Schools*. 1991; 28:123–138.
- Jacobson JW. Problem behavior and psychiatric impairment within a developmentally disabled population: 1. Behavior frequency. *Applied Research in Mental Retardation*. 1982; 3:121–139. [PubMed: 7125639]
- Kanner L. Autistic disturbances of affective contact. *Nervous Child*. 1943; 2:217–250.
- Kasari, C.; Freeman, S. Paper presented at the Annual Conference of the American Association of Mental Retardation; Denver, Colorado. 2001 Apr.
- Kasari C, Sigman M. Linking parental perceptions to interactions in young children with autism. *Journal of Autism and Developmental Disorders*. 1997; 27(1):39–57. [PubMed: 9018581]
- Keogh, BK. Temperament and schooling: Meaning of 'goodness of fit'?. In: Lerner, JV.; Lerner, RM., editors. *Temperament and social interaction in infants and children*. San Francisco: Jossey-Bass; 1986. p. 89-108.
- Keogh BK, Burstein ND. Relationship of temperament to preschoolers' interactions with peers and teachers. *Exceptional Children*. 1988; 54(5):456–461. [PubMed: 2963749]
- Koegel, RL.; Koegel, LK.; Frea, WD.; Smith, AE. *Teaching children with autism: Strategies for initiating positive interactions and improving learning opportunities*. Baltimore: Brookes; 1996. *Emerging interventions for children with autism: Longitudinal and lifestyle implications*.
- Kohnstamm, GA.; Bates, JE.; Rothbart, MK. *Temperament in childhood*. New York: Wiley & Sons; 1989.
- Konstantareas MM, Homatidis S. Assessing symptom severity and stress in parents of autistic children. *Journal of Child Psychology and Psychiatry*. 1989; 30:459–470. [PubMed: 2745596]
- Krantz PJ, McClannahan LE. Social interaction skills for children with autism: A script-fading procedure for beginning readers. *Journal of Applied Behaviour Analysis*. 1998; 31:191–202.
- Krauss MW. Child-related and parenting stress: Similarities and differences between mothers and fathers of children with disabilities. *American Journal on Mental Retardation*. 1993; 97:393–404. [PubMed: 8427694]

- Lavigne JV, Nolan V, McLone DG. Temperament, coping, and psychological adjustment in young children with myelomeningocele. *Journal of Pediatric Psychology*. 1988; 13(3):363–378. [PubMed: 3199294]
- Leaf, R.; McEachin, J. A Work in Progress: Behavior Management Strategies and a Curriculum for Intensive Behavioral Treatment of Autism. New York: DRL Partnership; 1999.
- Lerner, JV.; Lerner, RM., editors. Temperament and psychosocial interaction in infancy and childhood. *New directions for child development*. San Francisco: Jossey-Bass; 1986.
- Lord, C.; Schopler, E. TEACCH services for preschool children. In: Harris, SL.; Handleman, JS., editors. *Preschool education programs for children with autism*. Austin, TX: Pro-Ed; 1994. p. 87-106.
- Martin RP. Reflections on “Child temperament effects on special education process and outcomes”. *Exceptionality*. 1992; 3:127–131.
- Matheny AP, Wilson RS, Nuss SM. Toddler temperament: Stability across settings and over ages. *Child Development*. 1984; 55(4):1200–1211.
- McDebitt, SC. Assessment of temperament in developmentally disabled infants and preschoolers. In: Wachs, TD.; Sheehan, R., et al., editors. *Assessment of young developmentally disabled children. Perspectives in developmental psychology*. New York, NY: Plenum Press; 1988. p. 255-265.
- McDevitt, SC.; Carey, WB. *Manual for the Behavioral Style Questionnaire*. Scottsdale, AZ: Behavioral-Developmental Initiatives; 1996.
- Mesibov, G.; Schopler, E.; Hearshey, KA. Structured teaching. In: Schopler, E.; Mesibov, G., editors. *Behavioral issues in autism*. New York: Plenum; 1994. p. 195-207.
- Miller S. Parents’ attributions for their children’s behavior. *Child Development*. 1995; 66:1557–1584. [PubMed: 8556886]
- Mills RSL, Rubin KH. Parental beliefs about problematic social behaviors in early childhood. *Child Development*. 1990; 61:138–151.
- Myles, BS.; Cook, KT.; Miller, NE.; Rinner, L.; Robbins, LA. *Asperger syndrome and sensory issues: Practical solutions for making sense of the world*. Shawnee Mission, KS: Autism Asperger Publishing Company; 2000.
- Neisworth, JT.; Bagnato, SJ.; Silvia, J.; Hunt, F. *Temperament and Atypical behavior Scale (TABS); Early Childhood Indicators of Developmental Dysfunction: TABS Assessment and Intervention Manual*. Baltimore, MD: Brookes; 1999.
- Nitz KA, Lerner RM, Lerner JV, Talwar R. Parental and peer demands, temperament, and early adolescent development. *Journal of Early Adolescence*. 1988; 8:243–263.
- Nyman G. Infant temperament, childhood accidents, and hospitalization. *Clinical Pediatrics*. 1987; 26:398–404. [PubMed: 3595048]
- Osaki, D. Motor and sensory development in autism. In: Rogers, SJ., editor. *Denver Model Manual of Preschool Intervention*. 2000. Unpublished
- Ozonoff, S. Executive functions in autism. *Learning and cognition in autism*. In: Schopler, E.; Mesibov, G., editors. *Current Issues in Autism*. New York: Plenum; 1985. p. 199-219.
- Paget KD, Nagel RJ, Martin RP. Interrelationships between temperament characteristics and first-grade teacher-student interactions. *Journal of Abnormal Child Psychology*. 1984; 12(4):547–559. [PubMed: 6491061]
- Prizant, BM.; Wetherby, AM.; Rydell, PJ. Communication intervention issues for young children with autism spectrum disorders. In: Wetherby, AM.; Prizant, BM., editors. *Autism spectrum disorders: A transactional developmental perspective*. Baltimore: Paul H. Brookes; 2000. p. 193-224.
- Pullis M. LD students’ temperament characteristics and their impact on decisions by resource and mainstream teachers. *Learning Disability Quarterly*. 1985; 8:109–122.
- Quill K. Instructional considerations for young children with autism: The rationale for visually cued instruction. *Journal of Autism and Developmental Disorders*. 1997; 27(6):697–714. [PubMed: 9455729]
- Ratekin C. Temperament in children with Down syndrome. *Developmental Disabilities Bulletin*. 1996; 24(1):18–32.

- Rapin, I. Preschool children with inadequate communication: Developmental language disorder. London: MacKeith; 1996.
- Rogers SJ. Intervention for young children with autism: From research to practice. *Infants and Young Children: Special Issue on Autism*. 1999; 12(2):1–16.
- Rothbart MK. Longitudinal observation of infant temperament. *Developmental Psychology*. 1986; 22:356–365.
- Rothbart, MK.; Jones, LB. Temperament: Developmental perspectives. In: Gallimore, R.; Bernheimer, LP., et al., editors. *Developmental perspectives on children with high-incidence disabilities*. Mahwah, NJ: Lawrence Erlbaum Associates; 1999. p. 33-53.
- Ruskin EM, Mundy P, Kasari C, Sigman M. Object mastery motivation of children with Down syndrome. *American Journal on Mental Retardation*. 1994; 98:499–509. [PubMed: 8148126]
- Rutter, M. Temperament: Concepts and clinical implications. In: Kohnstamm, GA.; Bates, JE.; Rothbart, MK., editors. *Temperament in childhood*. New York: Wiley & Sons; 1989. p. 461-479.
- Rutter M, Quinton D. Parental psychiatric disorder: Effects on children. *Psychological Medicine*. 1984; 14:853–880. [PubMed: 6545419]
- Schraeder BD, Heverly MA, Rappaport J. Temperament, behavior problems, and learning skills in very low birth weight preschoolers. *Research in Nursing and Health*. 1990; 13(1):27–34. [PubMed: 2305107]
- Schwebel DC, Plumert JM. Longitudinal and concurrent relations among temperament, ability estimation, and injury proneness. *Child Development*. 1999; 70:700–712. [PubMed: 10368916]
- Smith J, Prior M. Temperament and stress resilience in school-age children: A within-families study. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1995; 34(2):168–179. [PubMed: 7896650]
- Thomas, A.; Chess, S. Temperament and development. New York: Bruner-Mazel; 1977.
- Thomas, A.; Chess, S. The New York Longitudinal Study: From infancy to early adult life. In: Plomin, R.; Dunn, J., editors. *The study of temperament: Changes, continuities, and challenges*. Hillsdale, NJ: Erlbaum; 1986. p. 39-52.
- Van Tassel E. Temperament characteristics of mildly developmentally delayed infants. *Journal of Developmental and Behavioral Pediatrics*. 1984; 5(1):11–14. [PubMed: 6199373]
- Wachs, TD.; Sheehan, R. Assessment of young developmentally disabled children. New York, NY: Plenum Press; 1988.
- Washington J, Minde K, Goldberg S. Temperament in preterm infants: Style and stability. *Annual Progress in Child Psychiatry and Child Development*. 1987:40–62.
- Weiner B. A cognitive (attribution)—emotion—action model of motivated behavior: An analysis of judgments of help-giving. *Journal of Personality and Social Psychology*. 1980; 39(2):186–200.
- Weiner B. On sin versus sickness; A theory of perceived responsibility and social motivation. *American Psychologist*. 1993; 48(9):957–965. [PubMed: 8214914]
- Weissbluth, M. Sleep well. London: Unwin Paperbacks; 1987.
- Wishart, J. Learning in young children with Down's syndrome: Developmental trends. In: Rondal, JA.; Perera, J., editors. *Down's syndrome: Psychological, Psychobiological, and Socio-Educational Perspectives*. London: Whurr Publishers Ltd; 1996. p. 81-96.

**Table 1**

Definitions of Temperament Dimensions as Defined by Chess &amp; Thomas (1996)

<b>Dimension</b>	<b>Definition</b>
Activity Level	the motor component present in a given child's functioning and the diurnal proportion of active and inactive periods
Rhythmicity	regularity; the predictability and/or unpredictability in time of any function ... such as feeding, sleeping, elimination
Approach/Withdrawal	the nature of the initial response to a new stimulus, be it a new food, a new toy, or a new person
Adaptability	responses to new or altered situations. One is not concerned with the nature of the initial responses, but rather the ease with which they are modified in the desired direction
Intensity of Reaction	the energy level of (an emotional) response
Mood	the amount of pleasant, joyful, and friendly behavior, as contrasted with unpleasant, crying, and unfriendly behavior
Distractibility	the effectiveness of environmental stimuli in interfering with or in altering the direction of the ongoing behavior
Persistence	the continuation of an activity in the face of obstacles
Threshold of Responsiveness	the intensity level of stimulation that is necessary to evoke a discernible response, irrespective of the specific form that the response may take, or the sensory modality affected