8

Assessment of Sensory Processing, Praxis, and Motor Performance

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This chapter discusses the domains of sensory processing, praxis, and motor performance. Sensory processing is the organization of sensory input from the body and the environment for use. Praxis is the ability to plan and sequence unfamiliar actions. Motor performance is the actual execution of the gross and fine motor coordination. This chapter provides general assessment guidelines that serve as the foundation for observing individual differences in sensory and motor functioning. It then presents qualitative and standardized evaluations for each of the three domains. The assessment process begins with an initial screening of the child. If findings are significant, qualified specialists need to conduct a more in-depth assessment. Extensive tables provide descriptions of available instruments and their sources. This discussion assumes that the child's vision and hearing have been previously evaluated for a primary sensory deficit.

GENERAL SCREENING AND ASSESSMENT GUIDELINES

This section provides general considerations for the screening and assessment of sensory processing, praxis, and motor performance. A screening provides an overall measure of the child's functioning in a particular domain and identifies whether there is a need for further assessment. A professional knowledgeable about child development from a variety of disciplinary perspectives is capable of conducting a screening. In contrast, when an assessment is necessary, a professional with specialized training in the area of concern is necessary. For example, a teacher could screen whether a child is having problems in fine motor control and sensory modulation, but an occupational therapist would be the most appropriate professional to complete the comprehensive assessment. The following guidelines, summarized in Box 1, establish important parameters for performing quality screening and assessment.

The key to assessment is to focus on *how* the child processes sensory information and manages environmental challenges and not to focus solely on the specific skills or milestones the child displays. This approach entails a dynamic *process* orientation to assessment in addition to a *product* focus typical of most developmental evaluations (Coster, 1998; Greenspan & Meisels, 1996). For instance, the milestone of building a block tower (product) may be analyzed in terms of the child's attention, task persistence, grasp patterns, problem solving, and other qualitative aspects

Box 1. General Screening and Assessment Guidelines

1. Focus on how the child processes sensory information using a dynamic *process* orientation.
2. Use parent interview and natural observation to gather information regarding sensory processing.
3. Do not look at the child in isolation, but observe the relationship between the child and the environment.
4. Remember that the influence of sensory input is not always immediately observable; there is cumulative effect and a latency of response.
5. Observe for autonomic signs of distress during or after sensory experiences.
6. Expect variability of responses to sensory input and behavior.
7. Keep in mind that sensory-based stereotypic behaviors serve different functions depending on the child's current sensory threshold.
8. Design the assessment process to provide the child with opportunities for choice, self-initiation, creativity, and flexible problem solving.

of performance (process). Likewise, assessment of repetitive rocking would include an analysis of what environmental conditions precede or follow this behavior. Such qualitative information enables the practitioner to understand the child and design meaningful intervention.

There are many ways to gather information regarding a child's capacity to process sensory information. The most effective methods are parental interview and natural observation of the child within the context of relationships, play, and functional activities. These primary approaches are supplemented by the administration of standardized tests. Observation of the following situations is particularly informative in understanding the child's sensory and motor processing: independent and social free play, mealtimes, bathing and other functional activities, structured and unstructured peer interaction, parent-child interaction, and transitions between activities.

An examiner does not look at the child in isolation during the assessment process, but at the relationship between the child and environmental challenges (Hanft & Place, 1996). The practitioner should avoid focussing on pathology and recognize that functional difficulties can arise from a poor fit between the child's needs and available resources. The fit may be complex, subtle, and dynamic. For example, a child who is distractible during play may be responding to glaring lights or a chaotic playroom instead of to internally driven impulsivity.

The influence of sensory input is not always immediately observed. There is both a cumulative effect and a latency of response. The response to sensation builds up over time and is cumulative (e.g., a child may be more sensitive to touch at the end of a long day rather than in the morning). Conversely, some children are slow to register input because of a high threshold but can rapidly become overloaded by accumulated sensation. Both of these tendencies makes it essential that any changes in the amount or type of sensory input provided to the child be done slowly and conservatively.

It is essential to observe the child closely after sensory experiences for autonomic

signs of distress (e.g., yawning, hiccuping, sighing, irregular respiration, color change, sweating, motor agitation, startling, pupil dilation) or changes in sleep/wake patterns (Als, 1986). If the child demonstrates autonomic signs of distress, the examiner should stop the activities immediately and determine the cause for the child's reaction. Consultation with a knowledgeable therapist is helpful for determining an appropriate course of action for the future.

Variability in a child's daily performance is common. At any time, the consistency of a child's behavior can be influenced by many factors, such as the degree of environmental stimulation, the child's current emotional state, general level of arousal, coping skills, accumulated sensory build-up, and the availability of a familiar caregiver. Children with sensory processing problems are more often variable than predictable in their performance day by day. Therefore, any assessment must allow for repeated observations over time.

Stereotypic and repetitive sensory-based behaviors serve different functions, based on the child's current sensory threshold (Anzalone & Williamson, 2000). A child who is hyperreactive at a given moment (i.e., with a low threshold for sensory input) may use hand-flapping to gain selective focus and to screen out the rest of the visual environment. The outcome can be calming and organizing. The child who is hyporeactive (i.e., with a high threshold for sensory input) may use this same behavior to increase arousal and activation. A third child may use hand-flapping to discharge tension. Practitioners must use their knowledge of sensory processing to understand these stereotypical mannerisms and rituals. Behavioral techniques that do not consider sensory needs may result in stereotypies that resurface in a different form. Inappropriate behavioral intervention would involve intrusive, highly adult-directed discrete trials when a child has major problems in sensory modulation. In such cases, it is a therapeutic error to interpret gaze avoidance or tactile defensiveness as willfully noncompliant behavior.

The examiner should not over-structure the assessment environment. The assessment process should provide the child with opportunities for choice, initiation, creativity, and flexible problem solving. During part of the time, the examiner needs to step back and avoid controlling the environmental conditions or initiating interactions. Direction from the examiner, although necessary for certain types of testing, can inhibit the child from expressing individual differences during qualitative observation.

Sensory Processing

It is important to evaluate two components of sensory processing as part of the assessment (Ayres, 1972; Fisher, Murray, & Bundy, 1991). First is sensory modulation, which is the ability to register, orient, and initially react to sensory stimuli. Second is the actual perception and discrimination of that input. Perception is the interpretation of sensory input in light of prior experiences and learning. Important to both modulation and perceptual discrimination are the sensory modalities and properties inherent in the stimuli themselves. Sensory modalities include the environmental senses (vision, hearing, smell, taste) and the body senses (vestibular, proprioception, touch). Proprioception is sensation from the muscles and joints that provide information about the posture and movement of the body. Vestibular receptors in the inner ear are responsive to movement of the body in relation to gravity.

When assessing sensory processing, it is essential to evaluate the child within the environment. The examiner must evaluate the

situational demands, goodness-of-fit between the child and the environment, and the sensory properties of the environment (Schaaf & Anzalone, in press). Such sensory properties include intensity and duration. Intensity refers to how powerful or arousing the stimulus is. For example, light touch is more intense than firm touch, and touch on the face is more intense than on the arm. Duration encompasses both the length of the actual stimulus (e.g., how long a sound persists) and the lasting effect of that stimulus within the central nervous system (e.g., rapid spinning resulting in motion sickness or a prolonged increase in activity level). Since each child experiences sensory input in a unique way, an individualized approach to assessment is indicated. The examiner must evaluate both the stimulus (i.e., the objective sensory input) and the sensation (i.e., a specific child's subjective appraisal of that input). Sensation is influenced by the task demands and the child's prior sensory experiences, current state of arousal, and affective state. For example, a light touch perceived as pleasant by one child might be considered threatening or painful by another.

The assessment process considers the behavioral expression of sensory processing in terms of the child's self-regulation of arousal, attention, affect, and action (Williamson & Anzalone, 1997). The child's sensory status moderates, and is moderated by, the child's state of arousal. Arousal is a child's level of alertness and the ability to maintain and transition between different sleep and wake states. The sensory status also influences the child's attention, which is the ability to focus selectively on a desired stimulus or task. Affect, which is the emotional component of behavior, is also influenced by sensory input through either the emotional response to a specific input (e.g., fearfulness in response to unexpected light touch) or through a global effect on behavior (e.g., the excitement of a child who has just gotten off a swing). Finally, action, which is the ability to engage in adaptive goal-directed behavior, is dependent upon sensory integration.

A child's ability to self regulate these processes depends upon the child's initial registration of sensory stimuli. Registration is the point at which novel sensory information is initially detected and the central nervous system activated. This point is considered the sensory threshold. Some children have a low threshold that results in hyperreactivity or sensory defensiveness. Their behavior is frequently characterized by high arousal, an inability to focus attention, negative or fearful affect, and impulsive or defensive action. Other children have a threshold that is very high, causing them to be hyporeactive to sensory input. Their state of arousal is usually decreased with a prolonged latency or an inability to attain focussed attention. Affect is typically flat, with a restricted expression of emotion that may interfere with social engagement. Their action tends to be passive and sedentary.

Perceptual discrimination is based upon the child's sensory modulation and higher order cognitive processes. The primary perceptual functions to be assessed in young children include visual, auditory, and tactile discrimination. Sample higher order perceptual skills include visual or auditory figure ground perception, visual-spatial relations, auditory memory, tactile localization, and stereognosis. Assessment of these functions is beyond the scope of this chapter, but is discussed in the clinical literature (e.g., Lezak, 1995; Schneck, 1996; Wetherby & Prizant, 2000).

Children with autistic spectrum disorders have sensory modulation problems present in two primary patterns: hyperreactive and hyporeactive. The profiles of each of these patterns provide a helpful framework for

understanding the behavioral patterns of these children. A specific child, however, may have a combination of symptoms and not fit clearly into any one category (Anzalone & Williamson, 2000).

Hyperreactivity

Children with *hyperreactivity* tend to have a low sensory threshold and a bias toward a sympathetic nervous system reaction. (Sympathetic responses are those that indicate activation of the central nervous system, such as increased heart rate and respiration.) These children have a restricted range of optimal arousal. Their arousal level tends to be high with a narrow, rigid control of sensory input. It is important to note that the observable behavioral arousal is not always the same as physiological arousal as reflected by measures such as heart rate and respiration. Some hyperreactive children may appear to be nonresponsive or under- aroused when, in fact, they are physiologically over-aroused (e.g., they may have either high levels of cortisol or elevated heart rate while appearing behaviorally inactive) (Miller & McIntosh, 1998; Porges, McCabe, & Yongue, 1982; Wilbarger & Wilbarger, 1991). In some children, this sensory overload becomes so threatening that they respond with an involuntary behavioral and physiological shutdown.

Children with hyperreactivity may overfocus their attention on detail (Kinsboume, 1983). This phenomenon serves a gate-keeping or screening function, excluding a more generalized sensory awareness of the environment. The affective range of these children is usually limited, varying from disconnection to sensory input to negative withdrawal. An exception is the positive effect often associated with spinning of self or objects. Action in children with hyperreactivity tends to be narrowly focused, with limited elaboration and inflexibility of behavior that often serves to control sensory input. Some of these children show little or no initiation of engagement. Others demonstrate repetitive actions; still others display surprising competence in very specific skills. Children with hyperreactivity may be very concerned about becoming disorganized and develop rigid routines, compulsions, and stereotypic patterns that help them maintain self-control. All these behaviors can be seen as adaptive at some level, as they are ways in which the children are trying to monitor and manage their registration and interpretation of sensory input so that they can maintain a level of comfort. These behaviors often interfere with interaction rather than foster it. Certain types of everyday sensation are actually painful for these children. The sound of a door slamming, unexpected laughter on a television soundtrack, or thunder can be so uncomfortable that the children will do everything they can to avoid experiencing the sensation again. Their rigid, controlling behaviors and rituals are understandable attempts to limit noxious sensory input, or at least to make the input predictable.

Hyporeactivity

Children with *hyporeactivity* tend to have a high sensory threshold; that is, they require a lot of sensory input to achieve arousal and activation. These children often have not registered novel sensory input; thus, they only have minimal information on which to base any interpretation. They do not learn from the environment because they have not noticed it. Their state of arousal is usually low or unmodulated. Attention is unfocussed or narrowly targeted to a specific type of sensory seeking to meet inner needs. Affect may be flat or uninvested, but may brighten with vestibular input. Action tends to be passive, aimless, and wandering. However, some children with hyporeactivity may have an insatiable craving

for a preferred type of sensory input and may seek it out in order to be "fueled." Spinning (rotary vestibular activity) is a favorite type of stimulation. Frequently, children with bland, disconnected affects become delighted once they start to spin. It should be noted that the sensory input that is the most arousing for these children is not necessarily the most organizing.

There are two important caveats in understanding the sensory modulation profiles of children with autistic spectrum disorders. First, a child who appears flat and unavailable may not be hyporeactive. As previously mentioned, some of these children are actually physiologically hyperreactive, and their behavioral shutdown is the opposite of their internal state. During an assessment, the examiner can differentiate between these two profiles by systematically decreasing sensory input, providing organizing activity, and observing behavioral responses over time. With decreased sensory input, the child who is truly hyperreactive will become calmer and more attentive, whereas the truly hyporeactive child may become more lethargic. Second, not all sensory seeking behaviors are associated with hyporeactivity. Some children with hyperreactivity or sensory defensiveness may engage in sensory seeking as a way to modulate their reactions to sensation (i.e., discharging tension or refocusing attention to organize themselves).

Mixed Patterns

A child with autism or pervasive developmental disorder (PDD) can have a *mixed pattern* of being hypersensitive in certain modalities (often auditory or tactile) and hyposensitive in others (frequently proprioceptive or vestibular). Likewise, a child may have variability of responses within a single sensory modality (e.g., a child may be hyperreactive to high-frequency sounds and hyporeactive to low-frequency sounds). A child can also be inconsistent over time in responding to the same stimulus. Variability among and within sensory systems is frequently linked to the child's shifting state of arousal, attention, and previous sensory experiences.

Some children have jumbling or distortion of sensory input and do not fit into the described clinical profiles. There is an erratic fluctuation in the registration of sensory input, somewhat like a volume switch being turned up and down repeatedly. For example, these children may hear only parts of words (e.g., the first part, the last part, or no consonants) or find that auditory or visual signals are intermeshed. Some adults with autism report seeing vibrations around a television set when it is on (Grandin, 1995; Williams, 1994).

Assessment of Sensory Processing

As previously described, sensory processing encompasses sensory modulation and perception. Sensory modulation precedes the more cognitive component of perception. This discussion focuses primarily on sensory modulation—the ability to register and orient to sensory stimuli. Assessment of sensory processing includes three complementary strategies: qualitative observation; parent interview; and, possibly, the administration of standardized instruments. Observation and parent interview are particularly important for screening, for enabling the practitioner to identify potential problems as well as the need for more in-depth assessment. A complete evaluation may require the skills of an occupational therapist with specialized training in sensory processing.

Qualitative Observation

Observation is the primary mode the examiner uses to identify problems and plan interventions for children who have difficulties in sensory processing. Examiners depend

less on standardized instruments because they do not reliably capture individual differences in this aspect of performance since sensory processing is so variable and dependent upon a child's prior experiences. In designing qualitative observations of performance, it is helpful for the examiner to contrast behavior in structured and unstructured situations. Unstructured situations may include individual free play, gross motor exploration, and activities of daily living. Structured tasks may include observation during formal evaluations and adult-controlled situations. The examiner should observe the child's performance in relation to the sensory demands of the environment (e.g., a child's increased arousal and impulsivity would be interpreted differently in a disorganized setting versus a quiet one).

Observation of the Child. The practitioner observes the child's reactivity during engagement in a variety of tasks as well as the child's global behavioral organization. Observation focuses on the influence of sensory input and its impact on the child's self-regulation of arousal, attention, affect, and action. Since the child's reactivity to sensory input is cumulative, the examiner should observe the child's behavior over time. For instance, a child may exhibit a temper tantrum in the late morning that is a result of sensory buildup over the course of 3 hours in a childcare center. Variability in performance is expected in these children and the assessment should document the range of response. The examiner should pay special attention to the sensory conditions that support optimal performance.

The following list provides questions that an examiner can use to focus observation on relevant factors related to sensory-based behavioral organization in the child.

Arousal

- What is the child's state of alertness and how does it change in response to different sensory experiences?
- Is the child able to transition smoothly between different states of alertness?
- Is the child able to sustain levels of energy and activity that support successful task engagement?
- Does the child have a narrow or wide range of optimal arousal?
- Does the child have a range of coping strategies that enable him to modulate sensory reactivity and arousal?

Attention

- Is the child able to maintain selective focus on relevant stimuli?
- Is the child able to shift attention between two or more targets or modalities?
- Is the duration of the child's attention span comparable to other children of the same age?
- When attending to tasks, does the child seem to be using more effort than other children of the same age?
- Does the child prefer or avoid certain sensory modalities?

Affect

- Does the child have an organized range of emotional expression?
- Is there a predominant emotional tone in the child (e.g., fearfulness, anxiety, defiance, or withdrawal)?
- Is the child available for social interaction with peers and adults?
- Will the child interact socially with peers and adults?
- Does the child have a playful disposition that reflects ease in the situation and supports learning and engagement?

Action

- Is the child able to formulate goals for play behavior that are appropriate to his or her developmental skills and environmental opportunities?
- Is the child able to solve problems encountered during exploration or play with creativity, flexibility, and persistence?
- Is the child's behavior characterized by consistent approach or avoidance of specific materials or tasks?
- Does the child have adequate motor planning and coordination for age-appropriate tasks?

Observation of the Context. In addition to observing the arousal, attention, affect and action of the child as they relate to sensory modulation, the examiner also has to examine the characteristics of the physical and social environments. It is the interaction of the child and the environment that produces the sensory-related behavior. The examiner should simultaneously observe the child and the context in order to determine the goodness-of-fit between the two elements (Williamson, 1993; Zeitlin & Williamson, 1994). Without an understanding of this connection, the practitioner can make incorrect clinical assumptions. For example, a child may demonstrate defensive behaviors such as gagging, spitting up, and facial grimacing during feedings. These behaviors could be interpreted as hypersensitivity in the oral area. However, closer examination of the environmental context reveals that the caregiver is feeding the child too quickly, which elicits the aversive reaction. The difficulty is not sensory-based, but rather an indication of inappropriate feeding technique. Therefore, the context in which a child is functioning contributes to an understanding of the sensory processing of the child. The examiner needs to appreciate the sensory attributes of the environment and how well they match the child's capacity for self-regulation and organization. A chapter appendix provides an observational form to assess the sensory-based characteristics of a school environment (Hanft & Place, 1996). The following questions can help focus observation on critical aspects of the physical and social environments.

Context

- What sensory input characterizes the physical and social environments (e.g., visual, auditory, tactile, proprioceptive, vestibular)?
- What are the sensory properties of the identified sensory systems (e.g., rate, intensity, and duration)?
- Does the environment require the child to form a response by organizing information simultaneously from different sensory systems?
- What is the quality of the physical environment in terms of temperature, lighting, noise, space, and related properties?
- What are the social characteristics of the situation (e.g., adult or peer, individualized or group, verbal or nonverbal, child- or adult-directed)?
- What are the specific environments, situations, or individuals that are particularly organizing for the child?
- Does the environment provide a routine that is reasonably predictable, consistent, and structured?

Parent Interview and Questionnaires. The parent interview supplements the examiner's observation of the child and context in providing important information regarding the child's ability to modulate sensory input in a variety of situations. The practitioner gathers information from the parents about the child's "sensory diet" (Wilbarger, 1995;

Williams & Shellenberger, 1996). The sensory diet is the profile of naturally occurring activities that occur throughout the day that provide sensory input and influence the child's regulation of arousal, attention, affect, and action. The profile provides data about the child's sensory tolerances and preferences as they are reflected in daily activity. It also identifies periods of behavioral organization and disorganization during the day and relates it to ongoing sensory experiences and environmental demands. Some situations that provide valuable insight into sensory modulation are bathing, mealtimes, disruptions in typical routines, and preferences in clothing or play. The following questions may generate a productive discussion with the parent or caregiver regarding a child's sensory processing and how it influences child and family functioning. These questions are designed to provide a starting point for an interview. They should be used selectively based on the presenting needs of the child and family.

Parent/Caregiver Observations

- What is a typical day like?
- What types of sensory activities does your child like and dislike?
- How does your child manage transitions and changes in daily routines?
- Is there a predictable time of day or type of activity when your child is most or least organized?
- Are your child's activities of daily living and self-care tasks limited by sensory or motor problems (e.g., does not tolerate textured foods, fearful during bathing)?
- Does your child have habits and routines that support daily functioning?
- How does your child respond to affectionate physical touch or handling?
- Does your child initiate exploration of novel as well as familiar situations?
- Does your child enjoy playing with other children?

The examiner can supplement semi-structured interviews with standardized questionnaires regarding the child's sensory and self-regulatory performance. The Infant Toddler Symptom Checklist (DeGangi & Poisson, 1995) addresses such areas as self regulation, attention, sleeping, eating, dressing, bathing, movement, language, vision, and emotional functioning in children between 7 and 30 months of age. The Sensorimotor History Questionnaire for Preschoolers (DeGangi & Balzer-Martin, in press) is a 51-item questionnaire that has been validated as a screening tool for 3-to 4-year-olds (see chapter appendix). This questionnaire categorizes behavior in terms of self-regulation, sensory processing of touch, sensory processing of movement, emotional maturity, and motor maturity. The Sensory Profile (Dunn, 2000 is a parent questionnaire appropriate for assessing sensory processing of children 3 to 10 years of age. Its 125 items address different sensory systems, activity level, movement, and emotional-social functioning. This questionnaire has been extensively studied with normative and clinical populations (Dunn & Brown, 1997; Dunn & Westman, 1997; Kientz & Dunn, 1997). The Short Sensory Profile (McIntosh, Miller, & Shyu, 2000) is an abbreviated version of the Sensory Profile with sound psychometric properties. The Short Sensory Profile has only 38 items in 7 subscales: tactile sensitivity, taste/smell sensitivity, under-responsive/seeks sensation, auditory filtering, visual/auditory sensitivity, low energy/weak, and movement sensitivity. The Functional Behavior Assessment for Children with Sensory Integrative Dysfunction (Cook, 1991) provides a way to use parent interviews to gather data regarding sensory-related activities of daily living.

Standardized Instruments. In addition to observation and parent interview, an

examiner can use standardized instruments to assess sensory modulation. Table 1 describes the relatively few standardized tools that are available. The Test of Sensory Functions in Infants (DeGangi & Greenspan, 1989) is a diagnostic, criterion-referenced test administered by professionals trained in child development and sensory processing. It is designed to assess infants and toddlers with regulatory disorders, developmental delay, and those at risk for learning disorders. The Early Coping Inventory (Zeitlin, Williamson, & Szczepanski, 1988) assesses the coping style of children 4 to 36 months of age. The coping behaviors of the children are observed over time in a variety of situations. This psychometrically sound tool is particularly sensitive to measuring sensory-based self-regulation and adaptation. The Sensory Integration and Praxis Tests (Ayres, 1989) are a diagnostic, norm-referenced test battery designed for school-aged children who are relatively high functioning. Sensory modulation is not directly measured on this instrument but can be inferred from qualitative observation. This battery requires extensive formal training for reliable administration and is dependent on the child having receptive language skills at the 4-year-old age level. It is typically not used for children with autistic spectrum disorders.

PRAXIS

Praxis is the ability to plan and sequence unfamiliar actions. It evolves from the interaction between the child and the environment and reflects the quality of sensory integration (Ayres,1985; Cermak, 1991). Praxis consists of three different components: (1) ideation, (2) motor planning, and (3) execution. *Ideation* is the ability to formulate a goal for action. It is the cognitive step of recognizing the multiple ways that toys, objects, or one's body can be used in play and learning

Table 1. Standardized Instruments for Assessing Sensory Processing

Name of Test	Age Range	Comments	Source
Test of Sensory Functions in Infants	4–18 months	Subtests include reactivity to tactile deep pressure and vestibular stimulation, adaptive motor functions, visual-tactile integration, and ocular-motor control.	DeGangi, G. A., & Greenspan, S. I. (1989) Western Psychological Corporation 12031Wilshire Blvd. Los Angeles, CA 90025
Early Coping Inventory	4–36 months	The instrument addresses sensorimotor organization, reactivity, and self initiation as the child copes with daily living.	Zeitlin, S., Williamson, G. G., & Szczepanski, M., (1988) Scholastic Testing Service 480 Meyer Road Bensonville, IL 60106
Sensory Integration & Praxis Tests	4 years, 6 months– 8 years, 11 months	12 subtests assess sensory and perceptual function in visual perceptual, visual, vestibular and postural, and somatosensory domains.	Ayres, A. J. (1989) Western Psychological Services 12031 Wilshire Blvd. Los Angeles, CA 90025

situations. For example, the child appreciates that there are a number of ways to play with a toy truck. *Motor planning* involves figuring out how to get one's body to carry out the goal for action. This step of planning and sequencing of motor tasks is based on the child's body scheme; that is, an internal sensory awareness of body parts, how they fit together, and how they move through space. Motor planning is active problem solving and reflects an inner, sensory awareness of one's physical self. *Execution* is the actual performance of the planned action. It involves gross and fine motor coordination to accomplish the task.

Children with dyspraxia may have difficulty with any one or a combination of these three components. A lack of ideation is noted if the child is unable to formulate new goals specific to situational demands. The child does not have an idea of what to do or is rigid or inflexible in goal formulation. With a deficit in motor planning, the child knows the purpose of the object or task but cannot organize motor patterns to interact effectively with the environment or solve the problem. Children may tend to be inactive or play in a limited, perseverative pattern (e.g., lining up toys). Children with autistic spectrum disorders tend to have a primary deficit in ideation and a secondary one in motor planning. Impairment in execution is relatively less common in children with autism.

Children with dyspraxia are typically clumsy with a poor body scheme. They do not know where their body is in space and have difficulty judging their relationship to objects and people. As a result, they are accident-prone and tend to stumble, bump into furniture or others, and break toys. They are generally poor in athletics. Since these children have difficulty in sequencing daily activities, they tend to be disorganized and disheveled looking. Due to their inflexibility in activity, they may perseverate and tend to prefer the familiar. Self-esteem is often poor as a result of frustration and repeated failure. They may be judged at times as manipulative and controlling. These behaviors reflect the child's use of language to compensate for the dyspraxia (e.g., distracting and redirecting attention away from the motor disorder). Problems in sequencing can include language, in which case organizational and educational deficits are generally present.

Observation of Praxis

The major means of assessing praxis is through observation of the child during novel gross and fine motor tasks. It is often observed that the child uses visual monitoring of movements to accomplish the skill. The examiner must provide a range of activities that require the control of large muscles as well as fine manipulation. Since children with dyspraxia often rely on familiar, overlearned activities, it is essential that any observation of praxis provide unexpected, flexible, and novel situations that challenge the child's ability to problem solve motor tasks. Observation focuses on *how* the child plans and sequences these tasks. The examiner should screen for the following behaviors during several observation periods.

Dyspraxia Indicators

- Inflexibility—perseverates on one aspect of the task and has difficulty in making transitions
- Lack of sensorimotor exploration
- Limited complexity of play
- Restricted problem solving of new tasks
- Low frustration tolerance
- Presence of "crash" solutions to terminate demanding activities (e.g., knocking down or throwing)

- Lack of organization in performance of activities
- Clothes in disarray and/or unfastened
- Poor quality of fine motor skills
- Poor temporal awareness and sequencing of daily living tasks
- Avoidance of group activities and peer play
- Preference for adult one-to-one interaction

A diagnosis of dyspraxia is not achieved with one observation but evolves over time. The examiner has to observe the child in numerous settings under diverse conditions to determine the nature of the problem. Is the breakdown in task engagement due to a sensory-motor deficit or other factors such as distractibility or impulsivity? Is this a sensory processing/practice deficit or primarily an issue of motor strength and coordination? Is the difficulty due to ideation, motor planning, and/or execution?

Assessment of Praxis with Standardized Instruments

As with sensory processing, there are few standardized instruments that are available for screening and assessment of praxis (see Table 2). Observation and clinical judgment are the most important factors in determining when praxis contributes to a performance deficit. For screening purposes, the Miller Assessment of Preschoolers (Miller, 1982) is a norm-referenced test that provides a few items directly addressing a child's motor planning. More formal standardized instruments for older children are the Sensory Integration and Praxis Tests (Ayres, 1989). This battery has specific tests that measure different components of praxis (e.g., postural praxis, sequencing praxis, oral praxis, constructional praxis, praxis on verbal command). As noted previously, this test is complex and requires certification through a formal training program.

MOTOR PERFORMANCE

Motor performance in the young child involves four interdependent components: neuromotor processes, and gross motor, fine motor, and oral-motor development. *Neuromotor processes* involve the underlying musculoskeletal elements that support movement, such as muscle tone and joint range of motion. *Gross motor* function incorporates those movements, postures, and skills of the large

Table 2. Standardized Instruments for Assessing Praxis

Name of Test	Age Range	Comments	Source
Miller Assessment of Preschoolers	2 years, 9 months – 5 years, 8 months	Developmental screening test that includes praxis items (imitation of postures and solving a maze).	Miller, L. J. (1982) Psychological Corporation 555 Academic Court San Antonio, TX 78204
Sensory Integration & Praxis Tests	4 years, 6 months – 8 years, 11 months	12 subtests assess sensory and perceptual function in visual perceptual, visual, vestibular and postural, and somatosensory domains.	Ayres, (1989) Western Psychological Services 12031 Wilshire Blvd. Los Angeles, CA 90025

muscles, whereas *fine motor* function is dependent on the small muscles of the arms and hands. *Oral-motor* function is based upon actions of the facial musculature for speech and eating. Table 3 provides further descriptions of each of these four components of motor performance.

There is more to assessment of motor performance than establishing the presence or absence of milestones and determining a

Table 3. The Four Components of Motor Performance

Component	Description
Neuromotor Processes	
Muscle tone	Muscle tension, ranging from hyper-to hypotonic, for maintaining posture and position of arms/legs for specific tasks
Range of motion	Extent of movement of each body joint, particularly arms, legs, trunk, and head
Postural stability and mobility	Holding positions and moving body parts to accomplish task (e.g., stabilize trunk and shoulders to squeeze toy with hands)
Symmetry	Use of both sides of the body in simultaneous or reciprocal action appropriate to the task at hand
Quality of movement	Degree to which child's actions are fluid and coordinated
Gross Motor Function	
Physical postures	Assuming and changing basic body positions for the task at hand (e.g., prone, supine, 4-point, sit, kneel, stand)
Physical skills	Actions dependent on large muscle movement (e.g., jumping, hopping, throwing a ball)
Functional mobility	Patterns of locomotion to move self from one point to another (e.g., rolling, crawling, creeping, walking, running)
Fine Motor Function	
Reach, grasp, and manipulation	Use of the arm/hand to secure, hold, and handle objects, toys, and utensils
Hand preference and bilateral coordination	Using two hands together, for stability and skilled manipulation (e.g., manipulatory exploration, using a fork, buttoning, writing with a pencil)
Visual-motor coordination	Coordination of visual perceptual information with action to guide the hand in skilled tasks
Oral-Motor Function	
Actions of the tongue, lips, cheeks	Coordination of sucking, swallowing, breathing, chewing, biting for eating, speaking, and self-exploratory play

developmental age. The *quality* of the child's motor performance is also a concern (e.g., a child's reach can be smooth and direct or tremulous). Many standardized tests provide a quantitative measure of the child's performance but fail to capture this qualitative aspect. It is often necessary for the practitioner to supplement findings with a clinical description of observations. Subtle differences in motor performance are important to note since they are often associated with early signs of behavioral and learning difficulties (e.g., low muscle tone and poor balance reactions are often seen in children who later exhibit learning or language disabilities).

A related issue is the need to evaluate the child's performance in terms of mobility and stability rather than as a compilation of motor skills. A child must be able to move part of the body with the active support of the rest of the body in order to develop gross and fine motor skills such as crawling, coloring, or buttoning. For example, in order to crawl, a child must move one hand and knee while the other hand and knee support the body weight. In the fine motor arena, this interplay between stability and mobility is equally important. For example, in order to color with a crayon, a child must be able to sit up and keep the head and shoulder steady (stability) while moving the wrist and fingers (mobility). This issue is critical since many children have inadequate stability to support functional movements (e.g., the preschool child who slouches in the chair during tabletop activities). Through the assessment, the examiner determines the adequacy of the child's mobility and stability functions during different motor tasks. The examiner always assesses motor performance in context and how the child organizes posture and movement to meet changing environmental demands.

Assessment of Neuromotor Processes

Assessment of neuromotor processes in young children focuses on muscle tone, range of motion, postural stability and mobility, symmetry, and quality of movement (DeMyer,1994; Piper & Darrah, 1994). These underlying neuromotor processes influence how a child assumes and maintains the positions needed to participate in play, self-help, and learning activities. Occupational and physical therapists have expertise in evaluating neuromotor processes using clinical observation and criterion-referenced scales. Other professionals can screen children to determine the need for an in-depth assessment of neuromotor functions. The following questions can guide the screening. A "yes" response to a number of these questions indicates the need for a comprehensive assessment. Concern is greatest if these risk indicators interfere with the child's acquisition of developmental skills.

Neuromotor Deficit Indicators

- Compared to peers, does the child have problems maintaining his or her posture during activity? Subtle examples of possible delays in neuromotor processes include leaning on the table for support, holding onto the wall to kick a ball, or lying on the floor instead of sitting during circle time.
- Compared to peers, is the child's muscle tone in the trunk and limbs too stiff or loose, resulting in restricted or floppy movement?
- Under the age of 3 years, does the child use one hand exclusively in play and self-help tasks? This may indicate a neglect of one body side or unusual muscle tone during a period when children are developing bilateral skills.

- Does the child fatigue easily and demonstrate poor endurance, especially during activities and gross motor play?

Table 4 lists criterion-referenced instruments useful for in-depth assessment of neuromotor processes. These tools require training to achieve reliability in administration and scoring. They are helpful for the early identification of emerging motor problems and soft neurological signs before the establishment of clear motor deficits or a definitive medical diagnosis. Understanding the neuromotor processes helps one to appreciate the reasons for a developmental delay or functional limitation in motor performance.

Assessment of Gross Motor Function

Gross motor skills affect how children coordinate their body positions, move fluidly from one location to another, and interact with people and objects. Assessment of gross motor skills focuses primarily on physical posture and skills as well as functional mobility and stability (Alexander, Boehm &

Table 4. Measures of Neuromotor Processes

Name of Test	Age Range	Comments	Source
Test of Infant Motor Performance	32 weeks gestation–4 months	Assesses the influence of postural control on head, trunk, arm, and leg movements	Campbell, S., Osten, E., Kolobe, T. & Fisher, A. (1993). Development of the Test of Infant Motor Performance. In C. Granger, G. Gresham (Eds.), *New developments in functional Assessment.* Philadelphia: W. B. Saunders
Alberta Infant Motor Scale	0–18 months	Observational and naturalistic assessment of ability within prone, supine, sitting, and standing positions	Piper, M., Darrah, J. (1994). *Motor assessment of the developing infant.* Philadelphia: W. B. Saunders.
Movement Assessment of Infants	0–12 months	Assesses muscle tone, reflexes, automatic reactions, and voluntary movement	Infant Movement Research PO Box 4631 Rolling Bay, WA
The Infanib	0–18 months	Consists of 20 items in 5 categories: spasticity, head and trunk, vestibular function, legs, French angles	Therapy Skill Builders 555 Academic Court San Antonio, TX 78204-2498
DeGangi-Berk Test of Sensory Integration	3–5 years	Measures three vestibular-based functions: postural control, bilateral motor integration and reflex integration	Western Psychological Services 12031 Wilshire Blvd. Los Angeles, CA 90025

Cupps, 1993; Bly, 1994). Table 5 identifies measures of gross motor function commonly used by occupational and physical therapists. There also are global developmental assessments that include major sections addressing gross motor development that are used by interdisciplinary professionals, but which are not referenced in this discussion.

Assessment of Fine Motor Function

Fine motor skills affect how children use their eyes and hands to manipulate objects, tools, and toys to engage in self-help and play activities, such as eating with a spoon, buttoning clothing, turning the pages of a book, and combing a doll's hair. Fine visual-motor skill

Table 5. Measures of Gross Motor Function

Name of Test	Age Range	Comments	Source
Gross Motor Function Measure	General	Assessment of motor function in five dimensions: lying/rolling; sitting; crawling/kneeling; standing; walking, running, jumping	Dianne Russell Dept. of Clinical Epidemiology & Biostatistics, Bldg. 74 Chedoke Campus McMaster University of Hamilton, Ontario Canada LSN 325
Peabody Developmental Motor Scales (PDMS) (revision underway)	0-83 months	Two scales measure gross motor skills (reflexes, balance, non-locomotor, locomotor, receipt/propulsion of objects) and fine motor skills (grasping, hand use, eye-hand coordination and, manual dexterity)	DLM Teaching Resources One DLM Park Allen, TX 75002
Bruininks-Oseretsky Test of Motor Proficiency (BOTMP)	4 years, 6 months–14 years, 6 months	Fine, gross, and visual-motor sections yield information in standard scores and age equivalents	American Guidance Service Circle Pines, MN 55014
Functional Independence measure for Children (WEEFIM)	6 months–7 years	Measures function in order to determine extent of care needed in: self-care, sphincter management, mobility, locomotion, communication, social cognition	Center for Functional Research U.B. Foundation Activities 82 Farber Hall SUNY – South Campus Buffalo, NY 14214
Pediatric Evaluation of Disability Inventory (PEDI)	6 months–7.5 years	Assesses functional abilities and performance in three domains: self-care, mobility, and social function	PEDI Research Group Dept. of Rehab Medicine New England Medical Center #75 K/R750 Washington St. Boston, MA 02111
School Function Assessment (SFA)	Grades K-6	Measures a student's performance of functional tasks (including eating, mobility, tool use and manipulation) that support participation in an elementary school program	Therapy Skill Builders 555 Academic Court San Antonio, TX 78204

Table 6. Measures of Fine Motor Function

Name of Test	Age Range	Comments	Source
Developmental Test of Visual Motor Integration (revised, 1997)	2 years, 9 months–19 years, 8 months	Looks at integration of visual perception and motor control; yields age equivalents, percentile ranking, and standard scores	Modern Curriculum Press 13900 Prospect Road Cleveland, OH 44136
Test of Visual Motor Skills (1986)	2–13 years	Measures ability to copy 26 different designs. Yields motor ages, standard scores, percentiles, and stanine scores	Children's Hospital of San Francisco Publications Dept. OPR-110 PO Box 3805 San Francisco, CA 94119
Developmental Test of Visual Perception (2nd ed.)	4–10 years	Subtests measure visual perceptual ability with two conditions: motor-reduced or motor-enhanced. Provides age equivalents, percentiles, and composite quotients	Western Psychological Services 12031 Wilshire Blvd. Los Angeles, CA 90025

***Note**: See also the following tests, as reviewed in the previous section on assessing fine motor function: Peabody Developmental Motor Scales (PDMS), Bruininks-Oseretsky Test of Motor Proficiency (BOTMP), Functional Independence Measure for Children (WEEFIM), Pediatric Evaluation of Disability Inventory (PEDI), and School Function Assessment (SFA).*

is also a factor in manual communication through gestures, sign language, drawing, and painting. Assessment of fine motor skills focuses particularly on reach, grasp, hand preference, bilateral coordination, manipulation, and visual-motor control (Henderson & Pehoski, 1995).

Table 6 identifies measures of fine motor function commonly used by occupational therapists and educators. In addition to these, there also are comprehensive developmental assessments that include major sections on fine motor development.

Assessment of Oral-Motor Function

Oral motor skills include the coordination of sucking, swallowing, breathing, chewing, and articulation. Assessment of oral motor development in young children focuses on the sensory and motor actions of the tongue, lips, cheeks, and respiratory system (Morris & Klein, 1987; Wolf & Glass, 1992; Oetter, Richter & Frick, 1988). Assessment of oral motor functions must be completed by professionals with specific training in this area, such as an occupational therapist or speech/language pathologist. Table 7 identifies measures of oral motor functional development commonly used by these practitioners. Other professionals can screen for the need for a comprehensive assessment by observing the child and answering the following questions. A "yes" response to more than one question indicates cause for a more comprehensive assessment.

Oral-Motor Assessment Indicators

- Compared to same-age peers, does the child have problems with speech or eating?
- Is there consistent or excessive drooling present, given the child's developmental age?
- When eating, does the child reject food based on texture or demand a bland or specific diet?
- Compared to same-age peers, does the child display excessive mouthing of toys, objects, clothing or furnishings?
- Are there significant disturbances in the parent/infant bond concerning the issue of feeding?

SUMMARY

In summary, this chapter addressed screening and assessment related to sensory processing, praxis, and motor performance. Qualitative observation and parental interviews were emphasized due to their importance in understanding the nature of the child's sensorimotor functioning. A dynamic process-oriented approach to assessment enables the clinician to capture subtle individual differences in performance. A primary concern is assessing the child within the context of environmental challenges and in the performance of functional tasks. The critical outcome of sensory and motor processes is to support functional participation in all aspects of daily life and not merely the achievement of developmental milestones. ■

Table 7. Measures of Oral-Motor Function

Name of Test	Age Range	Comments	Source
Clinical Feeding Evaluation of Infants	0-3 years	Clinical observations of the state of affect; motor control; oral-motor structures; suck, swallow, breathe; physiological control	Wolf, L., & Glass, R. (1992). *Feeding and swallowing disorders in infancy.* San Antonio. TX: Therapy Skill Builders
Pre-feeding skills	Early years	Nonstandardized qualitative assessment of structural and functional oral motor coordination and skills in the context of feeding	Morris. S., & Klein, M. (1987). *Pre-feeding skills.* San Antonio, AZ: Therapy Skill Builders
Neonatal oral-motor assessment scale	Neonate	Examines tongue and jaw movements during both nutritive and non-nutritive sucking	Braun, M. & Palmer, M. (1985). A pilot study of oral motor dysfunction in "at-risk" infants. *Physical and Occupational Therapy in Pediatrics, 5,* 13-25.

***Note**: Also see the following tests reviewed in the section on assessing gross motor functions: Functional Independence Measure for Children (WEEFIM), Pediatric Evaluation of Disability Inventory (PEDI), and School Function Assessment (SFA)*

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Appendix A

OBSERVATIONAL FORM FOR ASSESSING THE SENSORY-BASED CHARACTERISTICS OF A SCHOOL ENVIRONMENT

School Observation: Environment*

Student observed:_____ Age:_____ Date: _____

Activity:_____ Environment observed: _____

The following questions help identify environmental factors that facilitate or interfere with learning. Observe all relevant spaces of the student's environment, such as classrooms, gym, cafeteria, bathrooms, playground, and hallways.

Observation of the General Environment

Room Arrangement	Observations
1. Room size and shape adequate for task?	Yes No
2. Furniture/equipment arrangement?	Diagram room on blank sheet
3. Varied space available?	Intimate 6″–18″ Personal 1½′ – 4′ Social 4′–12′
4. Space for personal belongings?	Describe:
5. Active and quiet spots?	Yes No

Traffic Patterns	
1. Clearly defined pathways?	Yes No
2. All areas and materials accessible?	Yes No
3. Any architectural barriers?	Yes No
4. Time and distance student covers:	Describe:

Routines	
1. Adequate structured/unstructured time?	Yes No
2. Toileting, drinks, snack?	As needed Scheduled

Materials created by Barbara Hanft and Patricia Place.

145

Observation of the Sensory Environment

Auditory	Observations
1. Sounds in and out of observed setting?	Describe:
2. Unique acoustical features?	Carpet Cinder block Other

Visual	
1. Adequate light?	Yes No Source: _____ Natural _____ Fixtures
2. How is color used?	Highlight Guide Background Other:
3. Intense glare on materials?	Yes No
4. Unique visual features?	Describe:

Tactile/Kinesthetic	
1. Flooring	Tile _____ % Carpet _____ % Other _____ %
2. Use of textures in furniture/materials?	Describe:
3. Light touch from others?	Describe:
4. Unique tactile features?	Describe:

Movement	
1. What movement/breaks are permitted?	Describe:
2. Who moves through this space and how efficiently?	Describe:
3. Unique movement features?	Describe:

Observation of a Particular Learning Environment

Intent of Space	Observations
1. What is this space intended to facilitate?	Learning, resting, playing? Fine motor, gross motor, language, academic, social, self-help? Independent, cooperative? Intent unclear?
2. Clear boundaries?	Yes No
3. Enough space?	Yes No
4. Necessary materials easily accessible?	Yes No
5. Materials/furniture enhance performance?	Yes No
6. Time student is seated and/or in same position?	Time: _____ Seated _____ Same position

Recommendations for improving student performance:

Appendix B

SENSORIMOTOR HISTORY QUESTIONNAIRE FOR PRESCHOOLERS[1]

Sensorimotor History Questionnaire for Preschoolers[1]

Name of Child: _____

Gender: ❑ M ❑ F

Date Completed: _____

Birthdate: _____Age:_____

Completed By: _____

DIRECTIONS: The questionnaire may be administered by a parent, teacher, or therapist familiar with the child's functioning in the areas measured by this questionnaire. The questionnaire has been validated on 3- and 4-year-olds but may be administered to 5-year-olds as well. Sum the scores for each subscale, then enter the scores in the boxes at the bottom of the page. Children showing suspect performance in any one or more areas involving sensory processing or motor planning should be referred to an occupation therapist for further testing of sensory integration and motor skills. Children showing suspect performance in the general behaviors and emotional areas should be referred to a clinical psychologist or early intervention professional familiar with testing and treating problems in these areas.

Subscale	Normal	At-Risk
A. Self-Regulation: • Activity level and attention	0-2	3-6
B. Sensory Processing of Touch	0-2	3-9
C. Sensory Processing of Movement: • Underreactivity • Overreactivity	0-2 0	3-4 1-7
D. Emotional Maturity	0-2	3-10
E. Motor Maturity: • Motor planning and coordination	0-3	4-15

A. Self-Regulation (Activity Level and Attention)

Is your child: YES (1) NO (0)

1. Frequently irritable? YES (1) NO (0)
2. Frequently clingy? YES (1) NO (0)
3. Overly active and hard to calm down? YES (1) NO (0)
4. Overly excited by sights, sounds, etc.? YES (1) NO (0)
5. Distracted by sights and sounds? YES (1) NO (0)
6. Restless and fidgety during times when quiet concentration is required? YES (1) NO (0)

TOTAL:_____

B. Sensory Processing of Touch

Does your child:

1. Dislike being bathed or having his hands, face, or hair washed? YES (1) NO (0)
2. Complain that other people "bump" into him? YES (1) NO (0)
3. Dislike textured foods (chewy, crunchy) and avoid new food textures? YES (1) NO (0)
4. Prefer certain clothing and complain about tags in clothing or that some clothes are too tight or itchy? YES (1) NO (0)
5. Frequently bump or push other children and may play too rough? YES (1) NO (0)
6. Prefer as little clothing as possible or prefer long sleeves and pants, even in warm weather? YES (1) NO (0)
7. Seem excessively ticklish? YES (1) NO (0)
8. **Overreact** or **underreact** to physically painful experiences? (Circle which one) YES (1) NO (0)
9. Tend to withdraw from a group or seem irritable in close quarters? YES (1) NO (0)

TOTAL:_____

C. Sensory Processing of Movement

The first part of this section pertains to children who are underreactive to movement stimulation, the second part to children who are very sensitive or intolerant of movement in space.

Does your child:

1. Prefer fast-moving carnival or playground rides or spinning equipment, but does not become dizzy or seems less dizzy than others? YES (1) NO (0)
2. Frequently ride on the merry-go-round where others run around to keep the platform turning? YES (1) NO (0)

3. Especially like movement experiences at home such as bouncing on furniture, using a rocking chair, or being turned in a swivel chair?	YES (1)	NO (0)
4. Enjoy getting into an upside-down position?	YES (1)	NO (0)

TOTAL:_____

Does your child:

1. Tend to avoid swings or slides or use them with hesitation?	YES (1)	NO (0)
2. Seem afraid to let his feet leave the ground (getting up on a chair, jumping games) and prefer to be very close to the ground in play?	YES (1)	NO (0)
3. Fall down often and have difficulty with balance (e.g., when climbing stairs)	YES (1)	NO (0)
4. Fearful of heights or climbing?	YES (1)	NO (0)
5. Enjoy movement that she initiates but does not like to be moved by others, particularly if the movement is unexpected?	YES (1)	NO (0)
6. Dislike trying new movement activities or has difficulty learning them?	YES (1)	NO (0)
7. Tend to get motion sickness in a car, airplane, or elevator?	YES (1)	NO (0)

TOTAL:_____

D. Emotional Maturity

Does your child:

1. Play pretend games with dolls, cars, etc., with sequences or plots to the game (e.g., the doll gets up, gets dressed, eats breakfast)?	YES (0)	NO (1)
2. Engage you in games that he makes up or wants to play?	YES (0)	NO (1)
3. Seek you out for affection and play pretend games during which she will take care of a doll?	YES (0)	NO (1)
4. Play pretend games that involve assertiveness, exploration, or aggression (car races, soldiers fighting, or a trip to grandma's house)?	YES (0)	NO (1)
5. Understand rules such as to wait for you to say it is safe to cross the street?	YES (0)	NO (1)
6. Understand that there are consequences to his behavior (if he behaves nicely, you are pleased; if naughty, he will be punished)?	YES (0)	NO (1)

7.	Have difficulty getting over a temper tantrum (take longer than 10 minutes)?	YES (1)	NO (0)
8.	Have difficulty in playing with peers?	YES (1)	NO (0)
9.	Dislike changes in routine and prefer things to stay the same everyday?	YES (1)	NO (0)
10.	Seem unaware of dangers and take too many risks, often getting hurt?	YES (1)	NO (0)

TOTAL:_____

E. Motor Maturity (Motor Planning and Coordination)

Does your child:

1.	Use two hands for tasks that require two hands, such as holding down the paper while drawing or holding the cup while pouring?	YES (0)	NO (1)
2.	Have difficulty getting dressed?	YES (1)	NO (0)
3.	Avoid trying new play activities and prefer to play games that she is confident at?	YES (1)	NO (0)
4.	Have difficulty using his hands in manipulating toys and managing fasteners (stringing beads, buttons, snaps)?	YES (1)	NO (0)
5.	Seem clumsy and bump into things easily?	YES (1)	NO (0)
6.	Have trouble catching a ball with two hands?	YES (1)	NO (0)
7.	Have difficulty with large muscle activities such as riding a tricycle or jumping on two feet?	YES (1)	NO (0)
8.	Sit with a slouch or partly on and off the chair?	YES (1)	NO (0)
9.	Have difficulty sitting still in a chair and seem to move very quickly (runs instead of walks)?	YES (1)	NO (0)
10.	Feel “loose” or “floppy” when you lift him up or move his limbs to help him get dressed?	YES (1)	NO (0)
11.	Have difficulty turning knobs or handles that require some pressure?	YES (1)	NO (0)
12.	Have a loose grasp on objects such as a pencil, scissors, or things that she is carrying?	YES (1)	NO (0)
13.	Have a rather tight, tense grasp on objects?	YES (1)	NO (0)
14.	Spontaneously choose to do activities involving use of “tools,” such as crayons, markers, or scissors?	YES (0)	NO (1)
15.	Eat in a sloppy manner?	YES (1)	NO (0)

TOTAL:_____

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