

# Axis I: Regulatory-Sensory Processing Disorders<sup>1</sup>

## 200. Regulatory-Sensory Processing Disorder

### *Sensory Modulation Challenges (Type I)*

- 201. Over-Responsive, Fearful, Anxious Pattern
- 202. Over-Responsive, Negative, and Stubborn Pattern
- 203. Under-Responsive, Self-Absorbed Pattern
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### Contributing Sensory Discrimination and Sensory-Based Motor Challenges

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  - 207.8 Other Emotional and Behavioral Problems Related to Mixed Regulatory-Sensory Processing Difficulties
  - 207.9 Mixed Regulatory-Sensory Processing Difficulties where Behavioral or Emotional Problems Are Not Yet in Evidence

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Regulatory-Sensory Processing Disorders (RSPD) should be viewed on a continuum of regulatory-sensory processing variations. All children evidence unique regulatory-sensory processing profiles. They vary in the ways they respond to different sensations (such as touch and sound), comprehend these sensations, and plan actions. Some children, however, have processing differences that are extreme enough to interfere with daily functioning at home, in school, and in interactions with peers or adults, as well as with routine functions such as self-care, sleeping, and eating. As we describe regulatory-sensory processing below, note that while we focus on the disorders end of the continuum, the same patterns can characterize children without challenges and can be very helpful in understanding individual differences and the best ways to promote healthy emotional, social, and intellectual functioning. While observations of variations in motor and sensory functioning in infants and young children have a long history (e.g., the writings of Ayres, 1964); the concept of RSPD was first introduced in the 1980s and early 1990s when Greenspan introduced the concept of Regulatory Disorders (Greenspan et al., 1987; Greenspan, 1992). Along parallel lines, the concept of Sensory Processing Disorders has been developing since Ayres (1972). In 2004, a framework describing a new taxonomy for classifying classic patterns and subtypes of sensory processing problems was presented (Miller, Cermak, et al., 2004). (Greenspan, 1992)

Regulatory Disorders as a diagnostic entity was subsequently incorporated into the diagnostic classification system of Zero To Three: National Center for Infants, Toddlers, and Families. More recently, the Regulatory-Sensory Processing Work Group of the Interdisciplinary Council on Developmental and Learning Disorders (ICDL) has brought the two streams of thought together from the occupational therapy literature and the Developmental, Individual-Difference, Relationship-Based (DIR) model of Infant and Early Childhood Mental Health (Greenspan, 1992) and reformulated and added to the description of Regulatory-Sensory Processing Disorders, which is included in this section.

All children evidence their own unique regulatory-sensory processing patterns. These variations are always important to consider when constructing a developmental profile for a specific infant or child and her family. An RSPD, however, should be considered when the child's motor and sensory differences are contributing to challenges that interfere with age-expected emotional, social, language, cognitive (including attention), motor, or sensory functioning. RSPD gives rise to some of the same symptoms and behaviors as interactive disorders, including nightmares, withdrawal, aggressiveness, fearfulness and anxiety, sleeping and eating disturbances, and difficulty in peer relationships. However, RSPD involves clearly identifiable constitutional-maturational factors in the child.

### **CLINICAL EVIDENCE AND PREVALENCE OF REGULATORY-SENSORY PROCESSING DIFFERENCES**

Recognition and work with regulatory-sensory processing differences have a long history. Occupational therapists have clinically assessed, treated, and researched sensory processing difficulties in children since the late 1950s. Based on both clinical experience and assessment findings, tactile defensiveness was first described by Ayres (Ayres, 1965; 1966a; 1980) as an over-responsiveness to touch sensations, particularly light or unex-

pected touch. Subsequently over-responsiveness to sensory input in a specific sensory system (e.g., the vestibular system) or within the whole body (i.e., sensory defensiveness) has been identified and defined (Ayres, 1972a; Parham & Mailloux, 2001). Under-responsiveness to sensation has also been clinically characterized (Knickerbocker, 1980; Royeen & Lane, 1991; Dunn, 1994).

Sensory responsiveness differences have been used to characterize populations of children with difficult temperament (Rothbart, 1981; Rothbart & Posner, 1985; Thomas & Chess, 1985); regulatory disorders (DeGangi & Greenspan, 1989; DeGangi, 1991; DeGangi, 2001; Greenspan, 1981; 1992; Williamson & Anzalone, 2001); and children with autism spectrum disorders (Greenspan & Wieder 1997; 2005). In a recent study of a representative population, a parent questionnaire on regulatory-sensory processing differences distinguished infants and young children with a number of developmental disorders, including autism and cognitive deficits, from infants and children without challenges (Greenspan, 2004). Functional problems associated with regulatory-sensory processing differences have been described to include: decreased social skills and participation in play; decreased frequency, duration or complexity of adaptive responses; impaired self-confidence and/or self-esteem; deficient adaptive or daily life skills; and diminished fine-, gross- and sensory-motor skill development (Bundy, 2002; Parham & Fazio, 1996; Parham & Mailloux, 2001). While parents may struggle with issues long before children enter school, problems related to Sensory Processing Disorder (SPD) may become more apparent once a child enters a day-care or school environment (Miller & Summers, 2001).

Empirical evidence matching the behavioral manifestations such as those identified above, with physiologic indicators of sensory processing impairments, is accumulating (Mangeot, Miller, McIntosh, 2001; McIntosh, Miller, Shyu, Hagerman, 1999; Miller, McIntosh, McGrath, et al., 1999; Schaff, Miller, Sewell, & O'Keefe, 2003). Electrodermal activity (EDA), as a marker of sympathetic nervous system activity, has recently been used to document physiologic responses during a sensory challenge protocol. The EDA of children with severe Sensory Processing Disorder and Fragile X syndrome differs significantly from the EDA of typically developing children after sensory stimulation (Miller, et al., 1999). Further, children with sensory processing impairments and no other diagnosis demonstrated significantly abnormal EDA after sensory stimulation (McIntosh, et al., 1999). Parent ratings of sensory processing impairment have been shown to correlate with EDA measures, as well (McIntosh, Miller, Shyu, & Dunn, 1999).

In addition, vagal tone has been used to measure parasympathetic nervous system functioning in children identified with sensory processing impairments (Schaff, Miller, Sewell, & O'Keefe, 2003). Results indicate that children with sensory processing disturbances displayed significantly lower vagal tone than typically developing participants, consistent with other studies that found decreased parasympathetic functioning associated with stress vulnerability, developmental and cognitive delays, and emotional and behavioral over-reactivity.

Among children, prevalence estimates of Sensory Processing Disorder based on clinical experience have ranged from 5% to 10% for children without disabilities (Ayres, 1989; Ermer & Dunn, 1998). Estimated rates of Sensory Processing Disorder for children with disabilities such as autism, derived from reliable and valid survey results, are reported to be as high as 40%-88% (Adrien, Lenoir, P., Martineau, 1993; Dahl & Gillberg, 1989; Kientz & Dunn, 1997; Ornitx, Guthrie, & Farley, 1977; Talay-Ongan & Wood, 2000). A more recent investigation of prevalence placed the rate among the general population of kindergarten-aged children at 5% using conservative estimation procedures (Ahn, Miller, Milberger, & McIntosh, 2004).

Different views regarding an appropriate comprehensive theory or the effectiveness of particular intervention strategies must not distract attention from the compelling evidence for the existence of regulatory-sensory processing differences and their relevance to understanding a range of clinical phenomena. Studies supporting the existence of regulatory-sensory processing differences and difficulties in the general population and different clinical disorders should be separated from considerations of regulatory-sensory processing theories and intervention strategies. Research is underway to examine both of these areas of interest.

### DEVELOPMENTAL PERSPECTIVES ON REGULATORY-SENSORY PROCESSING DIFFERENCES

To recognize problems as early as possible, it is important to emphasize that regulatory-sensory processing differences are evident very early in life. In a study of 8-month-old children (Doussard-Roosevelt, Walker, Portales, Greenspan, & Porges, 1990; Porges & Greenspan, 1990), we were able to show that a high percentage of the symptomatic infants had constitutional-maturational differences that contributed to their sleeping problems, eating difficulties, temper tantrums, and other symptoms (DeGangi & Greenspan, 1988). The babies were either under- or over-responsive in some sensory modality or had sensory processing, muscle tone, or motor planning difficulties, in addition to difficulties with physiological regulation. These differences seemed to contribute to a skewing of parent-infant interaction patterns, which, in turn, affected the infants' personality development (DeGangi, DiPietro, Greenspan, & Porges, 1991).

The infants' constitutional-maturational differences persisted and were evident at 18 months. The families also showed signs of distress (Portales, Porges, & Greenspan, 1990). A small group of these infants who were followed to age 4 displayed more behavioral and learning problems than a comparison group (DeGangi, Porges, Sickel, & Greenspan, 1993). Clearly, children with constitutional-maturational unevenness tend to be especially challenging. They have a harder time than other children in their relationships with caregivers; their families' functioning tends to be stressed; and they eventually may experience more behavioral and learning difficulties (Miller, Robinson, & Moulton, 2004).

One can see how a child's constitutional-maturational characteristics influence interaction patterns, and hence the child's developing organization of experience, by considering a fifteen-month-old who has difficulty processing sounds she hears. At this age, chil-

dren experiment with independence and negotiate separateness and connectedness by walking or crawling away from the parent, while maintaining contact through glances and vocalizations. The child who cannot process sounds across a room, however, cannot obtain reassurance from the parent's voice. If her mother says, "Hey, that's terrific! Look how nicely you're walking!" the child, unable to decode the rhythm of mother's voice, is confused and may simply stare, instead of smiling and brightening up. To feel secure, she has to come over and cling to her mother. If the mother is unaware of her daughter's difficulty in processing sound, she may feel angry or impatient at this clingy behavior and push the child away. When we talk on the phone to a loved one far away, our ability to decode the affect in the voice allows us to feel warmth and connection. The child who lacks this ability has greater than average difficulty in developing independence.

Children with visuospatial processing impairments may have difficulty maintaining their internal representations, especially under the pressure of intense affects. If a child cannot maintain a mental image of her parents or other significant caregivers, she is likely to feel a sense of loss and may experience anxiety, fear, or depression. We hypothesize that the biologic vulnerability for depression may be mediated in part through a visuospatial vulnerability that, in turn, creates vulnerability in the stability of mental representations. The loss of internal representations leads to dysphoric affects. The dysphoria experienced in depression is, in this model, in part secondary to the processing disturbance.

*visuospatial vulnerability*

## DIAGNOSIS OF REGULATORY-SENSORY PROCESSING DISORDERS (RSPD)

The diagnosis of RSPD involves a distinct behavioral pattern *and* a sensory modulation, sensory-motor, sensory discrimination or attentional processing difficulty. When both a behavioral and a sensory pattern are not present, other diagnoses may be more appropriate. For example, an infant who is irritable and withdrawn after being abandoned may be evidencing an expectable type of relationship or attachment difficulty. An infant who is irritable and overly responsive to routine interpersonal experiences, in the absence of a clearly identified sensory, sensory-motor or processing difficulty, may have an anxiety or mood disorder. Sleep and eating difficulties, in the absence of identifiable sensory responsivity or sensory processing differences, are classified as disorders in their own right. Further evaluation is then needed to determine whether the cause is an interactive disorder or some other underlying problem that does not fall within our three categories.

Presenting problems that can indicate an underlying RSPD include behavior control difficulties, sleeping and feeding difficulties, fearfulness and anxiety, poor motor skills, avoidance or craving of activities involving different sensations, difficulties in speech and language development, organizational difficulties (pre-executive functioning challenges), and impaired ability to play alone or with others. Parents may also complain that a child gets upset easily, loses his temper frequently, and has difficulty recovering and/or adapting to change.

Poorly organized or modulated responses in infants and children may show themselves in the following domains:

1. The physiological or state repertoire (e.g., irregular breathing, startles, hiccups, gagging)
2. Gross motor activity (e.g., motor disorganization, jerky movements, constant movement)
3. Fine motor activity (e.g., poorly differentiated movements or sparse, jerky or limp movements)
4. Oral motor activity (e.g., picky eater, food texture sensitivities, drooling)
5. Attentional organization (e.g., "driven" behavior, inability to settle down or, at the other extreme, perseveration about a small detail)
6. Affective organization, including the predominant affective tone (e.g., sober, depressed or happy); the range of affect (e.g., broad or constricted); the degree of modulation expressed (e.g., infant shifts abruptly from being completely calm to screaming frantically); and the capacity to use and organize affects as part of relationships and interaction with others (e.g., avoidant, negativistic, clinging and demanding behavior patterns)
7. Behavioral organization (e.g., aggressive or impulsive behavior)
8. Sleep, eating or elimination patterns (e.g., unable to fall or stay asleep, eats little, or has a poor schedule, difficulty eliminating or incontinent)
9. Language (receptive and expressive) and cognitive difficulties

Many attentional, affective, motor, sensory, behavioral control and language problems that have traditionally been viewed as difficulties in their own right may in some children stem from a broader, more basic RSPD. General terms such as "overly sensitive," "difficult temperament," or "reactive" have commonly been used to describe infants and children with motor and sensory processing differences. But clinicians have tended to use such terms without specifying the sensory system or motor functions involved. There is growing evidence that constitutional and early maturational patterns contribute to the difficulties of such infants, but it is also clear that early caregiving patterns can exert considerable influence on how constitutional-maturational patterns develop and become part of the child's evolving personality. As interest in these children increases, it is important to systematize descriptions of the sensory, motor, and integrative patterns as well as the caregiving patterns presumed to be involved.

To make the diagnosis of Regulatory-Sensory Processing Disorder in an infant or young child, the clinician must observe one or more behavioral challenges and a sensory processing challenge including sensory modulation, sensory-motor, sensory discrimination or attentional problems from the list below:

### **Sensory Modulation Symptoms**

1. Over- or under-responsivity to loud, high-pitched, or low-pitched noises
2. Over- or under-responsivity to bright lights or new and striking visual images, such as colors, shapes, and complex fields

3. Tactile defensiveness (e.g., over-responsivity to dressing, bathing, or stroking of arms, legs, or trunk; avoidance of touching “messy” textures) or oral hyper-responsivity (e.g., avoidance of food with certain textures)
4. Under-responsivity to touch or pain
5. Gravitational insecurity—that is, over-responsivity in a child with normal postural responses (e.g., balance reactions) to the changing sensations involved in brisk horizontal or vertical movements (e.g., being tossed in the air, riding a merry-go-round, or jumping)
6. Under- or over-responsivity to odors
7. Under- or over-responsivity to temperature
8. Qualitative deficits in ability to modulate motor activity, such as extreme activity or passivity (not secondary to anxiety or interactive difficulties)

### **Sensory-Motor Symptoms**

1. Oral-motor difficulties or poor oral coordination influenced by low muscle tone, motor planning difficulties, or oral tactile over-responsivity (e.g., chewing, sucking, blowing, taking deep breaths)
2. Poor muscle tone and muscle stability (e.g., hypotonia, hypertonia, postural fixation, or lack of smooth movement quality)
3. Qualitative deficits in fine motor planning (e.g., difficulty in sequencing the hand movements necessary to explore a novel or complex toy, difficulty climbing a jungle gym). Qualitative deficits in fine motor skills including handwriting, coloring, matching construction tasks, puzzles, eye hand coordination.
4. Qualitative deficits in gross motor planning, including movements in space, obstacle courses, automatic movements while doing another task like talking
5. Qualitative deficits in articulation capacity (e.g., for an 8 month-old, difficulty imitating distinct sounds; for a 3 year-old, difficulty pronouncing words to describe an intended or completed action)
6. Poor components of movement patterns (e.g., flexion, extension, weight shifting, rotation, and balance reactions)

### **Sensory Discrimination Symptoms**

1. Qualitative deficits in visuospatial processing (e.g., for an 8 month-old, difficulty recognizing different facial configurations; for a 2½ year-old, difficulty knowing in which direction to turn to get to another room in a familiar house; for a 3½ year old, difficulty using visuospatial cues to recognize and categorize different shapes)
2. Qualitative deficits in aspects of auditory processing, such as difficulty distinguishing between closely related sounds
3. Qualitative deficits in aspects of tactile discrimination (e.g., unable to distinguish objects through touch)

## Attentional Symptoms

1. Qualitative deficits in capacity for sustained attention, including the capacity for shifting back and forth between two objects (such as a person and a toy), not related to anxiety, interactive difficulties, or clear auditory-verbal processing, visuospatial processing, or motor planning problems

## TYPES OF REGULATORY-SENSORY PROCESSING DISORDERS (RSPD)

As suggested earlier, regulatory-sensory processing is an encompassing term referring to the way the nervous system manages incoming sensory information. It is the means by which sensory information is perceived and organized from external stimuli in the environment or from internal stimuli within the body to produce an adaptive response. In this context, adaptive response is defined as an effective behavioral response. Although traditionally considered from a behavioral perspective, adaptive responses may also be considered from a physiologic perspective. From this perspective, adaptive responses include an efficient physiologic response to a sensory challenge or demand.

Also, as discussed earlier, some individuals have difficulty processing sensory information and responding to it appropriately. When the sensory and motor difficulties are severe enough that an individual's daily routines and activities are disrupted and there are related emotional and/or behavioral challenges, the condition is diagnosed as RSPD. Difficulties with motor, emotional, attentional, or daily living skills may be markers of how sensory stimuli are perceived and interpreted.

RSPD is divided up into a number of specific disorders, and also contains a category of "mixed" disorders based on the predominant characteristics of the child, including behavioral patterns and emotional inclinations, as well as motor and sensory patterns. Note that the descriptions of the different types include a discussion of caregiving patterns (therapeutic strategies) that promote better regulation and organization in the child, as well as caregiving patterns that intensify the child's difficulty. Because the daily routines of caregiving involve continual sensory, motor, and affective experiences for the infant and young child, irregular conditions in the environment, changes in routine, or handling that is not sensitive to individual differences can strongly affect infants and children with RSPD, as well as their caregivers.

There are a number of specific types of Regulatory-Sensory Processing Disorders. Each is characterized by different types of regulatory-sensory processing and behavioral patterns. While each type of disorder is identified separately, there are three broad patterns that characterize them.

1. Sensory modulation problems, such as over-responsivity, under-responsivity, and sensory-seeking (Type I)
2. Sensory discrimination problems (Type II)
3. Sensory-based motor challenges (dyspraxia and postural regulation difficulties) (Type III)



## SENSORY MODULATION CHALLENGES (TYPE I)

The first group of Regulatory-Sensory Processing Disorders to be described involves challenges in *sensory modulation*. Sensory modulation challenges are characterized by an inability to grade the degree, intensity, and nature of responses to sensory input. Often the child's responses do not fit the demands of the situation. The child therefore demonstrates difficulty achieving and maintaining an optimal range of performance and adapting to challenges in daily life. (See Guide for Observations in Appendix III for suggestions on observing sensory modulation differences.)

There are three subtypes of RSPD related to sensory modulation challenges.

### 201. Over-Responsive, Fearful, Anxious Pattern

Children who demonstrate over-responsivity to sensory stimuli have responses to sensations that are more intense, quicker in onset or longer lasting than those of children with typical sensory responsivity under the same conditions. Their responses are particularly pronounced when the stimulus is not anticipated. Children may demonstrate over-responsivity in only one particular sensory system, for example, "auditory defensiveness" or "tactile defensiveness," or they may demonstrate over-responsivity in multiple sensory systems. Over-responsivity to sensory stimuli in multiple modalities is often referred to as sensory defensiveness. Children are usually particularly over-responsive to specific types of stimuli within a sensory domain (e.g., in the tactile domain they respond defensively to light touch but not to deep pressure), rather than to all stimuli within a domain.

Responses to sensory stimuli occur along a spectrum. Some children manage their tendency towards over-responsivity most of the time, while other children are over-responsive almost continuously. Responses may appear inconsistent because over-responsivity is highly dependent on context. While children may generally attempt to avoid particular sensory experiences, sensitivities may vary throughout the day, and from day to day. Since sensory input tends to have a cumulative effect, the child's efforts to control responses to sensory stimuli may build up and result in a sudden behavioral disruption in response to a seemingly trivial stimulus.

A child's behavioral characteristics when faced with uncomfortable stimuli can fall within a broad range. At one end of this spectrum, the child shows fearfulness and anxiety, often avoiding many sensory experiences. At the other end of the spectrum, the child shows negativity and stubbornness, or obstinacy exemplified by attempts to control the environment. This latter tendency is described as a separate type below. This range of responses is often termed the "fight, flight, fright, or freeze" response, and is attributed to sympathetic nervous system activation. Secondary behavioral characteristics include: irritability, fussiness, poor adaptability, moodiness, inconsolability and poor socialization. In general, children who are over-responsive to sensation have difficulty with transitions and unexpected changes.

Sensory over-responsivity is often seen with other sensory reaction patterns. For example, children may show over-responsiveness to tactile stimuli while seeking proprioceptive stimuli. Sensory over-responsivity also may be observed concomitantly with sensory discrimination problems and dyspraxia.

**Behavioral patterns** include excessive cautiousness, inhibition, and fearfulness. The child avoids sensation in an effort to control unexpected incoming sensory stimuli. In early infancy, one sees a restricted range of exploration and assertiveness, dislike of changes in routine, and a tendency to be frightened and clinging in new situations. Young children's behavior is characterized by excessive fears or worries and by shyness in new experiences, such as forming peer relationships or engaging with new adults. Occasionally, the child behaves impulsively when overloaded or frightened. He tends to become upset easily (e.g., irritable, often crying); cannot soothe himself readily (e.g., finds it difficult to return to sleep); and cannot quickly recover from frustration or disappointment, especially in environments that include multiple or intense sensory stimuli. The fearful and cautious child may have a fragmented, rather than an integrated, internal representational world, and may therefore be easily distracted by different stimuli.

**Further examples include:**

- Avoids group activities and often plays alone
- Excessively cautious and afraid to try new things, resulting in a restricted range of exploration
- Prefers uniformity in the environment
- Prefers repetition and the absence of change or, at most, change at a slow or predictable pace
- Difficulty with transitions and unexpected changes
- Tends to be frightened, clinging, worried or shy in new situations
- May have difficulty forming peer relationships or engaging with new adults
- Becomes upset easily and quickly
- Perfectionist and compulsive
- Can appear under-responsive ("shut-down") as coping mechanism to over-arousal

**Caregiver patterns** that are characterized by soothing, regulating interactions; that respect the child's sensitivities; and that do not convey that the child has bad behaviors are helpful. Supportive parents anticipate noxious environments and minimize them or prepare the child for them. Enhancing flexibility and assertiveness in fearful and cautious children involves empathy, especially for the child's sensory and affective experience; very gradual and supportive encouragement to explore new experiences; and gentle, but firm, limits. Inconsistent caregiver patterns intensify these children's difficulties, as when caregivers are overindulgent or overprotective some of the time and punitive or intrusive at other times.

## 202. Over-Responsive, Negative, and Stubborn Pattern

Children with this pattern tend to evidence the same physiologic responses described above for the over-responsive, fearful and anxious type. However, this type of child seeks to control the sensory environments in which they find themselves and, thus, may prefer repetition and the absence of change or, at most, change at a slow, predictable pace. Rather than being overloaded and becoming fearful, anxious, and cautious, these children attempt to control their environments so that they can minimize fear and anxiety.

**Behavior patterns** may appear negative, stubborn, and controlling. The child can become aggressive and impulsive in response to sensory stimulation. He often does the opposite of what is requested or expected. Infants with this pattern tend to be fussy, difficult, and resistant to transitions and changes. Preschoolers tend to be negative, angry, and stubborn, as well as compulsive and perfectionistic. However, these children can display joyful, flexible behavior in certain situations.

In contrast to the fearful or cautious child, the negative and stubborn child does not become fragmented but organizes an integrated sense of self around negative patterns. In contrast to the impulsive, sensation-seeking child (described below) the negative and stubborn child is more controlling, tends to avoid or be slow to engage in new experiences rather than to crave them, and is not generally aggressive unless provoked.

### Further examples include:

- Aggressive or impulsive when overloaded by sensory stimuli
- Hit, kick or bite in response to unexpected sensory stimulation, such as being accidentally jostled in line
- Defiant (child does the opposite of what is requested or expected)
- “Difficult” and hard to soothe
- Controlling
- May be irritable, fussy, difficult, not adaptable, moody, and unsociable

**Caregiver patterns** that enhance flexibility involve soothing, empathetic support of slow, gradual change and avoidance of power struggles. (Caregivers can avoid power struggles by offering the child choices and opportunities for negotiation whenever possible.) Caregivers’ warmth, coupled with gentle, firm guidance and limits—even in the face of negative or impulsive responses that may feel like rejection—and encouragement of symbolic representation of affects, especially dependency, anger, and annoyance, also helps children with this pattern become more flexible. In contrast, caregiver patterns that are intrusive, excessively demanding, over-stimulating, or punitive tend to intensify negative patterns.

## 203. Under-Responsive, Self-Absorbed Pattern

Children who are under-responsive to sensory stimuli are often quiet and passive, disregarding or not responding to stimuli of typical intensity available in their sensory environment. Alternatively, they may be so enthralled by a world of their own imagination that they have trouble engaging in the here and now. They may appear withdrawn, difficult to engage, and/or self-absorbed because they have not registered the sensory input in their environment. The term “poor registration” is often used to describe their behavior, as they do not appear to detect or “register” incoming sensory information. They may also appear apathetic and lethargic. They may seem to lack the inner drive that most children have for socialization and motor exploration when, actually, they do not notice the possibilities for action that are around them. Their under-responsivity to tactile and proprioceptive inputs may lead to poorly developed body scheme, clumsiness, or poorly modulated movement. These children may fail to respond to bumps, falls, cuts or scrapes that can present a danger, as they may not notice pain, such as injuries to the skin, and objects that are too hot or too cold.

Children who are under-responsive to sensation often do not seek greater intensity in sensory input even though they may require it for optimal environmental interaction. Children with this pattern may be overlooked or thought of as the “good baby” or “easy child” simply because they fail to make demands on people and things in the environment. These children often need high intensity and highly salient input in order to become actively involved in the environment, the task, or the interaction.

In some instances, children who are easily overloaded by sensory stimulation may appear to be under-responsive when in fact they are extremely over-responsive. The observable behavior is one that suggests withdrawal and shutdown, perhaps as a defense mechanism. Children with sensory under-responsivity also may have sensory discrimination challenges and dyspraxia.

As indicated above, there are two patterns observed. Some children tend to be self-absorbed, unaware, and disengaged, while others are self-absorbed, but very creative and overly focused on their own fantasy lives. Therefore, we describe two subtypes for the Under-Responsive Self-Absorbed Pattern

### 203.1. Self-Absorbed and Difficult to Engage Type

Behavior patterns include seeming disinterest in exploring relationships or even challenging games or objects. Children may appear apathetic, easily exhausted, and withdrawn. High affective tone and saliency are required to attract their interest, attention and emotional engagement. Infants may appear delayed or depressed, lacking in motor exploration and social overtures. In addition to continuing the above patterns, preschoolers may evidence diminished verbal dialogue. Their behavior and play may present a limited range of ideas and fantasies. Sometimes, children seek out desired sensory input, often engaging in repetitive sensory activities, such as spinning on a sit-n-spin, swinging,

or jumping up and down on the bed. The child needs the intensity or repetition of these activities in order to experience them fully.

**Further examples include:**

- Often quiet, passive or withdrawn
- May be overlooked or thought of as “a good baby” or “an easy child” simply because of a quiet demeanor and lack of demands
- Disinterested in exploring games or objects
- Apathetic, easily exhausted
- May seem delayed or depressed
- Lacking in motor exploration and social overtures
- Difficult to engage – often fail to register others’ attempts at engagement
- May have diminished verbal dialogue
- May present only a limited range of ideas and fantasies
- May engage in repetitive sensory activities, such as spinning or playing on a sit-n-spin, swinging, or jumping up and down on the bed

**Caregiver patterns** that provide high-energy interactive input help engage the child in activities and relationships and foster initiative. These patterns involve energized wooing and robust responses to the child’s cues, however faint. In contrast, caregiver patterns that are low-key, “laid back,” or depressive in tone and rhythm tend to intensify these children’s patterns of withdrawal.

## 203.2. Self-Absorbed and Creative Type

**Behavioral patterns** of self-absorbed children, many of whom are also creative, include a tendency for the child to tune into his own sensations, thoughts, and emotions rather than to communications from other people. Infants may become interested in objects through solitary exploration rather than in the context of interaction. Children may appear inattentive, easily distracted, or preoccupied, especially when they are not pulled into a task or interaction. Preschoolers tend to escape into fantasy when faced with external challenges, such as a demanding preschool activity or competition from a peer. They may prefer to play by themselves if others do not actively join their fantasies. In their fantasy life, they may show enormous imagination and creativity.

**Further examples include:**

- Highly intelligent children who are in their own world
- Out of touch with actions happening around them
- Prefer to spend time on the computer or reading or in their own fantasy world
- May be difficult to engage because they are so involved in their cognitive processing

**Caregiver patterns** that are helpful include a tendency to tune into the child’s non-verbal and verbal communications and help the child engage in two-way communication, that is, to “open and close circles of communication.” Caregivers should also encourage a

good balance between fantasy and reality and help a child who is attempting to escape into fantasy stay grounded in external reality (e.g., by showing sensitivity to the child's interests and feelings; by promoting engagement and discussion of daily events, feelings, and other real-world topics; and by making fantasy play a collaborative endeavor between parent and child rather than a solitary activity). In contrast, a caregiver's self-absorption or preoccupation, as well as confusing family communications, tends to intensify the child's difficulties.

## 204. Active, Sensory Seeking Pattern

Children with this pattern actively seek or crave sensory stimulation and seem to have an almost insatiable desire for sensory input. They energetically engage in activities or actions that are geared toward adding more intense "feelings" of sensation to satisfy a basic need or desire for sensory input. They tend to be constantly moving, crashing, bumping, and jumping; they may have a need to touch everything and have difficulty inhibiting this behavior; they may play music or the TV at loud volumes, may fixate on visually stimulating objects or events, or may seek unusual olfactory or gustatory experiences that are more intense and last longer than those of children with typical sensory responsivity.

Atypical responses occur along a spectrum; some sensory seeking behavior is normal. Often these children prefer a higher level of arousal than adults feel is appropriate in a given environment. Sensory seeking may also be seen as a means to obtain enhanced input for individuals with reduced awareness of sensation. Sensory seeking may be done in an effort to influence (increase) their level of arousal. For children who are sensory seekers, the need for constant stimulation is difficult to fulfill and may be particularly problematic in environments where children are expected to sit quietly such as in school, in movies, and in libraries. Obtaining additional sensory stimulation, if unstructured, may increase the child's overall state of arousal and result in disorganized behavior. However, if directed, specific types of additional sensory input can have an organizing effect.

The behavioral characteristics of these children when their sensory needs are not met include demanding and insistent behavior. They may be impulsive, almost explosive, in their attempts to fill their quota for sensation. They have a tendency to "get in trouble," creating situations around themselves that others perceive as "bad" or "dangerous." Secondary behavioral characteristics that describe these children include: overly active or aggressive, impulsive, intense, demanding, hard to calm, restless, overly affectionate, and craving attention. Extreme seeking or craving of sensory input can also disrupt children's ability to maintain attention for learning. Activities of daily living are frequently disrupted. Children may have trouble in school because they are distracted as they are "driven" to attempt to obtain extra sensory stimulation instead of focusing on tasks.

**Behavioral patterns** involve high activity, with children seeking physical contact and stimulation, for example through deep pressure and intense movement. Frequently, the motorically disorganized child's tendency to seek contact with people or objects leads to

disruptive behavior (e.g., breaking things, unprovoked hitting, intruding into other people's physical space). Behavior that begins as a result of craving sensations may be interpreted by others as aggression rather than excitability. Once others react aggressively to the child, his own behavior may become aggressive in intent.

Infants in this group are most satisfied when provided with strong sensation in the form of movement, sound, touch, or visual stimulation. They may be content only when held or rocked. Toddlers may be very active. Preschoolers often show aggressive, intrusive behavior and a daredevil, risk-taking style, as well as preoccupation with aggressive themes in pretend play. When the young child is anxious or unsure of himself, he may use counterphobic behaviors such as hitting another child first, in anticipation of possibly being hit, or repeating unacceptable behavior after being asked to stop. When older and able to verbalize and observe his own patterns, the child may describe his need for activity and stimulation as a way to feel alive, vibrant and powerful. Children who have extreme sensory needs that are not met may become demanding and insistent on getting their own way. They may be impulsive, almost explosive in their attempt to fill their quota for sensation. They have a tendency to "get in trouble" as they create situations around them that others perceive as bad or dangerous.

#### Further examples include:

- Energetically engage in activities or actions that are geared to adding more intense "feelings" of sensation (seeming to satisfy a basic need or desire for sensory input)
- Crave sensory input in one or more sensory channels; may look like attention-seeking behavior, but actually craving sensation. Craving may be seen as:
  - Constantly moving and crashing, bumping and jumping
  - Playing music/TV extremely loudly
  - Watching visually stimulating scenarios for hours
  - Seeking olfactory or gustatory experiences that are more intense and last longer than children with normal sensory responsivity desire
- May seem hyperactive and have difficulty sitting quietly (at school, during worship situations, at the dinner table); can disrupt other children's ability to maintain attention
- May be restless, impulsive, almost explosive (in their attempt to fill their quota for sensation), and have a difficult time controlling their aggressive or impulsive behaviors ("out of control"). This results in a tendency to "get in trouble" or create situations around them that others perceive as "bad" or "dangerous."
- Child's overall state as it appears behaviorally is one of high arousal; the child gets "wound up" with increasing amounts of stimulation
- May become demanding and insistent on getting his own way

**Caregiver patterns** characterized by continuous, warm relating, a great deal of nurturing, and empathy, together with clear structure and limits, enhance flexibility and adaptivity. Caregivers should understand the need for extra stimulation and give the child many opportunities to acquire more stimulation, preferably through interactive,

modulated play. Encouraging the use of imagination and verbal dialogue to explore the external environment and elaborate feelings further enhances the child's flexibility. Advocacy in settings outside the home is required so that others understand the child's behavior, adapt these constructive caregiver patterns, and avoid labeling the child a "behavior problem." In contrast, caregiver patterns that lack warm, continuous engagement (e.g., frequent changing of caregivers); that over- or underestimate the child; that are overly punitive; or that vacillate between overly punitive limit-setting and insufficient limit-setting may intensify the child's difficulties.

### **SENSORY DISCRIMINATION CHALLENGES (TYPE II) AND SENSORY-BASED MOTOR CHALLENGES (TYPE III)**

As indicated earlier, in addition to challenges related to sensory modulation, there are regulatory-sensory processing disorders related to sensory discrimination challenges and to sensory-based motor challenges (postural control problems and dyspraxia). See the Guide for Observations in Appendix III for suggestions on observing these capacities.

The two Regulatory-Sensory Processing Disorders based on challenges in these processing areas involve inattentive, disorganized behavioral patterns and school performance and academic problems. Both these disorders may involve various combinations of difficulties in sensory discrimination, as well as sensory-based motor performance (including postural control problems and dyspraxia).

First, we describe each of these Regulatory-Sensory Processing Disorders in terms of its behavioral characteristics and the caregiver patterns that worsen or improve them. Then we describe the sensory discrimination challenges and sensory-based motor challenges (including postural control problems and dyspraxia) that are associated with these two Regulatory-Sensory Processing Disorders. We are describing the processing contributors to these disorders together (rather than individually), because they share various combinations of the same contributing sensory processing and motor planning challenges.