A Synthesis of Occupational Behavior and Sensory Integration Concepts in Theory and Practice, Part 2: Clinical Applications

(assessment, play, pediatric practice)

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This is the second of two papers addressing the occupational behavior and sensory integration approaches to occupational therapy for children. In the previous paper, basic concepts from these two approaches were discussed as presenting different, yet complementary, perspectives. The use of play was identified as central to occupational therapy practice from either perspective. Concepts from both approaches were integrated into a general systems model of play development in infancy and early childhood. This paper discusses play and sensory integration as interdependent developmental phenomena that are a function of interactions between the environment (input) and the child's internal processing (throughput). When input-throughput interactions do not permit the growth of competence, dysfunction occurs. Consideration of possible input and throughput deficits are suggested for assessment of individual children, and treatment guidelines are drawn from both the sensory integration and occupational behavior literature.

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In Part 1 of this series (1), the occupational behavior and sensory integration frames of reference were viewed as complementary perspectives that emphasize the use of play in clinical practice with handicapped children. A model of play development was presented using a general systems framework to unify sensory integration and occupational behavior concepts. Sensory integration was described in this model as a throughput process present at birth that develops and influences play throughout childhood. Play activity, in turn, provides experiences that nurture sensory integration.

The purpose of this paper is to further synthesize occupational behavior and sensory integration concepts for occupational therapy practice. The reciprocal influences of sensory integration and play will be discussed in depth and applied to the understanding of dysfunction. Suggestions for assessment and treatment incorporating this synthesized view will be made.

Interrelationships of Sensory Integration and Play

On a general level, the child's play is the primary area in which sensory integrative development occurs. Ayres states that "Play consists of the adaptive responses which make sensory integration happen." (2, p 7) Seeking novel stimuli and experiences as well as striving for environmental mastery, which characterize playful behavior, are present in the child's continuing effort to organize adaptive responses. As the child seeks in play to master the environment and to respond adaptively and successfully to ever more complex challenges, sensory integrative development is enhanced. The child creates experiences to allow new mastery and, as the child does so, sensory integrative development occurs to allow the organization of increasingly complex environmental interactions.

These early play experiences emphasizing use of the whole body

in environmental interactions serve as primary experiences to enhance the child's ability to organize sensations for use in creating more complex adaptive behavior. Imitation, exploration, and repetition of novel behaviors in play further contribute to sensory integration for the development of competent play. The child seeks to challenge existing capacities in play to develop more effective and complex strategies in relating to the environment in a sensorimotor, constructive, and social fashion.

The play milieu, then, may influence the degree and quality of sensory integrative development to the extent that appropriate opportunities for play are available; for example, materials, time and space for play, models for play, and adult support for play. In addition, the child's ability to use these opportunities appropriately in organizing playful behavior may influence the value of these early sensory integrative experiences. The enhancement of playfulness in the child may assist in creating and achieving these important sensory integrative activities.

With examination of the converse relationship, the influence of sensory integration on play, it is apparent that the relative adequacy of sensory integrative abilities will influence how the child plays. At the sensorimotor level, the child's ability to integrate and organize sensation is of paramount importance in using the body effectively in play. At the constructive level, such products of sensory integration as praxis, eye-hand coordination, and visual perception will influence the quality of the child's interactions with objects. And at the social level, end products of sensory integration—self-esteem and self-confidence—may influence the child's willingness and ability to interact, cooperate, and compete with peers in social play.

Thus, both processes of sensory integration and play are closely intertwined and related. On the one hand, much of sensory integrative development occurs within the context of childhood play; opportunities for children to choose play experiences and challenge themselves within these experiences are critical at all levels. On the other hand, the adequacy of sensory integrative processes will very much influence the child's ability to successfully master the environment through sensorimotor, constructive, and social play.

Dysfunction

The child who adapts successfully to the environment, whether it be the sensation it affords, the constructive opportunities it offers, or the social arenas it provides, becomes the competent child. For the system to function successfully—that is, for the child to be a competent player at all levels—it is proposed that two things must occur: first, one must be able to receive the appropriate amount and the appropriate kind of input at the appropriate time; second, one must have the capabilities to process that input effectively. If either of these two situations is not met, dysfunction occurs. Evidence of dysfunction is seen in the play behavior of the child. Dysfunction originates at the input phase of the model when it involves a deficiency in the environment or an abnormality of sensory reception. Dysfunction becomes a throughput problem when it is caused by faulty internal processing. Evidence of dysfunction is seen in the deficient play behavior resulting from one or both of these problems. Observable behavior as output indicates the presence of deficits, although the problem may lie elsewhere in terms of the model.

A problem at the input stage may take a variety of forms. The institutionalized infant who is not touched, cuddled, or moved through space may experience a lack of appropriate environmental input at this early stage. An example of an input problem that occurs because of an abnormality in sensory receptors might be blindness or deafness arising from nonfunctional peripheral receptors.

If the child does not have the capabilities to process the input effectively, dysfunction lies at the throughput phase of the model. Inadequate internal processes may involve neurological deficits that inhibit mobility and active exploration of the environment. Cerebral palsy is a clear example of this type of neurological throughput problem. Inability to process the input in a normal way may also involve higher cognitive processes, thereby impeding the formation of adequate rules of objects and rules of people. Mental retardation is an example of this cognitive type of throughput problem.

When the cause of the condition is clear, it is fairly easy to determine whether the dysfunction lies primarily at the input or the throughput phase of the feedback process. However, etiology is often unknown or unclear. A case in point is often the child who is labeled emotionally handicapped. The therapist who works with such cases should consider both input and throughput as potential problem areas. For example, a child who is hyperactive, destructive, and avoids physical contact with others might be considered tactilely defensive, a throughput problem. These same behaviors, however, might well be

Table
Assessments of Play Development Considering Environmental (Input) Factors and Internal Processing (Throughput) Factors

Assessment	Developmental Level of Play					
	Sensory Motor		Constructive		Social	
	Input	Throughput	Input	Throughput	Input	Throughput
History	Play history—Takata (3).	Sensory history—Ayres (4). Play history.	Play history.	Play history.	Play history.	Play history.
Observation	Play agenda—Michelman (5).	Play scale—Knox (6). Reflex, range of motion, spasticity, and muscle testing. Clinical observations—Ayres (7).	Play agenda.	Play scale. Play observation—Kalverboer (8).	Play agenda.	Observation of social participation—Parten (9). Observation of sociodramatic play—Smilansky (10).
Standardized Test	Home observation of the environment (HOME)—Caldwell (11).	Bayley infant scales (12). Bruininks-Oseretsky Test of Motor Proficiency (13). Gesell test (14). Southern California Sensory Integration Test——Ayres (15). Uzgiris-Hunt scales (16).	HOME	Portions of Bayley, Gesell, Uzgiris-Hunt.		

related to a history of physical abuse, an input problem.

In any handicapping condition, disordered feedback may exist. That is, the proper variety of feedback to nurture developmental processes may be lacking. Input, in turn, may become increasingly deficient or inappropriate unless special measures are taken to provide the child with experiences to meet individual needs. If these measures are not taken and the quality and quantity of input is not sufficient to foster growth, a vicious cycle is set up negatively affecting throughput processes. When this happens, the child does not process the input in a way that would normally be expected, and deficits result in many areas of play and development.

Assessment

From the perspective presented in this paper, assessment of play requires instrumentation for each hierarchical level of development. At each level, the therapist conducting the assessment must take into consideration the input available, or environmental opportunities for play, as well as the throughput capabilities, or internal factors affecting play. Throughput behaviors are generally inferred through observation of output.

Because output behaviors comprise the direct link between the child and environment, assessment of these provides information about the relative efficacy of environmental interactions. When assessing the effectiveness of play as an output behavior, the therapist should observe, among other factors, whether the child is assuming an active role in initiating and participating in play. The presence of intentionality or goal seeking (as opposed to randomness) in organizing playful interactions is also an important factor to be considered.

The table charts some suggested instruments for assessing the inputs and throughputs at each developmental level of play. Within each level, three categories of instruments are presented: the history, which looks back for the child's past play opportunities and behaviors; the observation of present play behaviors and opportunities; and standardized tests assessing the child's capabilities in comparison to normative data. It should be emphasized that this is not intended to be an exhaustive list of evaluations. The instruments listed here are merely suggestions that illustrate how one might assess the competence of play.

Treatment

General guidelines for treatment based on the perspective presented in this paper include concepts from both occupational behavior and sensory integration approaches. Occupational behavior is viewed here as a broad frame of reference for the understanding of child's play. Within this frame of reference, sensory integration is conceived as a nervous system function that devel-

ops within the context of childhood play. While occupational behavior is an approach that can apply to the activities of all handicapped children, sensory integration is a specialty area of occupational therapy practice intended to be used with children having specific problems with neural processing. Sensory integrative techniques are most effective when the child is spontaneously playing while successfully meeting environmental demands. Swenson-Miller has defined sensory integrative techniques as "creatively derived from natural play/leisure time activities." (17) It is the contention of the present authors that a sensory integration approach can be practiced in a way that is consistent with occupational behavior tenets.

A general concept proposed as central to intervention from this unified perspective is the importance placed on the child's play. A playful attitude is sought during therapy, for it will draw the child into active exploration of the environment as well as into experimentation with his or her own capabilities. The child's initiative and active involvement are necessary in order for growth-fulfilling play and sensory integrative development to occur. As Reilly points out, intrinsic motivation is a key feature of play that must be tapped during occupational therapy (18). Ayres emphasizes the inner drive of the child and advocates the self-direction of the child during therapy, thereby stressing intrinsic motivation and implying that the child's potential is being explored and developed through play (19). During occupational therapy, play can be facilitated by providing a model of playfulness and by arranging the environment optimally for the individual child.

Both occupational behavior and sensory integrative models of therapy suggest that it is the responsibility of the therapist to structure the therapeutic environment so as to provide the child with the "just right challenge." (2, 5) A task that is just right should be sufficiently novel to tap the child's inner drive toward effective interaction with the environment and should result in the arousal of curiosity and affective involvement. The task must not be so complex or demanding that it overwhelms the child or leads to failure, nor should it be so simple that the child loses interest. In occupational therapy, a special environment can be provided that will challenge the child, yet allow for success and gaining control of one's own actions. As Ayres describes it, the therapist carefully balances structure and freedom in a way that leads to constructive exploration (2, p 151). Close, ongoing observation of the child lets the therapist know whether the just right challenge is being met or whether it is time to restructure the environment. For example, a child who is introduced to a group game with rules and reacts with impulsive or disruptive behavior may be telling the therapist that he or she does not have adequate rules of people to deal with peers in such a structured social situation. The therapist might help the child by reducing the demands, perhaps by involving the child with one other child in a simple game requiring skills that have already been mastered.

The use of imitation and modeling may be an effective vehicle for helping the child engage in the "just right" challenge. A child who is highly motivated to engage in an activity, but lacks the rules of motion, objects, or people to do so effectively, may be guided by first observing the therapist or peers doing the activity. The provision of role models may be especially helpful for the child who has difficulty organizing and sequencing his or her actions.

The model of play development discussed in Part 1 (1) brings into focus other points that might be of use to the therapist using play with a handicapped child. First, because of the hierarchical nature of the model, treatment directed at one level may affect all other levels, and changes may be detected at the other levels. This might be related to why parents of children who have been involved in sensory integrative therapy often report that their child is able to engage in constructive activities for longer periods of time and is more willing and able to play with other children. Second, the therapist should keep in mind that therapy may be most effective when several levels of play are used simultaneously, even if therapy is focused on one level. Recall that, in normal development, children seldom play at a single level only. So also should therapeutic play incorporate elements other than the level primarily being addressed. In some instances, the therapist can help the child engage in play more readily by introducing a new element from another level of play. An example might be the child who is reluctant to play on a piece of equipment that moves for fear of losing control and falling. The therapist might primarily be interested in helping the child develop sensorimotor play, but might find that the child is more willing to explore this realm if the activity becomes an imaginative pretend game in which the equipment is a horse "taking us on a trip." If the child has developed some play skills to the extent that peers are of interest, the sensori-

motor activity can also become an opportunity for parallel or even cooperative play when another child joins the game. The child should guide the appropriateness of the activity. Many therapists already practice these concepts intuitively. Conscious awareness of the levels of play involved in activies may make therapy more effective in guiding the handicapped child's play toward increasing competence.

In addition to providing direct treatment using play, the occupational therapist can provide indirect services by making recommendations to parents or other caregivers regarding how to best nurture the handicapped child's play. Michelman (5), Takata (3), Knox (6), and Ayres (2) have provided useful references for the therapist in this capacity. Following assessment of the child's handicap, play, and natural environment, the therapist can make suggestions to modify the input phase of the child's play in order to facilitate development of throughput processes. For example, a culturally disadvantaged 5-year-old may not engage in sociodramatic role play, as would be expected of a child that age; this may be partly due to lack of exposure to competent adult role models. As a possible solution, the therapist might suggest that the child gain exposure to a number of competent adult role models by joining community-based activities. Another strategy reported by de Renne-Stephan (20) would be to provide occupational therapy to help the adult at home to become a more competent role model.

Summary

The occupational behavior frame of reference provides a broad philosophical framework for occupational therapy practice. Within this broader context, sensory integrative methods comprise a specialized area of practice aimed at certain neural processing disorders. Sensory integration is viewed as an ongoing process that underlies the development of play. Play experiences, in turn, influence the development of sensory integration. Dysfunction may occur if deficits exist in the environmental opportunities surrounding the child and/or in the child's internal processes and ability to make use of feedback. Clinical assessment and intervention must take each of these into consideration. The therapeutic process itself should maximize playfulness in order to elicit the child's active exploration of environment and self. In addition to acting as a model of playfulness, the therapist can engage the child's active involvement by structuring the environment to provide challenges that arouse curiosity and promote mastery through successful experiences. Awareness of the hierarchical levels of play development may assist the therapist in providing challenge that is just right for the individual child.

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