Research Base for the PLAYBIG METHOD


Abstract: Kids playing catch, running, jumping, climbing on jungle gyms, and flying down slides are all common sites at recess yards across America. Yet for the estimated 1 in 88 children with Autism Spectrum Disorder (ASD), physical impairments often go hand-in-hand with the disorder’s social and neurological impairments. Long the realm of occupational and speech therapy, some pediatric physical therapy programs have taken an interest in these patients, recognizing their need for PT interventions starts at a young age.


Abstract: Physical therapists have expanded their role and visibility in the treatment of children with autism spectrum disorders (ASD). Limitations in motor activity have not been considered in the assessments of core deficits of this population; however, physical therapists should be prepared to discuss and address these limitations in children with ASD. Purpose: The primary purposes of this review were to summarize current evidence for motor activity limitations in children with ASD and suggest further areas of research in physical therapy and autism while considering how physical therapy may benefit children with autism. Method: A literature search was carried out in 2009 and 2010 by using multiple search engines. Results: Forty-nine articles met inclusion criteria and were included in the review. Conclusion: Findings indicate that limitations in motor activity may be present in individuals with ASD, and further research is needed to identify specific functional limitations.


Abstract: Autism spectrum disorders (ASDs) are the most common pediatric diagnoses in the United States. In this perspective article, we propose that a diverse set of motor impairments are present in children and adults with ASDs. Specifically, we will discuss evidence related to gross motor, fine motor, postural control, and imitation/praxis impairments. Moreover, we propose that early motor delays within the first 2 years of life may contribute to the social impairments of children with ASDs; therefore, it is important to address motor impairments through timely assessments and effective interventions. Lastly, we acknowledge the limitations of the evidence currently available and suggest clinical implications for motor assessment and interventions in children with ASDs. In terms of assessment, we believe that comprehensive motor evaluations are warranted for children with ASDs and infants at risk for ASDs. In terms of interventions, there is an urgent need to develop novel embodied interventions grounded in movement and motor learning principles for children with autism.

**Abstract:** Have you ever wondered why your child might freeze at certain times, or what triggers an explosive tantrum? As parents we have become used to looking at these issues purely in terms of attachment, caused by high levels of stress hormones produced in the brain as a result of insufficient bonding during the pivotal years of infancy. We have read that because these children were not given adequate parenting, many are unable to form healthy relationships. But there could also be something else compounding their problems; an underlying sensory processing disorder. If a child is sensory defensive, i.e., they have intolerances of certain sounds, lights, touch, smells, foods and even temperature, or is unable to interpret and organize incoming sensory information for use, everyday experiences can be unpleasant and even overwhelming.


**Summary:** Autism spectrum disorders are generally thought to be caused by deficits in brain development, but a study in mice now suggests that at least some aspects of the disorder -- including how touch is perceived, anxiety, and social abnormalities -- are linked to defects in another area of the nervous system, the peripheral nerves found throughout the limbs, digits, and other parts of the body that communicate sensory information to the brain.


**Abstract:** The article describes a proposed model for considering sensory processing an important factor in young children's performance. The author reviews constructs from neuroscience and behavioral science to propose how the transaction among these constructs may provide a framework for understanding various patterns of behavior and for developing methods for handling young children's sensory processing needs in a functional and supportive manner. The author reviews data from a series of studies on the Sensory Profile, a family-report measure of a child's responses to sensory experiences during daily life, to illustrate the utility and possible quantitative support for the proposed model components in young children with and without disabilities.


**Summary:** The Developmental, Individual Difference, Relationship based approach to helping children with special needs, known as DIR®, was first described by Dr. Stanley Greenspan in two monographs published in the 1970s. This approach is the culmination of years of observation and study of infants and children, done by many outstanding researchers since the 1940s. Bringing together knowledge from Piagetian, Skinnerian, and psychoanalytic models, Dr. Greenspan’s contribution was in recognizing the critical importance of relationships and affect to learning. DIR®/Floortime is a framework for understanding child development, a philosophy that emphasizes the critical importance of relationships and affect, and a set of treatment strategies built upon those principles. DIR® is a broad and comprehensive approach which encompasses all disciplines that work with children.


**Abstract:** Impaired performance of skilled gestures, referred to as dyspraxia, is consistently reported in children with autism; however, its neurological basis is not well understood. Basic motor skill deficits are also observed in children with autism and it is unclear whether dyspraxia observed in children with
autism can be accounted for by problems with motor skills. Forty-seven high-functioning children with an autism spectrum disorder (ASD), autism, or Asperger syndrome (43 males, four females; mean age 10y 7m [SD 1 y 10m], mean Full-scale IQ (FSIQ) 99.4 [SD 15.9]), and 47 typically developing (TD) controls (41 males, six females; mean age 10y 6m [SD 1 y 5m], mean FSIQ 113.8 [SD 12.3], age range 8–4y) completed: (1) the Physical and Neurological Assessment of Subtle Signs, an examination of basic motor skills standardized for children, and (2) a praxis examination that included gestures to command, to imitation, and with tool-use. Hierarchical regression was used to examine the association between basic motor skill performance (i.e. times to complete repetitive limb movements) and praxis performance (total praxis errors). After controlling for age and IQ, basic motor skill was a significant predictor of performance on praxis examination. Nevertheless, the ASD group continued to show significantly poorer praxis than controls after accounting for basic motor skill. Furthermore, praxis performance was a strong predictor of the defining features of autism, measured using the Autism Diagnostic Observation Schedule, and this correlation remained significant after accounting for basic motor skill. Results indicate that dyspraxia in autism cannot be entirely accounted for by impairments in basic motor skills, suggesting the presence of additional contributory factors. Furthermore, praxis in children with autism is strongly correlated with the social, communicative, and behavioral impairments that define the disorder, suggesting that dyspraxia may be a core feature of autism or a marker of the neurological abnormalities underlying the disorder.


**Abstract:** Major depression is a neuropsychiatric disorder that can involve profound dysregulation of mood. While depression is associated with additional abnormalities besides reduced mood, such as cognitive dysfunction, it is not well established that sensory perception is also altered in this disorder (aside from in psychotic depression). Recent studies have shown that visual processing, in as early a stage as the retina, is impaired in depression. This paper examines the hypothesis that major depression can involve alterations in sensory perception. Methods: A Pubmed literature search investigated several lines of evidence: innervation of sensory cortex by serotonin and norepinephrine; antidepressant drugs and depression itself affecting processing of facial expressions of emotion; electroencephalography (EEG) studies of depressed persons and antidepressant drugs; involvement of the serotonergic 5HT2A receptor in both depression and hallucinogenic drug action; psychotic depression involving sensory distortions; dopamine possibly playing a role in depression; and the antidepressant effect of blocking the NMDA receptor with ketamine. Results: Data from each of these lines of evidence support the hypothesis that major depression can involve sensory perceptual alterations. Conclusions: Loss of interest in one's daily activities and inability to experience pleasure, also known as anhedonia, in major depression may in part be mediated by sensory abnormalities, where by normal sensory perceptions are no longer present to activate reward circuitry. Limitations: The data supporting the hypothesis tend to be associative, so further confirmation of the hypothesis awaits additional controlled experiments.


**Abstract:** Behavioral problems in childhood are common, with significant and wide-ranging implications for individuals, families and the community. There is some evidence that sensory processing difficulties are associated with behavioral problems in children with disabilities such as autism spectrum disorders (ASDs) and attention-deficit/hyperactivity disorder (ADHD). However, there has been minimal research into the association between sensory processing difficulties and behavioral problems in the absence of these disorders. The aim of this investigation was to determine the prevalence of sensory processing difficulties in children aged 5 to 9 who have been identified as at risk of developing conduct disorder, and to examine the relationship between sensory processing difficulties and behavioral problems. Participants were children aged 5 to 9 selected to participate in an early intervention program for children at risk of developing conduct disorder. Behavior problems were assessed using the Eyberg Child Behaviour Inventory (ECBI; Eyberg and Robinson 1983) and the Strengths and Difficulties Questionnaire (SDQ;
Goodman 1997). Sensory processing was assessed using the parent-reported Short Sensory Profile (SSP; McIntosh et al. 1999). Sensory processing difficulties were identified in 55.2%, which is higher than the estimated prevalence in the community (5.3–13.7%). Significant correlations were found between sensory processing difficulties and severity of behavioral problems. Using multiple regression analysis, sensory processing difficulties made a significant unique contribution to behavioral problems, and contributed more to the model than did other variables – language difficulties and socio-economic status. Notwithstanding the need for further research, these findings suggest that sensory processing should be considered in the assessment and management of children with behavior problems.


**Abstract:** Sound-based interventions (SBIs) are being used by pediatric occupational therapists to help children with autism spectrum disorders and co-morbid sensory processing disorders. A limited yet growing body of evidence is emerging related to the efficacy of SBIs in reducing sensory processing deficits among pediatric clients with co-morbid conditions. The current study employed an ABA single-subject case-controlled design, implementing The Listening Program® with a 7-year-old child diagnosed with autism spectrum disorder who demonstrated auditory sensory over-responsivity (SOR). The intervention consisted of 10 weeks of psycho-acoustically modified classical music that was delivered using specialized headphones and amplifier and a standard CD player. Repeated measures were conducted during the A(1), B and A(2) phases of the study using the Sensory Processing Measure, a subjective caregiver questionnaire, and the Sensory Over-Responsivity Scales, an examiner-based assessment measure to track changes of the participant’s auditory SOR-related behaviors. The results indicated that the participant exhibited a decrease in the number of negative (avoidant, verbal and physical negative) and self-stimulatory behaviors. The decreases in negative and self-stimulatory behavior may have been due to the therapeutic effect of the repeated exposure to the Sensory Over-Responsivity Scales or The Listening Program SBI.


**Abstract:** Here we describe the performance of children with autism, their siblings, and typically developing children using the Florida Apraxia Battery. Children with autism showed the lowest performance in all sections of the test. They were mostly impaired in pantomime actions execution on imitation and on verbal command, and in imitation of meaningless gestures. Interestingly, a correlation was found between performance in pantomime actions and the severity of social behavior deficits. We conclude that the presence of a rigid internal model prevents the execution of an exact copy of the observed pantomime actions and that the deficit in imitation of meaningless gestures is most likely due to a deficit in the mechanisms responsible for visuomotor transformations.


**Abstract:** This study is the second in a series evaluating the effectiveness of Relationship Development Intervention (RDI) to address unique deficits inherent in autism spectrum disorders. RDI is a parent-based, cognitive-developmental approach, in which primary caregivers are trained to provide daily opportunities for successful functioning in increasingly challenging dynamic systems. This study reviewed the progress of 16 children who participated in RDI between 2000 and 2005. Changes in the Autism Diagnostic Observation Schedule (ADOS) and Autism Diagnostic Interview-Revised (ADI-R), flexibility, and school placement were compared prior to treatment and at a minimum 30 month follow-up period. While all children met ADOS/ADI-R criteria for autism prior to treatment, no child met criteria at follow-up. Similar positive results were found in relation to flexibility and educational placement. Generalizability of
current findings is limited by the lack of a control or comparison group, constraints on age and IQ of treated children, parent self-selection, and parent education conducted through a single clinic setting.


**Abstract:** The hallmark of Asperger syndrome is a failure to develop social competence despite relatively normal language and cognitive development. Extensive research in this area points to a deficit in a key area of social development—experience-sharing relationships—as the primary factor in limiting the social development of individuals with Asperger syndrome. Experience sharing appears to develop in a manner different from attachment and instrumental interaction. The authors review the critical components of experience sharing, relate them to the specific social deficits found in children and adolescents with Asperger syndrome, then propose factors in developing a relationship intervention program that would incorporate these essential components.


**Abstract:** Thirty-eight children with autism were given movement therapy in small groups led by a trained movement therapist. After two months of biweekly sessions, the movement therapy versus the control (N = 38) children spent less time wandering, more time showing on-task behavior, less time showing negative responses to being touched, and less time resisting the teacher.


**Abstract:** Recent reviews highlight limitations in the evidence base for early interventions for children with autism. We conducted a systematic review of controlled studies of early intensive behavioral interventions (EIBI) for young children with autism. Eleven studies met inclusion criteria (including two randomized controlled trials). At group level, EIBI resulted in improved outcomes (primarily measured by IQ) compared to comparison groups. At an individual level, however, there was considerable variability in outcome, with some evidence that initial IQ (but not age) was related to progress. This review provides evidence for the effectiveness of EIBI for some, but not all, preschool children with autism.


**Abstract:** This study tested whether sensory integration (SI) treatment combined with psychotherapy would improve symptom outcome over psychotherapy alone in the treatment of complex posttraumatic stress, as measured by the Disorders of Extreme Stress Not Otherwise Specified (DESNS) clinical construct in a group of 10 adult patients with histories of childhood abuse. DESNS symptoms were assessed at three time periods (T1, baseline; T2, after experimental group SI treatment; and T3, after wait-list control group SI treatment) using the Structured Interview for Disorders of Extreme Stress (SIDES). The Sensory Learning ProgramTM (SLP), developed by the Sensory Learning Institute of Boulder, Colorado, was used as the SI treatment modality. Results indicated significant differential improvement for the group treated with SLP in SIDES Total Score (T1/T2 and T2/T3), Self Perception (T1/T2 and T2/T3), Affect Regulation (T2/T3), and Alterations in Meaning (T1/T2).

Abstract: This study examines the cognitive and language outcomes of children with an autism spectrum disorder (ASD) over a 5-year period after receiving targeted early interventions that focused on joint attention and play skills. Method: Forty children from the original study (n = 58) had complete data at the 5-year follow-up. Results: In all, 80% of children had achieved functional use of spoken language with baseline play level predicting spoken language at the 5-year follow-up. Of children who were using spoken language at age 8 years, several baseline behaviors predicted their later ability, including earlier age of entry into the study, initiating joint attention skill, play level, and assignment to either the joint attention or symbolic play intervention group. Only baseline play diversity predicted cognitive scores at age 8 years. Conclusions: This study is one of the only long-term follow-up studies of children who participated in preschool early interventions aimed at targeting core developmental difficulties. The study findings suggest that focusing on joint attention and play skills in comprehensive treatment models is important for long-term spoken language outcomes.


Abstract: Examine the rate, predictors, and effect on daily life skills of developmental coordination disorder (DCD) and other motor control difficulties in school age girls with autism spectrum disorder (ASD) and/or attention-deficit/hyperactivity disorder (ADHD), in preschool age girls with ASD referred to a neuropsychiatric clinic, and in a community sample of school age girls. The girls (131 in total) were examined with standardized test of motor function and parent interviews and questionnaires. The school girls were compared with 57 age- and IQ-matched girls from the community. DCD was diagnosed in 25% of clinic school girls with ASD, in 32% of those with ADHD, and in 80% of the clinic preschool girls with ASD. Parents reported more motor problems in the school age clinic group. Agreement between a brief motor screening test and a full comprehensive motor examination was moderate to good in the clinic group. Young age, autistic symptomatology, and low performance IQ predicted more motor coordination problems. Motor coordination problems were related to lower ability in daily life skills even when the effect of PIQ was controlled for. A large minority of school girls with ASD and/or ADHD, and a majority of preschool girls with ASD meet full diagnostic criteria for DCD. Their motor problems contribute to reduced activity in daily life even when the effects of IQ have been partialled out.


Abstract: This project assessed dyspraxia in high-functioning school aged children with autism with a focus on Ideational Praxis. We examined the association of specific underlying motor function including eye movement with ideational dyspraxia (sequences of skilled movements) as well as the possible role of visual–motor integration in dyspraxia. We found that compared to IQ-, sex- and age-matched typically developing children, the children with autism performed significantly worse on: Ideational and Buccofacial praxis; a broad range of motor tests, including measures of simple motor skill, timing and accuracy of saccadic eye movements and motor coordination; and tests of visual–motor integration. Impairments in individual children with autism were heterogeneous in nature, although when we examined the praxis data as a function of a qualitative measure representing motor timing, we found that children with poor motor timing performed worse on all praxis categories and had slower and less accurate eye movements while those with regular timing performed as well as typical children on those same tasks. Our data provide evidence that both motor function and visual–motor integration contribute to dyspraxia. We suggest that dyspraxia in autism involves cerebellar mechanisms of movement control and the integration of these mechanisms with cortical networks implicated in praxis.

Summary: In a new study looking at toddlers and preschoolers with autism, researchers found that children with better motor skills were more adept at socializing and communicating.


Summary: A relationship between motor skill deficiencies and the severity of the symptoms of autism spectrum disorder has been found in very young children. The findings indicate that development of motor skills should be included in treatment plans for young children with autism. Most autism treatment plans for young children focus on social communication because the disability has such a significant effect in that area. Incorporating fine and gross motor skill development into early interventions could provide a similar boost, the researchers say.


Abstract: Sensory processing disorders (SPD) affect 5–16% of school-aged children and can cause long-term deficits in intellectual and social development. Current theories of SPD implicate primary sensory cortical areas and higher-order multisensory integration (MSI) cortical regions. We investigate the role of white matter microstructural abnormalities in SPD using diffusion tensor imaging (DTI). DTI was acquired in 16 boys, 8–11 years old, with SPD and 24 age-, gender-, handedness- and IQ-matched neurotypical controls. Behavior was characterized using a parent report sensory behavior measure, the Sensory Profile. Fractional anisotropy (FA), mean diffusivity (MD) and radial diffusivity (RD) were calculated. Tract-based spatial statistics were used to detect significant group differences in white matter integrity and to determine if microstructural parameters were significantly correlated with behavioral measures. Significant decreases in FA and increases in MD and RD were found in the SPD cohort compared to controls, primarily involving posterior white matter including the posterior corpus callosum, posterior corona radiata and posterior thalamic radiations. Strong positive correlations were observed between FA of these posterior tracts and auditory, multisensory, and inattention scores ($r = 0.51–0.78; p < 0.001$) with strong negative correlations between RD and multisensory and inattention scores ($r = −0.61–0.71; p < 0.001$). To our knowledge, this is the first study to demonstrate reduced white matter microstructural integrity in children with SPD. We find that the disrupted white matter microstructure predominantly involves posterior cerebral tracts and correlates strongly with atypical unimodal and multisensory integration behavior. These findings suggest abnormal white matter as a biological basis for SPD and may also distinguish SPD from overlapping clinical conditions such as autism and attention deficit hyperactivity disorder.


Abstract: It has been recently shown that human adolescents with Attention Deficit/Hyperactivity Disorder (ADHD) have frontal lobe deficits, especially on the right sides of their brains (Castellanos et al., 1996). ADHD is commonly treated with psychostimulants which may have adverse consequences. Hence, less invasive therapies need to be developed. In the present work, we tested the ability of right frontal lesions to induce hyperactivity in rats. We also evaluated the effects of chronic play therapy during early adolescence to reduce both hyperactivity and the elevated playfulness later in development. Play therapy was able to reduce both hyperactivity and excessive playfulness. In additional work, we found that access to rough-and-tumble play in normal animals could enhance subsequent behavioral indices of behavioral inhibition (i.e., freezing in response to a startle stimulus) that appeared to be independent of increased fearfulness and fatigue. Overall, these results suggest that (1) neonatal frontal lobe lesions can be used as an animal model of the over activity in ADHD and (2) rough-and-tumble play therapy may be a new useful treatment for ADHD.

**Summary:** Scientists are shedding a new light on the effects of autism on the brain. Researchers have identified that connectivity between the thalamus, a deep brain structure crucial for sensory and motor functions, and the cerebral cortex, the brain's outer layer, is impaired in children with autism spectrum disorders.


**Abstract:** To evaluate the effectiveness of the Play and Language for Autistic Youngsters (PLAY) Project Home Consultation model, in combination with usual community services (CS), to improve parent-child interaction, child development, and autism symptomatology in young children with autism spectrum disorders (ASDs) compared with CS only. Methods: Children (N 5 128) with autism or PDD-NOS (DSM-4 criteria) aged 2 years 8 months to 5 years 11 months and recruited from 5 disability agencies in 4 US states were randomized in two 1-year cohorts. Using videotape and written feedback within a developmental framework, PLAY consultants coached caregivers monthly for 12 months to improve caregiver-child interaction. CS included speech/ language and occupational therapy and public education services. Primary outcomes included change in parent-child interactions, language and development, and autism-related diagnostic category/symptoms. Secondary outcomes included parent stress and depression and home consultant fidelity. Data were collected pre- and post-intervention. Results: Using intent-to-treat analysis (ITT), large treatment effects were evident for parent and child interactional behaviors on the Maternal and Child Behavior Rating Scales. Child language and developmental quotient did not differ over time by group, although functional development improved significantly. PLAY children improved in diagnostic categories on the Autism Diagnostic Observation Schedule (ADOS). PLAY caregivers’ stress did not increase, and depressive symptomatology decreased. Home consultants administered the intervention with fidelity. Conclusions: PLAY intervention demonstrated substantial changes in parent-child interaction without increasing parents’ stress/depression. ADOS findings must be interpreted cautiously because results do not align with clinical experience. PLAY offers communities a relatively inexpensive effective intervention for children with ASD and their parents.


**Summary:** Autism is an integral part of our social, emotional, and physical lives. Children with autism spectrum disorder often cannot coordinate the myriad of movements needed to complete these interactions. Motor differences are often due to motor planning challenges, sensory processing differences, atypical reflex developments, and underlying decreased tone. Physical therapy assesses neuromuscular, musculoskeletal, and cardiopulmonary systems. Physical therapy treatment works to improve postural control, static balance, sequencing and timing, sensorimotor processing and organization, and gross motor skills.


**Abstract:** Comments on an article, Stability of motor problems among young children with or at risk for autism spectrum disorders, attention-deficit-hyperactivity disorder, and/or developmental
coordination disorder by H. Van Waelvelde et al. (2010). This study documented the persistent nature of motor impairments which may present additional challenges to the quality of life of children with autism spectrum disorders (ASD). They reported the unexpected finding that children who did not receive therapy improved in motor proficiency more than children who did receive therapy. While the authors reasonably consider the plausible possibility that children who received therapy had the poorest prognosis, this clearly highlights the urgent need for further research to elucidate the role and efficacy of interventions. The interesting findings of this study further highlight the need for well-designed prospective longitudinal studies over extended time periods, preferably from large population-based samples.


**Summary:** Children with poor motor performance at school entry were found to have poorer reading and arithmetic skills than their better performing peers during the first three years of school. However, no relationship was found between cardiovascular fitness and academic skills, according to a new study.


**Abstract:** The aim of this study was to investigate the stability of motor problems in a clinically referred sample of children with, or at risk of, autism spectrum disorders (ASDs), attention-deficit-hyperactivity disorder (ADHD), and/or developmental coordination disorder (DCD). Participants were 49 children (39 males, 10 females; mean age 5y 6 mo, SD 10 mo) with various developmental problems, a Movement Assessment Battery for Children (M-ABC) score on or below the 15th centile, and an IQ of 70 or more. Sixteen children were at risk of developing ADHD, 15 children had a diagnosis of, or were at risk of developing ASD, and 18 children had neither diagnosis. Children were reassessed 2 to 3 years later. At follow-up (mean age 7y 11 mo; SD 1y), the mean M-ABC score was significantly increased, and in 22 children was no longer below the 15th centile. A general linear model to compare the difference in M-ABC scores in the three groups of children demonstrated a significant difference between groups (p=0.013), with the age at the initial assessment as a significant covariate (p=0.052). The group of children with or at risk of ASD showed less improvement in motor performance. Motor problems among preschool age children are not always stable, but appear to be so in most children with ASDs.


**Abstract:** Sensory processing disorder (SPD) is a disruption in the organization of sensory input, and affects up to three million children in the United States. SPD can have a serious impact on the ways that children behave, play, and learn, and yet, it may be overlooked or misunderstood by social work practitioners. The purpose of this article is to inform social work practice regarding SPD, strengthening the biological component of biopsychosocial assessment. After an introduction to the disorder, this article discusses differential diagnosis and practice implications, and concludes with a statement on interdisciplinary treatment.

Abstract: Based on work done in animal models showing that autism-like symptoms are ameliorated following exposure to an enriched sensorimotor environment, we attempted to develop a comparable therapy for children with autism. In an initial randomized controlled trial, children with autism who received sensorimotor enrichment at home for 6 months had significant improvements in both their cognitive ability and the severity of their autism symptoms (Woo & Leon, 2013). We now report the outcomes of a similar randomized controlled trial in which children with autism, 3 to 6 years old, were randomly assigned to groups that received either daily sensorimotor enrichment, administered by their parents, along with standard care, or they received standard care alone. After 6 months, enriched children showed statistically significant gains in their IQ scores, a decline in their atypical sensory responses, and an improvement in their receptive language performance, compared to controls. Furthermore, after 6 months of enrichment therapy, 21% of the children who initially had been given an autism classification, using the Autism Diagnostic Observation Schedule, improved to the point that, although they remained on the autism spectrum, they no longer met the criteria for classic autism. None of the standard care controls reached an equivalent level of improvement. Finally, the outcome measures for children who received only a subset of sensory stimuli were similar to those receiving the full complement of enrichment exercises. Sensorimotor enrichment therapy therefore appears to be a cost-effective means of treating a range of symptoms for children with autism.


Abstract: The current study examined the relation between autism severity at baseline, type of intervention employed and outcomes in young children with autism spectrum disorder (ASD). Seventy-eight children with ASD, aged 15–35 months (M= 25.4, SD = 4.2), received either applied behavioral analysis (ABA) or integration of several intervention approaches (Eclectic) in community center-based programs. Outcome was measured after 1 year of intervention using standardized autism diagnostic tests, and cognitive and adaptive skills evaluations. ASD diagnosis was highly stable (99%). Both intervention groups improved significantly in verbal cognitive abilities and in socialization and communication adaptive skills, but no significant difference between the intervention groups was documented. Less severe autism symptoms at baseline were associated with better progress in adaptive skills and in cognitive abilities. Within the group with less severe autism symptoms, those who received Eclectic intervention had a better outcome than those who received ABA in communication and socialization adaptive skills as reported by the parents, but not in the standardized cognitive test results. The child’s baseline social abilities and deficits appear to be crucial variables for intervention outcomes and should be considered in treatment approach decision-making.

Additional excerpts: The results emphasize the importance of very early diagnosis and intervention in ASD. Progress was noted not only in cognitive and adaptive measures but also in the core symptoms of autism. Clinicians should convey this information to the parents of newly diagnosed children and encourage early intervention and routine follow-up evaluations.

Engaging Autism: Using the Floortime Approach to Help Children Relate, Communicate, and Think
(Stanley Greenspan & Serena Wieder, 2009)
Grateful parents and professionals worldwide have welcomed this essential guide to the highly recommended Floortime approach for treating children with any of the autism spectrum disorders (ASD). Now available in paperback, Engaging Autism includes new, exciting information on neuroscience research into the effects of this approach, plus guidance
for parents navigating the controversies surrounding the treatment of autism. Unlike approaches that focus on changing specific behavior, Greenspan’s program promotes the building blocks of healthy emotional and behavioral development. He shows that, remarkably, children with ASD do not have a fixed, limited potential, and may often join their peers to lead full, psychologically healthy lives. The Floortime approach can also be applied at any age—including early infancy, when the first signs of risk for ASD may appear—so that preventing the full development of autism becomes a real possibility.

**The Whole-Brain Child**
(Daniel Siegel & Tina Payne Bryson, 2012)
In this pioneering, practical book, Daniel J. Siegel, neuropsychiatrist and author of the bestselling *Mindsight*, and parenting expert Tina Payne Bryson offer a revolutionary approach to child rearing with twelve key strategies that foster healthy brain development, leading to calmer, happier children. The authors explain—and make accessible—the new science of how a child’s brain is wired and how it matures. The “upstairs brain,” which makes decisions and balances emotions, is under construction until the mid-twenties. And especially in young children, the right brain and its emotions tend to rule over the logic of the left brain. No wonder kids throw tantrums, fight, or sulk in silence. By applying these discoveries to everyday parenting, you can turn any outburst, argument, or fear into a chance to integrate your child’s brain and foster vital growth.

Complete with age-appropriate strategies for dealing with day-to-day struggles and illustrations that will help you explain these concepts to your child, *The Whole-Brain Child* shows you how to cultivate healthy emotional and intellectual development so that your children can lead balanced, meaningful, and connected lives.

**Brainstorm**
(Daniel Siegel, 2015)
Between the ages of twelve and twenty-four, the brain changes in important and, at times, challenging ways. In *Brainstorm*, Dr. Daniel Siegel busts a number of commonly held myths about adolescence—for example, that it is merely a stage of “immaturity” filled with often “crazy” behavior. According to Siegel, during adolescence we learn vital skills, such as how to leave home and enter the larger world, connect deeply with others, and safely experiment and take risks.

Drawing on important new research in the field of interpersonal neurobiology, Siegel explores exciting ways in which understanding how the brain functions can improve the lives of adolescents, making their relationships more fulfilling and less lonely and distressing on both sides of the generational divide.
The Connected Child
(Karyn Purvis, David Cross, & Wendy Lyons Sunshine, 2007)
The adoption of a child is always a joyous moment in the life of a family. Some adoptions, though, present unique challenges. Welcoming these children into your family—and addressing their special needs—requires care, consideration, and compassion. Written by two research psychologists specializing in adoption and attachment, The Connected Child will help you:
Build bonds of affection and trust with your adopted child
Effectively deal with any learning or behavioral disorders
Discipline your child with love without making him or her feel threatened

Zero to Three
(www.zerotothree.org)
Helpful articles, podcasts, videos, and research for parents and professionals. Materials span the full spectrum of children topics.

Sensory Parenting
(Britt Collins & Jackie Linder Olson, 2012)
A child’s sensory system affects their ability to learn, play, socialize and function. Maybe a child isn’t able to sit still in class because his shirt tag is bothering him. Or a child isn’t able to play with other children because his balance is off and other kids make him feel unstable and dizzy. Maybe your child isn’t just a picky eater—it could be that his sensory system needs some special guidance and adjusting. And with so much technology and choices of games out there, which ones are beneficial for your children to play?

Raising a Sensory Smart Child
(Lindsey Biel & Nancy Peske, 2009)
For children with sensory difficulties—those who struggle to process everyday sensations and exhibit unusual behaviors such as avoiding or seeking out touch, movement, sounds, and sights—this groundbreaking book is an invaluable resource. Sensory integration dysfunction, also known as sensory processing disorder, affects all kinds of children—from those with developmental delays, attention problems, or autism spectrum disorders, to those without any other issues. Coauthored by a pediatric occupational therapist and a parent of a child with sensory issues, this updated and expanded edition of Raising a Sensory Smart Child is comprehensive and more helpful than ever.
The Art of Roughhousing
(Anthony DeBenedet, 2011)
Everywhere you look, physical play—what some might call “roughhousing”—is being marginalized. Gym classes are getting shorter. Recess periods are being eliminated. Some new schools don’t even have playgrounds. Is it any wonder children retreat to “virtual horseplay” via video games?

But Drs. Anthony T. DeBenedet and Lawrence J. Cohen are here to shake things up—literally! With The Art of Roughhousing, they show how rough-and-tumble play can nurture close connections, solve behavior problems, boost confidence, and more. Drawing inspiration from gymnastics, martial arts, ballet, traditional sports, and even animal behavior, the authors present dozens of illustrated activities for children and parents to enjoy together—everything from the “Sumo Dead Lift” to the “Rogue Dumbo.” These delightful games are fun, free, and contain many surprising health benefits for parents. So put down those electronic games and get ready to rumble!

No-Drama Discipline
(Daniel Siegel & Tina Payne Bryson, 2014)
Highlighting the fascinating link between a child’s neurological development and the way a parent reacts to misbehavior, No-Drama Discipline provides an effective, compassionate road map for dealing with tantrums, tensions, and tears—without causing a scene.

Defining the true meaning of the “d” word (to instruct, not to shout or reprimand), the authors explain how to reach your child, redirect emotions, and turn a meltdown into an opportunity for growth. By doing so, the cycle of negative behavior (and punishment) is essentially brought to a halt, as problem solving becomes a win/win situation. Inside this sanity-saving guide you’ll discover

• strategies that help parents identify their own discipline philosophy—and master the best methods to communicate the lessons they are trying to impart
• facts on child brain development—and what kind of discipline is most appropriate and constructive at all ages and stages
• the way to calmly and lovingly connect with a child—no matter how extreme the behavior—while still setting clear and consistent limits
• tips for navigating your child through a tantrum to achieve insight, empathy, and repair
• twenty discipline mistakes even the best parents make—and how to stay focused on the principles of whole-brain parenting and discipline techniques

Parenting from the Inside Out
(Daniel Siegel & Mary Hartzell, 2013)
In Parenting from the Inside Out, child psychiatrist Daniel J. Siegel, M.D., and early childhood expert Mary Hartzell, M.Ed., explore the extent to which our childhood experiences shape the way we parent. Drawing on stunning new findings in neurobiology and attachment research, they explain how interpersonal relationships directly impact the development of the brain, and offer parents a step-by-step approach to forming a deeper understanding of
their own life stories, which will help them raise compassionate and resilient children.

Born out of a series of parents’ workshops that combined Siegel's cutting-edge research on how communication impacts brain development with Hartzell's decades of experience as a child-development specialist and parent educator, this book guides parents through creating the necessary foundations for loving and secure relationships with their children.

**The Reason I Jump**  
(Naoki Higashida)  
You’ve never read a book like *The Reason I Jump*. Written by Naoki Higashida, a very smart, very self-aware, and very charming thirteen-year-old boy with autism, it is a one-of-a-kind memoir that demonstrates how an autistic mind thinks, feels, perceives, and responds in ways few of us can imagine. Parents and family members who never thought they could get inside the head of their autistic loved one at last have a way to break through to the curious, subtle, and complex life within.

Using an alphabet grid to painstakingly construct words, sentences, and thoughts that he is unable to speak out loud, Naoki answers even the most delicate questions that people want to know. Questions such as: “Why do people with autism talk so loudly and weirdly?” “Why do you line up your toy cars and blocks?” “Why don’t you make eye contact when you’re talking?” and “What’s the reason you jump?” (Naoki’s answer: “When I’m jumping, it’s as if my feelings are going upward to the sky.”) With disarming honesty and a generous heart, Naoki shares his unique point of view on not only autism but life itself. His insights—into the mystery of words, the wonders of laughter, and the elusiveness of memory—are so startling, so strange, and so powerful that you will never look at the world the same way again.

**The Science of Parenting**  
(Margot Sunderland, 2008)  
Based on over 700 scientific studies into children’s development, this book explains how to develop your child’s potential. It gives information about childcare tactics, how touch, laughter and play build emotional wellbeing, and advises how to deal with temper tantrums and tears.

**Pathways**  
([www.pathways.org](http://www.pathways.org))  
Helpful articles on child development, assessment tools, and best-practices pediatric treatments for childhood disorders.
**Kids Beyond Limits**  
(Anet Baniel, 2012)  
Supported by the latest brain research, The Anat Baniel Method uses simple, gentle movements and focus to help any child, who has been diagnosed with autism, Asperger's Syndrome, ADHD, Cerebral Palsy or other developmental disorders.  
In this supportive and hands-on book, Anat Baniel guides parents through the nine essentials of the method, each one designed to harness the brain's capacity to heal itself -- with remarkable and sometimes immediate results.  
By shifting the focus to connecting rather than "fixing," this powerful yet simple method helps both children and parents to de-stress, focus, and grow. Most of all, the it helps all children maximize their potential, no matter what their diagnosis.

**The Interpersonal Neurobiology of Play**  
(Theresa Kestly, 2014)  
The mental health field has seen a significant shift in the past decade toward including a neuroscience perspective when designing clinical interventions. However, for many play therapists it has been challenging to apply this information in the context of play therapy. Here, Theresa Kestly teaches therapists how to understand the neurobiology of play experiences so the undeniable benefits of play therapy can be exploited to their fullest.

At last, clinical readers have a book that takes seriously the importance of play and brings a scientific eye to this most important aspect of life. Drawing on concepts of interpersonal neurobiology, the benefits of play interventions to achieve attunement, neural integration, healthy attachment, and the development of resilience and well-being become clear.

**Movement Method, the way the brain wants to learn**  
Life skills to academics  
Science backed approach for schools, home ed & higher education alike that show how movement helps us build the brain, learn & break free

We train parents, teacher, and therapists alike in the methods we have found effective for not only children with neuro-psychiatric conditions like autism, ADD, ADHD, anxiety, depression, PTSD, but also for neuro typical children for mainstream education, homeschooling and unschooling.
Neurobiologically Informed Trauma Therapy with Children and Adolescents
(Linda Chapman, 2014)
The model of treatment developed here is grounded in the physical, psychological, and cognitive reactions children have to traumatic experiences and the consequences of those experiences. The approach to treatment utilizes the integrative capacity of the brain to create a self, foster insight, and produce change. Treatment strategies are based on cutting-edge understanding of neurobiology, the development of the brain, and the storage and retrieval of traumatic memory. Case vignettes illustrate specific examples of the reactions of children, families, and teens to acute and repeated exposure to traumatic events.

Also presented is the most recent knowledge of the role of the right hemisphere (RH) in development and therapy. Right brain communication, and how to recognize the non-verbal symbolic and unconscious, affective processes will be explained, along with examples of how the therapist can utilize art making, media, tools, and self to engage in a two-person biology.

The Mindful Therapist
(Daniel Siegel, 2010)
An integrated state of mindful awareness is crucial to achieving mental health. Daniel J. Siegel, an internationally recognized expert on mindfulness and therapy, reveals practical techniques that enable readers to harness their energies to promote healthy minds within themselves and their clients. He charts the nine integrative functions that emerge from the profoundly interconnecting circuits of the brain, including bodily regulation, attunement, emotional balance, response flexibility, fear extinction, insight, empathy, morality, and intuition.

A practical, direct-immersion, high-emotion, low-techno-speak book, The Mindful Therapist engages readers in a personal and professional journey into the ideas and process of mindful integration that lie at the heart of health and nurturing relationships.

Mindsight
(Daniel Siegel, 2010)
This groundbreaking book, from one of the global innovators in the integration of brain science with psychotherapy, offers an extraordinary guide to the practice of “mindsight,” the potent skill that is the basis for both emotional and social intelligence. From anxiety to depression and feelings of shame and inadequacy, from mood swings to addictions, OCD, and traumatic memories, most of us have a mental “trap” that causes recurring conflict in our lives and relationships. Daniel J. Siegel, M.D., a clinical professor of psychiatry at the UCLA School of Medicine and co-director of the UCLA Mindful Awareness Research Center, shows us how to use mindsight to escape these traps. Through his synthesis of a broad range of scientific research with applications to everyday life, Dr. Siegel has developed novel approaches that have helped hundreds of patients free themselves from obstacles blocking their happiness. By cultivating
mindsight, all of us can effect positive, lasting changes in our brains—and our lives. A book as inspiring as it is profound, *Mindsight* can help us master our emotions, heal our relationships, and reach our fullest potential.

**Mindfulness-Based Play-Family Therapy**  
(Dottie Higgins-Klein, 2013)  
When a child is offered a space to relax the “busy mind,” his experience is comparable to mindfulness meditation. Therapists can help children remain in this calm state—in the state of the present moment—if they have the right tools and techniques to do so. During this stillness, a child can reach a level of consciousness that is parallel to the deepened awareness that occurs during mindfulness meditation. Conducting play sessions in this stage allows for healing and progress. Not only can the symptoms of children’s pain be reduced in intensity and duration, but their self-esteem can be enhanced.

This book presents a new and comprehensive framework for helping children through play therapy within the context of the family and incorporating ideas from the practice of mindfulness. This experience-based therapeutic model respectfully derives from the best roots of traditional family therapy and play therapy modalities. Additionally, it draws from child development theory, interpersonal neurobiology, and mindfulness. Either spontaneous play or directed play can be used according to the need.

**Soft-Wired**  
(Michael Merzenich, 2013)  
In *Soft-Wired*, Dr. Michael Merzenich—a world authority on brain plasticity—explains how the brain rewires itself across the lifespan, and how you can take control of that process to improve your life. In addition to fascinating descriptions of how your brain has produced your unique memories, skills, quirks, and emotions, *Soft-Wired* offers sound advice for evaluating your brain and gives clear, specific, scientifically proven guidance for how to rejuvenate, remodel, and reshape your brain to improve it at any age.

**Spark**  
(John Ratey, 2013)  
Did you know you can beat stress, lift your mood, fight memory loss, sharpen your intellect, and function better than ever simply by elevating your heart rate and breaking a sweat? The evidence is incontrovertible: aerobic exercise physically remodels our brains for peak performance.

In SPARK, John Ratey, MD embarks upon a fascinating journey through the mind-body connection, illustrating that exercise is truly our best defense against everything from depression to ADD to addiction to menopause to Alzheimer’s. Filled with amazing case studies (such as the revolutionary fitness program in Naperville, Illinois, that has put the local school district of 19,000 kids first in the world of science test scores), SPARK is the first book to explore comprehensively the connection between exercise and the brain. It will change forever the way you think about your morning run.
Sensory Processing Challenges  
(Lindsey Biel, 2014)  
Many children and teens suffer from sensory challenges, meaning that they have unusual reactions to certain sensory experiences that most of us find commonplace. These challenges can range from moderate to severe—from an aversion to bright lights or the feel of anything remotely abrasive, to stopping short in panic every time a loud noise or siren is heard, or having an oral tactile sensitivity that prevents normal feeling in the mouth and hinders feeding. Accompanying these sensory issues—the full-blown version of which is called “sensory processing disorder” (SPD)—can be a range of behavioral problems like OCD and anxiety, and more severely, Asperger’s and autism.

This book equips clinicians with all the information they need to know to accurately identify sensory sensitivities in their child clients: how to pay attention to sensory issues and recognize when a client is struggling; how these issues factor into the behavioral problems at hand; and how best to partner with the right professionals to help kids at home and in school.

Smart Moves  
(Carla Hannaford)  
Neurophysiologist and educator Dr. Carla Hannaford brings the latest insights from scientific research to questions that affect learners of all ages. Examining the body’s role in learning, from infancy through adulthood she presents the mounting scientific evidence that movement is crucial to learning. Dr. Hannaford offers clear alternatives and remedies that people can put into practice right away to make a real difference in their ability to learn. She advocates more enlightened educational practices for homes and schools including: a more holistic view of each learner; less emphasis on rote learning; more experiential, active instruction; less labeling of learning disabilities; more physical movement; more personal expression through arts, sports and music; less prescribing of Ritalin and other drugs whose long term effects are not even known.

A Moving Child is a Learning Child  
(Gill Connell & Cheryl McCarthy, 2013)  
In order to learn, kids’ need to move! Grounded in best practices and current research, this hands-on resource connects the dots that link brain activity, movement, and early learning. The expert authors unveil the Kinetic Scale: a visual map of the active learning needs of infants, toddlers, preschoolers, and primary graders that fits each child’s individual timetable. Teachers, parents, and caregivers will find a wealth of information, actionable tips, and games they can use to support children’s healthy development—all presented in a lively, full-color format with demonstrative diagrams and photos. A final section offers easy-to-implement activities geared to the Kinetic Scale.
**Being a Brain-Wise Therapist**  
(Bonnie Badenock, 2008)
This book, part of the acclaimed Norton Series on Interpersonal Neurobiology, brings interpersonal neurobiology into the counseling room, weaving the concepts of neurobiology into the ever-changing flow of therapy. Neuroscientific discoveries have begun to illuminate the workings of the active brain in intricate detail. In fact, sometimes it seems that in order to be a cutting-edge therapist, not only do you need knowledge of traditional psychotherapeutic models, but a solid understanding of the role the brain plays as well. But theory is never enough. You also need to know how to apply the theories to work with actual clients during sessions.

**The Well Balanced Child**  
(Sally Goddard Blythe, 1994)
A whole body approach to learning, integrating the brain, senses, movement, and play.

**Autism Breakthrough**  
(Raun Kaufman, 2015)
As a boy, Raun Kaufman was diagnosed by multiple experts as severely autistic, with an IQ below 30, and destined to spend his life in an institution. Years later, Raun graduated with a degree in Biomedical Ethics from Brown University and has become a passionate and articulate autism expert and educator with no trace of his former condition. So what happened? Thanks to The Son-Rise Program, a revolutionary method created by his parents, Raun experienced a full recovery from autism. (His story was recounted in the best-selling book Son-Rise: The Miracle Continues and in the award-winning NBC television movie Son-Rise: A Miracle of Love.) In Autism Breakthrough, Raun presents the ground-breaking principles behind the program that helped him and thousands of other families with special children. Autism, he explains, is frequently misunderstood as a behavioral disorder when, in fact, it is a social relational disorder. Raun explains what it feels like to be autistic and shows how and why The Son-Rise Program works. A step-by-step guide with clear, practical strategies that readers can apply immediately—in some cases, parents see changes in their children in as little as one day—Autism Breakthrough makes it possible for these special children to defy their original often-very-limited prognoses. Parents and educators learn how to enable their children to create meaningful, caring relationships, vastly expand their communications, and to participate successfully in the world. An important work of hope, science, and progress, Autism Breakthrough presents the powerful ideas and practical applications that have already changed the lives of families all over the world.
**The Hurried Child**  
(David Elkind, 2006)

With the first edition of *The Hurried Child*, David Elkind emerged as the voice of parenting reason, calling our attention to the crippling effects of hurrying our children through life. He showed that by blurring the boundaries of what is age appropriate, by expecting--or imposing--too much too soon, we force our kids to grow up too fast, to mimic adult sophistication while secretly yearning for innocence. In the more than two decades since this book first appeared, new generations of parents have inadvertently stepped up the assault on childhood, in the media, in schools, and at home. In the third edition of this classic (2001), Dr. Elkind provided a detailed, up-to-the-minute look at the Internet, classroom culture, school violence, movies, television, and a growing societal incivility to show parents and teachers where hurrying occurs and why. And as before, he offered parents and teachers insight, advice, and hope for encouraging healthy development while protecting the joy and freedom of childhood. In this twenty-fifth anniversary edition of the book, Dr. Elkind delivers important new commentary to put a quarter century of trends and change into perspective for parents today.

**Sensorimotor Psychotherapy**  
(Pat Ogden & Janina Fisher, 2015)

The body’s intelligence is largely an untapped resource in psychotherapy, yet the story told by the “somatic narrative”-- gesture, posture, prosody, facial expressions, eye gaze, and movement -- is arguably more significant than the story told by the words. The language of the body communicates implicit meanings and reveals the legacy of trauma and of early or forgotten dynamics with attachment figures. To omit the body as a target of therapeutic action is an unfortunate oversight that deprives clients of a vital avenue of self-knowledge and change.

**The Loving Push**  
(Temple Grandin & Debra Moore, 2016)

Parents, teachers, therapists, and anyone who cares about a child or teen on the autism spectrum needs this essential roadmap to prepare our youth for being successful adults in today’s world. Best-selling author, autism advocate, and animal science professor Dr. Temple Grandin joins psychologist and autism specialist Dr. Debra Moore in spelling out the steps you can take to restore your child’s hope and motivation, and what you must avoid. Eight life stories told by people on the autism spectrum, including chapters on subjects such as how to get kids off their computers, how to build on their strengths and get back to caring about their lives, and how to find a path to a successful, meaningful life make this a “MUST-READ BOOK.”
Children with Special Needs
(Anat Baniel)
In this workshop, Anat introduces innovative theory and practice for breakthrough outcomes with your child. You will learn to better understand your child’s experience and be able to help their brain reach more of its potential. The professional can apply the Anat Baniel Method concepts and techniques to their practice.

Principles of Neural Science, 5th Ed.
(Eric Kandel, James Schwartz, Thomas Jessell, Steven Siegelbaum, & A.J. Hudspeth, 2012)
In this classic text, prominent researchers in the field expertly survey the entire spectrum of neural science, giving an up-to-date, unparalleled view of the discipline for anyone who studies brain and mind. Here, in one remarkable volume, is the current state of neural science knowledge—ranging from molecules and cells, to anatomic structures and systems, to the senses and cognitive functions—all supported by more than 900 precise, full-color illustrations. In addition to clarifying complex topics, the book also benefits from a cohesive organization, beginning with an insightful overview of the interrelationships between the brain, nervous system, genes, and behavior. Principles of Neural Science then proceeds with an in-depth examination of the molecular and cellular biology of nerve cells, synaptic transmission, and the neural basis of cognition. The remaining sections illuminate how cells, molecules, and systems give us sight, hearing, touch, movement, thought, learning, memories, and emotions.