

Evidence Base for the DIR/Floortime Approach

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DIR/Floortime is a way of relating to a child in which we recognize and respect the emotional experience and expressions of the child, shown in their actions, ideas, and intentions, and interact in a way that helps the child use their natural emotions with a greater sense of purpose, building their capacity to engage and communicate, at increasingly complex levels of functional development.

Type of Support for developmental approaches

DIR/Floortime is derived from over 50 years of study and research about child development from the fields of psychology, medicine, and education, and includes the areas of language, attention, mental health, attachment, infant development, sensory processing, and motor development.

“Evidence-based practice” means a decision making process which integrates the best available scientifically rigorous research, clinical expertise, and individual’s characteristics. Evidence-based practice is an approach to treatment rather than a specific treatment. Evidence-based practice promotes the collection, interpretation, integration, and continuous evaluation of valid, important, and applicable individual- or family-reported, clinically-observed, and research-supported evidence. The best available evidence, matched to infant or toddler circumstances and preferences, is applied to ensure the quality of clinical judgments and facilitates the most cost-effective care. [CA Trailer Bill 2009]

What to measure?

A starting point to measure effectiveness of intervention is to determine the factors to be measured. This is a major challenge in the field of developmental disabilities. Generally, behavioral approaches measure specific targeted behaviors. More recently, there has been a focus on measuring spontaneous interactions and generalization of skills, which presents new challenges in measurement. In contrast, developmental programs target underlying capacities, or ‘core deficits’ as the focus of intervention, with progress evident in a complex array of changes in interactive behavioral patterns.

Developmental approaches seek to measure changes in an individual’s capacity for:

- *Shared attention*
- *Ability to form warm intimate and trusting relationships*
- *The ability to initiate(rather than respond) using intentful actions and social engagement; spontaneous communication*
- *The ability to participate in reciprocal (two-way, mutual) interactions while in a range of different emotional states*
- *Problem solving through a process of co-regulation, reading, responding and adapting to the feelings of others*
- *Creativity*
- *Thinking logically about motivations and perspective of others*
- *Developing an internal personal set of values*

These developmental measures are more closely aligned to the diagnostic criteria for PDD/autism than those often used in older research such as IQ, performance on early academic skills and responsive behaviors. The National Research Council stated in 2001: “More appropriate outcome measures are improvement in initiation of spontaneous communication in functional activities, and generalization of language across activities people, and settings”

Lord, Catherine; McGee, James (Editors). Committee on Educational Interventions for Children with Autism. *Educating Children with Autism*. Division of Behavioral and Social Sciences and Education, National Research Council. Washington, DC: National Academy Press (2001) p 217

An additional challenge confronting all researchers in the field is the wide diversity of individuals with a diagnosis of autism or a related disorder.

Warren, Z. et. al. in “*A Systematic Review of Early Intensive Intervention for Autism Spectrum Disorders*” stress the need for further research “to better characterize subgroups of children who respond differently to individual approaches” and conclude that “There is not yet adequate evidence to pin-point specific behavioral intervention approaches that are the most effective for individual children with ASDs.”

Warren, Z. et al, Pediatrics, Vol 127 No5 May 2011

Developmental models emphasize individual differences and the need to tailor intervention to the unique biological profile of the child and to the unique characteristics of the parent-child interaction.

Research is challenging both because both the factors being measured are complex and because of the wide range of individual differences in the population. In considering the evidence for DIR/Floortime, it is important to appreciate the challenges to studying a complex model, and to consider the long history of study on the effectiveness of various facets of a developmental framework. These can be summarized by looking at the three major aspects of the DIR/Floortime approach: “D”- developmental framework, “I”- individual differences, and “R”-relationship and affective interactions.

Because of the wide range of individual differences in autism, there is more interest in using single-subject research design.

A single subject study design was used to evaluate the effectiveness of Floor Time Play with a 3.6 year old boy with autism. The study used an observation and intervention phase, and utilized circles of communication as the measure of change. Results showed a significant improvement using Floor Time play strategies, and mother’s journal included insights on the changes observed.

Dionne and Martini, *Revue canadienne d’ergotherapie*; June 2011 78 (3)

“D” Developmental

A developmental approach is founded on work by major developmental theorists such as Piaget, Vygotsky, Erikson, and Kohlberg. A developmental approach considers behavior and learning in the greater context of a developmental or changing process. DIR theory was first described by Dr. Greenspan in 1975 and was further developed over the next 20 years. He received high honors and acclaim for his work including American Psychiatric Association's highest award for child psychiatry research.

Greenspan, S.I. A Consideration of Some Learning Variables in the Context of Psychoanalytic Theory, (1975)

Greenspan, S.I. Intelligence and Adaptation, (1979)

Greenspan, S.I. Psychopathology and Adaptation in Infancy and Early Childhood (1981)

Greenspan, S.I. First Feelings (1985),

Greenspan, S.I. The Essential Partnership (1989)

Greenspan, S.I. The Development of the Ego (1989)

Greenspan, S.I. Infancy and Early Childhood (1992)

In 1997, Dr. Greenspan and Serena Weider published, The Child with Special Needs: Encouraging Intellectual and Emotional Growth and in 2006 they published, Engaging Autism.

In 1997, they reported the results of an extensive chart review of 200 children with autism who had received DIR/Floortime. This showed the promise of the DIR/FT approach:

The goal of the review was to reveal patterns in presenting symptoms, underlying processing difficulties, early development and response to intervention in order to generate hypotheses for future studies. The chart review suggests that a number of children with autistic spectrum diagnoses are, with an appropriate intervention program, capable of empathy, affective reciprocity, creative thinking, and healthy peer relationships; that an intervention approach that focuses on individual differences, developmental level, and affective interaction may be especially promising;

Greenspan, S.I. and Wieder, S. (1997) Developmental patterns and outcomes in infants and children with disorders in relating and communicating: A chart review of 200 cases of children with autistic spectrum diagnoses. *Journal of Developmental and Learning Disorders* 1:87-141.

8 years later, they reported the follow-up of a subgroup of children, showing that it is possible for children with autism to become empathetic, creative, and reflective thinkers.

Greenspan, S.I. and Wieder, S. (2005) Can Children with Autism Master the Core Deficits and Become Empathetic, Creative and Reflective? A Ten to Fifteen Year Follow-up of a Subgroup of Children with Autism Spectrum Disorders (ASD) Who Received a Comprehensive Developmental, Individual-Difference, Relationship-Based (DIR) Approach. *The Journal of Developmental and Learning Disorders* 9.

Previous approaches using behavioral principles, relied upon outside motivators on the premise that children with autism did not have their own motivation to participate in social interaction or to learn. The DIR/Floortime approach revealed that all children will show purpose and initiative, and will seek close social relationships when provided with interactions which respect their interests and are tailored to their individual differences.

The DIR/Floortime approach has provided a developmental framework that has been studied and found to be accurate and effective in understanding behavior. The widely used *Bayley Scales of Infant development* has adopted the DIR milestones as the measure of social-emotional development through a process of careful standardization across populations.

The following research studies report the effectiveness of developmental approach:

Rogers, S. and D. Delalla. (1991). "A comparative study of the effects of a developmentally based instructional model on young children with autism and young children with other disorders of behavior and development." *Topics in Early Childhood Special Education* 11: 29-47.

Jocelyn, L., et al. (1998). Treatment of children with autism: a randomized controlled trial to evaluate a caregiver based intervention program in community day-care centers. *Developmental and Behavioral Pediatrics*, 19, 326-334.

National Research Council and Institute of Medicine (2000). *From Neurons to Neighborhoods: The Science of Early Childhood Development*. Jack P. Shonkoff and Deborah A. Phillips, eds. Board on Children, Youth, and Families, Commission on behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

B. Hwang & C. Hughes (2000) "Increasing Early Social Communicative Skills of Preverbal Children with Autism through Social Interactive Training." *Journal of the Association for Persons with Severe Handicaps*, Vol 25, pp. 18-28.

Salt 2002 *The Scottish Centre for Autism preschool treatment programme* The National Autistic Society Vol 6 (1) 33

A developmentally based early intervention programme; treatment group showed significant improvement in joint attention, social interaction, imitation, daily living skills, motor skills and an adaptive behaviour composite.

Aldred, C., Green, J., Adams, C. (2004) A new social communication intervention for children with autism: pilot randomized controlled treatment study suggesting effectiveness, *Journal of Child Psychology & Psychiatry and Allied Disciplines*, 45(8): 1420-30 RCT pilot study, dyadic social communication treatment. The active treatment group showed significant improvement on ADOS total score, social interaction, language, parent-child interaction.

Vismara, Colombi, & Rogers. (2009). Can one hour per week of therapy lead to lasting changes in young children with autism? *Autism*, Vol 13 (1), 93-115

In 2007, Solomon reported a pilot study on the Play Project which showed significant increases in child subscale scores on the FEAS after an 8-12 month program using Floortime.

Solomon, R., J. Necheles, C. Ferch, and D. Bruckman. "Pilot study of a parent training program for young children with autism: The P.L.A.Y. Project Home Consultation program." *Autism* 11, no. 3 (2007) 205-224.

In June 2011, Pajareya published a pilot RCT of DIR/Floortime with preschool children with ASD. Results showed improvements in FEAS, CARS, and the functional emotional questionnaires, confirming the results of the Solomon 2007 study.

Pajareya and Nopmaneejumrulers, *Autism*, Vol 15(2) 1-15. June 2011.

Historically, behavioral approaches have not focused on relationships or individual differences. Pivotal Response Training or PRT a form of naturalistic behavioral treatment is a form of behavioral intervention that is based on following the child's interest to increase motivation, and incorporates some developmental principles into a behavioral model.

Koegel, R., Koegel, L., and McNerney, E. (2001). Pivotal areas in intervention for autism. *Journal of Clinical Child Psychology*, 30, 19-32.

Recent studies have shown efficacy in blending developmental and behavioral approaches:

Dawson (2010) *Randomized controlled trial of an intervention for Toddlers with autism: The Early Start Denver Model*, *Pediatrics* 125 (1)

EDSM is based on developmental and applied behavioral analytic principles. Children in the EDSM group had "significant improvements in IQ, language, adaptive behavior, and autism diagnosis"

Kasari (2010) *Randomized Controlled Caregiver Mediated Joint Engagement Intervention for toddlers with autism*. *J. Autism Dev Disord*

Significant improvements in joint engagement, joint attention, and diversity of functional play acts, with maintenance of these skills 1 year post-intervention; intervention was focused on "the development of play routines in which the adult could follow in on the child's interests maintain and then expand upon their play activities." "The approach involved developmental procedures of responsive and facilitative interaction methods as well as aspects of applied behavior analysis."

20 authors, representing 17 major institutions, and 3 countries collaborated to write a paper which outlines principles of assessment and effective intervention for children with suspected autism under the age of 2. They concluded "Interventions should ultimately be directed toward specific functional concerns and be informed by key developmental principles, including the child's role as an active learner, the social contexts of learning, and the pivotal role of the parent-child relationship." These principles are basic tenants of the DIR/Floortime approach.

Zwaigenbaum et al (2009), *Clinical Assessment and Management of Toddlers with Suspected autism spectrum disorder: Insights from studies of High-risk infants*.

In 2010, Wallace and Rogers published a review of controlled studies which identified four factors which were most important for effective intervention for infants with autism. These were: "(1) parent involvement in intervention, including ongoing parent coaching that focused both on parental responsivity and sensitivity to child cues and on teaching families to provide the infant interventions, (2) individualization to each infant's developmental profile, (3) focusing on a broad rather than a narrow range of learning targets, and (4) temporal characteristics involving beginning as early as the risk is detected and providing greater intensity and duration of the intervention."

Wallace Katherine S. and Rogers Sally J. Intervening in infancy: implications for autism spectrum disorders *Journal of Child Psychology and Psychiatry* (2010)

More and more, intervention models are incorporating these elements, which are all fundamental features of the DIR/Floortime approach.

“I” Individual Difference

In the 1970s Jean Ayres pioneered discoveries about innate sensory processing differences.

Ayres JA. (1979). *Sensory Integration and the Child*. Western Psychological Services. Los Angeles, CA.

This provided a new way of understanding movement and regulatory behaviors. In addition this work showed that these biological differences could be influenced and changed by specific therapeutic interventions. Over the past 40 years, a huge body of research has further described not only biological differences in sensory-motor processing but further differences in emotional-regulatory processing.

The National Research Council of the National Academy of Sciences, in their 2001 landmark report, “Educating Children with Autism,” called for tailoring the treatment approach to the unique features of the individual child.

Lord, Catherine; McGee, James (Editors). Committee on Educational Interventions for Children with Autism. *Educating Children with Autism*. Division of Behavioral and Social Sciences and Education, National Research Council. Washington, DC: National Academy Press (2001) p 217

A (2011) pilot randomized control study showed the effectiveness of sensory integration treatment for children with autism. Results showed improvement in social responsiveness, sensory processing, functional motor skills, and social-emotional factors with a significant decrease in autistic mannerisms.

Pfeiffer, B. A., Koenig, K., Kinnealey, M., Sheppard, M., & Henderson, L. (2011). Research Scholars Initiative—Effectiveness of sensory integration interventions in children with autism spectrum disorders: A pilot study. *American Journal of Occupational Therapy*, 65, 76–85

DIR/Floortime places great emphasis on tailoring intervention to individual differences, consistent with the knowledge gained from this research.

“R” Relationship and Affect

Developmental models have evolved from many years of discovery in the field of infant mental health. Beginning in the 1950s, there was a new understanding of the importance of parent-infant interaction, known as attachment theory.

Bowlby, J. (1951). *Maternal care and mental health*. World Health Organization (WHO). Monograph Series, no. 51. Geneva: World Health Organization.

Ainsworth, M., Bell, S.M., & Stayton, D. (1974). Infant-mother attachment and social development: Socialization as a product of reciprocal responsiveness to signals. In M. Richards, ed., *The Integration of the child into a social world*. Cambridge: Cambridge University Press.

Stern, D. (1974). Mother and infant at play: The dyadic interaction involving facial, vocal, and gaze behaviors. In M. Lewis and L. Rosenblum, eds., *The effect of the infant on its caregiver*. New York: John Wiley & Sons, Inc.

Dr. Greenspan and Serena Wieder contributed to the field with their study of the importance of mother-child interactions in high risk infants.

National Center for Clinical Infant Programs (1987). *Infants in Multirisk Families. Case Studies in Preventive Intervention*. Stanley I. Greenspan, Serena Wieder, Robert A. Nover, Alicia Lieberman, Reginald S. Lourie, Mary E. Robinson, eds. Clinical infant Reports, Number three. International Universities Press.

There is abundant research confirming the importance of parent-child interaction and the value of intervention programs focused on supporting parent-child relationships. This work has become highly sophisticated in research methodologies examining joint attention and emotional attunement.

Mundi, P., Sigman M., Kasari C. (1990). A longitudinal study of joint attention and language development in autistic children. *Journal of Autism and developmental Disorders* 20:115-128.

Alan Fogel (1993), *Developing Through Relationships*, The University of Chicago Press. Synopsis available at <http://www.press.uchicago.edu/presssite/metadata.epl?mode=synopsis&bookkey=52786>

Board on Children, Youth, and Families, *From Neurons to Neighborhoods: The Science of Early Childhood Development*, Jack B. Shonkoff and Deborah A. Phillips (Eds.), National Academies Press, Washington, DC, 2000, pdf version at www.nap.edu/catalog.php?record_id=9824

Affleck, G., et al. (2001). Promise of relationship-focused early intervention in developmental disabilities. *Journal of Special Education*, 16, 413-430.

Mahoney, G. & Perales, F. (2003). Using relationship-focused intervention to enhance the social-emotional functioning of young children with autism spectrum disorders. *Topics in Early Childhood Special Education*, 23, 74-86.

Mahoney, G., and F. Perales. "Relationship-focused early intervention with children with pervasive developmental disorders and other disabilities: a comparative study." *Journal of Developmental & Behavioral Pediatrics* 26, (2004): 77-85.

Kim, J. and Mahoney, G. (2005). The effects of relationship focused intervention on Korean parents and their young children with disabilities. *Research in Developmental Disabilities*, 26, 117-130.

Gernsbacher has shown that intervention can change the way parents interact to increase reciprocity and that these changes are correlated with changes in social engagement and in language.

Gernsbacher M.A., (2006). Toward a behavior of reciprocity. *Journal of Developmental Processes*, 1, 139-152. http://psych.wisc.edu/lang/pdf/gernsbacher_reciprocity.pdf

Kasari et al. 2008 used a randomized, controlled trial looking at joint attention and symbolic play in 58 children with autism. Results indicate that expressive language gains were greater for treatment groups which used developmental approaches compared with the control group that was based only on behavioral principles.

Kasari, Connie; Paparella, Tanya; Freeman, Stephanny; Jahromi, Laudan B. "Language outcome in autism: Randomized comparison of joint attention and play interventions." *Journal of Consulting and Clinical Psychology*. Vol 76(1), Feb 2008, 125-137.

DIR/Floortime is a psychodynamic approach, with affective interactions as the basis of treatment, and the goal of increasing functional capacities. Psychodynamic treatments are inherently more difficult to measure in quantitative terms. Shedler, in 2010 authored, *The efficacy of psychodynamic psychotherapy* in which he reviews many studies and meta-analyses and refutes the belief that “psychodynamic concepts and treatments lack empirical support or that scientific evidence shows that other forms of treatment are more effective.”

“Empirical evidence supports the efficacy of psychodynamic therapy. Effect sizes for psychodynamic therapy are as large as those reported for other therapies that have been actively promoted as ‘empirically supported’ and ‘evidence based.’”

He describes 7 features of psychodynamic therapy:

1. Focus on affect and expression of emotion
2. Exploration of attempts to avoid distressing thoughts and feelings
3. Identification of recurring themes and patterns
4. Discussion of past experience (developmental focus)
5. Focus on interpersonal relations
6. Focus on therapy relationship
7. Exploration of fantasy life

Although the article is not about children with autism, it provides the basic framework of a psychodynamic approach, which is the root of developmental approaches to treatment with children. He describes the goals of this type of treatment: *“The goals of psychodynamic therapy include, but extend beyond, symptom remission. Successful treatment should not only relieve symptoms, but also foster the positive presence of psychological capacities and resources.”* The idea that developmental approaches improve developmental capacities, rather than only changing specific skills or behaviors, is a core distinction in measurement for research outcome. The outcomes of change in functional capacity are more difficult to measure, and make comparisons across different fields of literature more challenging. This article discusses previous broad reviews, including: Cochrane report 2006; meta-analysis 2008, 2009:

“These meta-analyses represent the most recent and methodologically rigorous evaluations of psychodynamic therapy. Especially noteworthy is the recurring finding that the benefits of psychodynamic therapy not only endure but increase with time, a finding that has now emerged from at least five independent meta-analyses”.

There is now clear evidence emerging that psychodynamic approaches are in fact effective. DIR/Floortime is in large part grounded in the understanding and appreciation of psychodynamic interactions between parents and children.

Claims

Sweeping claims are made about the effectiveness of behavioral approaches, specifically ABA, however, a careful reading of research reveals that evidence of effectiveness is not so definitive. In 2001, The National Academy of Sciences report concluded that there is some evidence for both developmental approaches and behavioral approaches but no definitive evidence for either. There have been no comparative studies between these two approaches.

Lord, Catherine; McGee, James (Editors). Committee on Educational Interventions for Children with Autism. *Educating Children with Autism*. Division of Behavioral and Social Sciences and Education, National Research Council. Washington, DC: National Academy Press (2001)

Two systematic reviews published in 2009 reaffirm the academy's findings:

Ospina, M., Krebs Seida, J., Clark, B., Karkhaneh, M., Hartling, L., Tjosvold, L., Vandermeer, B., Smith, V. (2008) Behavioural and Developmental Interventions for Autism Spectrum Disorder: A Clinical Systematic Review, *PLoS ONE* 3(11): e3755. doi:10.1371/journal.pone.0003755.

“As no definitive behavioural or developmental intervention improves all symptoms for all individuals with ASD, it is recommended that clinical management be guided by individual needs and availability of resources.”

Seida, Ospina, Karkhaneh, Hartling, Smith, and Clark. *Developmental Medicine and Child Neurology*, 2009, 51.95-104 Systematic reviews of psychosocial interventions for autism: an umbrella review

The second metaanalysis concluded that, “Current evidence does not support ABI [Applied Behavior Intervention] as a superior intervention for children with ASD.”

Spreckley, M., Boyd, R. (2009) Efficacy of Applied Behavioral Intervention in Preschool Children with Autism for Improving Cognitive, Language, and Adaptive Behavior: A Systematic Review and Meta-analysis. *The Journal of Pediatrics*, 154(3): 338-344.

“Currently there is inadequate evidence that ABI has better outcomes than standard care for children with autism.”

Reichow B., Volkmar, Cicchetti, 2008 *Development of the Evaluative Method for Evaluating and Determining Evidence-Based Practices in Autism* J Autism Dev Disord 38:1311

Created an evaluation method which can be used across research methodologies. Conclusion is that no treatments for autism can be considered evidence based

Because of the challenges in identifying uniform treatment groups, isolating treatments, ensuring fidelity of treatment approaches, and the lack of validated measurement tools, many authors have stated that it is too soon for meaningful randomized clinical trials.

Michelle Garcia Winner, *A Politically Incorrect Look at Evidence-based Practices and Teaching Social Skills* (2008)

S. J. Rogers & L.A. Vismara (2008), “Evidence-based Comprehensive Treatments for Early Autism,” *Journal of Clinical Child and Adolescent Psychology*, p 37, pp 8-38

Costa G & Witten MR (August 2009). Pervasive Developmental Disorders. In Mowder, Rubinson & Yasik (Eds), *Evidence-Based Practice in Infant and Early Childhood Psychology*. Wiley.

Drew 2002, and Mahoney 2003 have suggested that other methodology be considered in lieu of randomized controlled trials, such as norm referenced scores, and logic models.

Drew, A., et al. (2002). A pilot randomized control trial of a parent training intervention for preschool children with autism: preliminary findings and methodological challenges. *European Child & Adolescent Psychiatry*, 11, 266-272.

Mahoney, G. and Perales, F. (2003). Using relationship-focused intervention to enhance the social-emotional functioning of young children with autism spectrum disorders. *Topics in Early Childhood Special Education*, 23.

Dr. Granpeesheh, who serves as a First Vice Chair of the Autism Society of America, and has written extensively about ABA states: *“Increasingly, researchers have been suggesting that the idea that there is a best treatment for autism is counterproductive and misleading....The remarkable heterogeneity displayed by people with autism calls into question the idea that randomized clinical trials (RCTs) should, at the time of the development of the field, be considered the gold standard for evaluation whether a specific treatment has merit.”*

Carr, E., Granpeesheh, D., Grossman, L. The Future of Applied Behavior Analysis in Autism Spectrum Disorder. *Autism Advocate* 2008; 4:50-58.

Odom 2009 *Evaluation of Comprehensive Treatment Models for Individuals with Autism Spectrum Disorders* *J Autism Dev Disord*

“There are two classifications of intervention: focused intervention practice (intent of changing targeted behavior) and comprehensive treatment models (designed to achieve a broader learning or developmental impact)” “To realize the benefits of CTMs...one must look to a broader set of information than usually found in research studies. To enhance the research to practice process, practitioners’ implementation of the CTM is a necessary feature.” “Evaluation differs from research in that its purpose is to provide information that informs decision making.” Across all CTMs, developmental and behavioral, “the published evidence of efficacy was not strong.”

Interagency autism Coordinating Committee Strategic Plan for Autism Spectrum Disorder Research, IACC of the US Dept of HHS 2009, 2010

“A wide range of treatment and intervention options are available for children and adults with ASD... For all of these interventions, there is a range of improvement, with some people making profound gains and others showing little response. We do not know how to predict which people will benefit from any of the available treatments.”

Current research and new technologies

Because of the alarming increase in incidence of autism, there is urgent interest and active research from a wide array of perspectives. There are many researchers actively studying methods which incorporate developmental principles. Two examples are:

Dr. Rick Solomon is doing a randomized control trial study on the Play Project. The National Institute of Mental Health has granted 1.85 million dollars, to execute a Phase II study. The Play Project has partnered with Easter Seals and Michigan State University to conduct this three year long study.

The Bridge Project 2009 is a joint effort of the Bridge Collaborative, a group comprised of UCSD, Rady Children's Hospital, the San Diego Regional Center, the Harbor Regional Center (Torrance, Long Beach), Kaiser Permanente, parents, and private providers, and others. They were awarded a \$250,000 NIH R01 grant for a pilot study, with a clear path

toward a \$2,500,000 grant, to implement evidenced based screening and intervention in Southern California. They have chosen Project ImPACT and added components of engagement, individual differences, and reflective process.

Autism is now recognized as a disorder of integration of various distinct brain functions. Research investigation is focused on deficits in neuronal communication as a basis of the wide array of behavioral manifestations of the disorder. Developmental intervention is based upon the use of affective interactions to enhance integration of sensory-regulatory, communication and motor systems. Neuro-imaging techniques are beginning to be used in research to provide important ways of showing how experience affects developing brains.

Siegel has shown how attuned relationships in infancy change brain structure in ways that later affect social and emotional development.

Siegel, D. (2001). Toward an interpersonal neurobiology of the developing mind: attachment relationships, “mindsight,” and neural integration. *Infant Mental Health Journal*, 22, 67-94.

A current research study by Casenhiser, Stieben and Shanker at the Milton and Ethel Harris Research Institute at York University is investigating behavioral and neurophysiological outcomes of intensive DIR/Floortime, using both ERP and EEG measurements. They have found significant improvements in attention, joint attention, enjoyment, involvement, social interaction, and language after 2 hours/week of DIR based therapy for one year. Results of imaging studies are in publication.

Parent choice

Part of the definition of “evidence base” is clinical experience. While research efforts continue to explore the etiology, biology, and efficacy of treatment approaches for autism, clinical experience also continues to accumulate. DIR/Floortime programs have high family satisfaction ratings and are widely utilized as an effective framework for assessment and intervention.

The Interdisciplinary Council for Developmental and Learning disorders (ICDL) provides a training program for clinicians and teachers to become certified in using DIR/Floortime. The certification process requires several years of training, and is designed for licensed or certificated clinicians and teachers. Floortime can also be done by parents, caregivers, and non-certified professionals, under the guidance of a specialist for a particular child. It is utilized in over 35 countries around the world.

A review by the National Institute of Mental Health (NIMH) states, “There is no single best treatment package for all children with ASD. Decisions about the best treatment, or combination of treatments, should be made by the parents with the assistance of a trusted expert diagnostic team.”

NIMH. (June 2, 2009). *Autism Spectrum Disorders (Pervasive Developmental Disorders)*. Retrieved June 8, 2009, from <http://www.nimh.nih.gov/health/topics/autism-spectrum-disorders-pervasive-developmental-disorders/index.shtml>

Because of the wide range of individual differences in children with autism, and the many unique relationships within families, it is necessary and proper for parents to have the information and options necessary to make informed choices about the type of services their child will receive. DIR/Floortime has a solid base of empirical evidence, and is widely used for children of all ages and abilities. The clinical evidence for *functional* outcomes does not clearly favor behavioral approaches over developmental approaches. Evidence based practice means the clinician can utilize all types of information including clinical expertise, and a family's individual values and preferences, in addition to published research. There is ample evidence for the effectiveness of DIR/Floortime to support an informed parent choice.