

Developmental Interventions in Autism

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The theory underlining the developmental approach to intervention as described by Greenspan is based on the view that certain interactive difficulties between child and caregiver interfere with normal child development. Greenspan states that during the first several years of life, relationships with others, especially the mother, are the primary vehicle for development in language and social areas. Two-way communication between mother and child provides the opportunity for mother's affective cues to convey information about appropriate and inappropriate behavior. These emotional experiences are necessary for children to develop representational and abstract thinking. Children with autism are seen as having biological deficiencies in sensory processing and modulation. The autism syndrome is seen as secondary to these deficits and is the result of relationships breaking down due to the caregiver's inability to maintain a bond with the infant because of the child's biological deficiencies. Treatment is intended to help parents work around their child's processing difficulties so as to re-establish reciprocal affective interactions, which are thought to "mobilize the child's emerging developmental capacities" and to "harness cognitive and emotional growth" (Greenspan and Wieder, 1997) so as "to accomplish broad developmentally crucial improvements" (NRC, p.147). The Developmental, Individual Difference, Relationship (DIR) model is a conceptual framework and comprehensive intervention approach based on these theoretical assumptions.

Consensus Panel Recommendations

The NRC (2001) stated in a chapter by Amy Wetherby that "the empirical support for developmental approaches is more limited than for behavioral approaches" (p.54) and in a chapter by Sally Rogers, that there is "very little data on the effectiveness of developmental approaches for [improving] social development in early autism" (p. 81), but there are several treatment studies that provide empirical support for language outcomes using strategies built on a developmental approach, e.g., the NRC chapter by Gail McGee lists studies by Rogers and DiLalla (1991), Rodgers and Lewis, (1989), Greenspan and Wieder, (1997) as support for the Developmental approach (these studies are discussed below). The NYSDOH (1999) concluded that some aspects of the DIR model may be consistent with elements in interventions that have been shown to be effective for children with autism in other studies, e.g., "playful obstruction" is similar to the strategy of withholding a desired toy until the child requests it in some way, which has been shown to result in increased language use within interventions based on Incidental Teaching, Pivotal Response Training and Time Delay (Smith & Wick, 2008). However, as a comprehensive program, the NYSDOH concluded that there was "currently no adequate scientific evidence that demonstrates the effectiveness of DIR-based interventions for young children with autism. Therefore the use of these approaches cannot be recommended as a primary intervention method for young children with autism" (NYSDOH, Chapter 4, p. 58)

Brief Review of Studies

Greenspan and Wieder, (1997) performed a chart review of 200 children who they initially had diagnosed with their own term, Multi-System Developmental Disorder, and treated over an eight year period. For purposes of the review paper, they re-diagnosed the children using the CARS from their intake notes when the children were between 22 months and 4 years old. Of the 200 children selected for review, the authors determined that 75% met criteria for autism and 25% met criteria for PDD-NOS. Treatment consisted of training parents to interact with their children, increasing responsiveness and "circles of communication" (back and forth segments of communication, whether verbal or

nonverbal) during several 20-30 minute sessions per day, referred to as "Floor Time. Children were assessed using Greenspan's measure, the Functional Emotional Assessment Scale (not normed or standardized or shown to distinguish between children with autism and neurotypical children), which yields "functional levels". After reviewing the notes on his patients, Greenspan judged that 58% had made "good to outstanding" progress, 24% had shown "medium" progress, and 17% continued to show "continuing significant difficulties". The retrospective nature of this study and absence of standardized tests or independent evaluators greatly interfere with interpretation.

The Colorado Health Sciences Program, also referred to as the Denver Model, is based on developmental theory including those of Piaget and Mahler. Rogers and Lewis (1989) described a study with 31 children with autism or PDD-NOS (age 45 mos, NVIQ 69) who had been in the Denver program for six months. Treatment was done in a school setting, 22 hours per week. Measures included two developmental checklists completed by the children's teachers, rather than independent evaluators, a measure of symbolic play and the CARS. Based on changes in estimated growth rates, all measures showed significant improvement during treatment. Cognitive scores (AE/CA) increased from 62.2 to 67.9 over 6.5 months of treatment. A separate group of children who received one year of treatment (n=15) had a mean pre-treatment IQ of 65.5 prior to treatment, and showed accelerated gains during the second six months of treatment in self-help and social emotional skills. However, in spite of showing a 3 months increase in age equivalent during the second 6 months of treatment, the estimated cognitive level of this group (AE/CA) was 67 after six months of treatment, and 65 after twelve months, showing little change relative to maturation. In a later study, Rogers and DiLalla (1991) provided the same treatment for children with autism (n=39, age=47.5 months, nonverbal IQ=70) for 15 hours per week for one third of the children, and 22.5 hours per week for the rest. Based on a developmental checklist completed by the children's teachers rather than independent evaluators, children showed 10 months gain in language age after 10 months of treatment. The authors concluded that the intervention was highly effective and had increased the children's growth rate to normal. However, changes in age equivalent and "growth rate" are not accurate indicators of skill development relative to maturation and Smith (1999) estimated the increase in IQ to be 4-9 points. By contrast, ABA has shown increases of about 18 points during the first year (Eldevik, 2007).

Mahoney and Perales (2005) described a study using a relationship-focused intervention referred to as Responsive Teaching to treat 20 children with PDD (age 32.4 months) and 30 children with other developmental disabilities (age 23.3 months). Treatment consisted of one hour of parent training every 1 to 2 weeks for one year, with parents stating that they provided about 15 hours per week themselves, although the hours varied widely and only about half were rated as implementing treatment strategies faithfully. Using four unpublished tests, two of which were developed by the authors, and with data consisting of Likert scales (global ratings rather than observational or test data) and parent ratings, results showed that parents and children increased their responsiveness with each other during play sessions. Child responsiveness correlated .32 with developmental changes (accounting for 10% of the variance, i.e., increased responsiveness was not a major factor affecting developmental scores). Further, changes in child responsiveness did not correlate with ratings of socio-emotional functioning, again indicating a weak treatment effect. The authors offered an alternate interpretation, i.e., that the socio-emotional measure was not reliable. Either way, the study provided only weak support for Responsive Teaching.

Solomon, Necheles, Ferch, and Bruckman (2007) described a retrospective study using Solomon's PLAY Project, based on Greenspan's Floor-Time Model. Children (n=68) averaged 31 months old at the beginning of treatment (24 to 83 months), were diagnosed by Solomon rather than independent evaluators, and were selected for the study because they had pre-post data (no test for whether these children were representative of children without pre-post testing). Parents were trained to implement Floor-Time during monthly, three to four hour visits by trained consultants, and were

instructed to provide 15 hours per week of direct treatment. No standard pre-treatment tests of cognitive, language, or adaptive skills were used. Instead, Greenspan's Functional Emotional Assessment Scale (FEAS) was administered prior to and after treatment. Results showed an increase in Functional Development Level from 3.8 to 4.5, reflecting an increase in age equivalent of 5.5 months over 1 year of treatment, not a large increase and no different from pretreatment rate of growth. The conclusion of no treatment effect was supported by the authors' observation that parents' scores on the FEAS showed no change from pre-treatment to one-year outcome, and the only intervention provided was parent training.

Gutstein (2003) reported the effects of Relationship Development Intervention (RDI) in this still unpublished study. The theoretical underpinnings of the intervention are similar to those of Greenspan. The study described a retrospective case review of children (age 2 to 10), who Gutstein had worked with. The treatment group (n=17, age 5 yrs, IQ 87, low average to average range) was selected because they had pre and post test scores (no test for whether they were similar to children treated with RDI who did not have pre-post test scores). Although there was a non-treated control group, there were clear differences between groups prior to intervention, rendering comparisons uninterpretable. Results after 15 months of RDI showed gains on the ADOS (unclear whether evaluator was independent) with 5 of the 17 children no longer diagnosed as being on the autism spectrum, but who continued to have many problems. Language tests were administered, but results were not reported. Gutstein, Burgess, and Montfort (2007) reported a follow up study of 16 children (many were included in the earlier study, age 5 at onset, IQ 90.5, low average to average range) after a mean of 3 ½ years of RDI. Results showed that children receiving RDI improved on ADOS scales of communication and social interaction (unclear whether evaluator was independent). On Gutstein's Flexibility Scale (not normed or standardized), the number of skills rated as "age-appropriate" by parents increased from 16.3% prior to treatment to 71.3% following treatment. Educational placement improved from 2 of 14 children to 10 of 16 children in mainstream class with and without pullout. While these results may seem impressive, at least for children with average IQ prior to intervention, there are some problems with interpretation. The ADOS scales are essentially symptom checklists of aberrant behaviors. They change more easily than do standardized tests measuring similar areas (White et al., 2007) and have not been shown to be accurate indicators of skills, i.e., language may become less odd, resulting in a decrease in ADOS score, but still be quite delayed (Zachor, Ben-Itzhak, Rabinovich, and Lahat, 2007). Similarly, parent ratings of treatment effects as in the Flexibility Scale or satisfaction with treatment are not reliable indicators of effectiveness. Two studies noted that parents do not discriminate well between treatments, tending to rate all as helpful (Hume et al, 2005; Smith and Antolovich, 2000). Finally, at age 5, many children with delays of all kinds may be placed in special education early childhood classes in spite of average IQ, whereas at age 8, children with similar problems but average IQ may well be placed in regular education classes with pullout for delays. This is the reason that other authors have criticized classroom placement as an outcome measure

Developmental Approaches to Building Language

Developmental approaches described here aimed to increase parental sensitivity and responsiveness to the child's rudimentary attempts to communicate and interact, thereby providing an intensified version of the normal pathway by which children are thought to acquire language. The Hanen program is one example. It is a manualized 11 week parent training program. McConachie, Randle, Hammal, and Le Couteur (2005) compared 17 children receiving treatment with 12 children on a wait list. Results after seven months showed no change in ADOS communication or social interaction scales or in behavior problems. Children's vocabulary based on parent report increased for

the treatment group, but these figures may have reflected different expectations on the part of parents in treatment versus those waiting for treatment. Girolametto, Sussman, and Weitzman (2007) implemented Hanen with three children and measured effects using coded videotapes. Results when the children were about 39 months old showed that they had all increased the number of spoken words, while the number of new words increased from a mean of 13 to 32, representing a fairly small improvement compared to the typical three year old, who uses hundreds of words. The child's rate of speech was dependent on the mother's rate of initiations, raising concerns regarding maintenance and generalization, and no follow-up results were reported.

Aldred et al. (2004) reported results of a randomized controlled trial (RCT) with random assignment of 14 children to treatment and 14 to a no treatment control group matched on total ADOS scores. In this manualized treatment, parents were trained to increase coordinated attention, decrease intrusive demands, while increasing synchronous communications, such as ongoing verbal commentary on the child's actions, interpreting the child's vocalizations as words, establishing predictable play routines, e.g., peek-a-boo, and promoting intentionality using teasing and pauses to create opportunities for the child to initiate communicative acts. After one year of intervention, ADOS scores in social interaction were better for children in treatment, but there were no differences for ADOS communication or stereotypic behavior. Increases in parent reported vocabulary were higher for children in treatment, but as above this may reflect expectations. Vineland Communication raw scores favored the treatment group, but increases in age equivalents were quite similar and standard scores (correcting for maturation) showed no gain for either group. By comparison, after one year of treatment, children receiving ABA (Sallows & Graupner, 2005, $N = 23$) showed increases in Vineland Communication of 14 standard score points ($p < .002$).

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