



# Past, Present and Future: Early Intervention in Autism

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## The Past - Model Development

### Three Main Models

- Didactic application of Applied Behavior Analysis – discrete trial teaching
- Naturalistic application of Applied Behavior Analysis
- Developmental approaches - derived from theories and research in infant and early childhood development – includes relationship based approaches
-

## Traditional, or Didactic Behavioral Approaches (DTT)

- **ABA  $\neq$  DTT**
- DTT = one way of applying ABA principles to teach new skills
- DTT = Adult directed teaching (Lovaas and Smith; Princeton; Rutgers; derived from Wolf and Risley's first treatment report – 1964)
  - Adult chooses materials
  - Adult selects the teaching lesson
  - Adult pre-determines the correct response
  - Positive reinforcement chosen for strength
  - Massed trials
  - Focus is on child responses

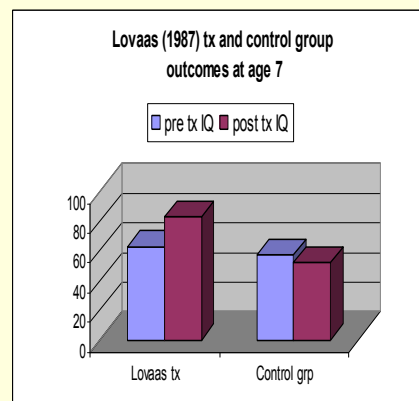


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## Outcomes from Lovaas's Treatment

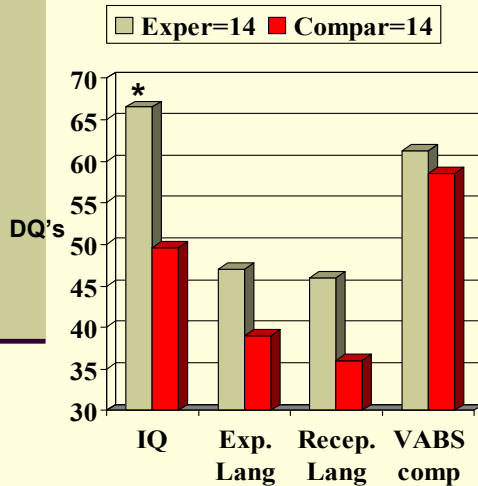
- **Treated group/ comparisons**
- reg ed = 9 (47%)
- mild dis. = 8 (42%)
- severe = 2 (10%)
  
- Best outcome 9/19 (49%)
- Tx grp mean IQ 85
- Effects continued into adolescence
- Have the results been replicated?



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## Smith et al (2000) Outcomes: Experimental vs Comparison Groups



- Significant IQ gain
- No other sig differences
- No “recovery”
- 2/15 best outcomes
- 60% in special ed rooms
- Tx effects appear to be driven by PDDNOS group

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## Other Replications

### Other Efficacy Studies

- Delivered 25-30 hours per wk over several years with high levels of expertise and supervision
- Demonstrated significant and large IQ gains
- Demonstrated significant language gains compared to controls
- No other RCTs

(Eikeseth et al 2002; Sallows and Graupner, 2005; Remington et al, 2007)

### Community Effectiveness Studies

- When delivered at high intensity with expertise and strong supervision, some produce results similar to efficacy studies
- When delivered in homes by visiting consultants or self trained teams, little changes in scores
- Though progress occurs
- **Progress versus acceleration**

(Luiselli et al, Bibby et al, Smith et al, 2000; Howard et al, 2005; Cohen et al, 2006; Magiati et al, 2007)

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## Should DTT Teaching Be Used Exclusively?

"The method must be combined with other interventions to enable children to initiate the use of their skills and display these skills across settings", Smith, 2001.

### Current Lovaas replication project:

- 10 min of generalization each hour
- 3-5 peer play hrs weekly after 1<sup>st</sup> year
- 6-9 hrs inclusion in typical preschool with aides

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## Naturalistic Applications of Behavioral Teaching

- Incidental teaching
  - first used with impoverished preschoolers in the 1970's (Hart and Risley, 1975)
  - used with children with autism to teach receptive language (McGee et al, 1983)
- Pivotal Response Training (Laura Schreibman, Robert and Lynn Koegel)
  - Initial papers in 1980's involving language instruction intrinsic reinforcement, reinforcing attempts, parent training; each aspect empirically supported

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## Should This Approach Be Used Exclusively?

- No, not a comprehensive approach to treatment
- Specific to behaviors for which there are natural reinforcers: communication, play, imitation
- If no natural reinforcers exist, then must use extrinsic reinforcers



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## TEACCH

- Treatment & Education of Autistic & Communication-handicapped Children
- Developed at the University of North Carolina in early 1960's by Eric Schopler
- Goal is independence and functional living skills
  - Capitalize on good visual-spatial skills & interest in visual detail
  - Reduce reliance on other people, prompts
  - Help individual predict and control own environment and behavior
  - "Normal" not necessarily the goal
    - Accepts "culture of autism" as different but not inferior
    - Increase self-acceptance and sense of self-efficacy

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## Evidence of TEACCH Effectiveness

- Controlled group study provided at home by parents 1 hr/week – significant developmental differences in 4 months on PEP-R (Ozonoff & Cathcart, 1998)
- Controlled group study of 8 children in a residential TEACCH-based program vs. 8 children in Italian public school classrooms – 1 year of treatment resulted in significant differences in cognitive skills (Panerai, Ferrante & Zingale, 2002)
- ABAB single subject design study found large increase in on-task behavior and reduction in teacher prompting when using schedules and work systems (Hume & Odom, 2007)

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## Should This Approach be Used Exclusively?

- Issues involve developmental appropriateness:
  - Language development
  - Play development
  - Social development
- Philosophical issues: To what extent do we accommodate early autism? To what extent do we try to change the developmental trajectory?

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## Development of New Models; Testing of Existing Models

- Mahoney – Responsive teaching
- Rogers and Dawson –Early Start Denver Model
- Webb and Dawson – prevention of ASD in infant sibs
- Landa - “feature match” design: instructional features selected for individual patterns of strength-need
- Autism Speaks Toddler Treatment Network

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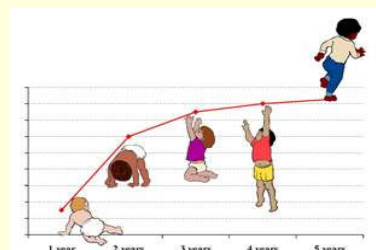
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## Developmental Approaches

- Autism as a developmental disorder
- Build skills teaching sequences of normal development
- Focus on internal motivation for learning & positive affect
- Relationships as a core component
- More focused on content, less focused on precision of teaching process, than ABA based interventions

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## Commonalities Across the Interactive Developmental Approaches

Floortime, Denver Model, SCERTS, RDI ,  
TEACCH, Hanen,

- Focus on social interaction and engagement
- Focus on play, especially symbolic play
- Focus on communication and language development, shared attention
- Models come from empirical literature involving typical early social and language development
- Goal is normalizing skills to the extent possible

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## Do Developmental Approaches Help? Randomized Controlled Trials

Jocelyn et al, 1998; 35 children AD /PDD; mn age 44m	12 wk study. training & consult to day care centers and parents; spec worker assigned; focus on language dev and behavior	Group diff in language; trend towards improved soc/emot after 12 wks
Drew et al 2002: 24 AD children, mean age 23 months	Home based. Parent training 3 hr every 6 wks; int 1 hr daily; behavior, jt attn, shared routines	few diff; some trends after 12 months
Aldred et al, 2004; 28 AD children, mean age 48 mon	Home based, parent training pragmatic language intervention delivered 30 min per day. Parents recd group training a 1 visit/ mon	Dec autism severity scores, inc exp language, child comm, parent responsivity

YES

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## Strengths and Weaknesses of a Developmental Approach

### Strengths

- Familiar to a wide range of interventionists
- Approach is used in typical preschools – makes for easier inclusion
- DAP
- Developmental fittedness improves learning rate (Lifter, 1991)
- Based on current research in child development
- Fits many different settings
- Addresses all domains



### Weaknesses

- Empirical studies of poorer quality than others
- Less articulated teaching procedures
- Not as data driven as others
- Needs adaptation for children with autism: repetition, structure, attention, weaknesses in observational learning

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## Targeting ASD Specific Deficits

- **Joint attention**- short term increases in joint attention, and imitation, play, social initiations, and language usage (Whalen et al, 2006) Longer term changes in joint attention, language, symbolic play (Kasari et al, 2008)
- **Symbolic play** – short term increased play and language and social initiations (Thorpe et al, 1995), longer term changes in joint attention, language, and symbolic play (Kasari, 2008)
- **Imitation** – short term increases in generalized imitation, and joint attention, language, symbolic play (Ingersoll and Screibman, 2006)

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# The Early Start Denver Model



an intervention approach for  
12-36 month olds with ASD

S. Rogers and G. Dawson

➤NIMH STAART #U54 MH66399, NIMH/NICHD ACE # R01MH081757, Autism Speaks,  
NIDCD DC05574, OSERS #G008100247,#G008401921

## Early Start Denver Model

### Denver Model Principles

- Quality of relationship/attitude
- Optimize arousal
- Communicate in all activities
- Teach multiple objectives in each activity
- Vocal communicative functions
- Emphasize nonverbal communication
- Follow child's lead

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### PRT Principles

- Takes turns
- Gives choices
- Maintenance interspersed with acquisition
- Reinforces child attempts
- Activities are intrinsically reinforcing for child

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### ABA Principles

- Attention
- ABC Format
- Efficacious application of behavioral teaching techniques
- Number of repetitions
- Management of unwanted behavior

## Joint activity routines

### **Object focused routines**

- Cognitive, imitation, self care, motor objectives
- Communication opportunities
- Dyadic engagement
- Social orienting

### **Sensory social routines**

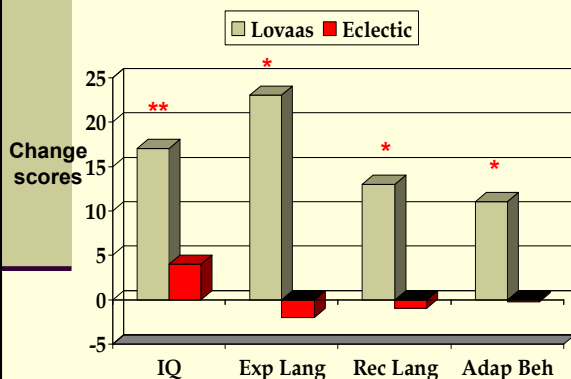
- Focus is social exchange
- Positive affect
- Reciprocal interactions
- Social, communication, imitation objectives
- Modulates child arousal, attention



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## Testing an Eclectic Approach: Eikeseth's 2002 Study

Change in standard test scores  
after 1 year of treatment



- 25 children dx with Autistic Disorder
- Ages 4-7, IQ's 50 and higher
- ½ received Lovaas's treatment; ½ eclectic
- Treatment delivered in public schools
- Hours (28) and ratio (1:1) equal across the treatments
- Uniform assessment after 1 year of treatment
- Replicated by Howard et al, 2005; Cohen et al, 2006;
- Why? Curriculum, parent training, supervision and oversight?

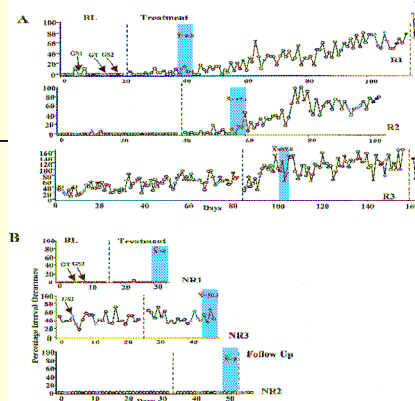
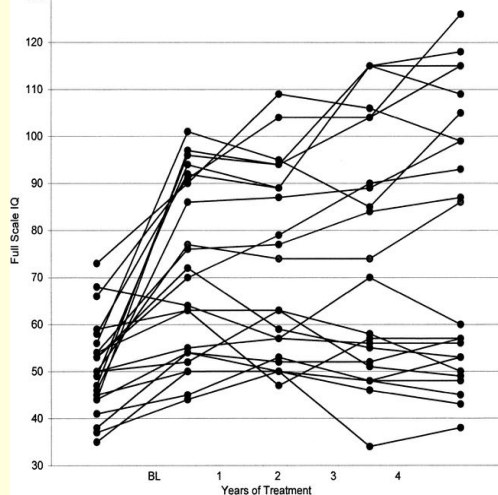
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## Fitting Treatments to Individual Profiles

Full scale IQ scores for 20 EIBI preschoolers



- Individ responses to same tx differ greatly
- Assumption of biologically different subgroups
- Future will involve choosing tx based on individual profiles

## Predicting Outcomes

Sallows and Graupner 2005

- |  |  |   |
|--|--|---|
| All are related  | ■ Predicts better good outcome                           | ■ Did not predict outcomes                              |
|  | ■ Pretreatment IQ  | ■ Regression  |
|  | ■ Pretreatment imitation                                 | ■ Hours of ABA treatment                                |
|  | ■ Pretreatment language skills                           | ■ Biomedical treatments                                 |
|  | ■ Pretreatment ADI soc and Comm scores                   | ■ Supplemental treatments                               |
|  | ■ Significant amount of weekly peer play                 | ■ See also Ben-Itzchak et al, 2006 for similar findings |
| ■ Pretx variables predicted over 70% of IQ and language variance 4 years later | ■ Note: none of these children have biological diagnoses |   |

## Resolving Treatment Controversies

- Which model to use
- Language approach: operant or developmental
- PECS versus speech for nonverbal children
- Hours per week
- Mixing therapy approaches (DTT + Floortime)
- How to address sensory and repetitive behaviors
- Efficacy of OT and PT
- Inclusion versus center-based group programs
- Home versus center-based individual programs
- Specialists versus generalists



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## To Conclude

- Are we too optimistic?
- Are we burdening parents and families?
- Are we developing too many models?
- What about culturally appropriate practices?
- Early intervention depends upon early identification



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