Developing Effective Interventions for Infants and Toddlers with Autism

Sally J. Rogers, Ph.D.
ACE Multisite Treatment Network
Interagency Autism Coordinating Committee
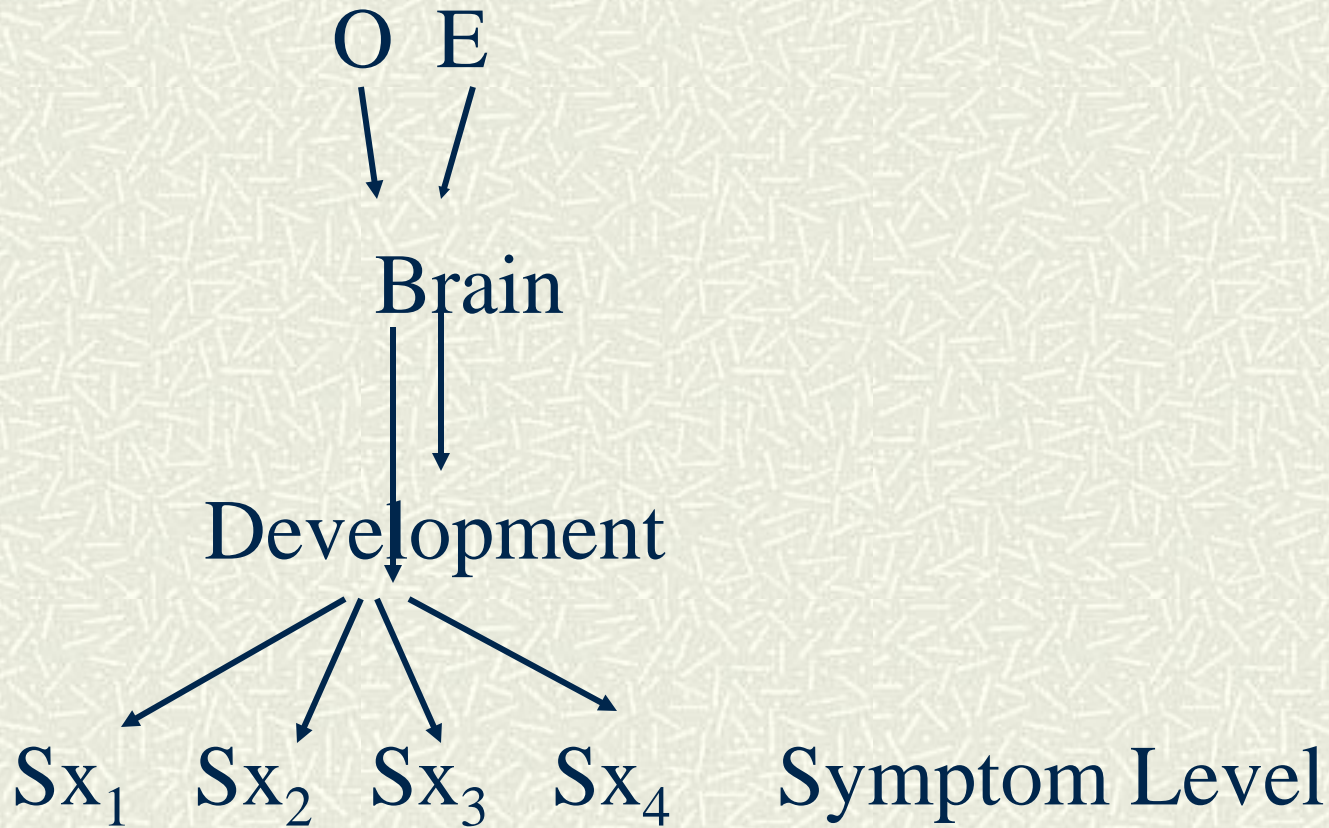April 11, 2011

Acknowledgements

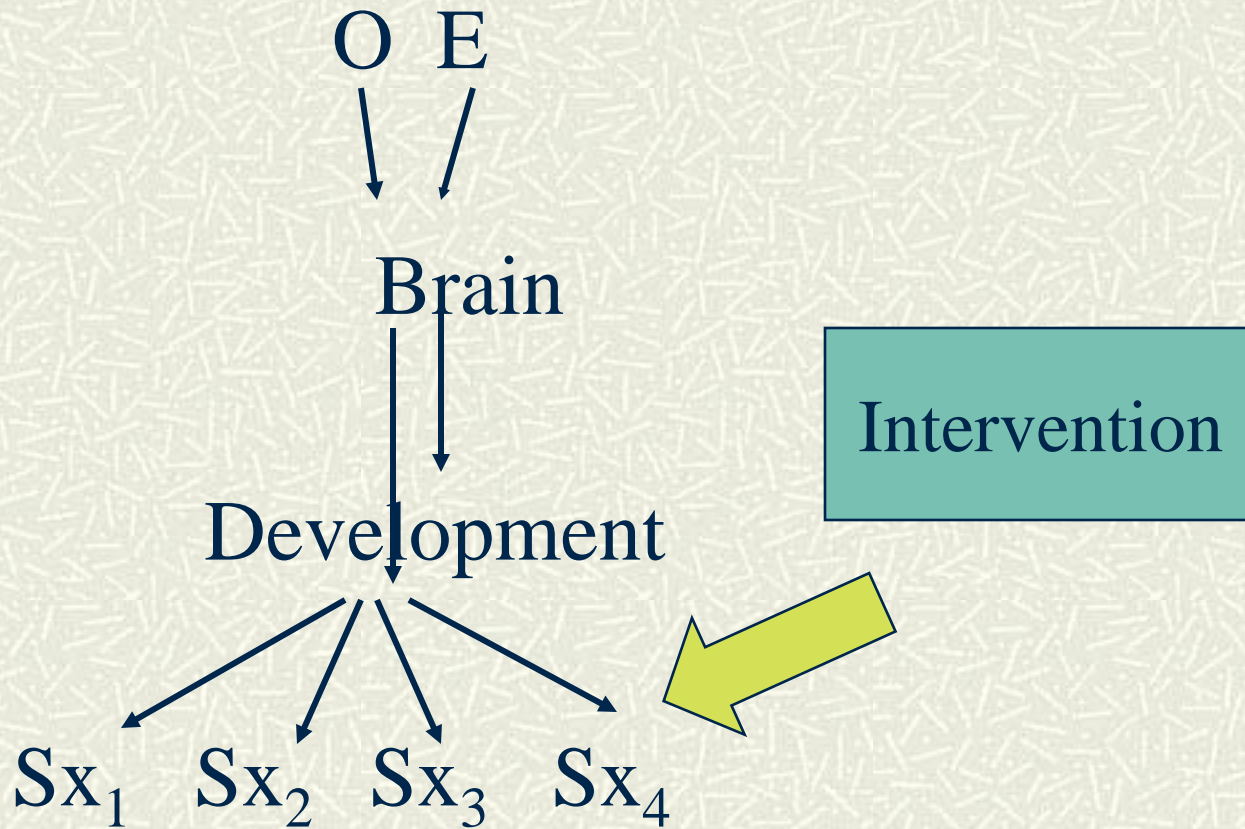# Three studies of infant toddler interventions

- ACE Multisite study of one year olds
- ARRA Infant Treatment Study of 6-12 month olds
- New Distance Technology pilot study for families of 18-36 month olds

Biological model of ASD

O E

Brain

Development

Sx_1 Sx_2 Sx_3 Sx_4 Symptom Level

Biological model of ASD

O E

Brain

Development

Intervention

Sx_1 Sx_2 Sx_3 Sx_4

Transactional model of ASD

O O

Br

Development

Sx$_1$ Sx$_2$ Sx$_3$ Sx$_4$ Symptom Level

Social environment changes
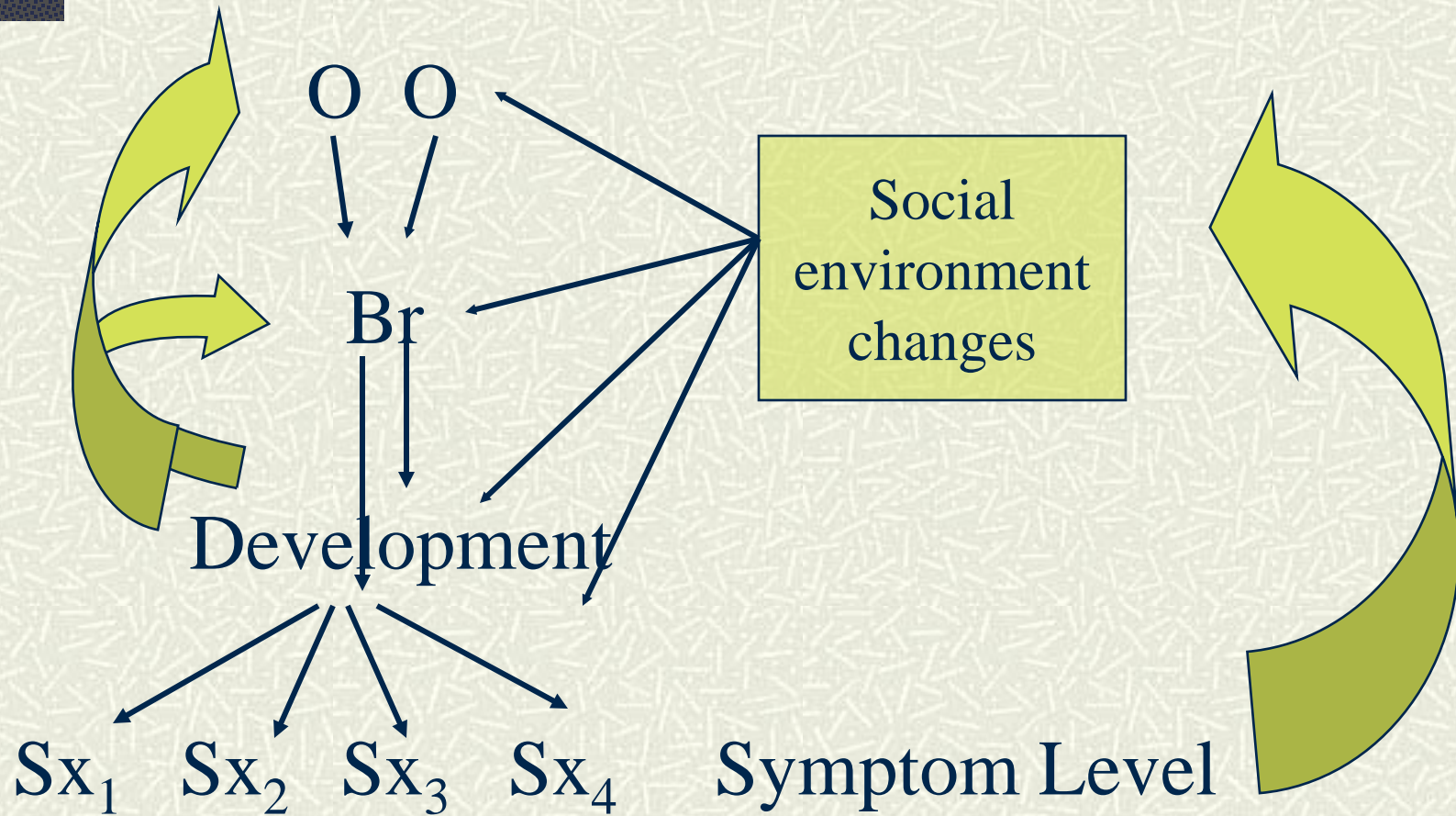
Early Steps Study: ACE multisite network study for toddlers with ASD

Research aims

- To conduct a multi-site intent-to-treat RCT of ESDM compared to standard community treatment for one year olds with ASD

- To evaluate efficacy of the intervention for cognitive, language, and social development and autism symptoms

- To evaluate family characteristics, stressors and responses to ESDM

- To examine social, dev, and biological influences on outcomes

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Core elements

- Curriculum and teaching approach
- Developmental framework
- Relationship-based
- Focus on early autism profile: social attention, imitation, jt attn, language, play
- Embedding behavioral teaching practices in joint play activities
- fully manualized, data based, RTI
- Multidisciplinary,interdisciplinary
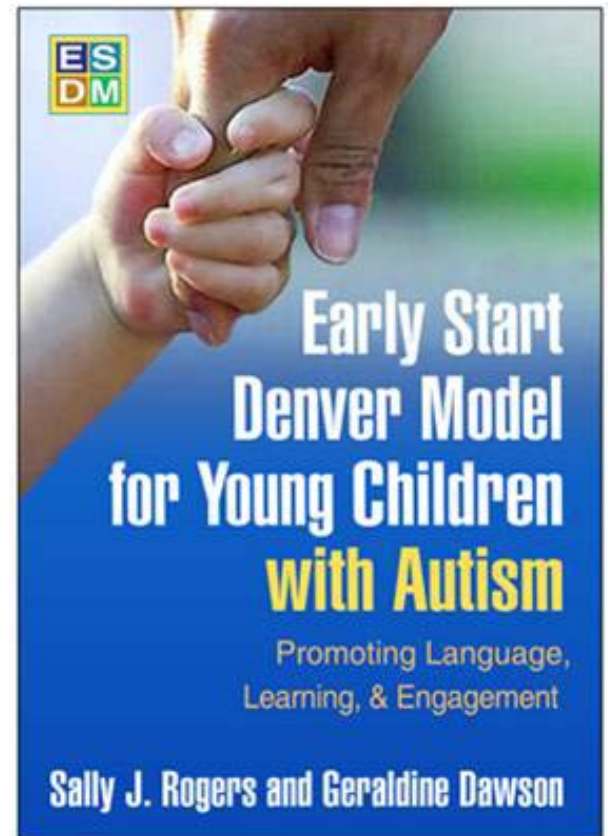
**Randomized, Controlled Trial of an Intervention for Toddlers With Autism: The Early Start Denver Model**

Geraldine Dawson, Sally Rogers, Jeffrey Munson, Milani Smith, Jamie Winter, Jessica Greenson, Amy Donaldson and Jennifer Varley

- Funded by NIH STAART Centers program; Dawson, PI, in collaboration w/ Sally Rogers

- 48 Children < 2.5 years of age when intervention began; Randomized study – ESDM vs. community intervention

- 2 year intervention – 25 hr/week (20 by therapist, 5 by parent). Groups received similar levels of actual intervention hours/week (22 vs. 18)

- Outcome measures conducted by naïve examiners

Main effect of ESDM on IQ (Mullen)
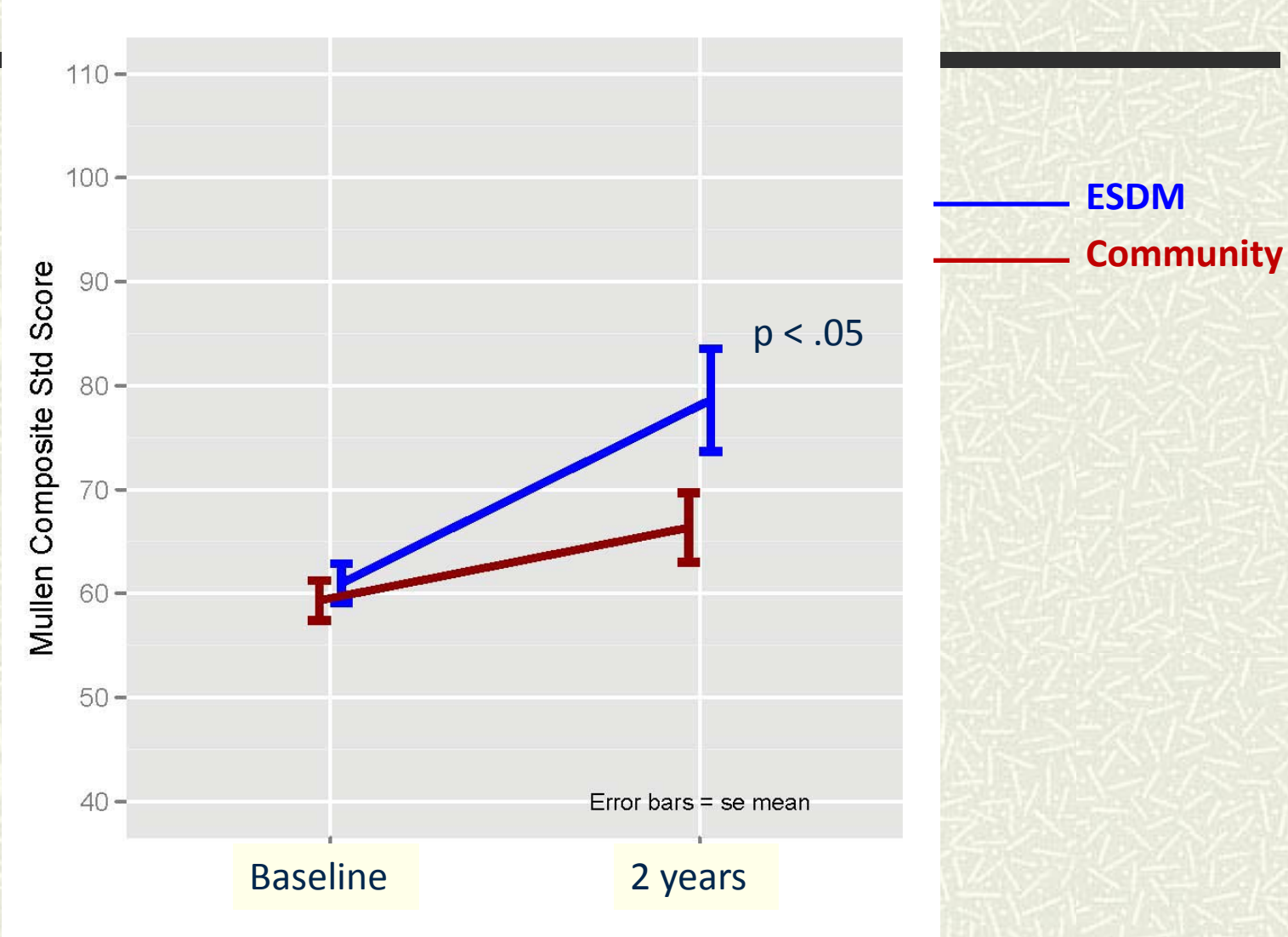
Pre-treatment IQ *does not* moderate the effect of ESDM on IQ gains
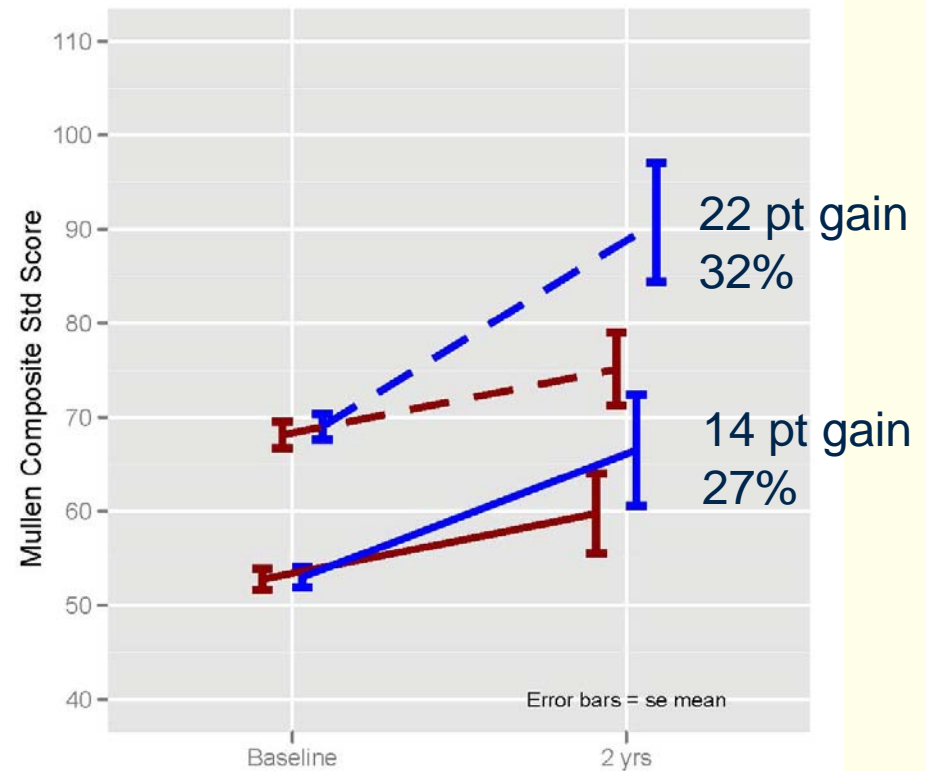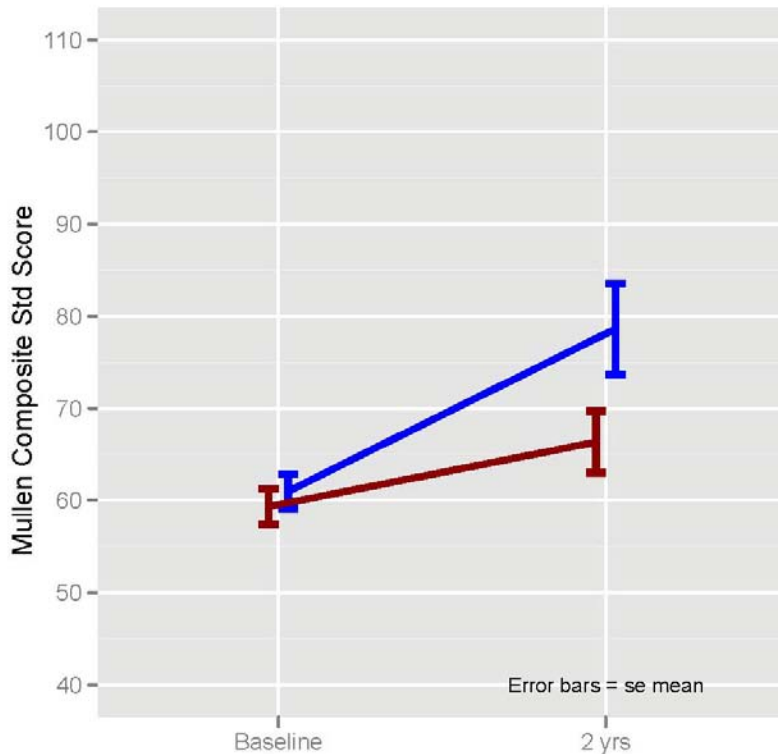
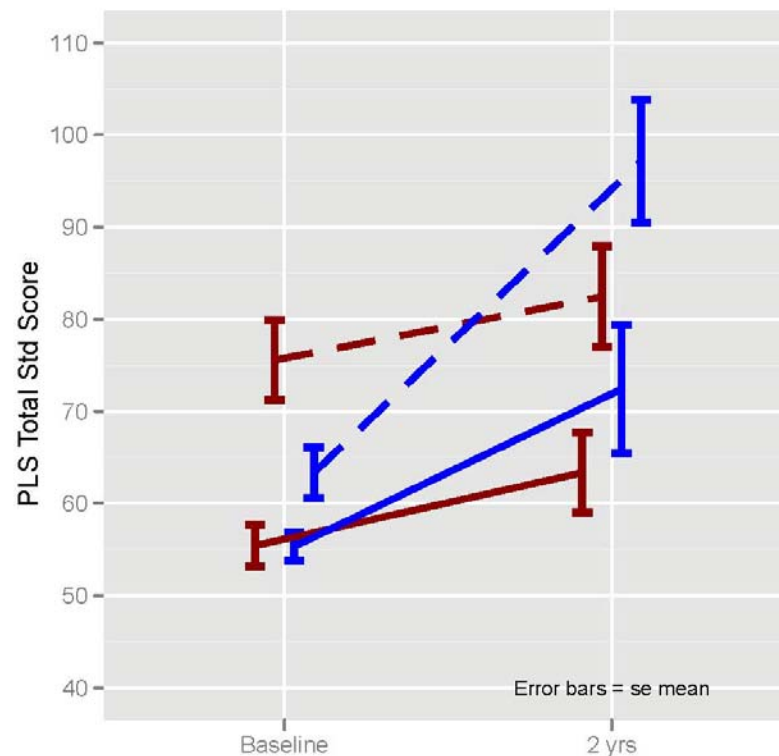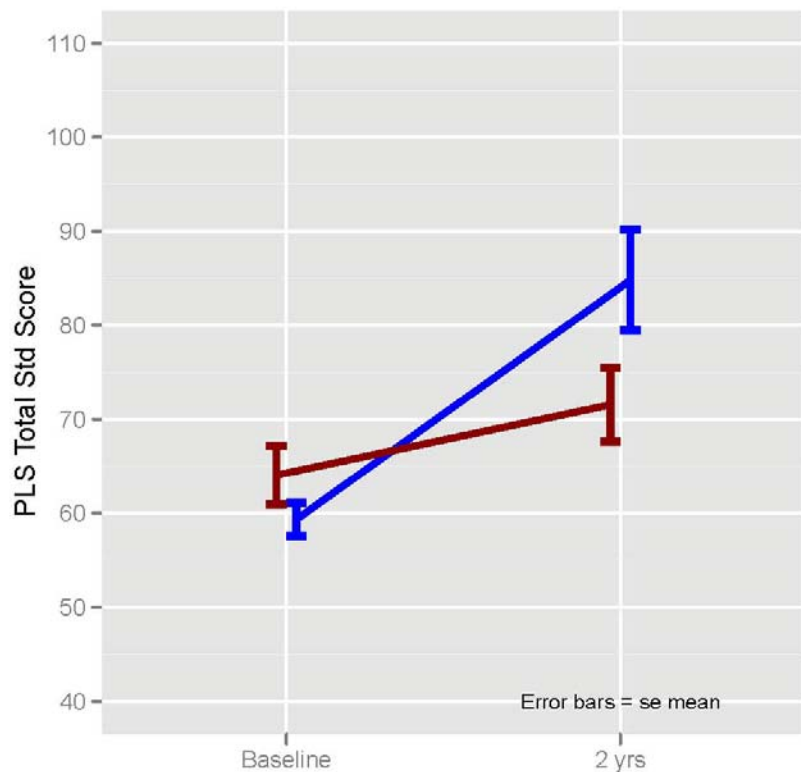# Pre-treatment IQ *does not* moderate the effect of ESDM on language
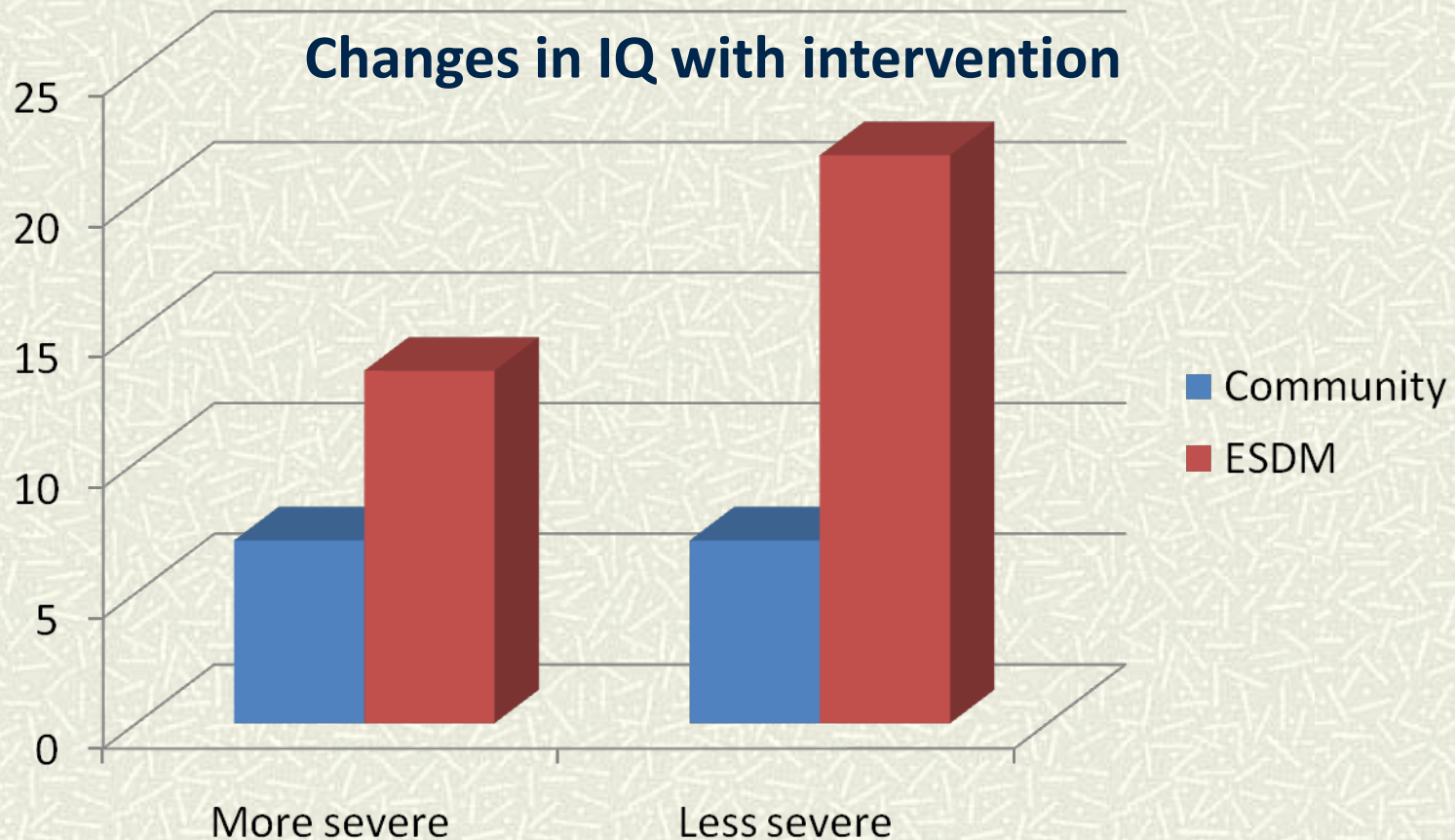
Pre-treatment severity of ASD *does* moderate IQ gain for ESDM
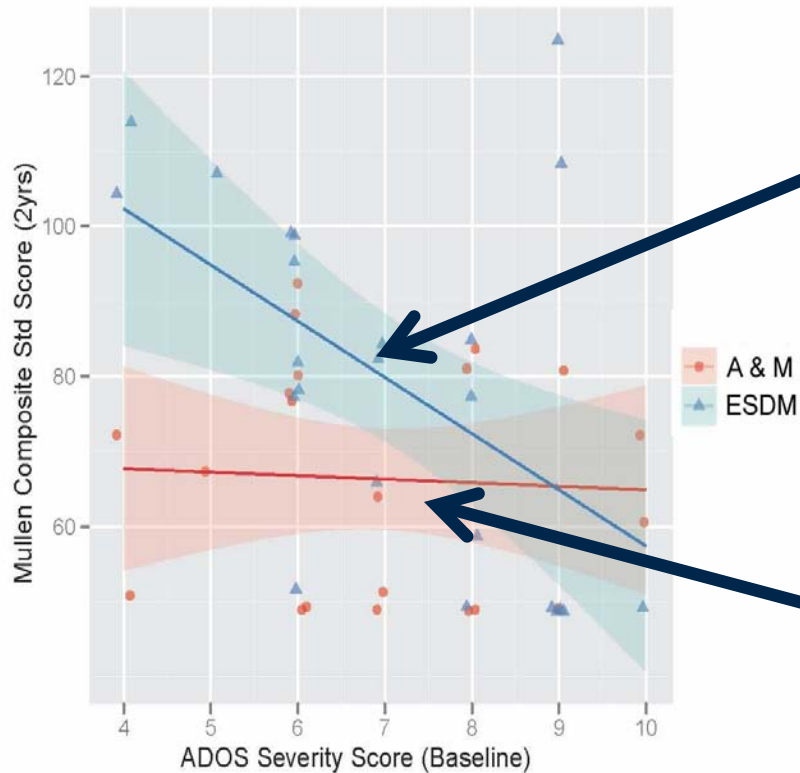
In the ESDM group, children with *less severe ASD symptoms* show more IQ gain over time

In the community group, symptom severity does not influence outcome

But, children with more severe ASD symptoms respond to ESDM intervention!

Changes in IQ with intervention

Multisite ACE RCT Trial:
2007-2012

- 100 12-24 month olds with ASD stratified by CA, gender, DQ
- Randomized to community or ESDM
- 3 months of parent training, 24 months of intensive Early Start Denver Model
- 20 hours 1:1 per wk in home, 4 hr per month parent training
- 31,325 hrs of tx delivered thus far

Enrollment to date

	Comm	ESDM	Tot
U C	19	19	38
U M	9	10	19
U W	20	20	40
	48	49	97

228 phone screen → 57 disc

166 assessed T1 → 49 disc

117 randomized → 20 disc

97 entered ESS T2 → 10 disc

56 assessed 1 yr T3 → 6 disc

24 completed T4
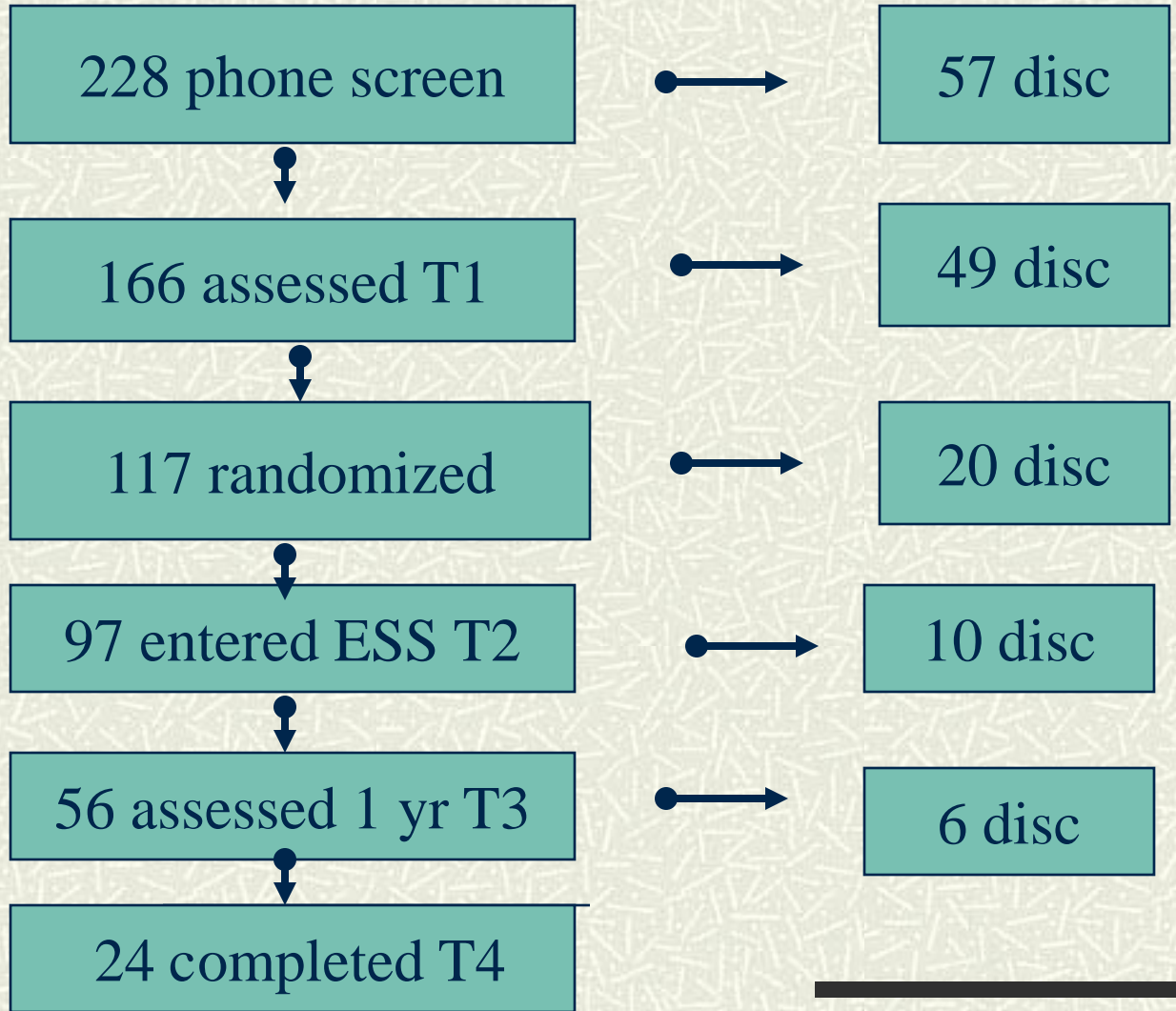
Subjects (97) enrolled

	Comm	ESDM	
Gender	**62.5**	**75.5**	**% male**
Race	**75.0**	**67.3**	**% white**
Maternal Education	**52.1**	**63.3**	**% College deg or higher**
SCL-90 Primary caretaker	**54.3**	**47.0**	**p=.005**
Age /Pre-Treatment	**21.0**	**21.0**	**months**
Mullen DQ	**63.1**	**64.9**	
ADOS Total Score	**21.9**	**20.1**	

First 12 weeks :
Parent learning data
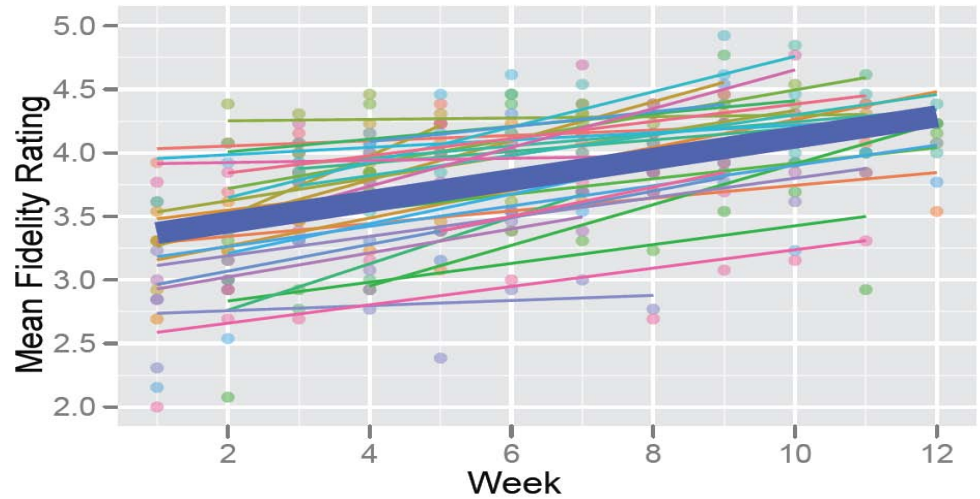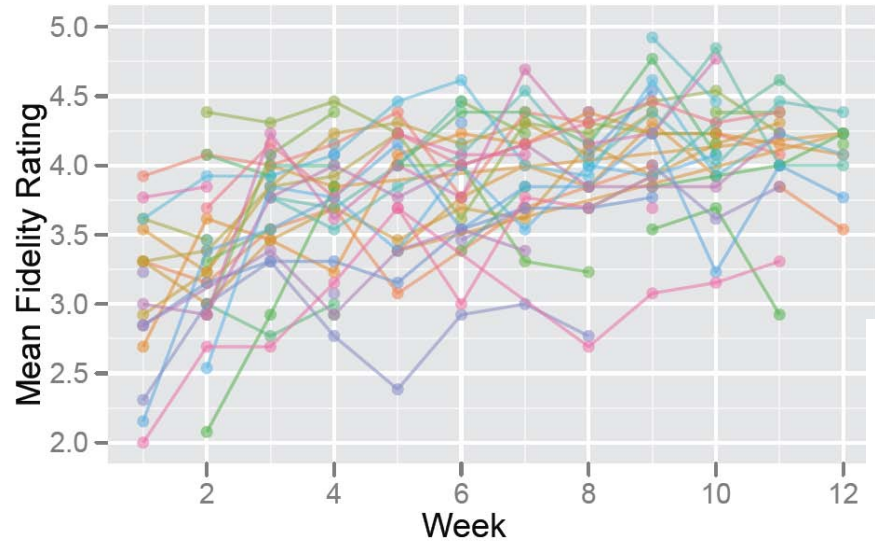
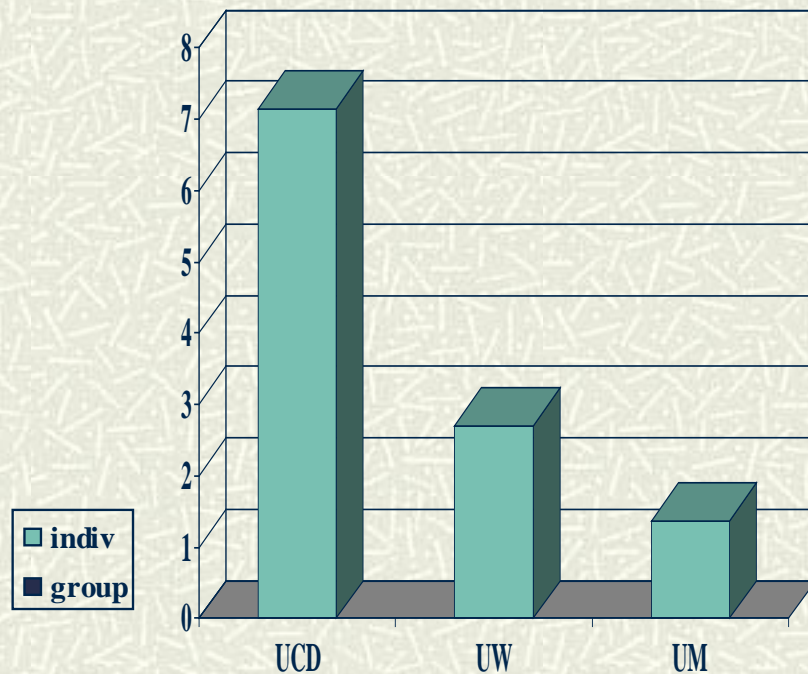# First 12 weeks: Average amount of 1:1 and group treatment per week across 12 weeks
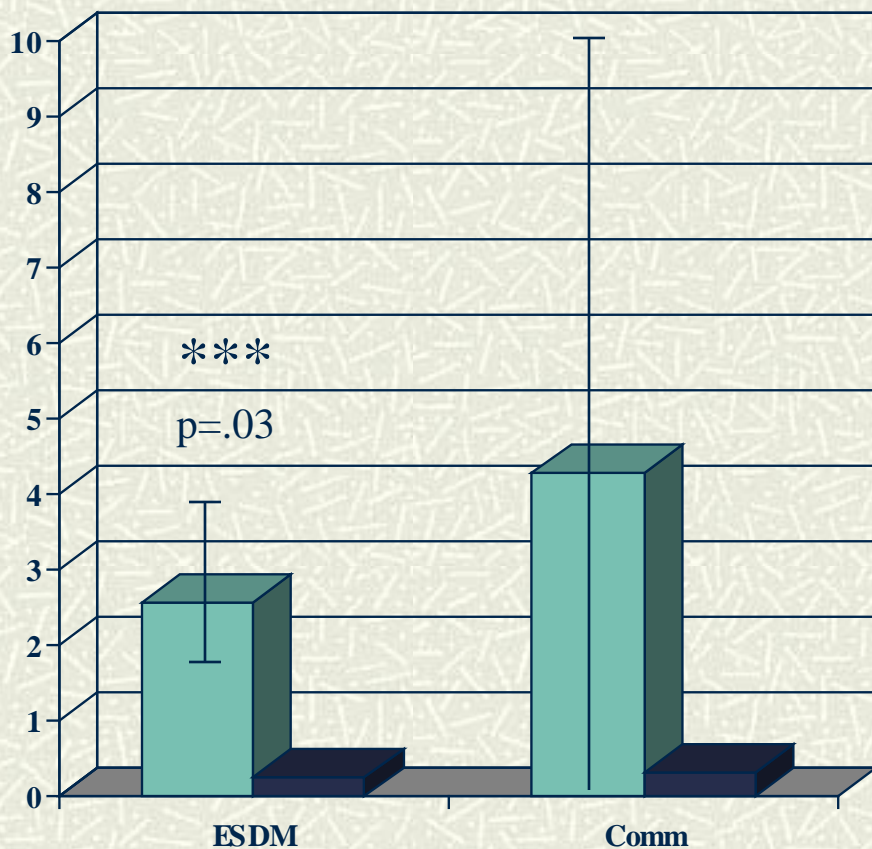
Mean 2.57 hr   Mean 4.29 hr

Relationships between treatment hours and 3 month child change
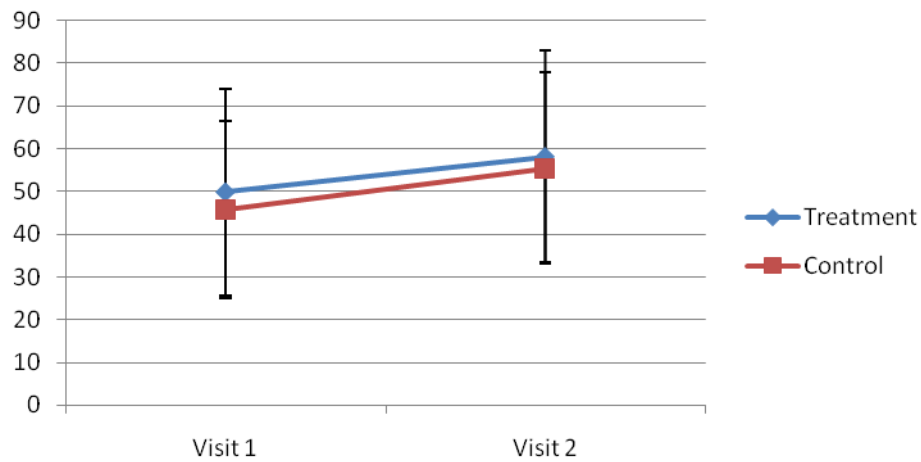
score		p
MSEL comp	pos	.005
ADOS	pos	.075
MCDI vocab	neg	.06

score		p
MSEL comp	pos	.0001
ADOS		ns
CDI vocab	pos	.0001

Control group
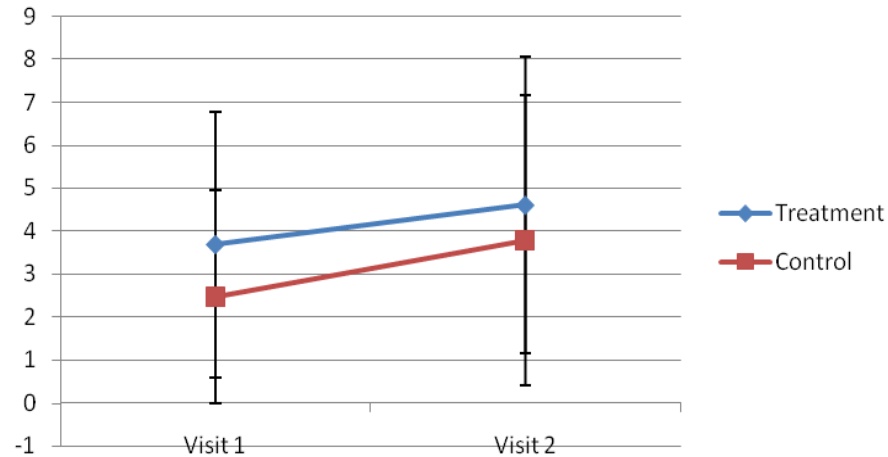
Treatment group

Mullen verbal IQ

Sig effect of time p=.002

Imitation Sequence Final score

Sig effect of time p=.002

Very few differences by site

No significant
group mean differences
or interactions

ADOS: Social Affect and Restricted and Repetitive Behavior Total

Sig effect of time p=.004

Parent responses to intervention

Parental sense of competence
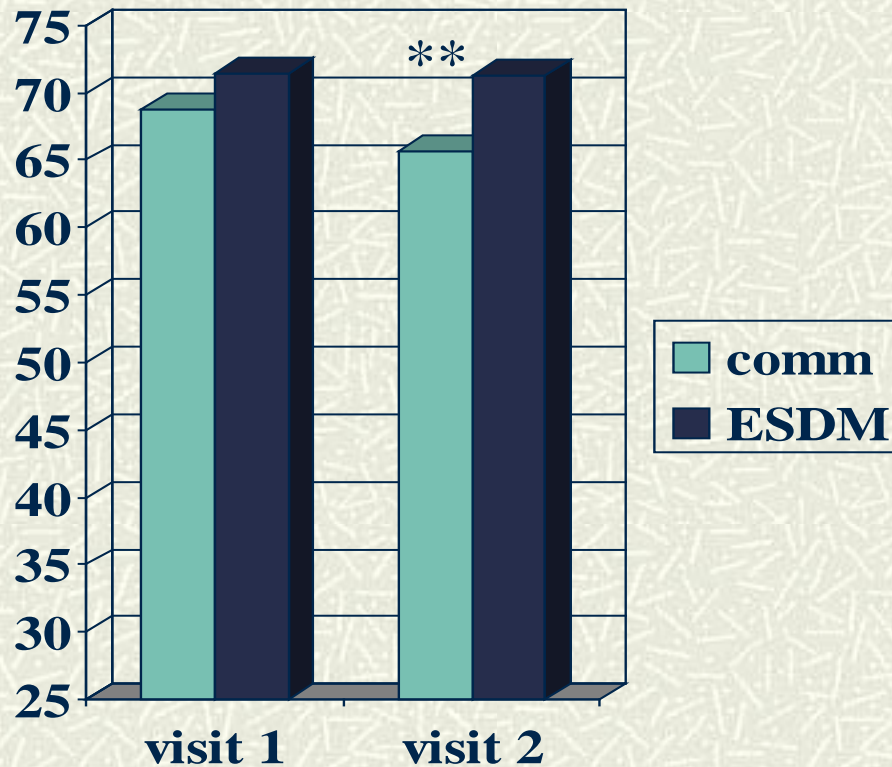
P=.02, d=.51

Can technology improve access to early intervention for families?

A Pilot Study

PI: Laurie A. Vismara, Ph.D.
Gregory S. Young, Ph.D.
Sally J. Rogers, Ph.D.

Telemedicine supports long-distance care

- **Integrates audio, video, and data system technologies**
  - Digital interactive highway
  - Medicine: dermatology, psychiatry, pulmonary medicine, pediatric obesity, cardiology (Callahan et al., 1998; High et al., 2000; Pacht et al., 1998; Shaikh et al., 2008; Tsagaris et al., 1997)

- **Benefits** (Ondersma et al., 2008)
  - 24 hour accessibility
  - Inexpensive equipment = affordability
  - Flexibility - learning styles, language
  - Integrity – central source allows for fidelity of implementation

Research questions

1. Will parents engage in an internet ESDM intervention?

2. Will internet ESDM increase parent provision of learning opportunities for their children?

3. Will children show short-term benefit?

3. Would parents perceive internet ESDM to be easy and satisfying to use?

Child information

ID	CA	MSRL	MSEL	VABS Comp (M=100)	ADOS AD=9 ASD=1	State
Child 1	34 mo	15 mo	20 mo	77	AD (15)	UT
Child 2	36 mo	24 mo	22 mo	65	ASD (10)	CA
Child 3	30 mo	9 mo	10 mo	65	AD (19)	NC
Child 4	26 mo	24 mo	23 mo	97	AD (23)	AR
Child 5	17 mo	14 mo	14 mo	80	AD (17)	TX
Child 6	24 mo	7 mo	5 mo	66	AD (25)	NV
Child 7	**30 mo**	**10 mo**	**13 mo**	**61**	**AD (20)**	**Quebec**
Child 8	16 mo	13 mo	8 mo	85	AD* (15)	TX
Child 9	30 mo	8 mo	9 mo	73	AD (17)	PA
Child 10	**15 mo**	**9 mo**	**12 mo**	**60**	**AD (17) provisional**	**CA**

Parents: skill changes over 12 weeks
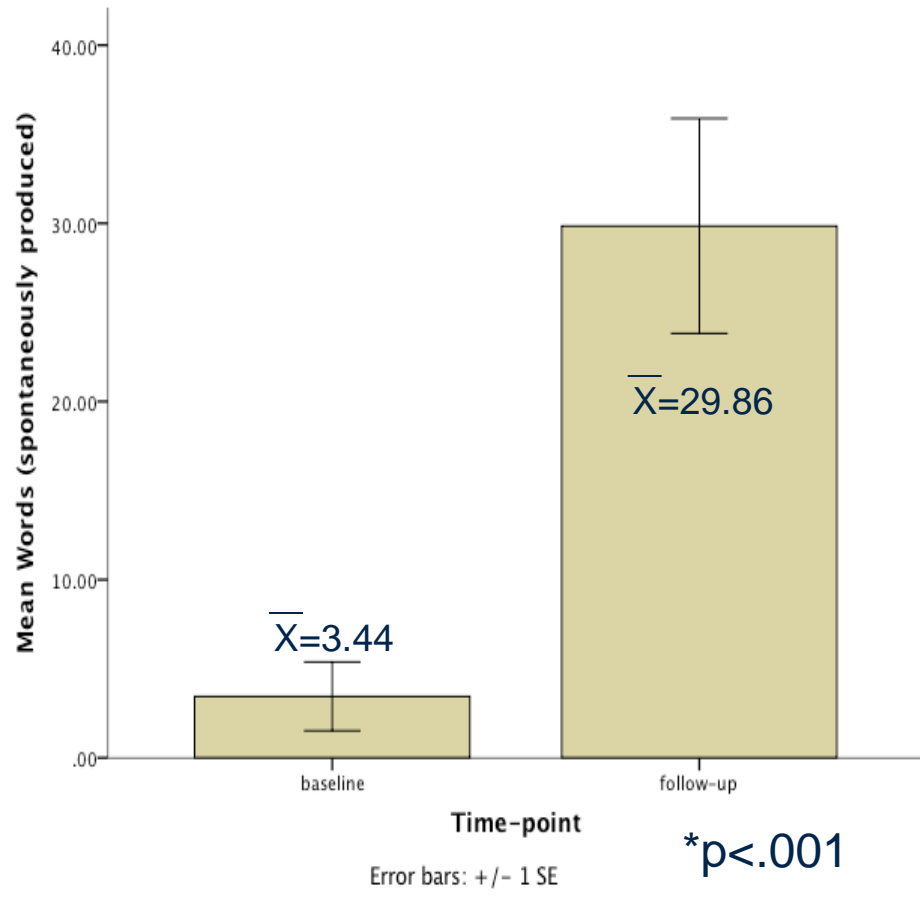

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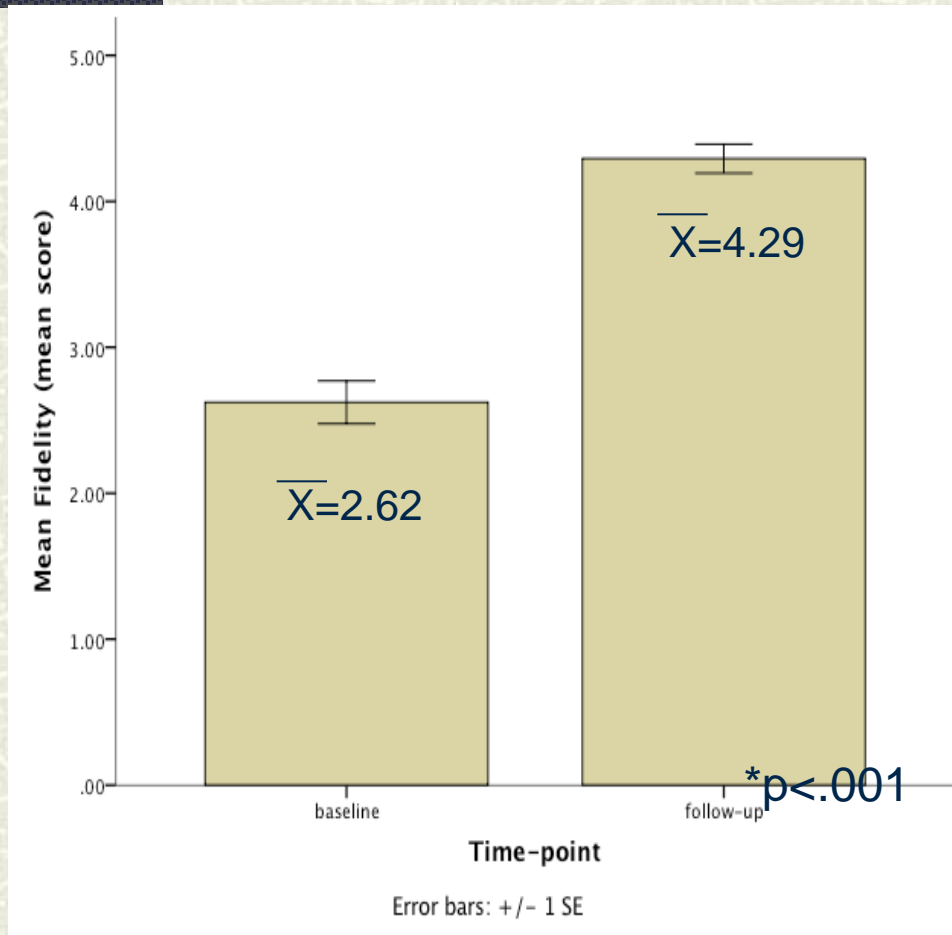
- Significant increase over time
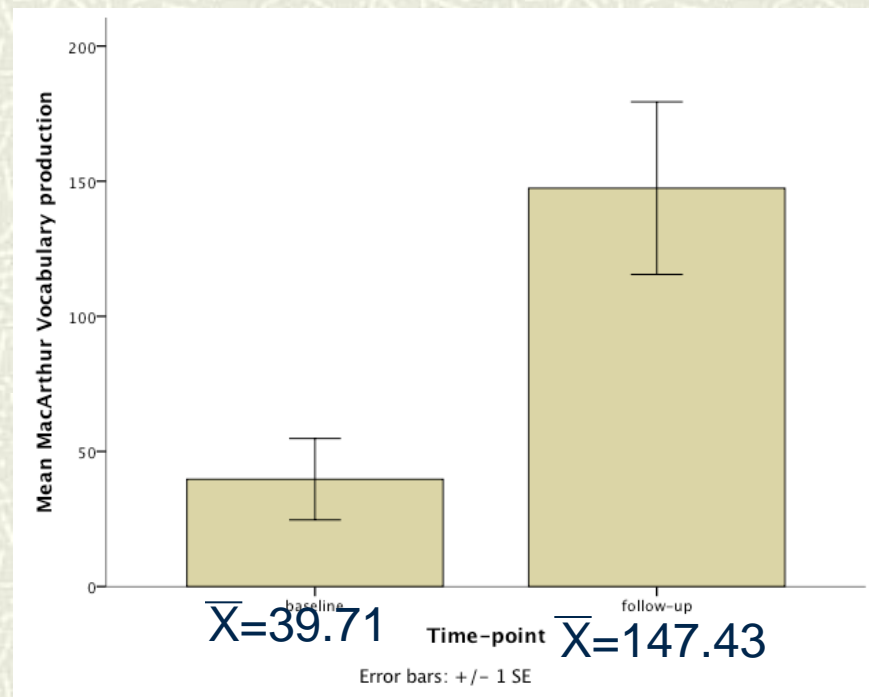
- Interactive learning from a distance

- Skill acquisition similar in rate, quality of learning to center-based approach
  (Vismara et al., 2009)

Children: spontaneous words increase in typical home routines

X̄=29.86

X̄=3.44

*p<.001

Direct observation

- Significant word increase over time

- Spontaneous, novel, pragmatically-appropriate language

X̄=39.71   X̄=147.43

Parent report measure p<.001

Parent Responses

- 90% parents liked the collaborative approach
- 90% of parents liked the use of videos, written materials, and internet materials
- 90% of parents liked the internet approach; 1 found it frustrating
- Follow-up study using RCT is in progress
- Videos!

Can infant intervention prevent the full emergence of ASD?

NICHD/NIMH ARRA funding R21 HD065275; Rogers & Vismara, 2009-2011

- 6-12 month olds
- Symptomatic: elevated ASD scores and parent and expert clinician concerns
- Target symptoms:
  - Unusual repetitive behaviors
  - Lack of phonemic development
  - Lack of social interest and face to face engagement
  - Unusual visual fixations, interest on objects
  - Poor quality, infrequent dyadic engagement
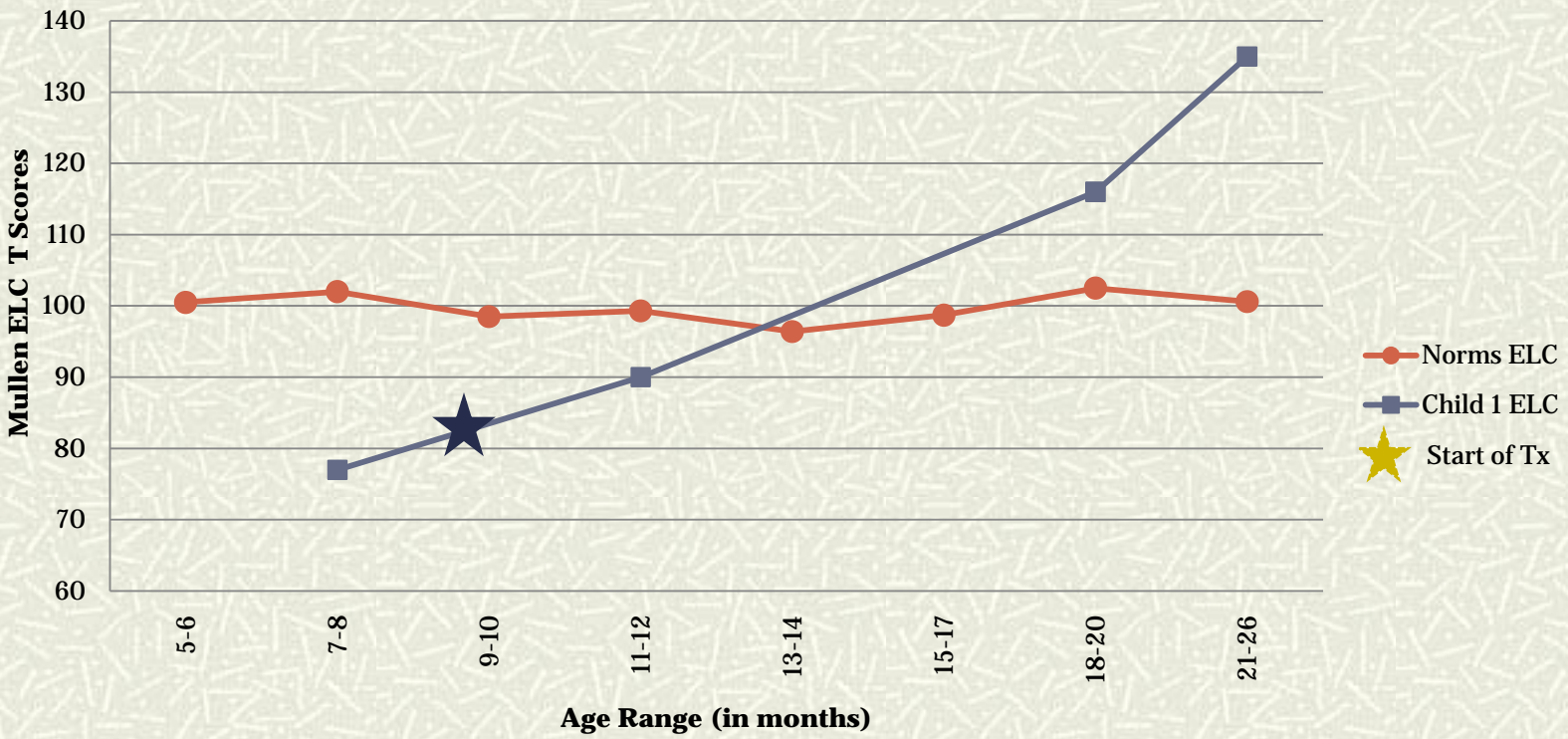- Parent coaching model 12 weeks, 1hr

AOSI Scores: Child 1
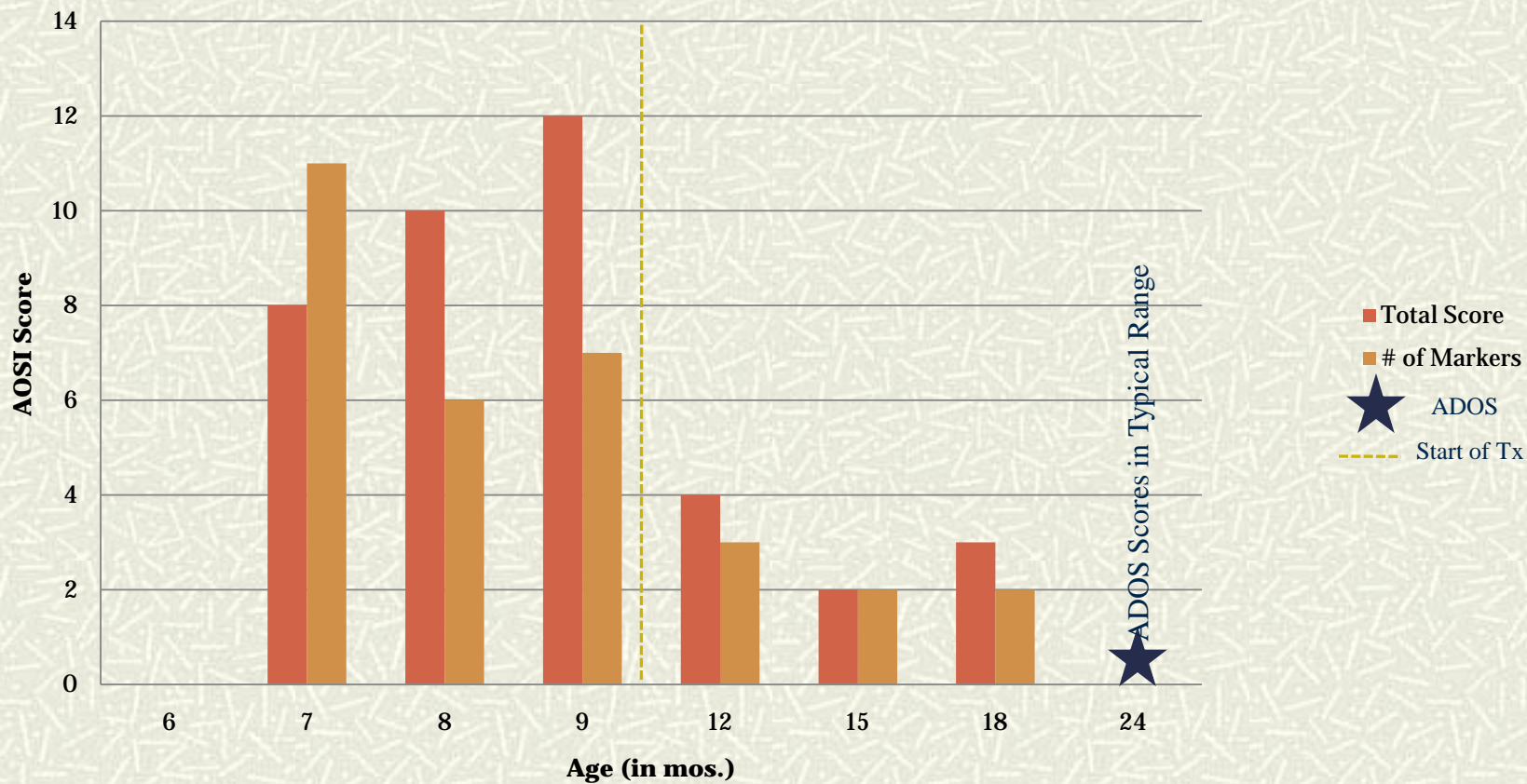
Mullen Early Learning Composite T Scores: Child 1

Mullen Early Learning Composite (ELC) T Scores: Child 1

Pre post videos of first two CA children

- Child 1 pre
- Child 1after 1 yr

- [Child 2 pre](#)
- [Child 2 post](#)

Discussion Points

- ASD can be identified at age 1 in clinical referrals: 115 of 117 one year olds showed stable symptoms over 3 months
- Far more plasticity in early ASD than any of us would have expected: 90=% verbal, 80% IQ normal
- Effects of early intervention may be more intense, more economical, earlier
- Large numbers of preschoolers, families cannot access appropriate treatment: large disparities. Must create access
- Is early preventative treatment possible? Only an RCT can tell
- Thank you to NIH and IACC for your support