Improving Social Communication Outcomes for Young Children with Autism

Connie Kasari

Help Group Summit
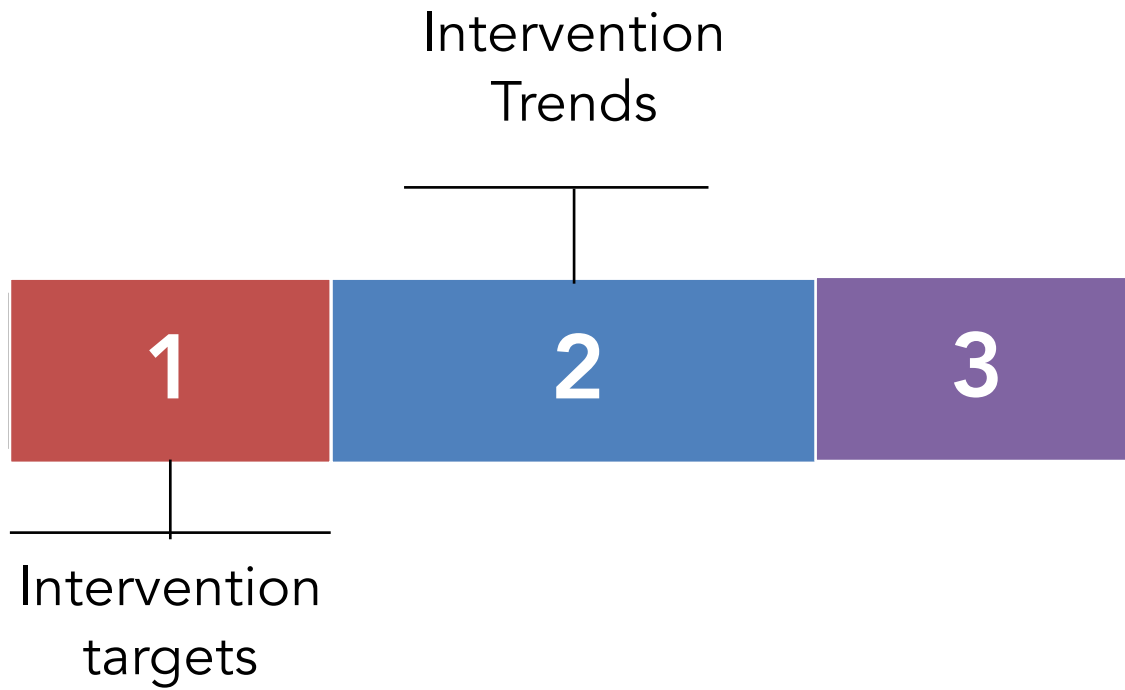October 15, 2021

KASARI LAB

UCLA CART
CENTER FOR AUTISM RESEARCH AND TREATMENT

Disclosures

Grant funding: NIH, HRSA, Autism Speaks, DOD, Institute of Education Sciences; Private donors

Early social communication challenges

Newer intervention models specifically target social communication goals

Naturalistic Developmental Behavioral Interventions
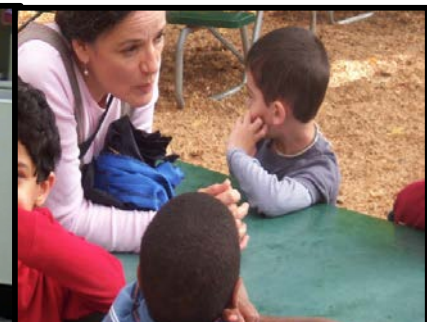
Social communication targets

| Play skills | Gesture use | Engagement-Interactions | Language |

Why focus on social communication?

1) Importance to Development

Language* by age 5-6 best social outcomes

(Lord, 2000; Rutter, 1978)

Joint attention predicts to language

(Kasari et al,2008; Kasari et al, 2012; Mundy et al., 1986; Mundy, Sigman, & Kasari, 1990); Shih et al, 2021)

Play skills associated with cognitive abilities

(Kasari et al, 2012)

*Speaking in phrases

Joint Attention Gestures and Autism

➢ Children use gestures before they learn to talk with words
➢ Gestures can be used to request help or access to something (requesting gestures)
➢ Or gestures can be used to share an experience with another (joint attention gestures)

➢ Children with autism use fewer joint attention gestures than other children

➢ Children who have more joint attention gestures have better language skill

Social communication and language skills are malleable

Social communication skills responsive to early intervention

- Initial test of teaching joint attention skills
  - Started in1998

- 58 preschoolers
  - All attending the same outpatient early intervention program (ABA based, 30 hours per week)
  - Exclusions only by age, non-ASD diagnosis

- Randomized to receive 30 minutes daily of JA, SP or regular program
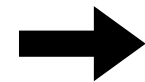 - Average of 6 weeks, 30 sessions

- Therapist mediated
  - parents not involved in interventions

Joint Attention Group

Continue regular program

Symbolic Play Group
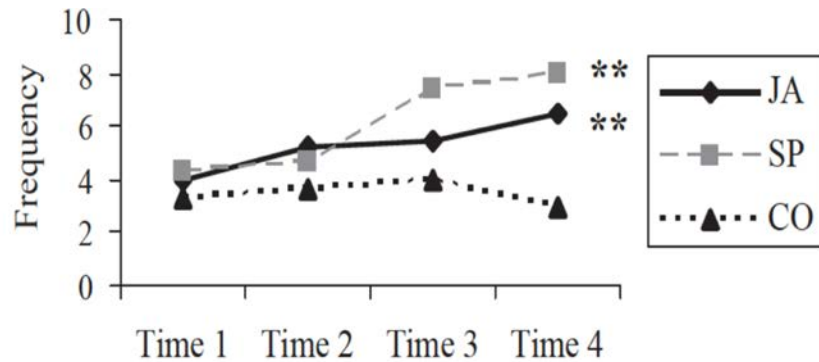
Teaching Joint Attention & Play

Figure 4. Growth in JA initiation skills in mother–child interaction and Early Social-Communication Scales. JA = joint attention; SP = symbolic play; CO = control group. **JA & SP > CO, $F(2, 164) = 5.35$, $p < .01$.

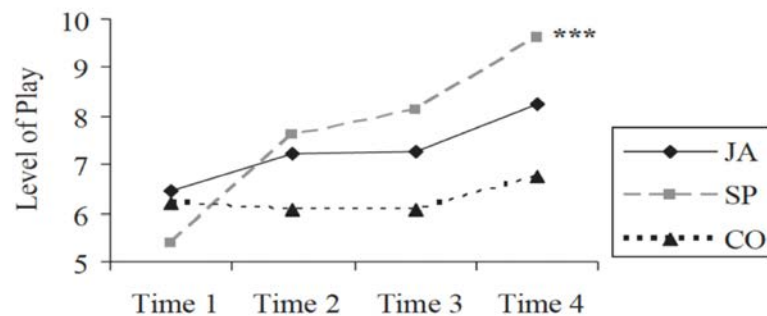Teach joint attention and initiations of JA increase

Figure 7. Growth in play level in mother–child interaction and structured play. JA = joint attention; SP = symbolic play; CO = control group. ***SP > JA & CO, $F(2, 164) = 10.48$, $p < .001$.

Teach play skills and play level increases

Increases in Language

Prediction to Language

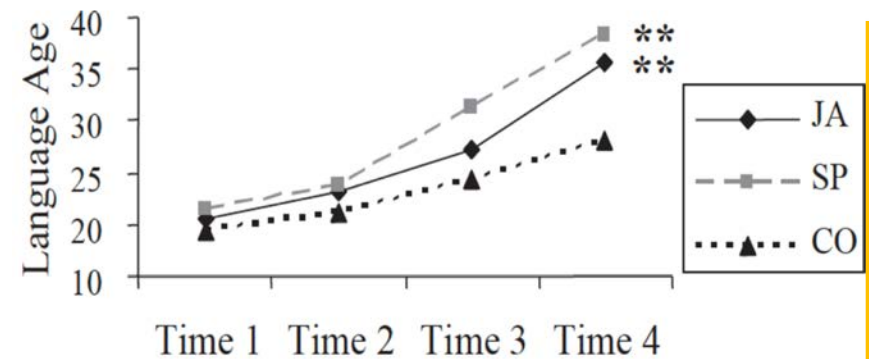*Figure 2.* Growth in expressive language, measured in months. JA = joint attention; SP = symbolic play; CO = control group. **JA & SP > CO, $F(2, 164) = 6.84$, $p < .01$.

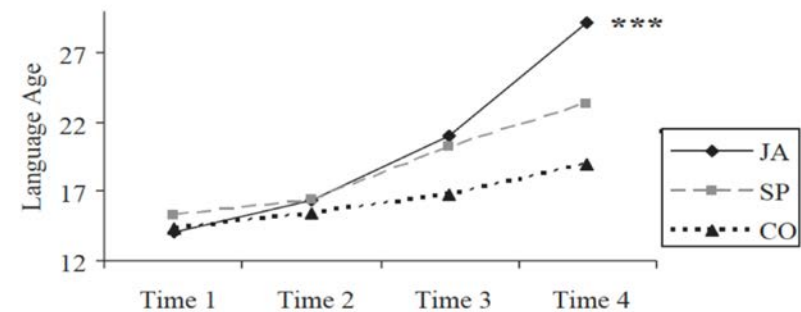**Low language to begin did better in JA intervention**

Figure 3. Growth in expressive language in months for children low in expressive language. JA = joint attention; SP = symbolic play; CO = control group. ***JA > SP & CO, $F(2, 74) = 11.17$, $p < .001$.

Joint engagement is a potential mechanism leading to increased initiations of joint attention and downstream effects on language: JASPER early intervention for children with ASD

Wendy Shih,[1] Stephanie Shire,[2] Ya-Chih Chang,[3] and Connie Kasari[1]

[1]University of California-Los Angeles, Los Angeles, CA, USA; [2]University of Oregon, Eugene, OR, USA; [3]California State University –Los Angeles, Los Angeles, CA, USA

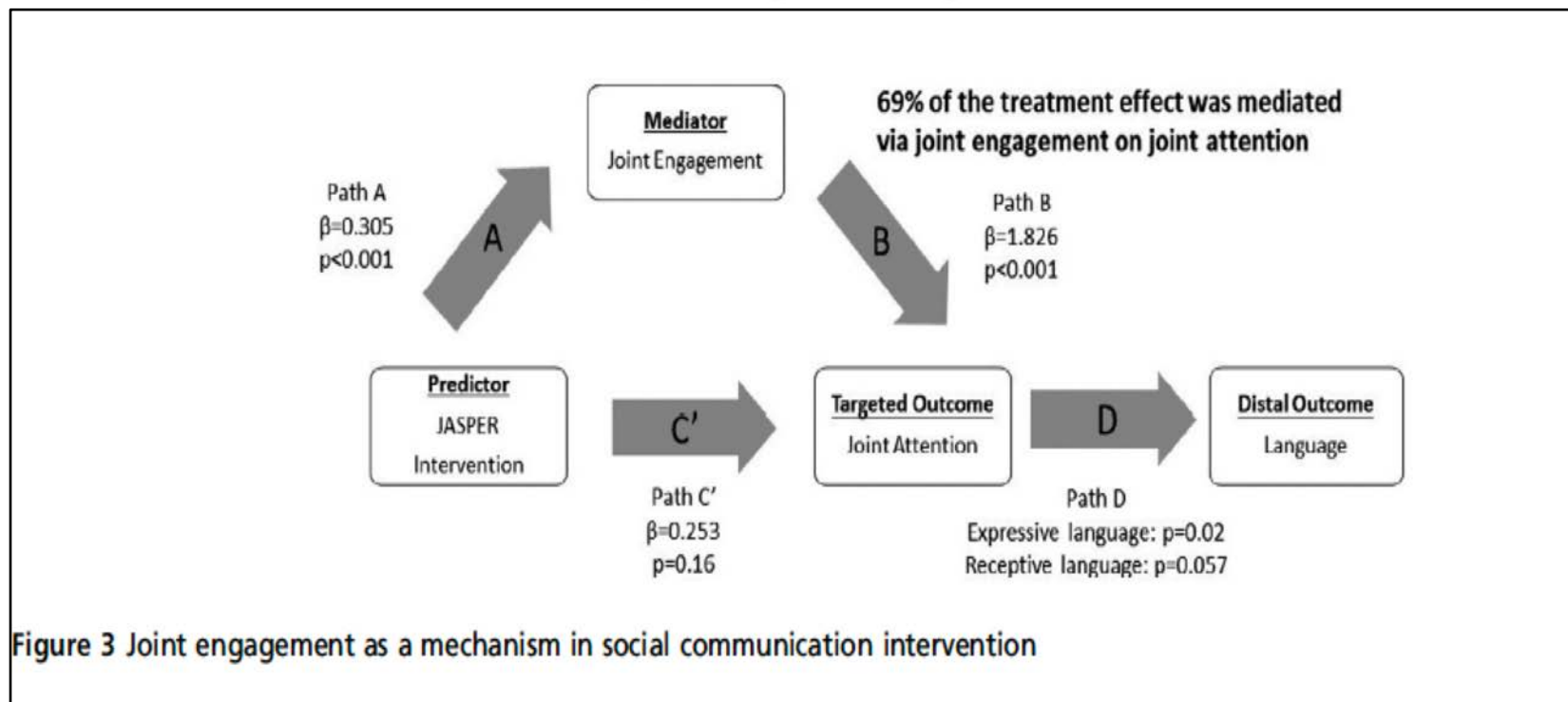Figure 3 Joint engagement as a mechanism in social communication intervention

2. Engaging children with autism can be challenging

Play can feel frustrating or not enjoyable

Difficulty engaging the child in an activity
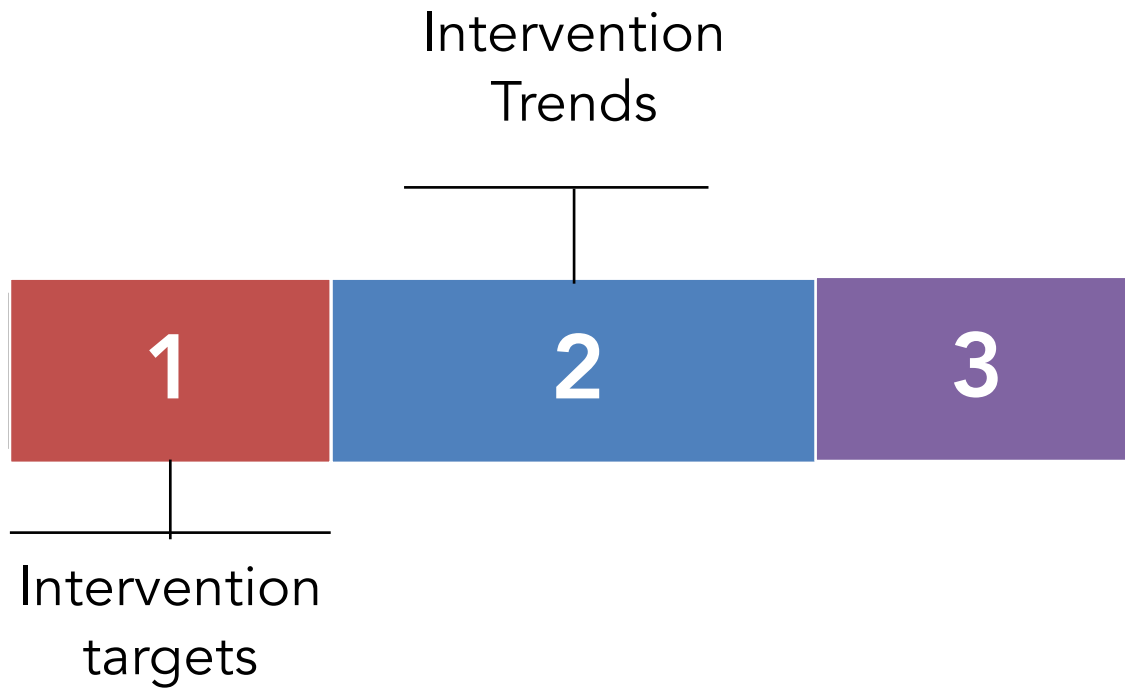
Range of interventions that focus on language improvements

JASPER

PRT and ESDM

Naturalistic Developmental
Behavioral Interventions
(still ABA)

Discrete Trial Training

Proliferation of Interventions

Joint Attention Symbolic Play Engagement Regulation JASPER Early Start Denver Model ESDM Pivotal Response Training PRT Floortime DIR Developmental Individual difference Relationship-based RDI Relationship Development Intervention Early Achievements Proj ImPACT PEERS Secret Agent Society Discrete Trial Training DTT Verbal Behavior Intervention VB SCERT Social Communication Emotion Regulation Transaction Supports Unstuck and on target Focused Playtime Intervention Adapted Responsive Intervention Joint Attention Symbolic Play Engagement Regulation JASP Early Start Denver Model ESDM Pivotal Response Training PRT Floortime Developmental Individual difference Relationship-based DIR Relationship Development Intervention RDI Early Achi Project ImPACT PEERS Secret Agent Society Discrete Trial Trainin DTT Verbal Behavior

ASD INTERVENTIONS

Despite increasing numbers of research studies on early interventions…..

Many have never been tested….

Samples restricted to mostly White, middle class samples and children with milder levels of impairment

Early Intervention Studies

Who is left out?

Low income, historically marginalized and minoritized populations

Children who have intellectual disability and/or are minimally verbal

Families who cannot access research centers (most studies are not done in community)

Current State of Science

The evidence base does not represent most children with ASD

How can we increase diversity and representation?

Community based interventions using community partnered participatory research methods

Schools, homes

Examples: UCLA JASPER studies in schools, homes

o JASPER in low resourced communities

o JASPER at school with toddlers

o JASPER at school in public preschool programs

o Focus on understudied groups
   o Significant ID, minimally verbal

KASARI LAB

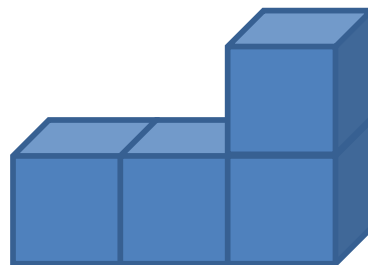# Joint Attention, Symbolic Play, Engagement, & Regulation

JASPER

JASPER is a module and targeted intervention

NDBI

Naturalistic Developmental Behavioral Intervention
(Workgroup, 2014)

Targeted

Modular—can build a comprehensive program

JASPER

Highly replicable findings
(therapists, teachers, parents)

↑ Joint engagement

↑ Play skills

↑ Joint Attention

↑ Language

Evidence

Randomized Comparative Efficacy Study of Parent-Mediated Interventions for Toddlers With Autism

Connie Kasari, Amanda Gulsrud, Tanya Paparella,
Gerhard Hellemann, and Kathleen Berry
University of California Los Angeles

Objective: This study compared effects of two parent-mediated interventions on joint engagement outcomes as augmentations of an early intervention program for toddlers with autism spectrum disorder (ASD). *Method:* Participants included 86 toddlers (range 22–36 months) with ASD and their primary caregiver. Caregiver-child dyads were randomized to receive 10 weeks of hands-on parent training in a naturalistic, developmental behavioral intervention (joint attention, symbolic play, engagement and regulation—JASPER) or a parent-only psychoeducational intervention (PEI). Dose was controlled in terms of researcher-parent contact and early intervention services received by the child. *Results:* Results yielded significant effects of the JASPER intervention on the primary outcome of joint engagement. The treatment effect was large (Cohen's $f^2 = .69$) and maintained over the 6-month follow-up. JASPER effects were also found on secondary outcomes of play diversity, highest play level achieved, and generalization to the child's classroom for child-initiated joint engagement. The PEI intervention was found to be effective in reducing parenting stress associated with child characteristics. All secondary effects were generally small to moderate. *Conclusions:* These data highlight the benefit of a brief, targeted, parent-mediated intervention on child outcomes. Future studies may consider the combination of JASPER and PEI treatments for optimal parent and child outcomes. Trial registry no. NCT00999778.

What is the public health significance of this article?
To improve outcomes associated with core impairments of toddlers with ASD, this study highlights the impact of direct, hands-on parent coaching of techniques to facilitate child social development. Parents also benefit from expert-delivered educational consultation, as shown by reduced parenting stress, but this treatment is less likely to improve child outcomes.

JASPER efficacy

JASPER is an established evidenced based early intervention

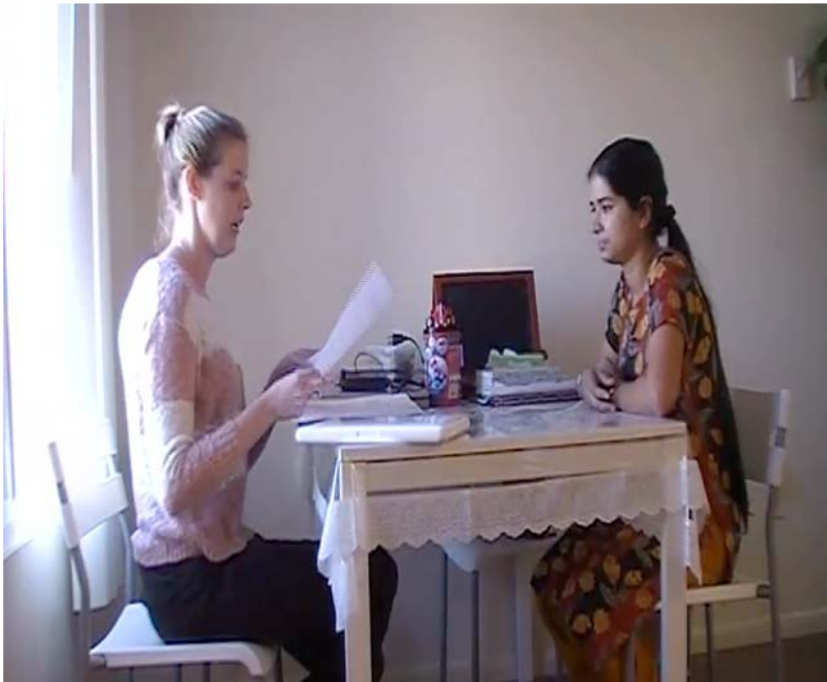WHAT you teach as well as HOW you teach matters

Increasing study representation

Requires adaptation to home and school routines

Parent mediated interventions

Example 1: Comparing 2 Intervention Approaches

Information Sharing

Hands on Coaching

Child initiated joint engagement

JASPER

Group Education

(Kasari, Lawton, Shih, Barker et al, Pediatrics, 2014)

RCT-Comparative Efficacy, Multi-site
N=112

Parent Mediated Intervention— Low Resourced Preschoolers

o   112 children (2-5 year olds)

o   >60% ethnic minorities, low income

o   Comparison 2 parent interventions

o   In home intervention or neighborhood group

o   24 sessions over 12 weeks

o   3 month follow up

JASPER group

↑ Joint engagement

↑ Symbolic play

↑ Initiating JA

(Kasari, Lawton, Shih, Barker, Landa, Lord, Orlich, King, Wetherby, Sentruk, Pediatrics, 2014)

Schools require particular adaptations

Schools important because all children go to school; more complex children, more diversity

JASPER added into school program

Toddlers (paraeducators taught 1:1)	Jasper taught in small group rotations-preschool
➤ Toddler public program ➤ 98% minority, low income ➤ Children 2-3 years old ➤ Paraeducators 1:1 model, 98% minority from community	➤ Public school program ➤ 60% minority students ➤ Preschoolers 3-5 years old ➤ Teachers, paraeducators >60% minority ➤ Title 1 schools

Toddler participants

Table 1 Participant characteristic at entry

Mean (SD)	Treatment as usual waitlist (n = 59)	Joint Attention, symbolic play, engagement, and regulation (n = 56)	p-value
Age (Months)	31.54 (3.17)	31.71 (2.94)	.8591
Boys: n (%)	45 (76.27)	44 (78.57)	.9428
Ethnicity: n (%)			
African American	10 (16.95)	15 (26.78)	.7034
Caucasian	4 (6.78)	3 (5.36)	
Hispanic	39 (66.10)	33 (58.93)	
Asian	1 (1.69)	2 (3.57)	
Mixed	2 (3.39)	3 (5.36)	
Did not report	3 (5.08)	0 (0)	
Mullen Scales of Early Learning Age-Equivalent			
Receptive language	16.00 (10.15)	16.55 (10.35)	.8226
Expressive language	16.44 (9.28)	17.32 (8.81)	.5772

Paraprofessionals from community taught toddlers 1:1

Compared to existing group socialization program

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Paraprofessionals from community taught toddlers 1:1

Compared to existing group socialization program

Hybrid implementation model of community-partnered early intervention for toddlers with autism: a randomized trial

Stephanie Y. Shire,[1] Ya-Chih Chang,[2] Wendy Shih,[1] Suzanne Bracaglia,[3] Maria Kodjoe,[3] and Connie Kasari[1]

[1]University of California Los Angeles, Los Angeles, CA; [2]California State University Los Angeles, Los Angeles, CA; [3]New York Center for Child Development, New York City, NY, USA
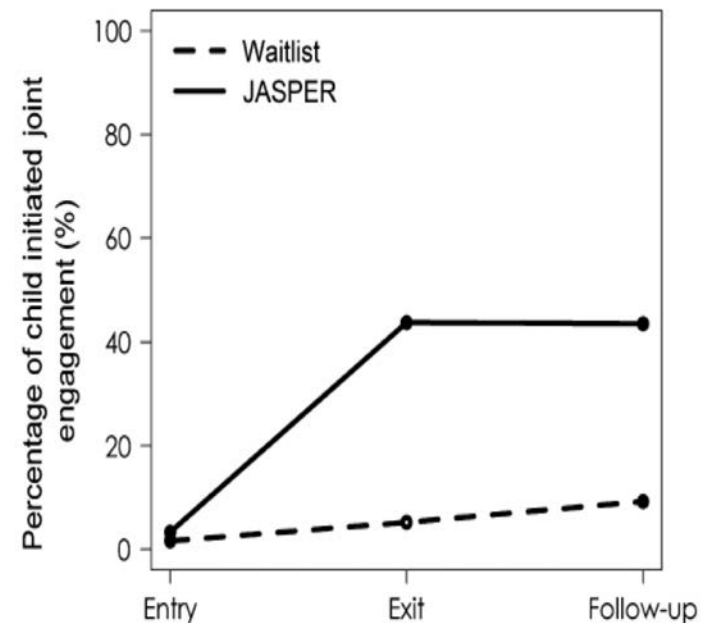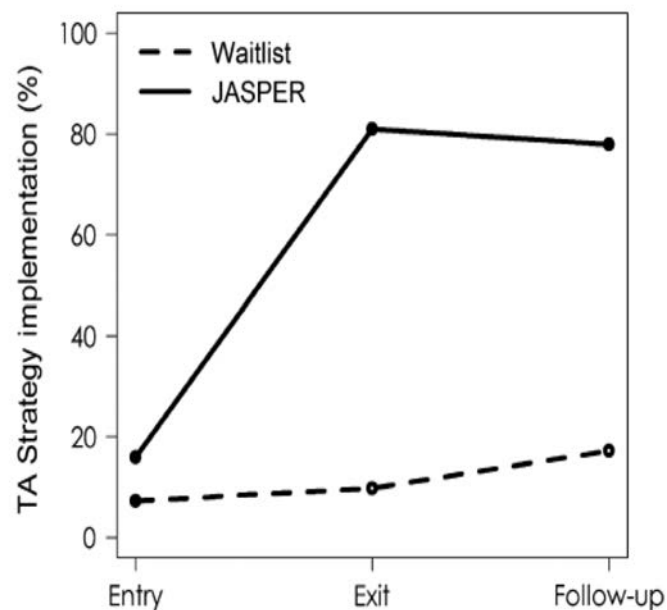
Fitting into school routines
Adapting per center request

1:1 model
Social communication with adult

Small group peer model
Social communication with peers

ORIGINAL PAPER

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Sustained Community Implementation of JASPER Intervention with Toddlers with Autism

Stephanie Y. Shire[1] · Wendy Shih[2] · Ya-Chih Chang[3] · Suzanne Bracaglia[4] · Maria Kodjoe[4] · Connie Kasari[2]

- Support from researchers

- Fidelity high, up to 80%

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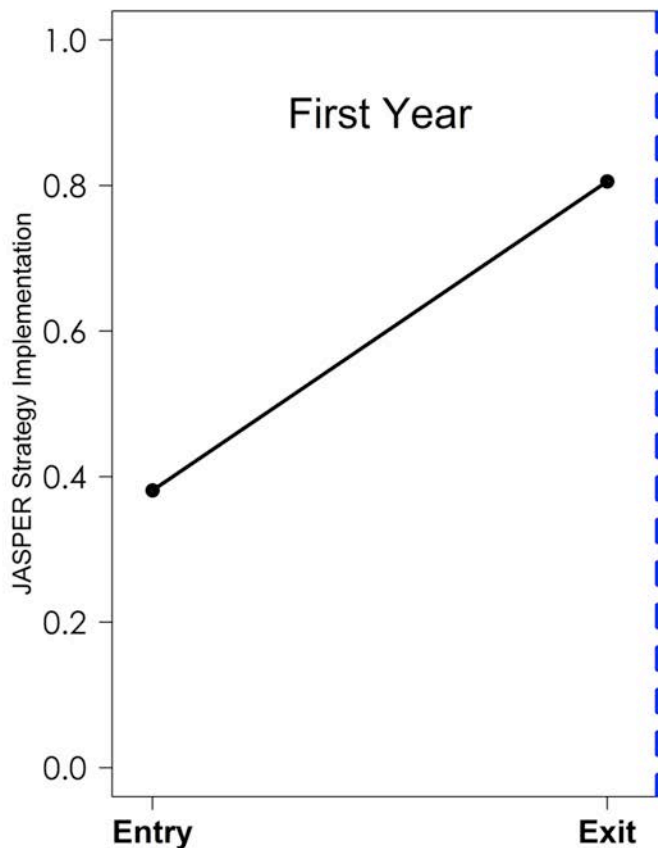
Sustained Community Implementation of JASPER Intervention with Toddlers with Autism

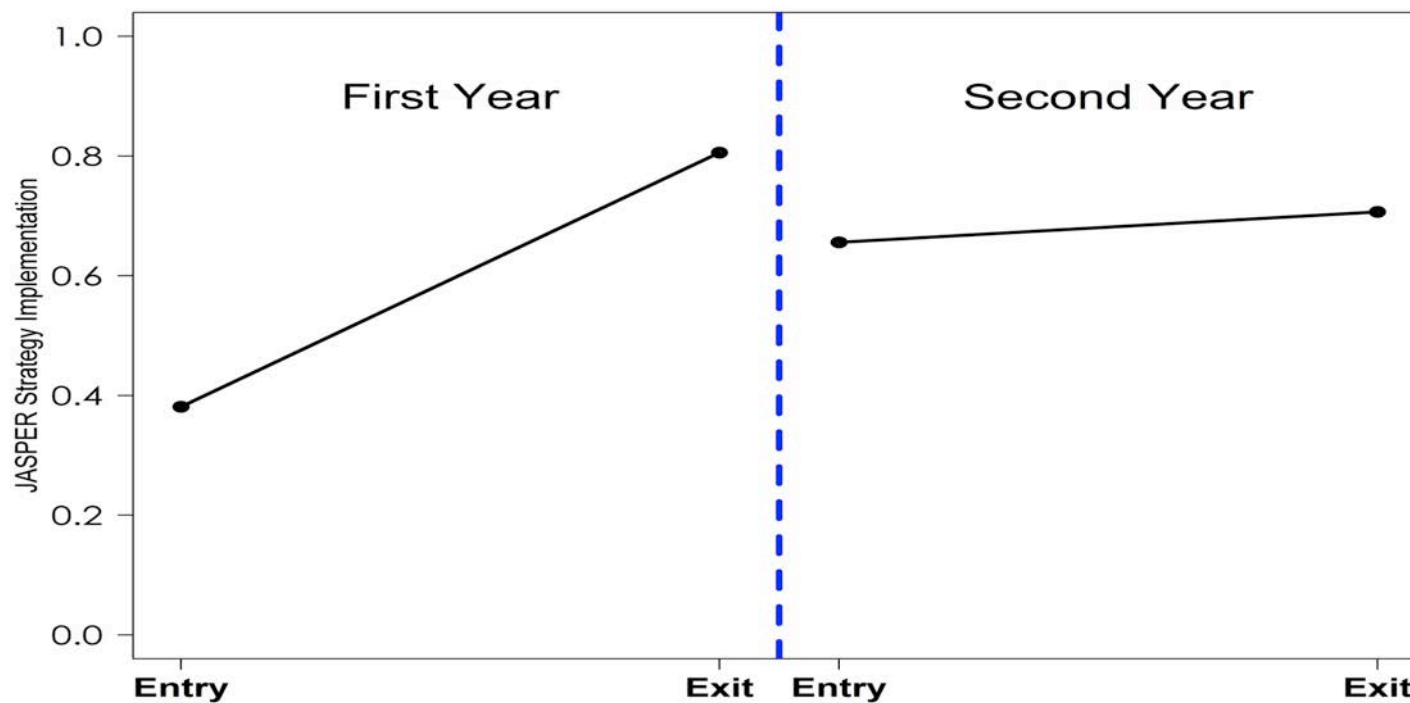Stephanie Y. Shire[1] · Wendy Shih[2] · Ya-Chih Chang[3] · Suzanne Bracaglia[4] · Maria Kodjoe[4] · Connie Kasari[2]

Peer engagement in toddlers with autism: Community implementation of dyadic and individual Joint Attention, Symbolic Play, Engagement, and Regulation intervention

Stephanie Y Shire[1] (iD), Wendy Shih[2], Suzanne Bracaglia[3],
Maria Kodjoe[3] and Connie Kasari[2]

- Children and paraprofessionals worked in dyads; JASPER strategies implemented with focus on peer to peer interactions

- Both JASPER only and jasPEER groups had similar outcomes suggesting social communication outcomes can be improved in context of peer to peer interactions
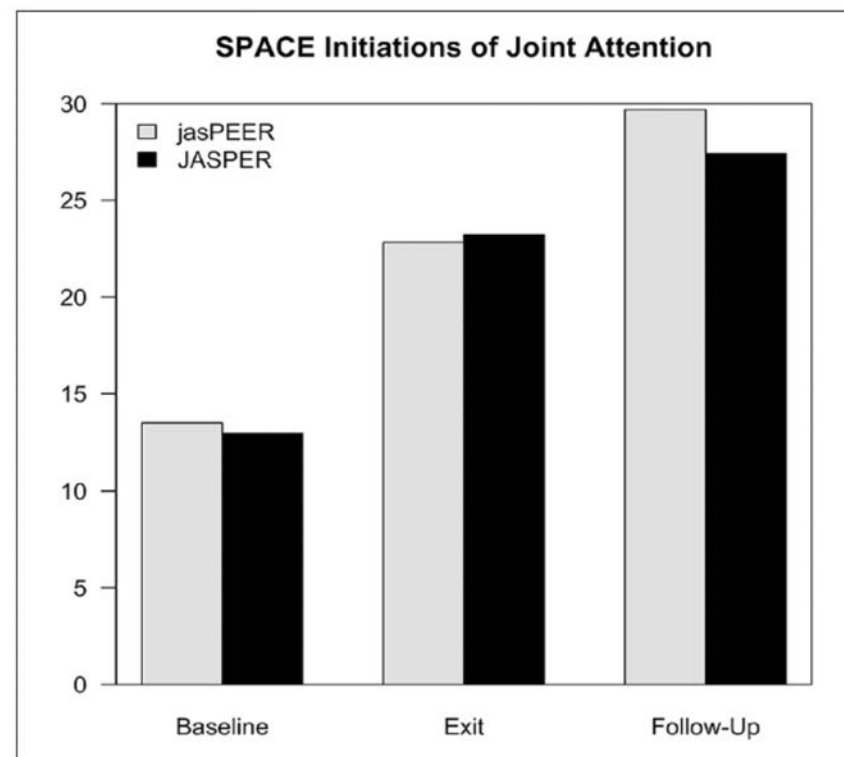

Figure 2. Initiations of joint attention.

Toddlers on their own;
Outcome on unsupported peer interactions

Imitation

'Conversation'

Public school preschool programs

Preschoolers (Part B services 3-5)

Autism specific programs in large urban
school district

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Preschool Deployment of Evidence-Based Social Communication Intervention: JASPER in the Classroom

Ya-Chih Chang[1] · Stephanie Y. Shire[2] · Wendy Shih[2] · Carolyn Gelfand[3] · Connie Kasari[2]

Table 1 Participant demographics

Demographics	Waitlist		Immediate treatment		p value
	Mean	SD	Mean	SD	
Chronological age (month)	51.64	6.46	48.87	6.30	0.087
ADOS severity	6.82	1.36	7.06	1.26	0.379
MSEL age equivalent score (months)					
Mental age	36.61	12.34	34.53	10.73	0.478
Visual receptive	40.96	13.17	36.05	11.76	0.123
Fine motor	37.93	14.27	35.53	10.81	0.459
Receptive language	31.54	15.51	30.76	12.78	0.830
Expressive language	30.93	12.41	32.00	11.69	0.724

	Ratio	Percentage	Ratio	Percentage	p value
Male/female	25/3	89	30/8	79	0.331
Race/ethnicity					0.001
African American		25		5	
Caucasian		18		37	
Hispanic		39		10	
Asian		4 %		24	
Other		14		24	

- 12 classrooms
- ABA focus
- VB-MAPP
- Taught teachers JASPER strategies
- Integrated JASPER into play rotations

CrossMark

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Teacher Strategy Implementation
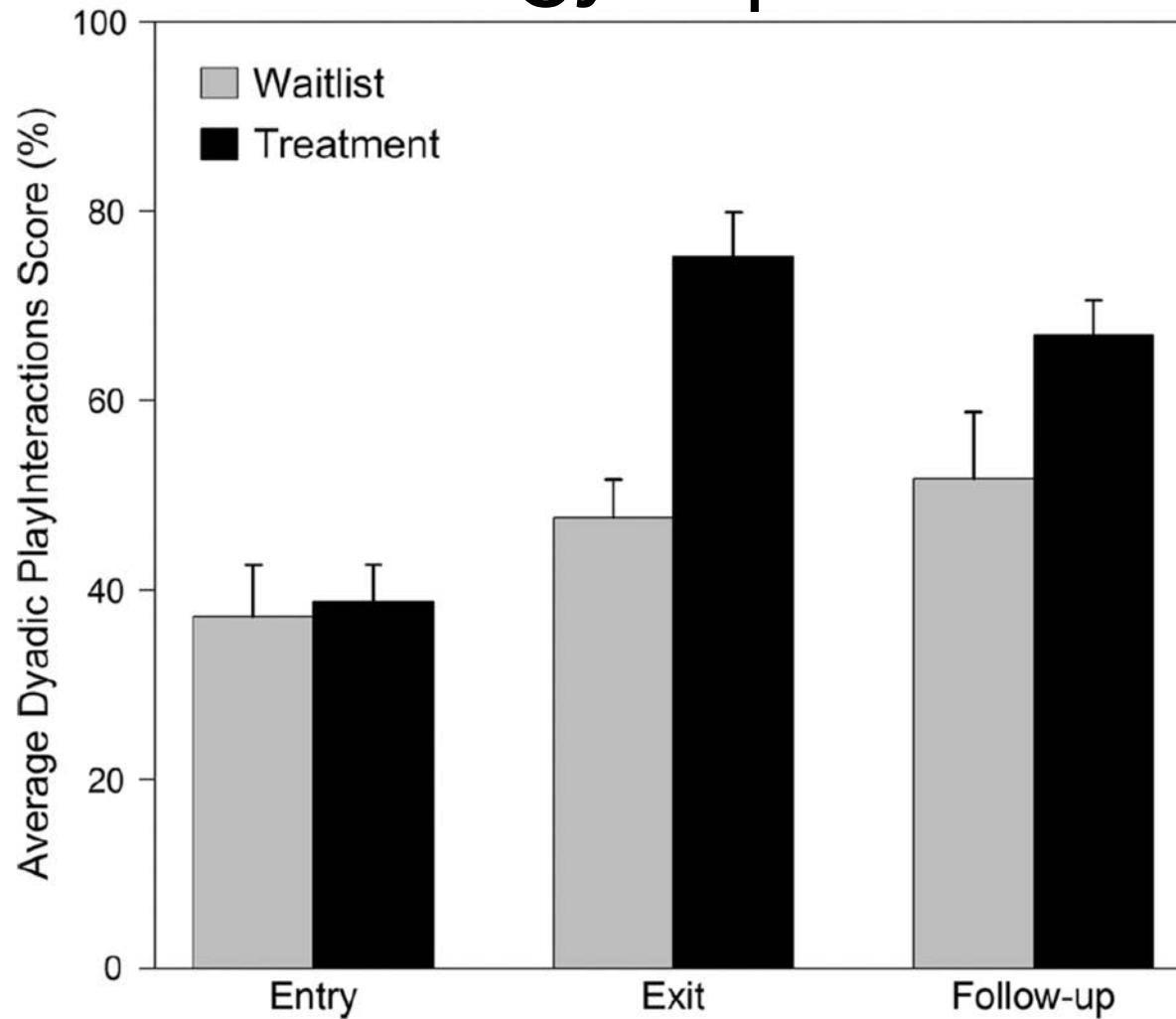
Fig. 3 Teacher's strategy implementation

Effects on Preschoolers

Child Initiated Joint Engagement

Initiating Joint Attention
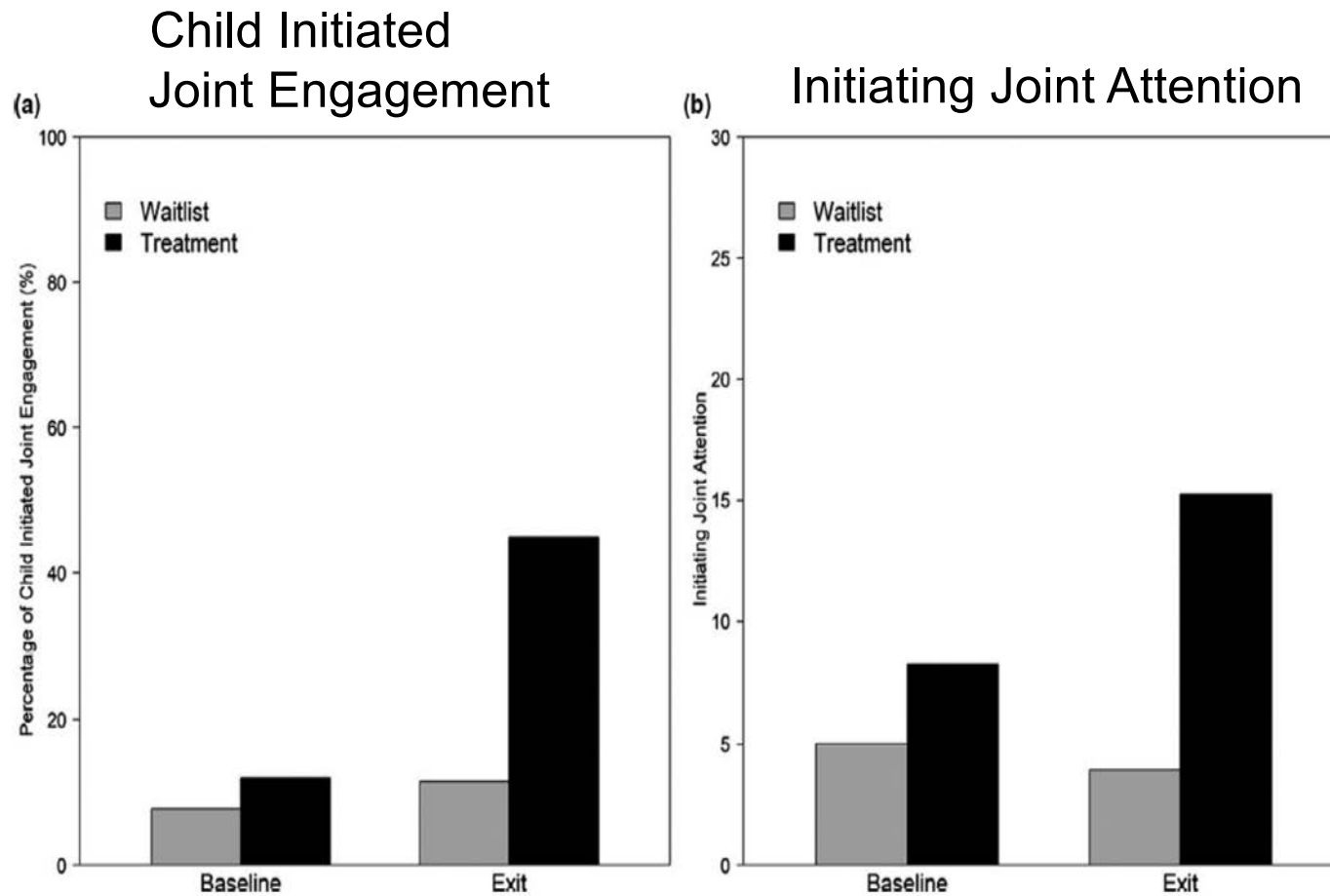
Figure 2 Children receiving JASPER intervention improved significantly more in (A) child-initiated JE and (B) IJA from baseline to exit compared to children in TAU waitlist

The schools change again…..

PALS classrooms

➢ Standard curriculum throughout district

➢ Designed for typical learners: Creative Curriculum

➢ Worked with teachers to embed autism specific goals into small group rotations—Jasper strategies

Results

Outcome Measures

	Control Class	JASPER Embedded Class	Treatment Effect
Small Group Rotation: mean (SD)			
Strategy Implementation			
Entry	0.60 (0.13)	0.66 (0.12)	$p < .001$
Exit	0.61 (0.13)	0.84 (0.13)	
Jointly on task			
Entry	0.62 (0.30)	0.66 (0.21)	$p = .94$
Exit	0.74 (0.16)	0.78 (0.16)	
Peer Engagement at Exit n (%)			
Entry	5 (26%)	5 (23%)	$p = .001$
Exit	7 (37%)	14 (64%)	

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Funded by Goldman Foundation; Study under review

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The schools change again…..

Student characteristics

Participant Demographics

Student Demographics	Control		Treatment		p value
	Mean	SD	Mean	SD	
Age (months)	51.3	6.50	47.8	8.52	0.12
ADOS Severity	6.29	1.76	6.71	0.86	0.38
MSEL Age Equivalence (months)					
Visual Reception	34.6	9.68	30.4	6.70	0.10
Fine Motor	35.1	8.93	32.6	7.54	0.32
Receptive Language	28.5	8.70	23.8	8.73	0.08
Expressive Language	28.3	11.10	24.60	9.50	0.23

	Ratio	Percentage	Ratio	Percentage	p value
Male/Female	27/2	93%	20/0	100%	0.23
Race/Ethnicity					0.14
Black		0%		8%	
White		6%		4%	
Latinx		67%		85%	
Asian		13%		0%	
Other		13%		4%	

Teacher characteristics

Teacher Demographics	Control		Treatment		p value
	Mean	SD	Mean	SD	
Age (months)	37	13.08	40.14	10.29	0.53

	Ratio	Percentage	Ratio	Percentage	p value
Female/Male	9/0	100%	10/0	100%	--
Race/Ethnicity					0.57
Black		0%		0%	
White		22%		20%	
Latinx		67%		70%	
Asian		0%		10%	
Other		11%		0%	
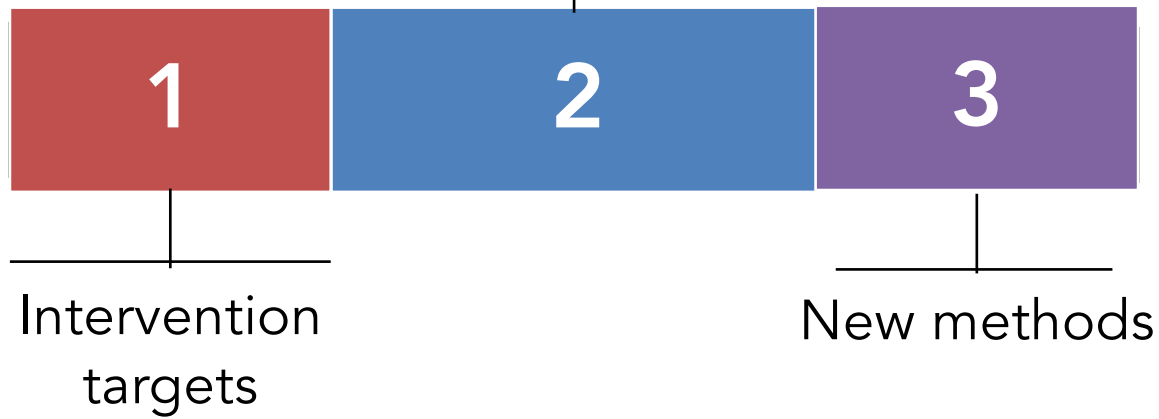
Well Documented in Intervention Science

Heterogeneity in response to interventions

Methodologies are needed to **personalize, tailor and target** interventions

Address for whom the intervention works, and why…..
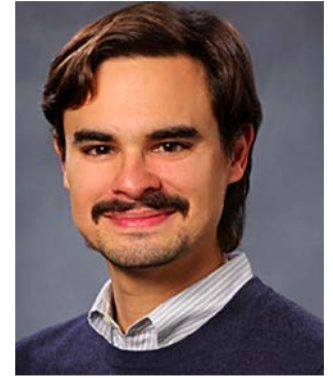
Sequence of treatments

Adaptations based on child response

Adaptive Intervention designs systematize clinical practice

DEFINITION: A sequence of decision rules that specify whether, how, when (timing) and based on which measures, to alter the dosage (duration, frequency or amount), type or delivery of treatment(s) at decision stages in the course of care.

Susan Murphy Danny Amirall

SMART design

Sequential Multiple Assignment Randomized Trial

Minimally verbal often excluded

NIH Workshop

Minimally Verbal School-Aged Children with Autism Spectrum Disorder: The Neglected End of the Spectrum

Helen Tager-Flusberg and Connie Kasari

It is currently estimated that about 30% of children with autism spectrum disorder remain minimally verbal, even after receiving years of interventions and a range of educational opportunities. Very little is known about the individuals at this end of the autism spectrum, in part because this is a highly variable population with no single set of defining characteristics or patterns of skills or deficits, and in part because it is extremely challenging to provide reliable or valid assessments of their developmental functioning. In this paper, we summarize current knowledge based on research including minimally verbal children. We review promising new novel methods for assessing the verbal and nonverbal abilities of minimally verbal school-aged children, including eye-tracking and brain-imaging methods that do not require overt responses. We then review what is known about interventions that may be effective in improving language and communication skills, including discussion of both nonaugmentative and augmentative methods. In the final section of the paper, we discuss the gaps in the literature and needs for future research. *Autism Res* 2013, **••**: ••–••. © 2013 International Society for Autism Research, Wiley Periodicals, Inc.

Keywords: behavioral intervention < intervention; early intervention < intervention; school age < pediatrics; spoken language; minimally verbal ASD; alternative and augmentative communication; eye-tracking

Research in the field of autism spectrum disorder (ASD) has flourished over the past two decades. However, the vast majority of studies have focused on either young toddlers and preschoolers or older higher functioning, verbal children primarily because they are easier to evaluate using standard assessment tools, and they are more compliant during behavioral or neuroimaging experimental investigations. Recently, the Interagency Autism Coordinating Committee (IACC) highlighted the dearth of knowledge about nonverbal children with ASD (IACC 2011 Strategic Plan: http://iacc.hhs.gov/strategic-plan/2011/index.shtml). As awareness about this issue grew in recent years, Autism Speaks held a series of meetings in 2009 on "Characterizing cognition in nonverbal individuals with autism," and the National Institutes of Health (NIH) convened a workshop that was held in April 2010 to identify what is currently known, what are the gaps in our knowledge and what are the research opportunities that could address these gaps. In this paper, which grew out of the NIH workshop, we summarize current research on minimally verbal school-aged children with ASD, focusing on three main questions: (a) Who are these children? (b) What novel technologies

cognitive skills? (c) Which interventions may be effective in improving their language and communicative skills?

Minimally Verbal Children with ASD

It is not known how many children with ASD remain with little expressive spoken language abilities by the time they reach school age. Older statistics suggest that over half of all children with autism failed to acquire spoken language [National Research Council, 2001]; however, more recent studies suggest that this figure is now lower, at around 30%, in part because of the broadening of diagnostic criteria, in part because more verbal children are now identified as having autism and in part because of earlier diagnoses as well as greater access to more effective early interventions that significantly improve spoken language and communication skills in younger preschoolers with ASD, thus potentially preventing them from remaining nonverbal at later ages [Tager-Flusberg, Paul, & Lord, 2005].

We do not understand why, despite access to interventions, some children fail to make progress in acquiring

Who are the 'minimally verbal'

- Clear most are not 'nonverbal'

- Defined by number of functional words spoken

- Some can speak but rarely do or only in some contexts

- Treatment is often to do MORE of the same.....

- (or less, blaming child for lack of progress)

Intervention for minimally verbal children
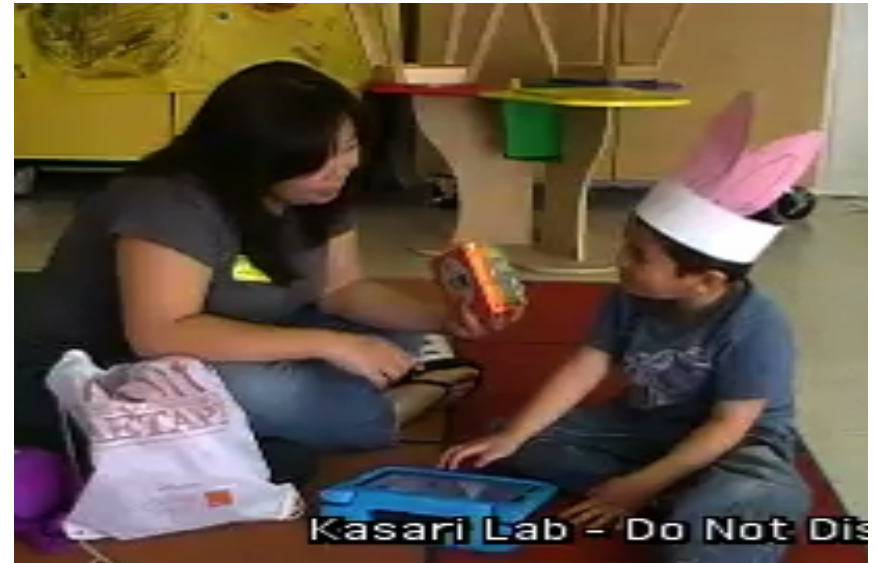
61 children aged 5 to 8 years

Minimally verbal (fewer than 20 functional words)

Had already received 2 years of intensive early intervention

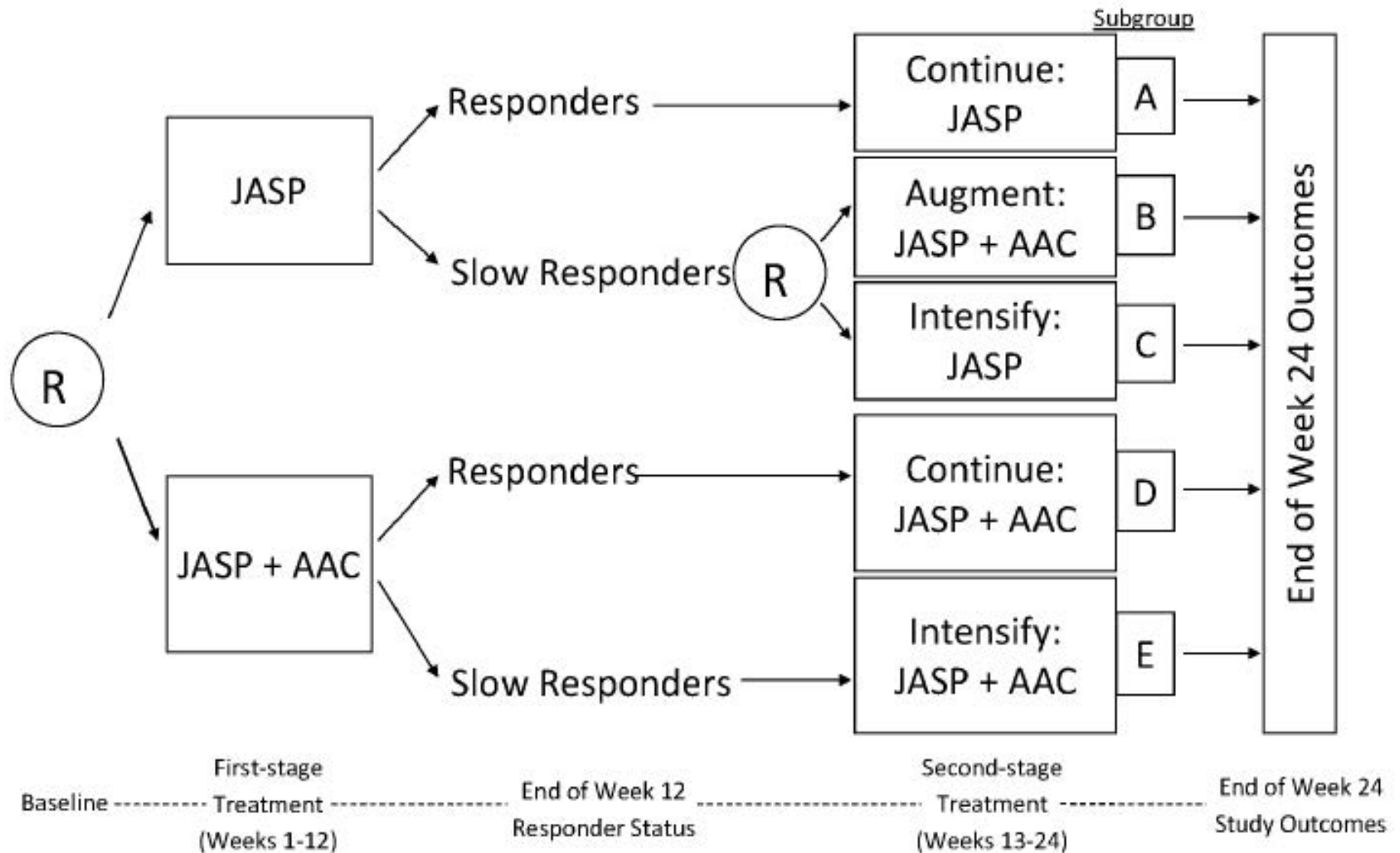ALL received JASPER plus a spoken language intervention (EMT)

HALF randomized to also receive Speech Generating Device (iPad)

Kasari, Kaiser, Landa, Neitfeld, Mathy, Murphy, Almirall, JAACAP, 2014

Example of a SMART in Autism Research
PI: Kasari (UCLA).

Subgroup

End of Week 24 Outcomes

R → JASP
- Responders → Continue: JASP → **A**
- Slow Responders → **R**
  - Augment: JASP + AAC → **B**
  - Intensify: JASP → **C**

R → JASP + AAC
- Responders → Continue: JASP + AAC → **D**
- Slow Responders → Intensify: JASP + AAC → **E**

Baseline ---------- First-stage Treatment (Weeks 1-12) -------------- End of Week 12 Responder Status ------------------- Second-stage Treatment (Weeks 13-24) --------------- End of Week 24 Study Outcomes

Minimally verbal and meaningful outcomes

Socially communicative utterances

Novel words

Comments

Kasari, Kaiser, Goods, Neitfeld, Mathy, Landa, Murphy, Almirall, JAACAP, 2014
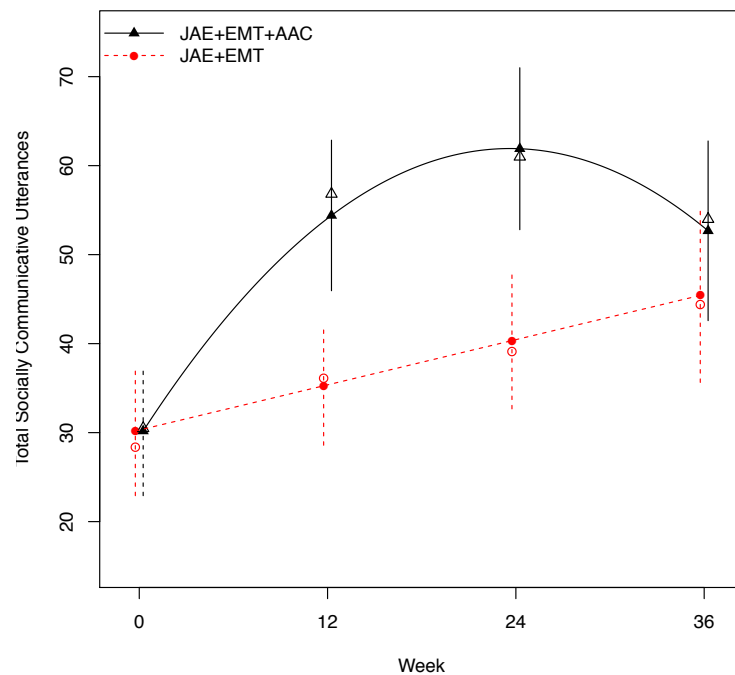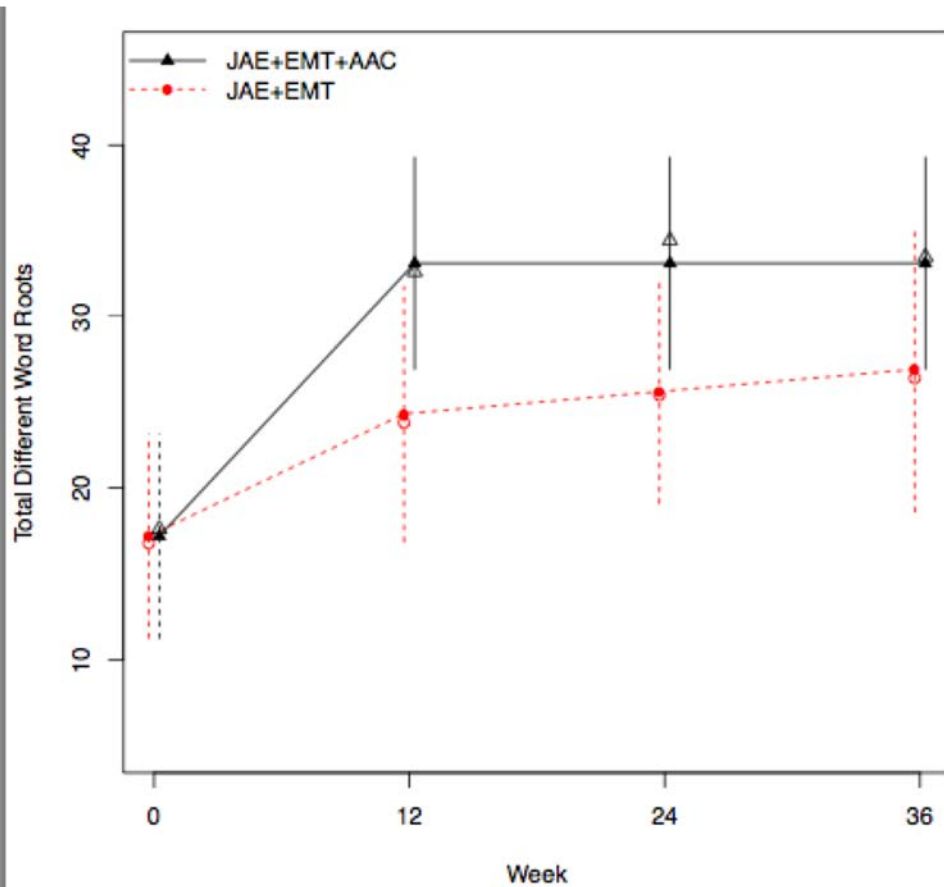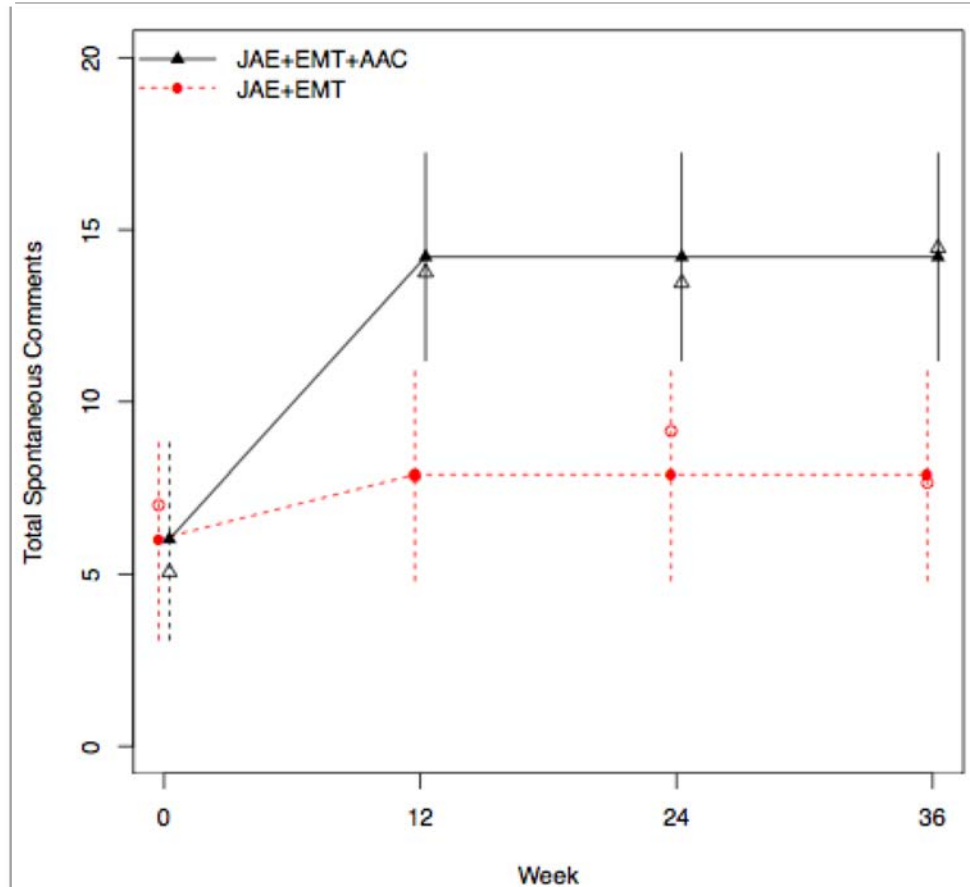
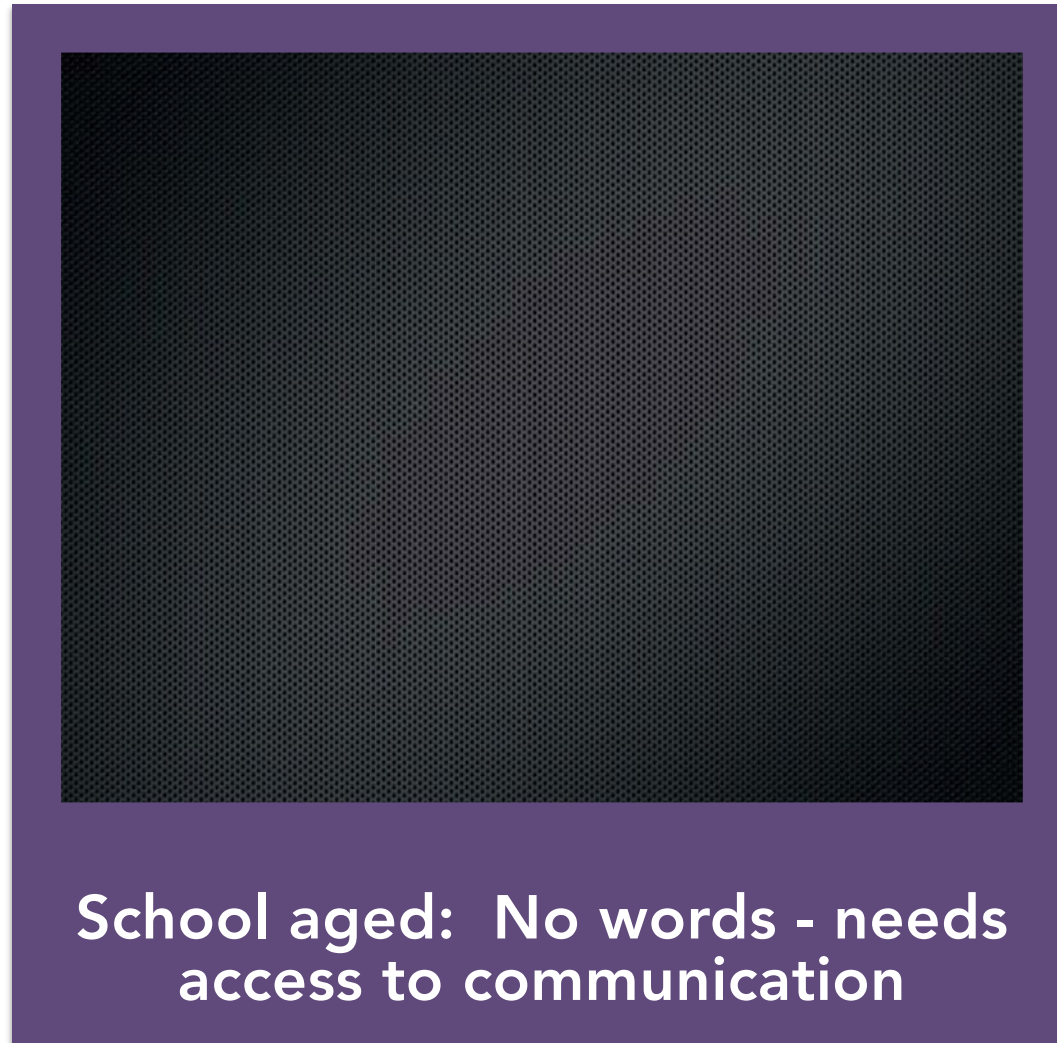# Example
Minimally verbal
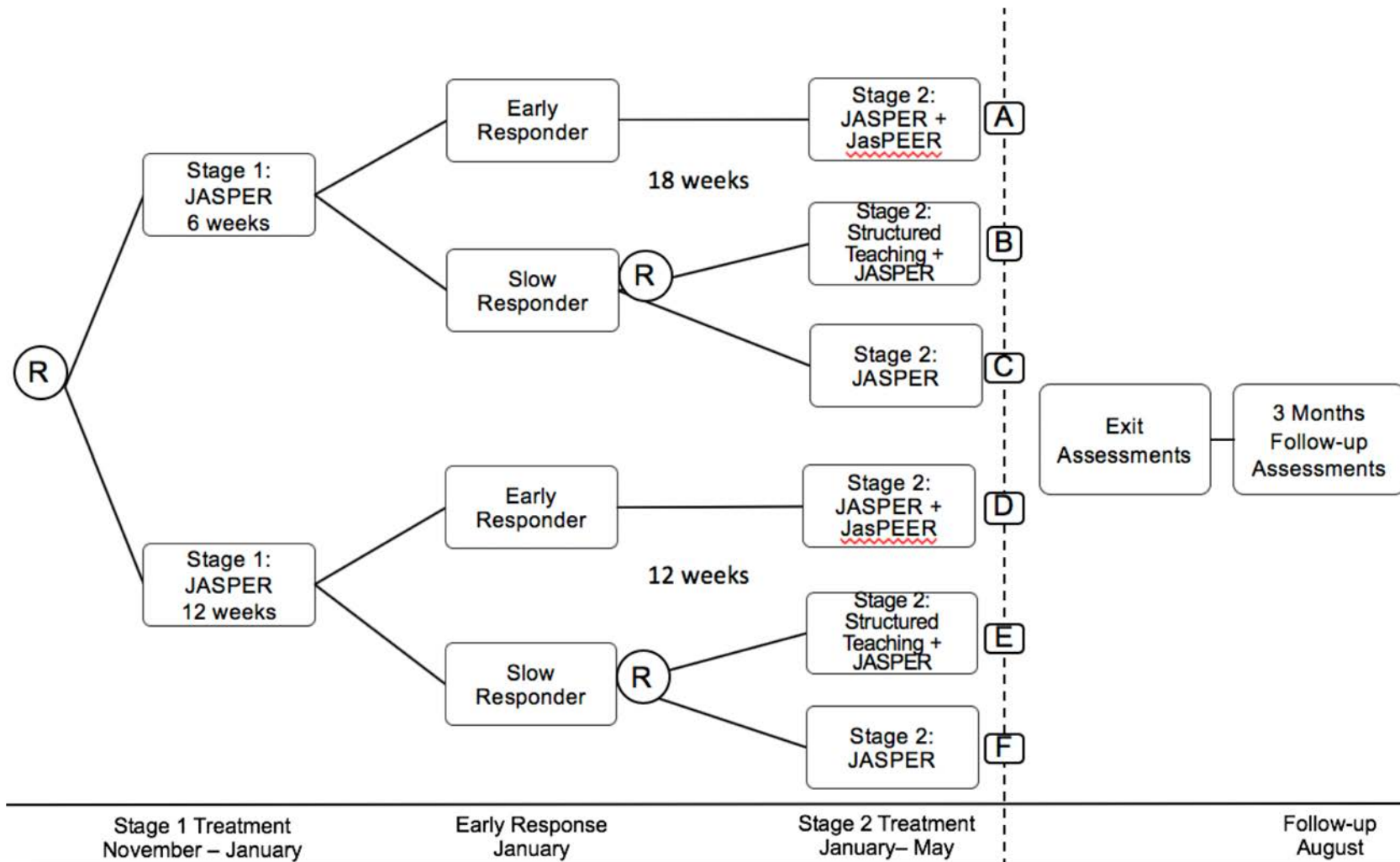

School aged: No words - needs access to communication

New studies that focus on personalization of interventions
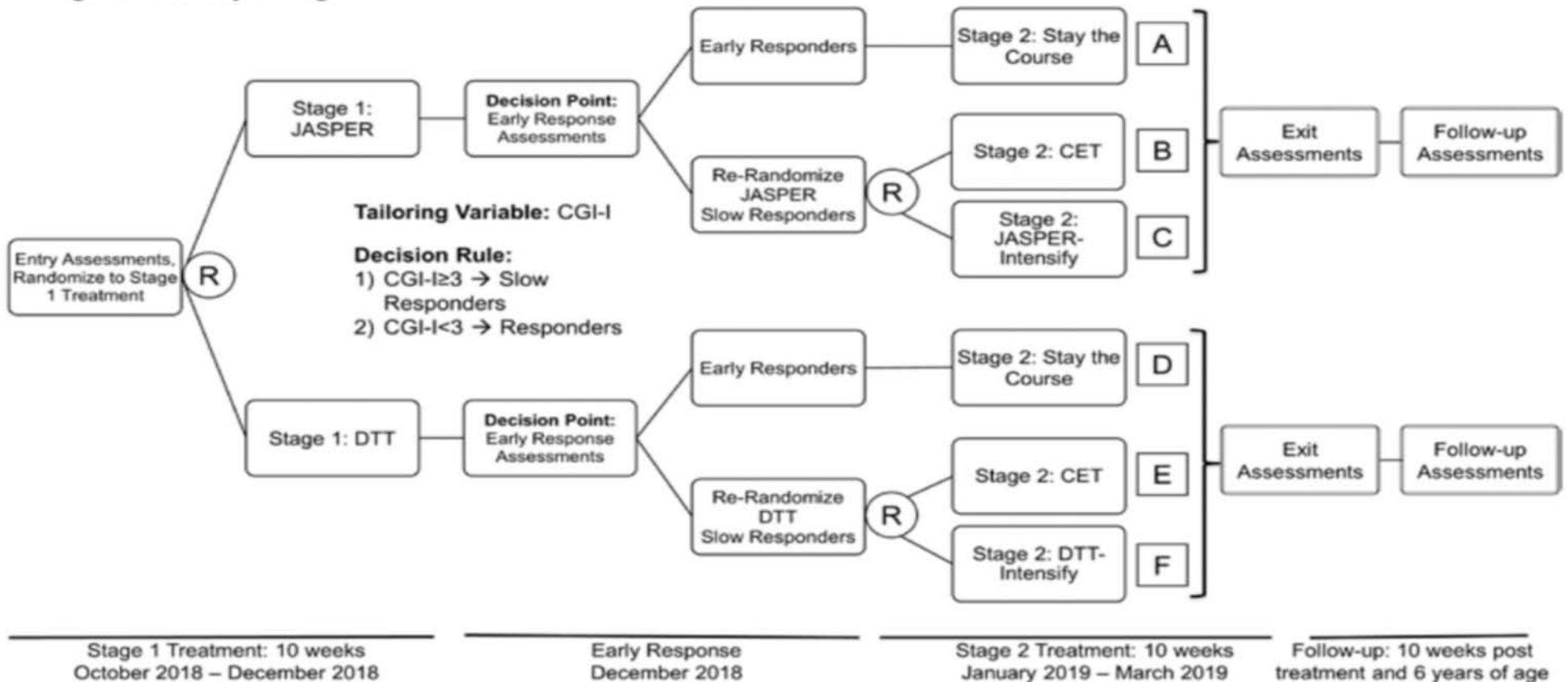
Toddler study

Here question is how long do we wait to evaluate response, and what to change to for responders and slow responders

Preschooler Study

Limited language 3.5 to 5 year old: How do we sequence interventions for best result in language outcomes

Figure 1. Study Design

What we have learned.....

- Children with autism can improve in social communication and language outcomes, even past preschool aged, and even when minimally verbal

- Access to communication critical

- Measuring change early and then changing course if response is slow (augmenting or changing an intervention) can lead to better outcomes

- Goal is to help all children improve their ability to "do well"

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