Early Interventions and Autism: What we have learned and the promise of the future!

ISEI
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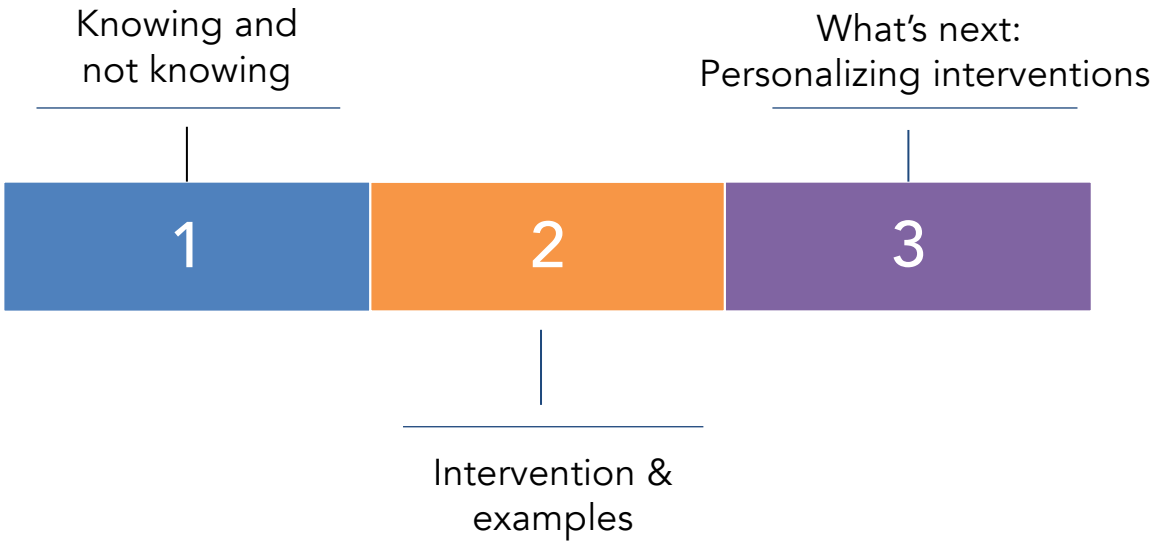
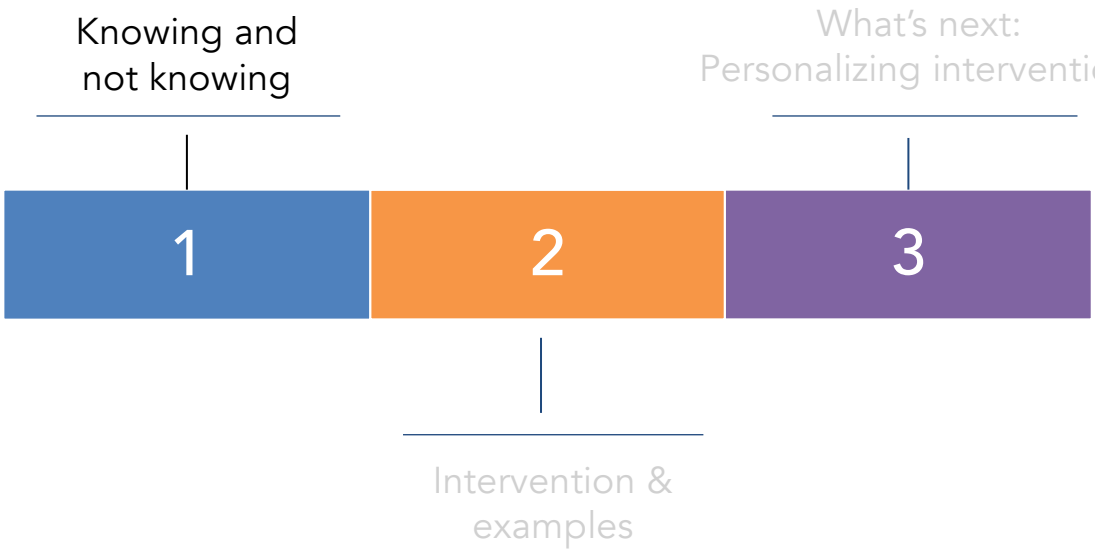
KASARI LAB

Disclosures

Grant funding for studies described:

NIH (NICHD, NIDCD), HRSA


Knowing and not knowing
What's next: Personalizing interventions
1
2
3
Intervention & examples


Knowing and not knowing
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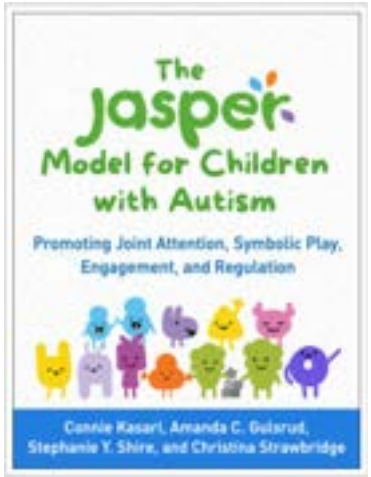
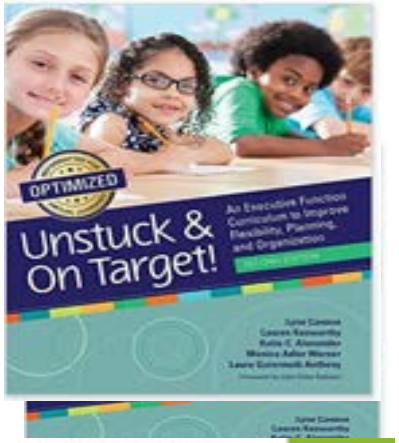
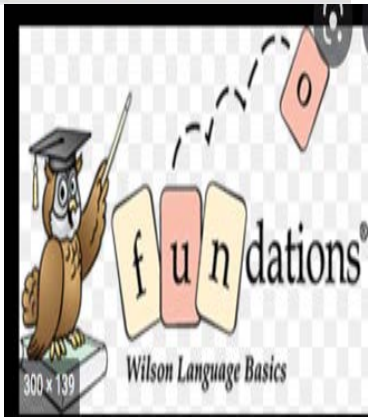
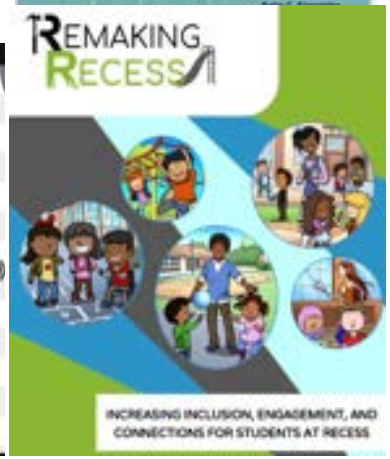
What we know…..We have made progress!









Early interventions likely responsible for improved language outcomes in autism….from 70% minimally verbal entering school in the 1980s to about 30% today (Tager-Flusberg & Kasari, 2013)

More rigorously tested interventions using **randomized controlled trials**

More individuals accessing inclusive education and community settings

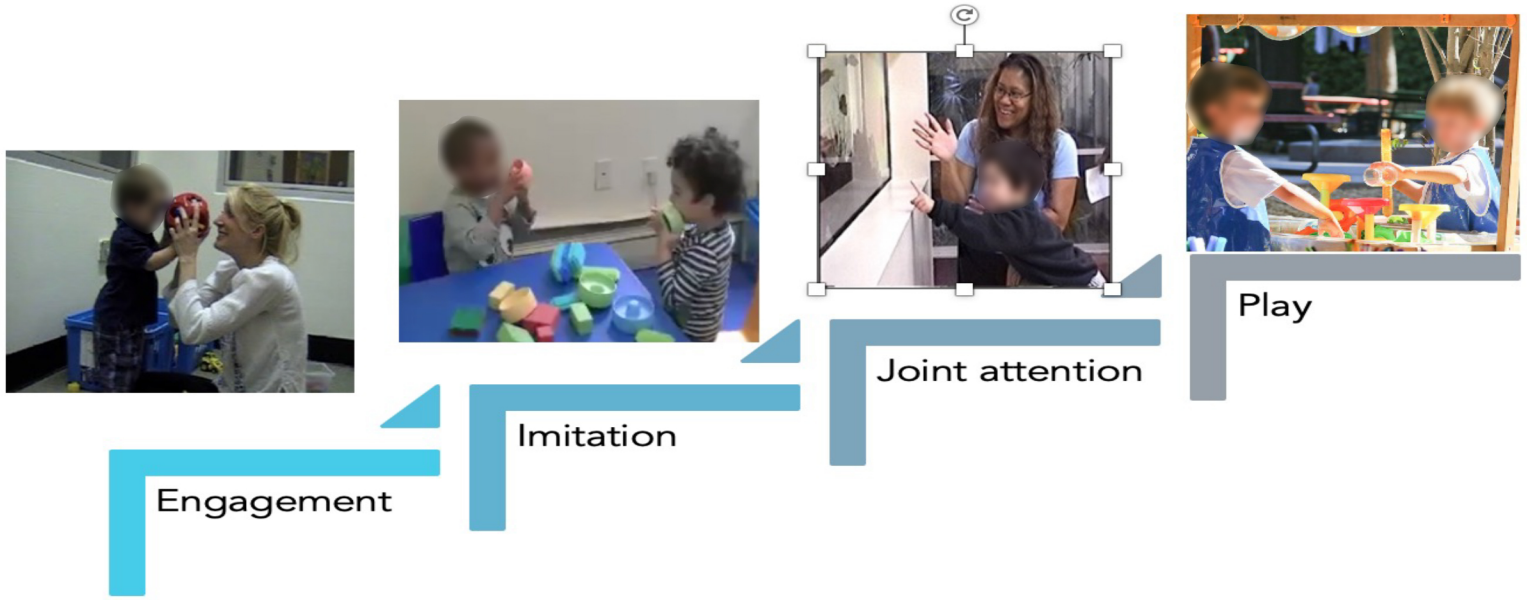
More individuals experiencing 'optimal outcomes' (Georgaides & Kasari, 2018, JAMA Pediatrics)

What we know we know….

1. Increased knowledge of malleable intervention targets

Recognition of the developmental nature of autism

While specific targets change with development and context, nearly all autistic children require intervention on:



Based on experimental studies

Targets identified through carefully conducted experimental studies in the 1980s

Autistic children compared to DD matched on MA, CA and typical children matched on MA (Mundy et al, 1986; Mundy, Sigman, Kasari, 1990)

Joint attention skills more delayed than requesting skills

Symbolic and social play more delayed than functional and independent play

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)

Play skills associated with cognitive abilities

(Kasari et al, 2012)

Engagement and regulation necessary for learning

(e.g. Shih et al, 2023; Smith, et al 2009)

*Speaking in phrases

Goal of Early Intervention

Reduce the number of children with autism who have significant language delays by the time they start school!

LANGUAGE IS THE SINGLE BEST PREDICTOR OF LONG-TERM OUTCOMES

We also recognize…..

A single intervention is not effective for all individuals

Heterogeneity in how individuals present

- Across a broad range of health, behavior, genetics, and background demographics

Heterogeneity in response to interventions

- Including in the moment changes to health and behavior

What we know we don't know

For whom an intervention works?

We cannot predict with certainty the best intervention for an individual child.

Why does the intervention provide benefit?

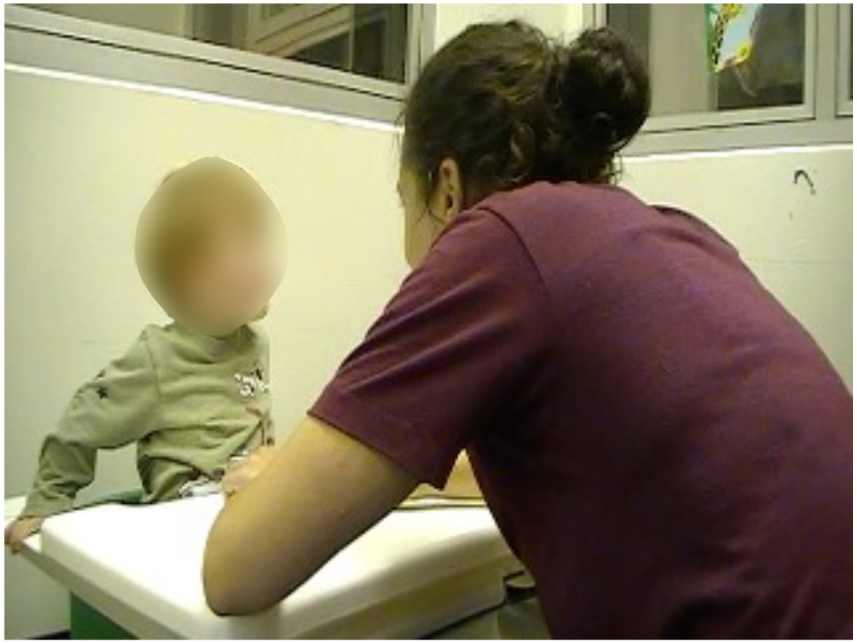
What are the active ingredients (the important components) that make the intervention work?

There are also challenges to the idea of intervention

What are the core challenges that might trigger intervention?

Typical 18 mo.-old

18 mo.-old with autism



Early Core Challenges: Interactions can be difficult

Play can feel frustrating or not enjoyable

Difficulty engaging the child in an activity

Interventions important for most children identified early

Questions are in how we intervene and what we intervene on?

Complication: Who and what gets studied?

Most interventions have never been tested

Most autistic children have never been in a research study

Our evidence base does not represent the entire spectrum of autism

Shifting the conversation

Neurodiversity movement

Autistic adults have had a lot to say about what, when and how we study autism.

Community partnered participatory methods…..help to refine research questions, and meaningful outcomes

Listening to families

Families may have differing views

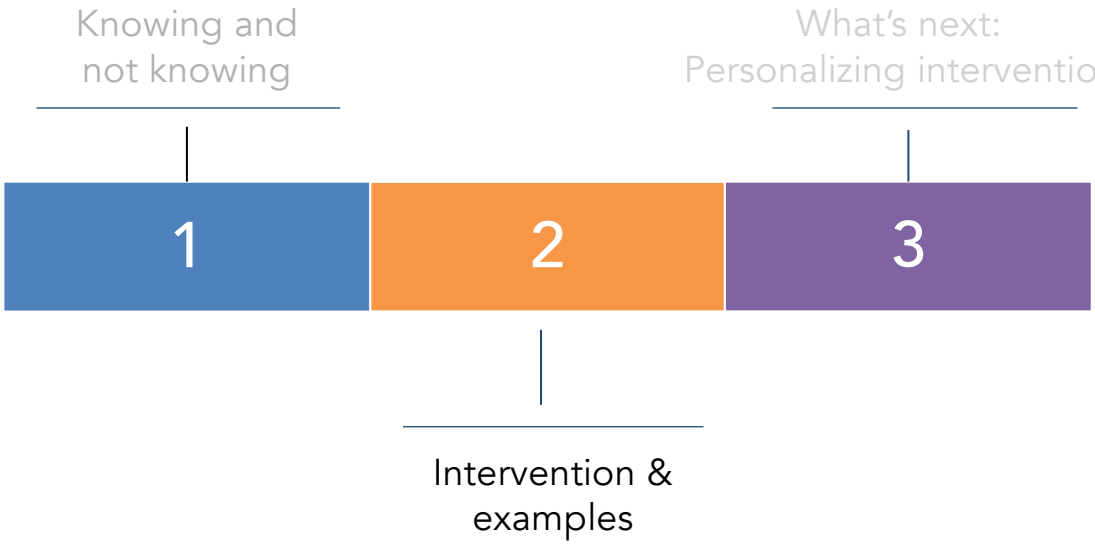
They have been particularly active in advocating for children who are intellectually disabled, and those at high likelihood for remaining minimally verbal at school age

Children less likely represented in research studies

We know the least about children who are most delayed….low DQ, limited language

These children often excluded from research studies---we know less about what interventions work best for them

As well as children who are low income. They may have transportation issues, or have less access to information about studies in their community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Modular interventions

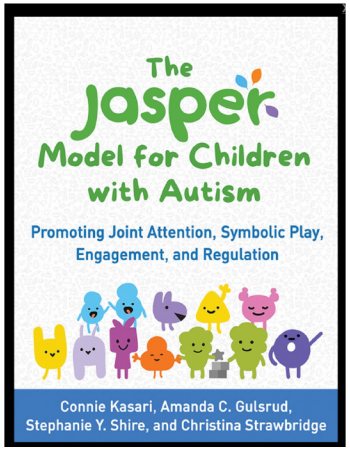
To address some of these early developmental and practical concerns:

modular interventions conducted in community (schools, home) may push the field further along

They can be added flexibly---not a one size fits all approach

Example intervention: JASPER

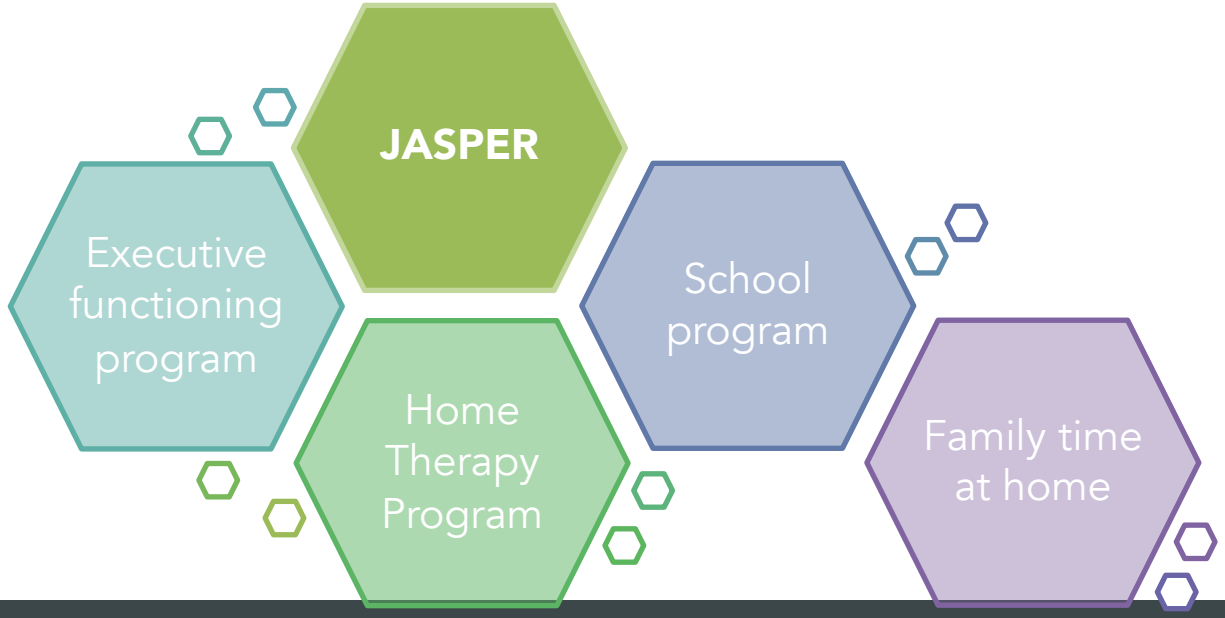
Improving language skills through gestures, play and engagement



Considered an NDBI---Naturalistic, developmental, behavioral intervention

Modular interventions can begin to address questions of for whom and why

JASPER is a module--a comprehensive social communication/language intervention that can float inside other interventions, used on its own, or used sequentially.



Methods Matter…..

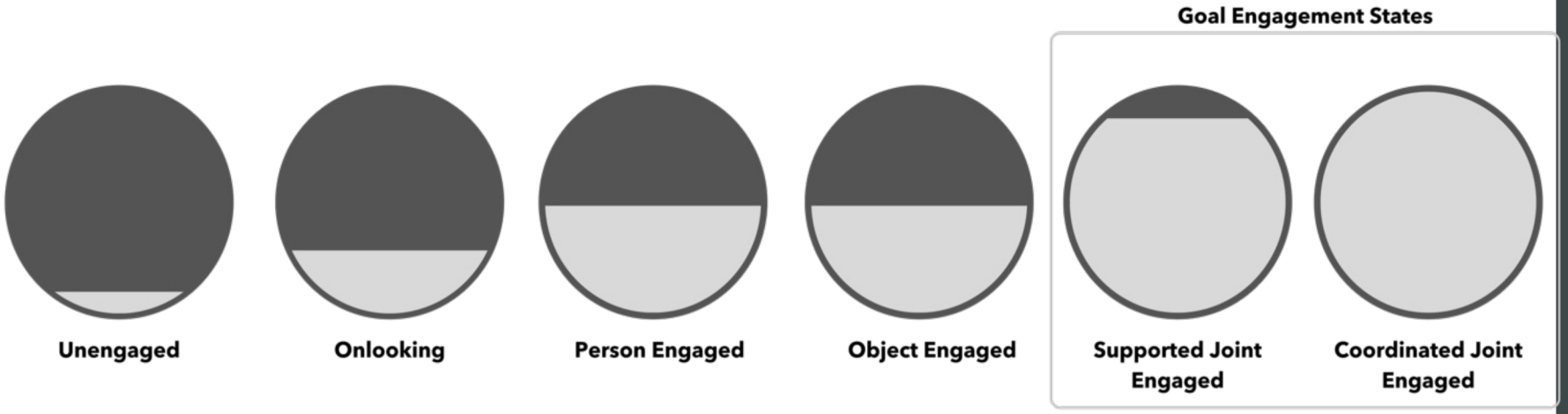
Issue: no standard of care for autism interventions

Solution: Important to use rigorous scientific methods to know what is effective and what is not---with whom and when!

We also need to pay attention to meaningful outcomes

Joint Engagement is a primary outcome for JASPER studies:

- Different from Joint Attention
- Foundation for language learning
  - Drawing on developmental language work of Lauren Adamson and Michael Tomasello



Important outcome of early intervention
improvement of Joint Engagement

Object engaged

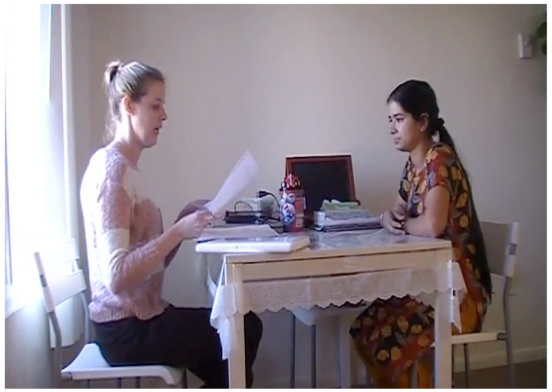
Jointly engaged

Early childhood interventions involve families

Family involvement can take many forms…..

- Involvement (coaching vs. education)
- Comparative efficacy
- Addressing heterogeneity
- CPPR methods
    - Mommy and me

Hands -on Coaching



Parent Education

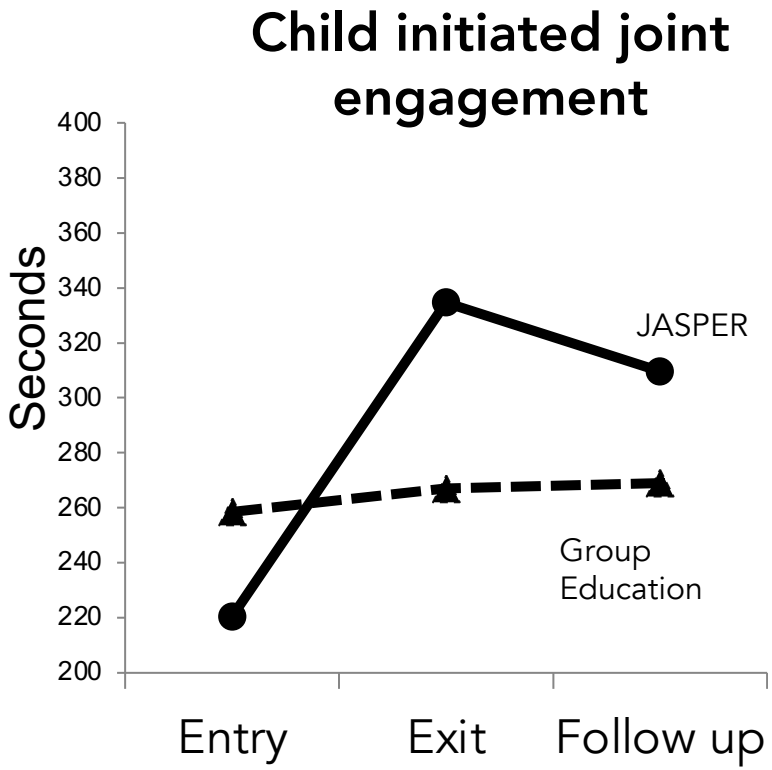
Parent mediated interventions

- Involvement (coaching vs. education)
- Comparative efficacy
- Addressing heterogeneity
- CPPR methods
    - Mommy and me

- 112 children (2-5- year- olds)
- >60% ethnic minority, low income families
- Comparison 2 parent interventions
- In home intervention or neighborhood group
- 24 sessions over 12 weeks
- 3 month follow up

JASPER group

- ↑ Joint engagement
- ↑ Symbolic play
- ↑ Initiating JA



RCT-Comparative Efficacy, Multi-site
N=112

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

Parent mediated interventions

Parent Involvement

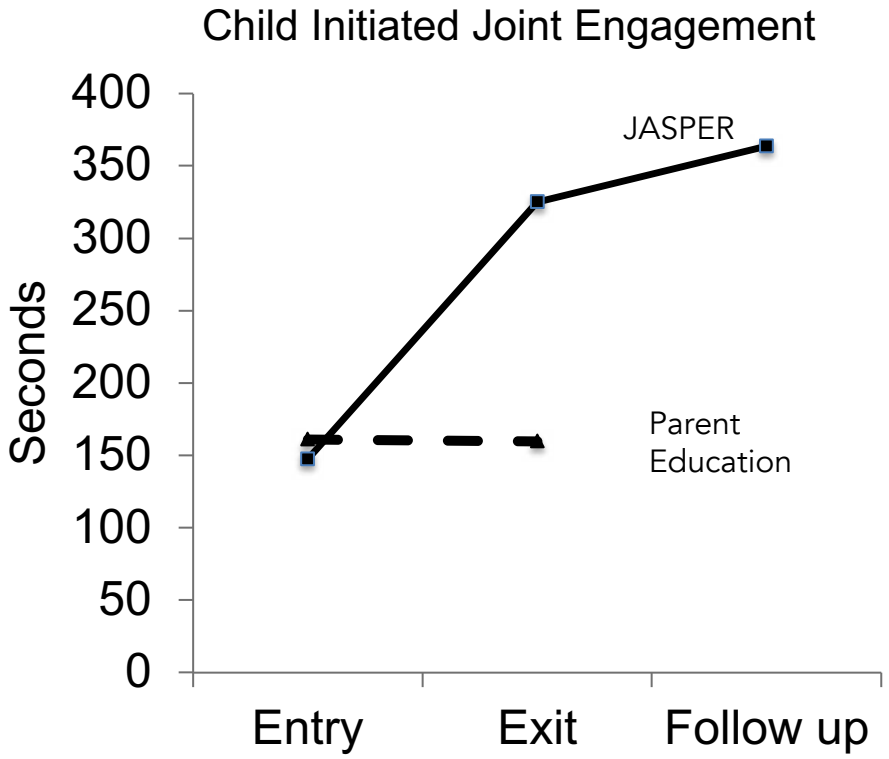
- Involvement (coaching vs. education)
- Comparative efficacy
- Addressing heterogeneity
- CPPR methods
    - Mommy and me

- 86 children (2-3 –year- olds)
- All enrolled in same early intervention program (30 hours ABA based)
- Comparison 2 parent interventions
- Blinded independent assessments
- 20 sessions over 10 weeks
- 6 month follow up

Journal of Consulting and Clinical Psychology

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



RCT—Comparative Efficacy
N=86

JASPER group

- ↑ Joint engagement (primary)
- ↑ Play diversity
- ↑ Play level

Generalization to classroom

Information Group comparison

- ↓ Parenting stress

(Kasari, Gulsrud, Paparella, Hellemann, Berry, JCCP, 2015)

Parent mediated interventions

- Involvement (coaching vs. education)
- Comparative efficacy
- Addressing heterogeneity
- CPPR methods
    - Mommy and me

The Spectrum

- There is great heterogeneity among children, **as well as their parents**
- Models need to be flexible and attentive to where parents begin….

Where you begin matters…..fit between parent and model

Parent strategies overall by group

Table 2: Caregiver strategies by treatment group

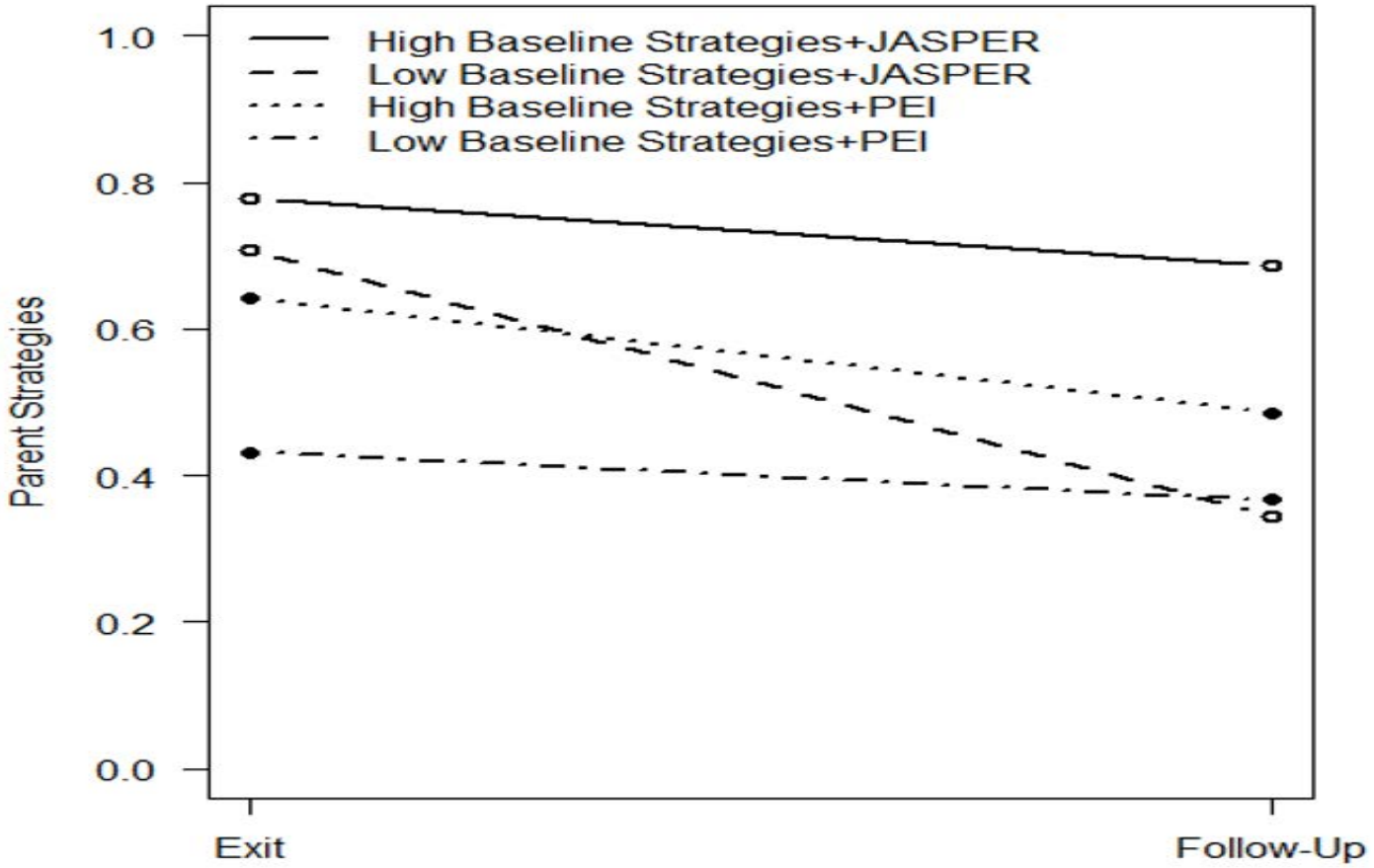
	Parent Ed	JASPER
Overall Caregiver Strategies		
Baseline	48.6% (10.8%)	49.5% (11.1%)
Exit	53.1% (13.5%)	74.2% (16.4%)
Follow-up	42.2% (8.4%)	51.2% (15.7%)

Unpacking the data

High and low parent strategies before intervention predict sustainment

Shih et al, 2023, JCPP Advances

Where you begin matters…..fit between parent and model



Shih et al, 2023, JCPP Advances

Parent mediated interventions

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Contents lists available at ScienceDirect

Infant Behavior and Development

journal homepage: www.elsevier.com/locate/inbede

ELSEVIER

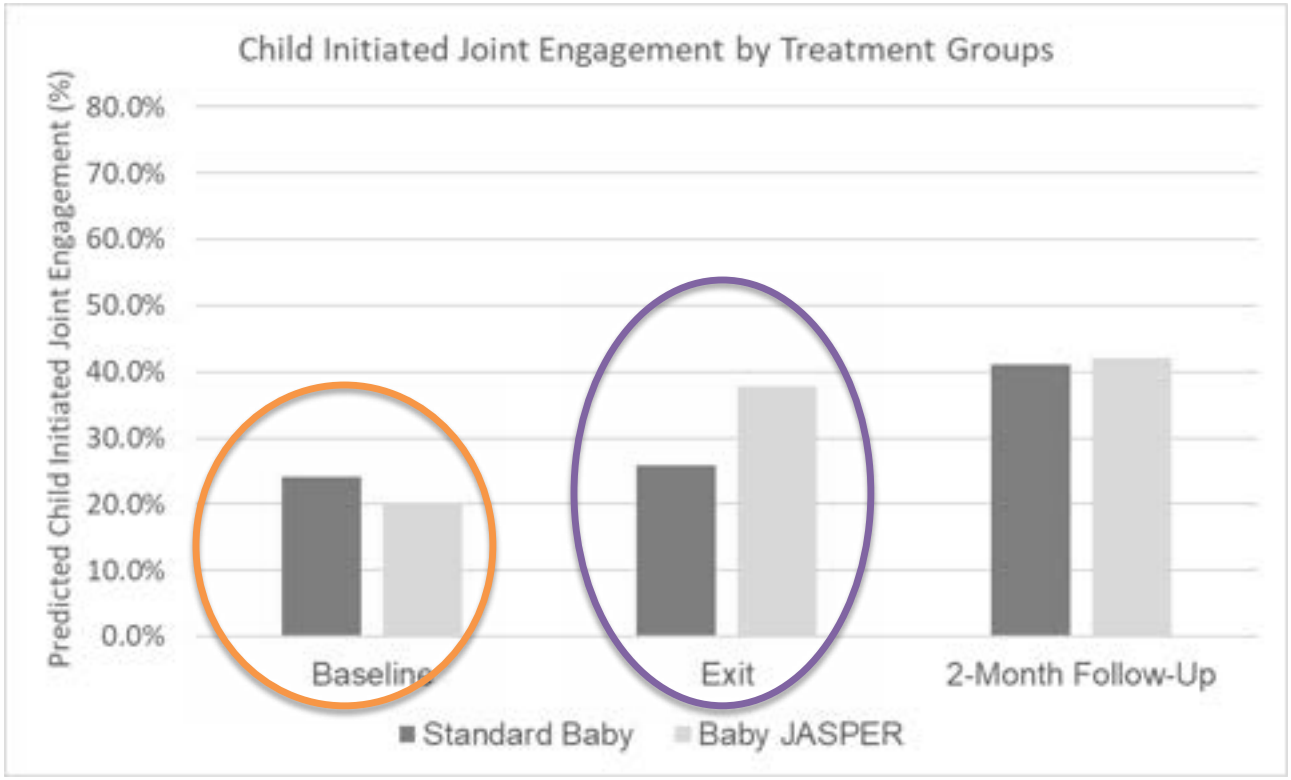
Comparative efficacy of an early intervention "parent and me" program for infants showing signs of autism: The Baby JASPER model

Amanda C. Gulsrud*, Wendy Shih, Tanya Paparella, Connie Kasari

University of California, Los Angeles Semel Institute for Neuroscience and Human Behavior, 760 Westwood Plaza, Los Angeles, CA 90024, USA

- Listening to families
- 'Normalizing' intervention
- 2 classrooms—same curriculum with JASPER enhancement in one
- Parent education for both

Baby JASPER vs. Standard Baby



Implementation in schools

Schools require specific adaptations

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

Implementation in schools: Requires specific adaptations

- Schools important because ALL children go to school

- More complex children, more diversity

Teacher-mediated---Fitting into school routines

1:1 model
Social communication with adult

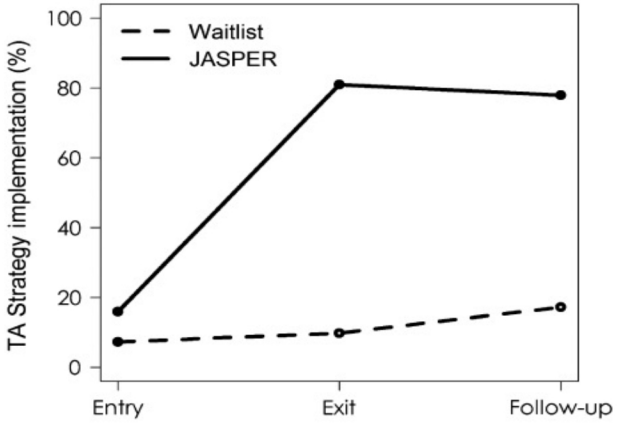
Small group peer model
Social communication with peers

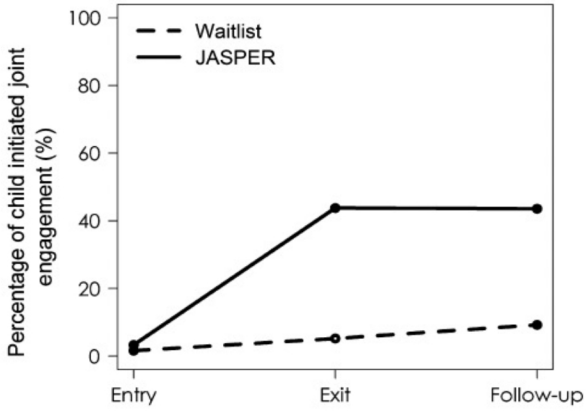
THE JOURNAL OF CHILD PSYCHOLOGY AND PSYCHIATRY
ACAMH THE ASSOCIATION FOR CHILD AND ADOLESCENT MENTAL HEALTH
Journal of Child Psychology and Psychiatry 58:5 (2017), pp 612–622
doi:10.1111/jcpp.12672

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

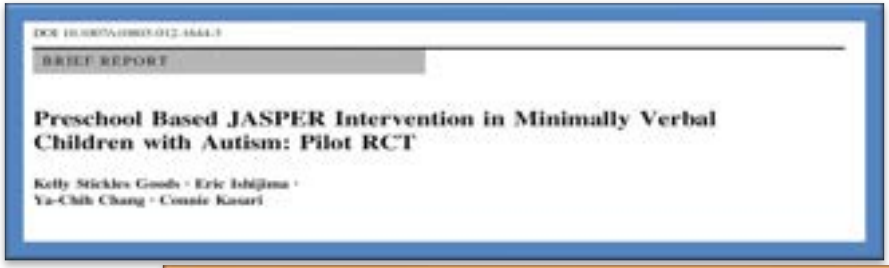
N=113 toddlers,
45 teaching assistants,
14 group leaders





Shire, S. Y., Chang, Y. C., Shih, W., Bracaglia, S., Kodjoe, M., & Kasari, C. (2017). *Journal of Child Psychology and Psychiatry*, *58*(5), 612-622.

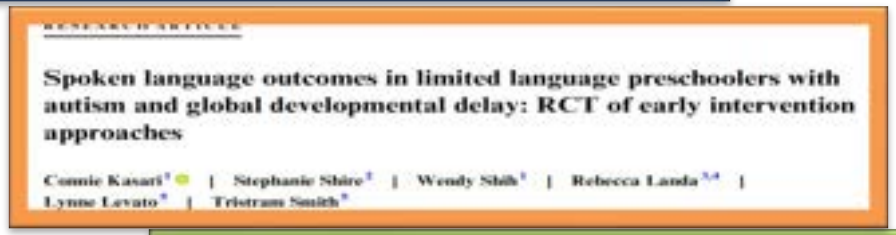
Focus on non-speaking, minimally verbal autistic children


BRIEF REPORT

Preschool Based JASPER Intervention in Minimally Verbal Children with Autism: Pilot RCT

Kelly Stickles Goods · Eric Ishijima · Ya-Chih Chang · Connie Kasari

N=15


Spoken language outcomes in limited language preschoolers with autism and global developmental delay: RCT of early intervention approaches

Connie Kasari | Stephanie Shire | Wendy Shih | Rebecca Landa | Lynne Levato | Tristram Smith

N=164


Communication Interventions for Minimally Verbal Children With Autism: A Sequential Multiple Assignment Randomized Trial

Connie Kasari, PhD, Ann Kaiser, PhD, Kelly Goods, PhD, Jennifer Nietfeld, MA, Pamela Mathy, PhD, Rebecca Landa, PhD, Susan Murphy, PhD, Daniel Almirall, PhD

N=61


NEW RESEARCH

Adaptive Intervention for School-Age, Minimally Verbal Children With Autism Spectrum Disorder in the Community: Primary Aim Results

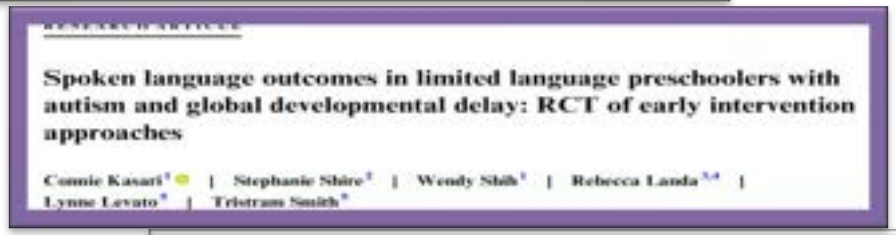
Connie Kasari, PhD, Stephanie Shire, PhD, Wendy Shih, DrPH, Ann Kaiser, PhD, Catherine Lord, PhD, Lynne Levato, PhD, Tristram Smith, PhD, Daniel Almirall, PhD

N=194

Focus on non-speaking, minimally verbal autistic children in school


Preschool Based JASPER Intervention in Minimally Verbal Children with Autism: Pilot RCT

N=15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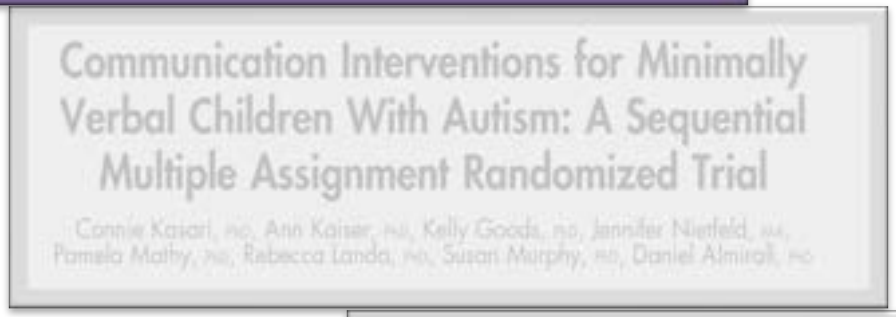
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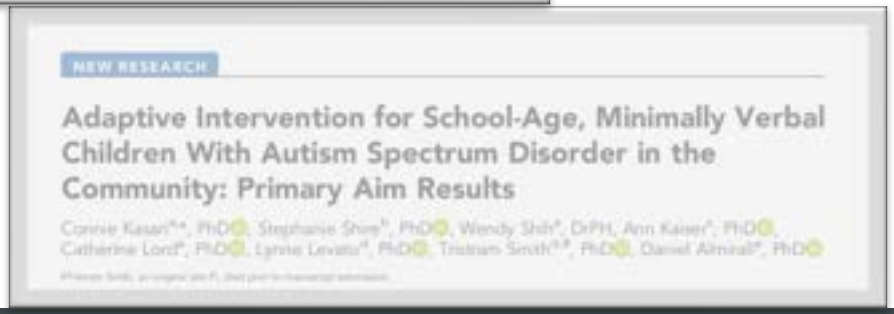
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Adaptive Intervention for School-Age, Minimally Verbal Children With Autism Spectrum Disorder in the Community: Primary Aim Results

N=194

DOI: 10.1002/aur.2932

RESEARCH ARTICLE

Spoken language outcomes in limited language preschoolers with autism and global developmental delay: RCT of early intervention approaches

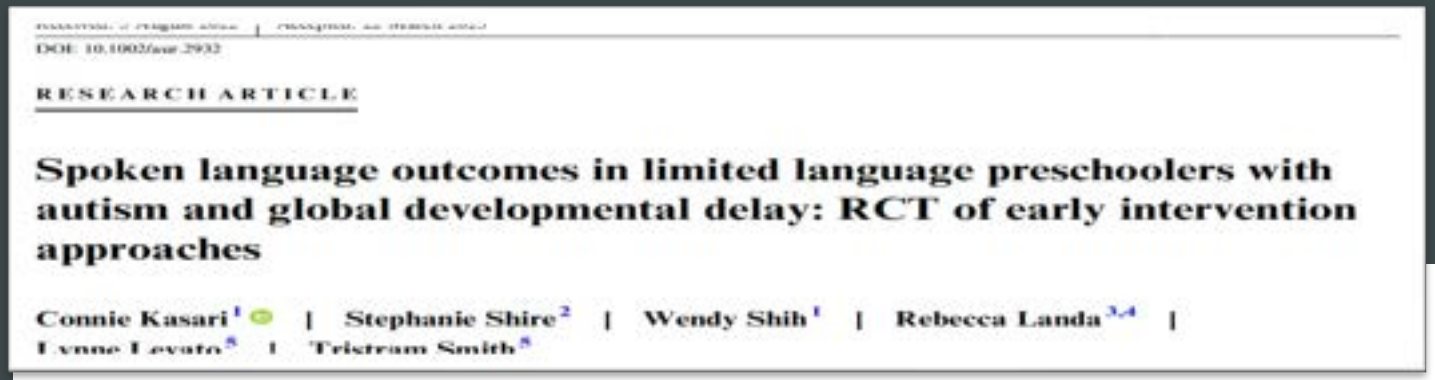
Connie Kasari[1] | Stephanie Shire[2] | Wendy Shih[1] | Rebecca Landa[3,4] | Lynne Levato[5] | Tristram Smith[5]

Tris Smith

Becky Landa

Traditional ABA (DTT) versus JASPER

- 164 autistic 3-4- year- old children
- DQ average 45 (Mullen)
- Majority minority children (60%)
- Interventions delivered in school settings by research staff
- <30 single words at baseline
  - Average 17 words



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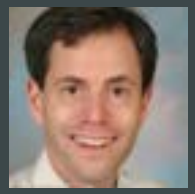

Tris Smith

Becky Landa

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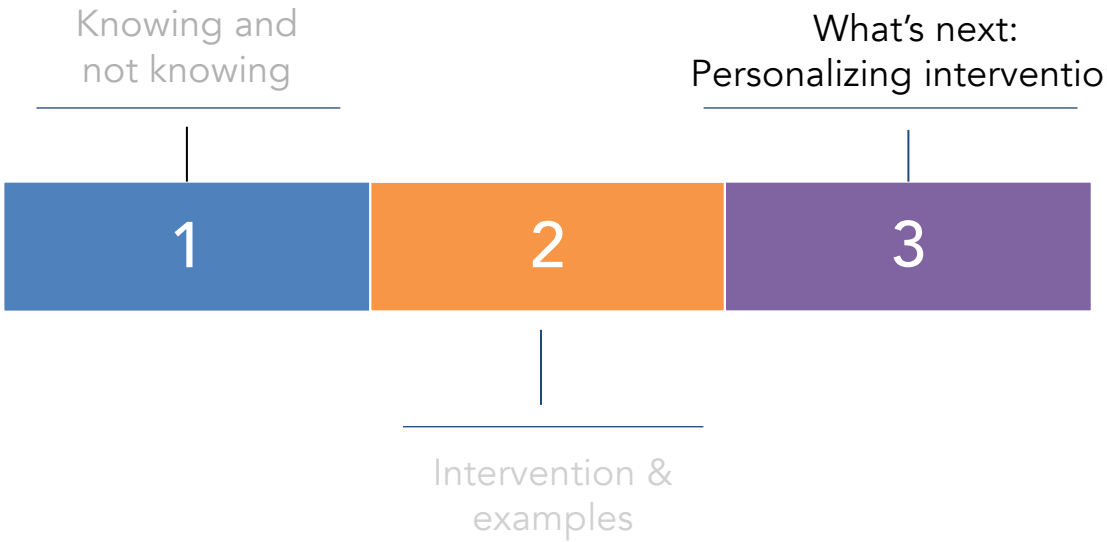
Both groups make significant language gains

- Over 6 months of intervention, children made on average 6 months gain on standardized language tests
- 45% of sample moved to word combinations or phrase speech at exit
- A goal was to avoid label of MV at school aged or later Profound Autism

What we learn from these efforts

- We can implement interventions with rigor in community
- Increasingly samples are majority ethnic/racial minority children, mostly low income thus improving the overall evidence base of early interventions
- Outcomes vary using JASPER
  - With development
  - Sample characteristics (limited language, age)
- Implementation and sustainment vary
  - With context (home, school, community)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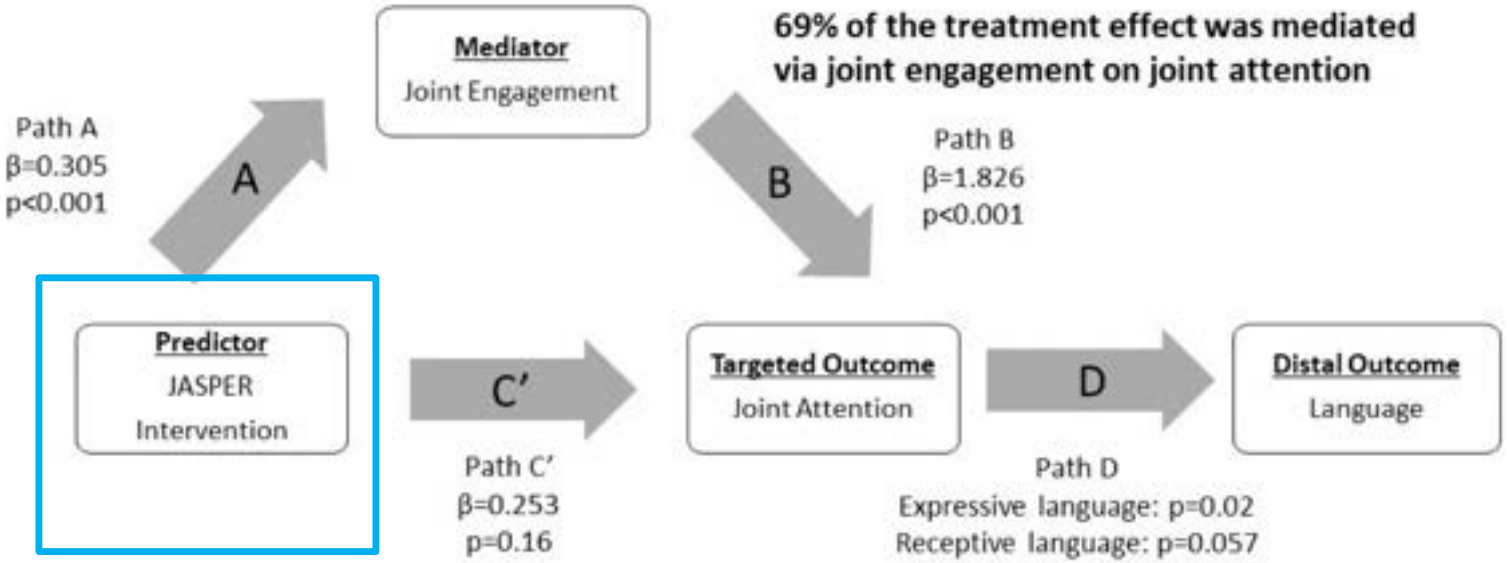
Personalizing interventions is improved when we have understanding **for whom an intervention might work, and why**

We have some understanding of mechanism for JASPER


Wendy Shih

179 autistic children
2-5 years old

Figure 3: Joint engagement as a mechanism in social communication interventions



Shih et al, 2021, *JCPP*

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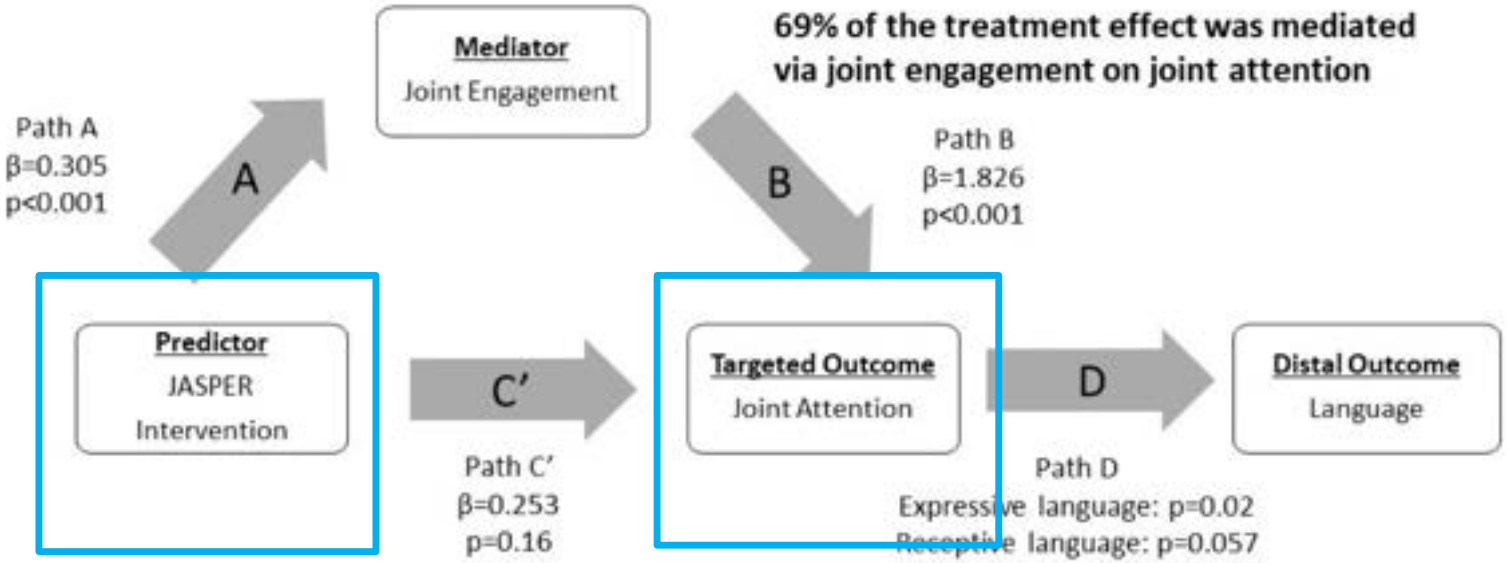
Figure 3: Joint engagement as a mechanism in social communication interventions



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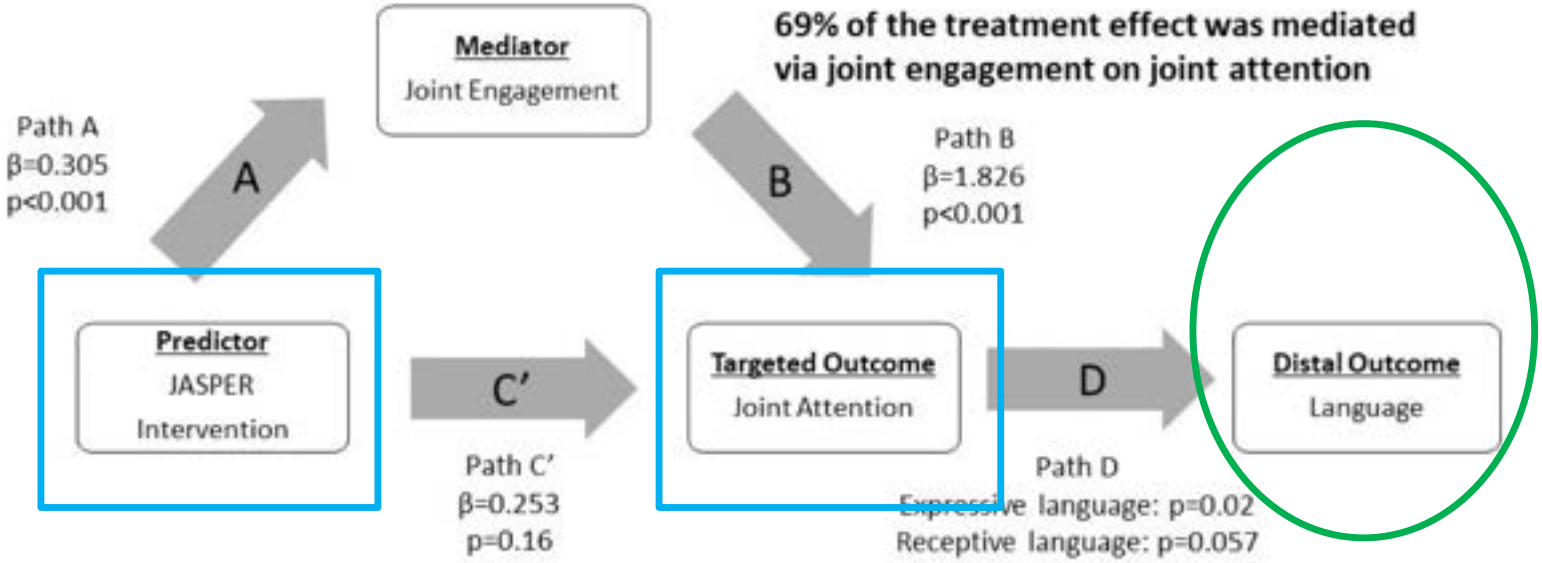

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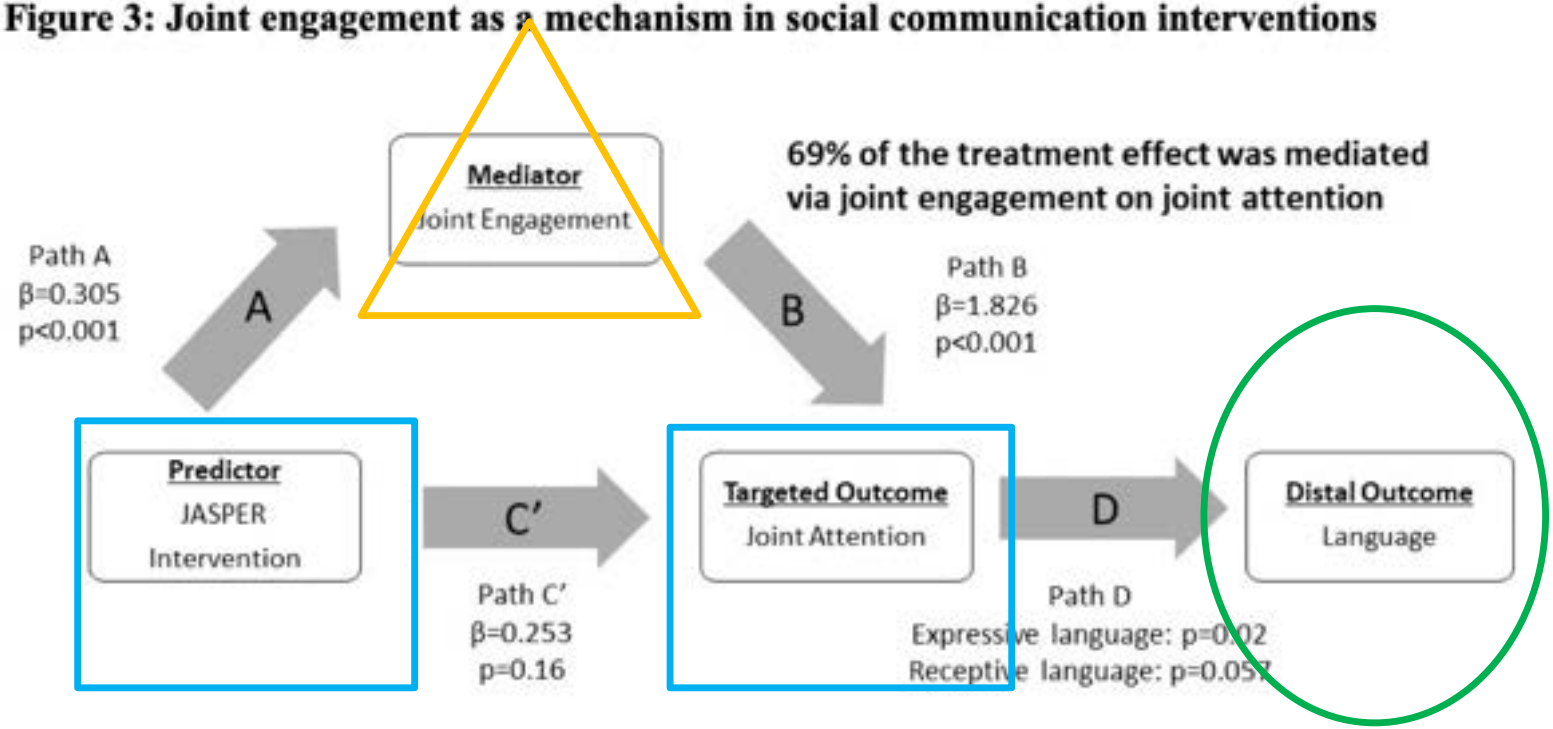


Shih et al, 2021, *JCPP*

For whom does an intervention work?

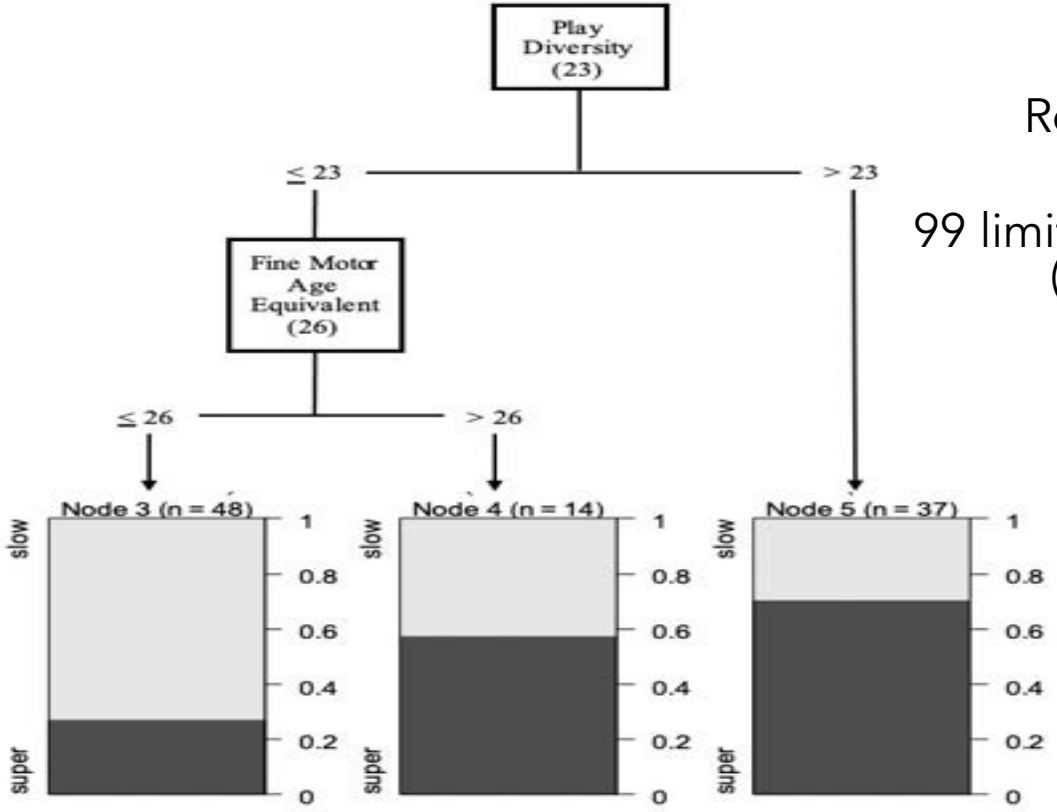


Figure 2. *Conditional Inference Tree of Play Diversity and Fine Motor Predicting Super vs. Slow Responders*, confidence level of .90. The final model identifies two predictive variables; play diversity and fine motor ability.

Response to JASPER---

99 limited language preschoolers (3 -and 4- year- olds)

■super
□slow

Panganiban & Kasari 2022, *Autism Research*

Heterogeneity in response to interventions

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

Address for whom the intervention works, and why…..

Personalization of interventions

Sequence of interventions with adaptations based on individual 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.

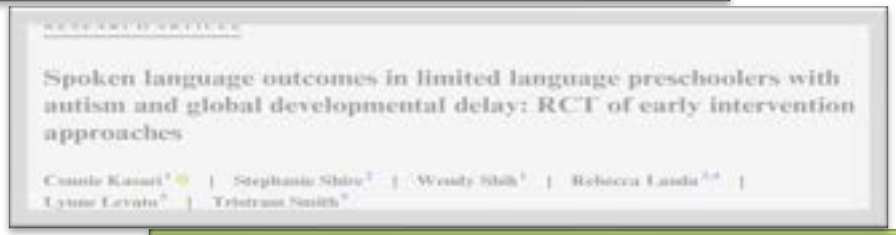
Susan Murphy

Danny Amirall

Sequential Multiple Assignment Randomized Trial

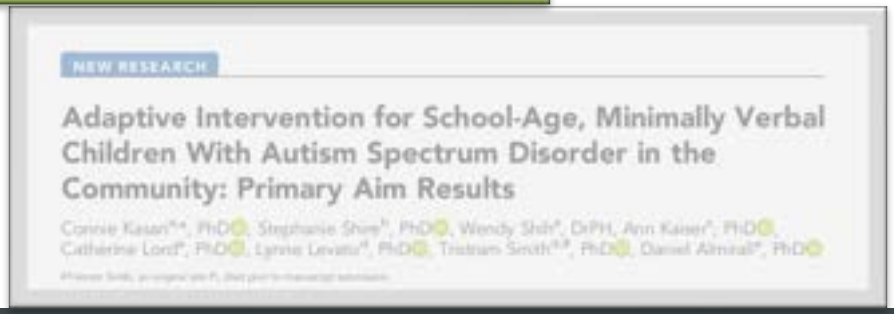
Focus on non-speaking, minimally verbal autistic children

N=15



N=164

N=61



N=194

Intervention for minimally verbal children
Primary Question: Would AAC support spoken language?

61 children aged 5 to 8 years

Minimally verbal (fewer than 20 functional words)

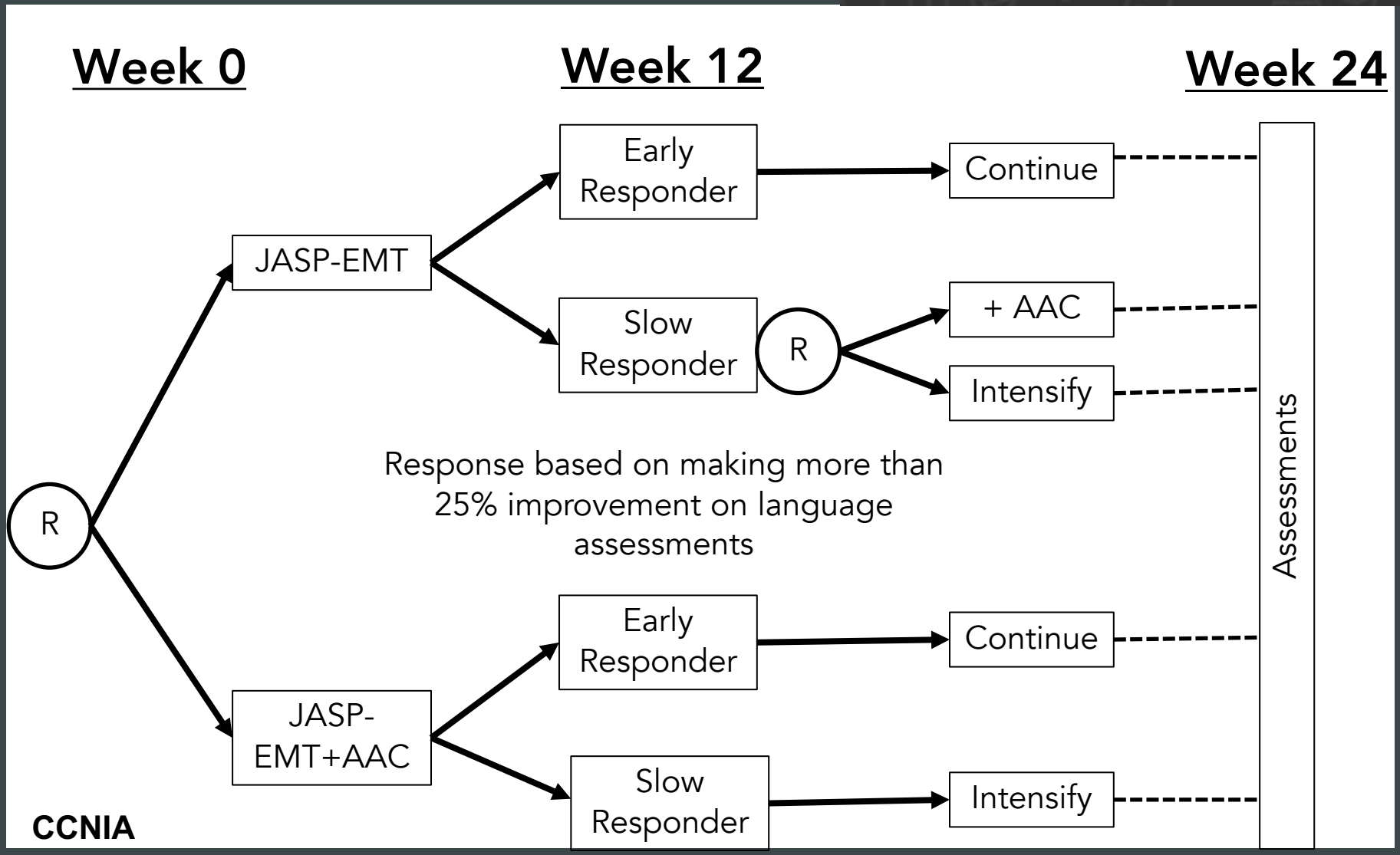
Had already received 2 years of intensive early intervention

ALL received JASPER plus a spoken language intervention (EMT)

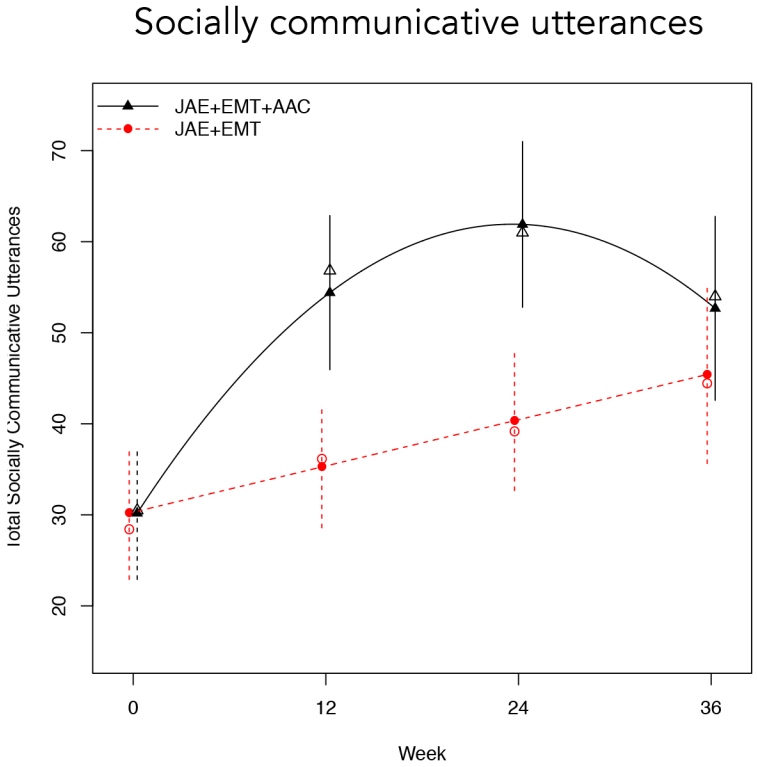
HALF randomized to also receive Speech Generating Device (iPad)

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

Ann Kaiser Becky Landa



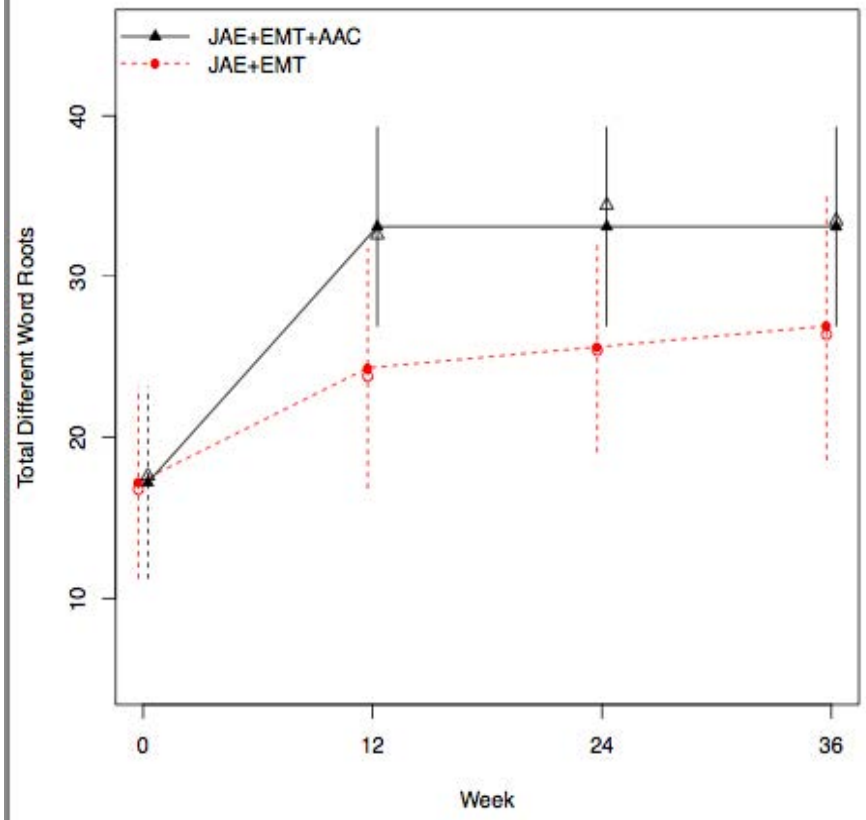
Minimally verbal and meaningful outcomes

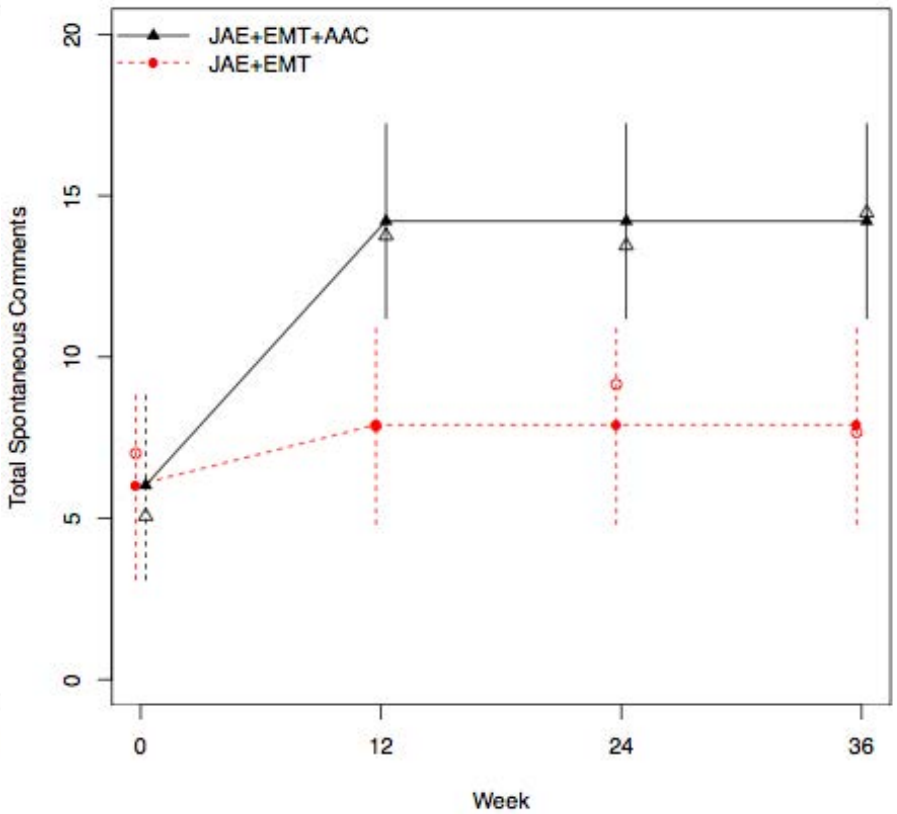


Kasari, Kaiser, Goods, Neitfeld, Mathy, Landa, Murphy, Almirall, JAACAP, 2014

Novel words

Comments





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

RESEARCH ARTICLE

Communication Growth in Minimally Verbal Children with ASD: The Importance of Interaction

Charlotte DiStefano, Wendy Shih, Ann Kaiser, Rebecca Landa, and Connie Kasari

Charlotte DiStefano

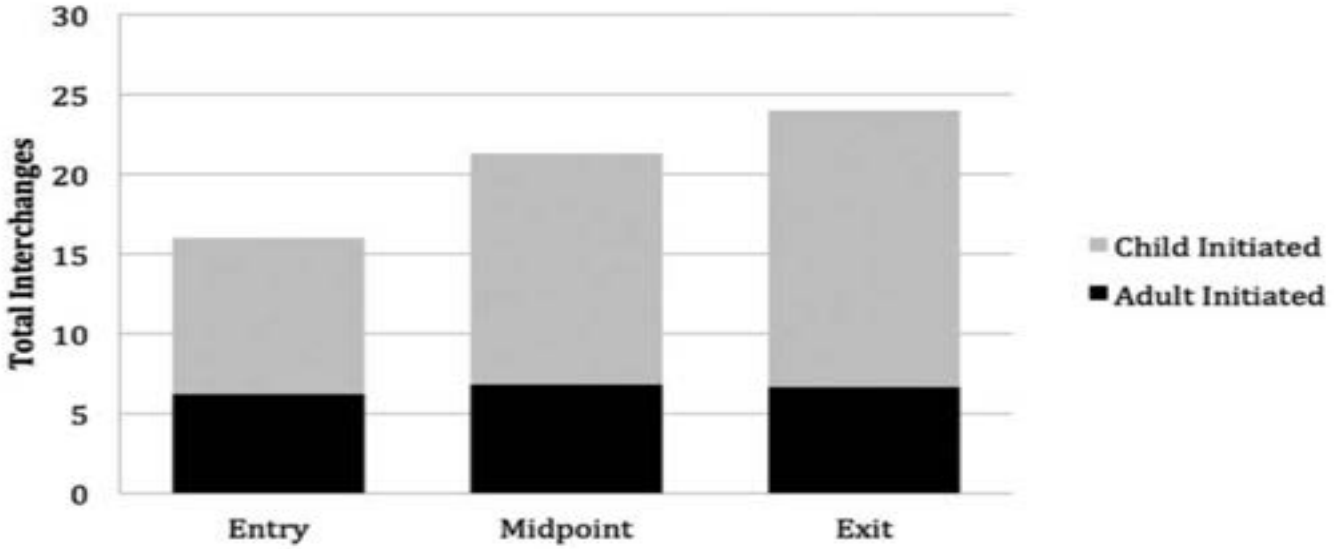


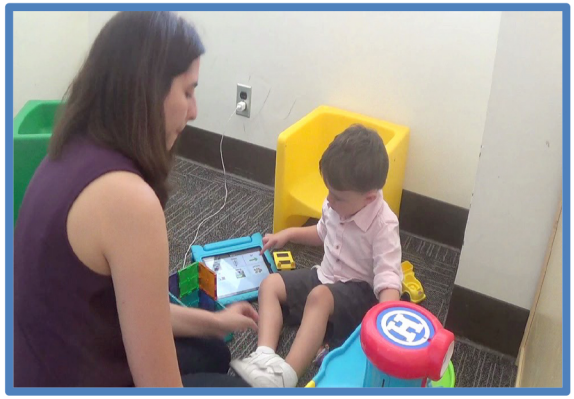
Figure 2. Child- and adult-initiated interchanges. The number of interchanges initiated by child and adult are presented for entry, (month 0), midpoint (month 3), and exit (month 6).

Autism Research, 2016

We now regularly add AAC into intervention with younger children

Age 3—NO WORDS, NO BABBLE

Day 1



Day 2

2 weeks later

Age 7

Variability among children *and parents*

Parent Involvement

- Parents have differing opinions about their own involvement
- Not all want hands on involvement right away
- May depend on age of child and level of disability

J Autism Dev Disord (2015) 45:1712–1724
DOI 10.1007/s10803-014-2329-x

ORIGINAL PAPER

Parents' Adoption of Social Communication Intervention Strategies: Families Including Children with Autism Spectrum Disorder Who are Minimally Verbal

Stephanie Y. Shire · Kelly Goods · Wendy Shih · Charlotte Distefano · Ann Kaiser · Courtney Wright · Pamela Mathy · Rebecca Landa · Connie Kasari

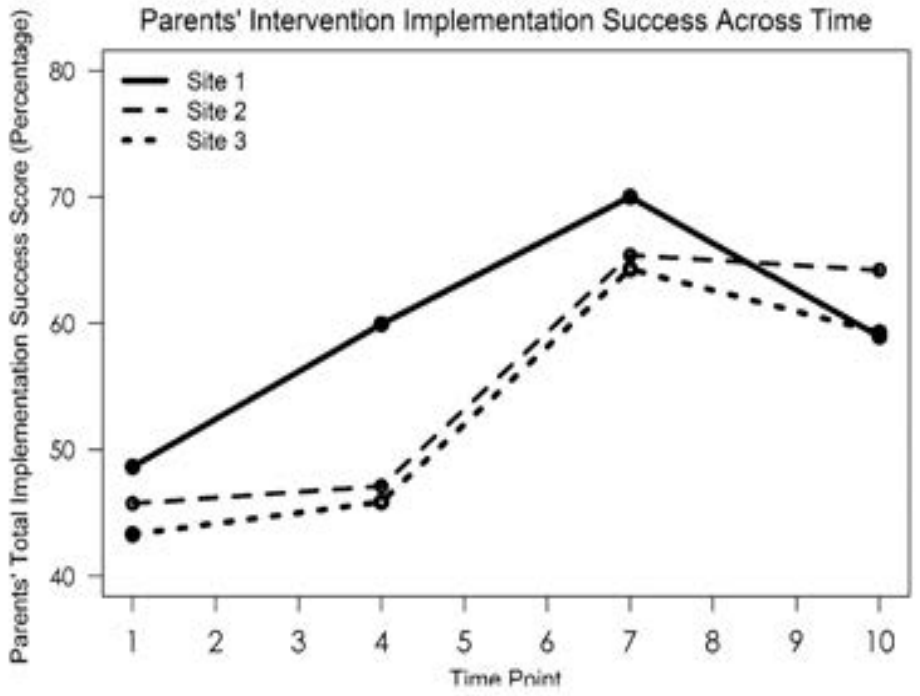
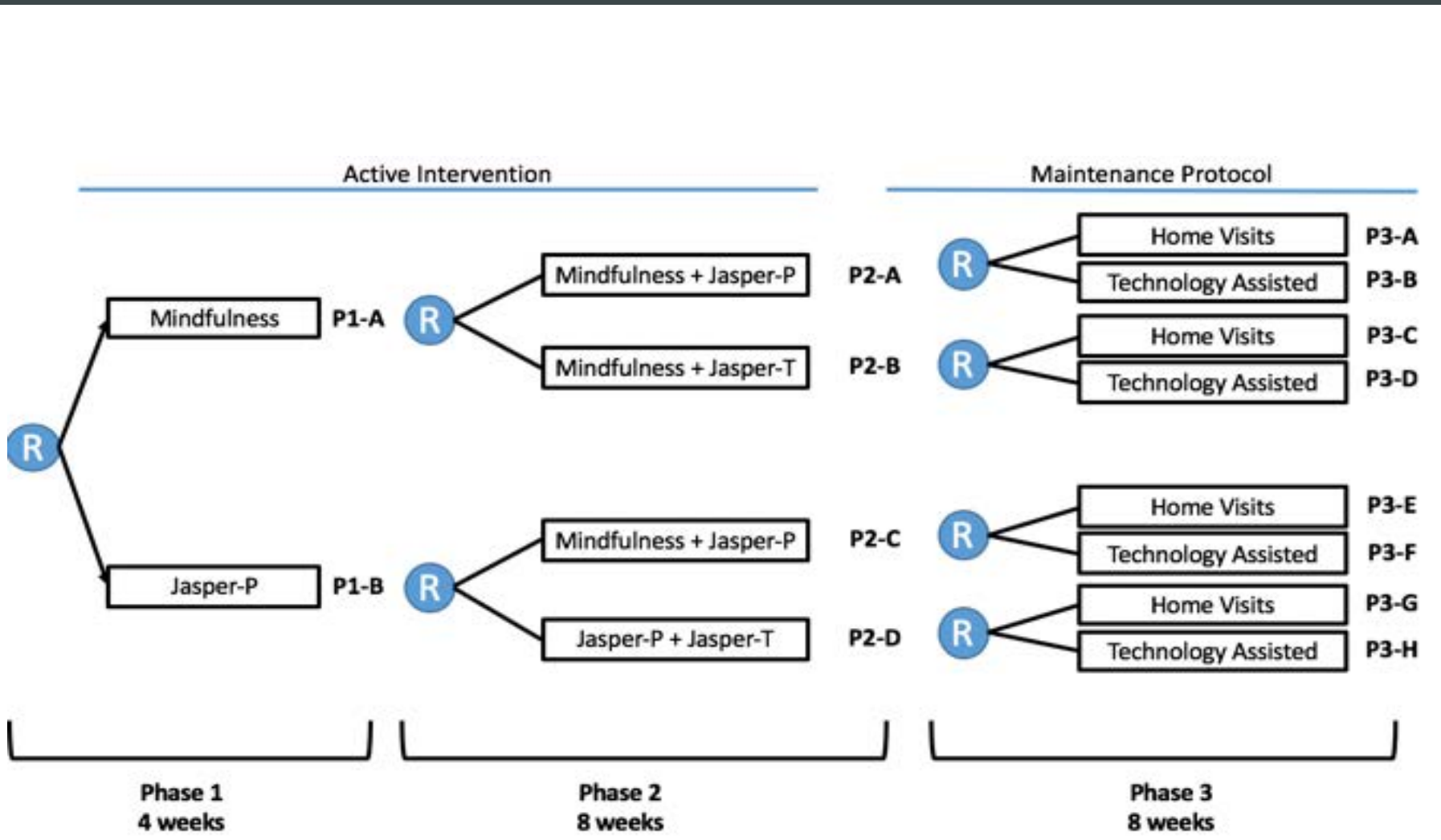


Fig. 2. Parents' successful strategy implementation across time by site

SMART designs applied to early childhood

Example SMART design: Baby bears—12-36 month olds



Summary—What we have Learned

- We can target important developmental areas and improve on social communication and language outcomes for autistic children
- What seems critical is what and how we target these skills for different developmental age groups
- Methods matter…. we need to pay close attention to how we are conducting research for rigor and replication
- Future: Personalizing intervention and learning from application of new designs

APPRECIATION…

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