Adapting Enhanced Milieu Teaching for Young Children With Communication Impairment

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Today's Talk

- Building a new generation of communication interventions
- Enhanced Milieu Teaching (EMT)
  - Brief overview
  - Research evidence
- EMT active ingredients
  - Underlying model of communication development
  - Core procedures
  - Additions to core EMT
- Adapting EMT To Fit Learner Characteristics
  - Profiles of four populations
  - Adaptations to maximize social communication outcomes
- The Intervention Tool Box: Tools for Adapting EMT
- Summary and Conclusions

What is Enhanced Milieu Teaching?

- EMT is a naturalistic, conversation-based intervention that uses child interests and initiations as opportunities to model and prompt language in everyday contexts.
- EMT can be used throughout the day as part of the everyday interactions.
- EMT is an evidence-based intervention with 20 years of research.
- EMT is an effective intervention.

EMT is effective

- Increases child use of language targets
  - Vocabulary (Kaiser et al, l993; Scherer & Kaiser, 2010; Roberts & Kaiser, 2012; Kaiser & Roberts, 2012)
  - Early syntactic forms (Kaiser & Hester, l994)
  - Moderately complex syntax (Warren & Kaiser, l986)
- Increases child frequency of communication (Warren et al, l994; Kaiser et al, l993)
- Generalization across settings, people, and language concepts (Warren & Bambara, l989; Goldstein & Mousetis, l989; Kaiser & Roberts , 2012)
- Maintenance of newly learned targets (Warren & Kaiser, l986; Kaiser & Roberts, 2012)
- More effective than drill-practice methods (Yoder, Kaiser et Alpert, l991, Kaiser, Yoder, et al,1996)

EMT Principles and Strategies

1. Promote adult-child communication *now*
   - Notice and respond
   - Follow the child's lead
2. Increase child engagement with objects and activities
   - Child preferred activities
   - Join the child in play and activity
   - Teach play and participation
3. Expand the social basis of communicative interactions
   - Arrange environment to increase engagement
   - Teach joint attention strategies
   - Balance turns (mirror and map)
   - Increase person engagement
4. Teach child communication target forms to advance language
   - Respond
   - Model
   - Expand
   - Prompt

EMT Child Communication Goals

1. Increase duration of engagement
   - Social (joint engagement)
   - Objects (play)
2. Increase rate of communication
   - Emphasize spontaneous social initiations
3. Increase diversity of communication
   - Same level forms
   - More words and phrases
   - More functions (requests, comments, questions)
   - Across more contexts
4. Increase complexity of communication
   - Higher level forms
   - Prelinguistic to linguistic,
   - Mean length of utterances
   - Complexity of utterance types
5. Increase independence
   - Initiated social communication
   - Generalization across contexts, people

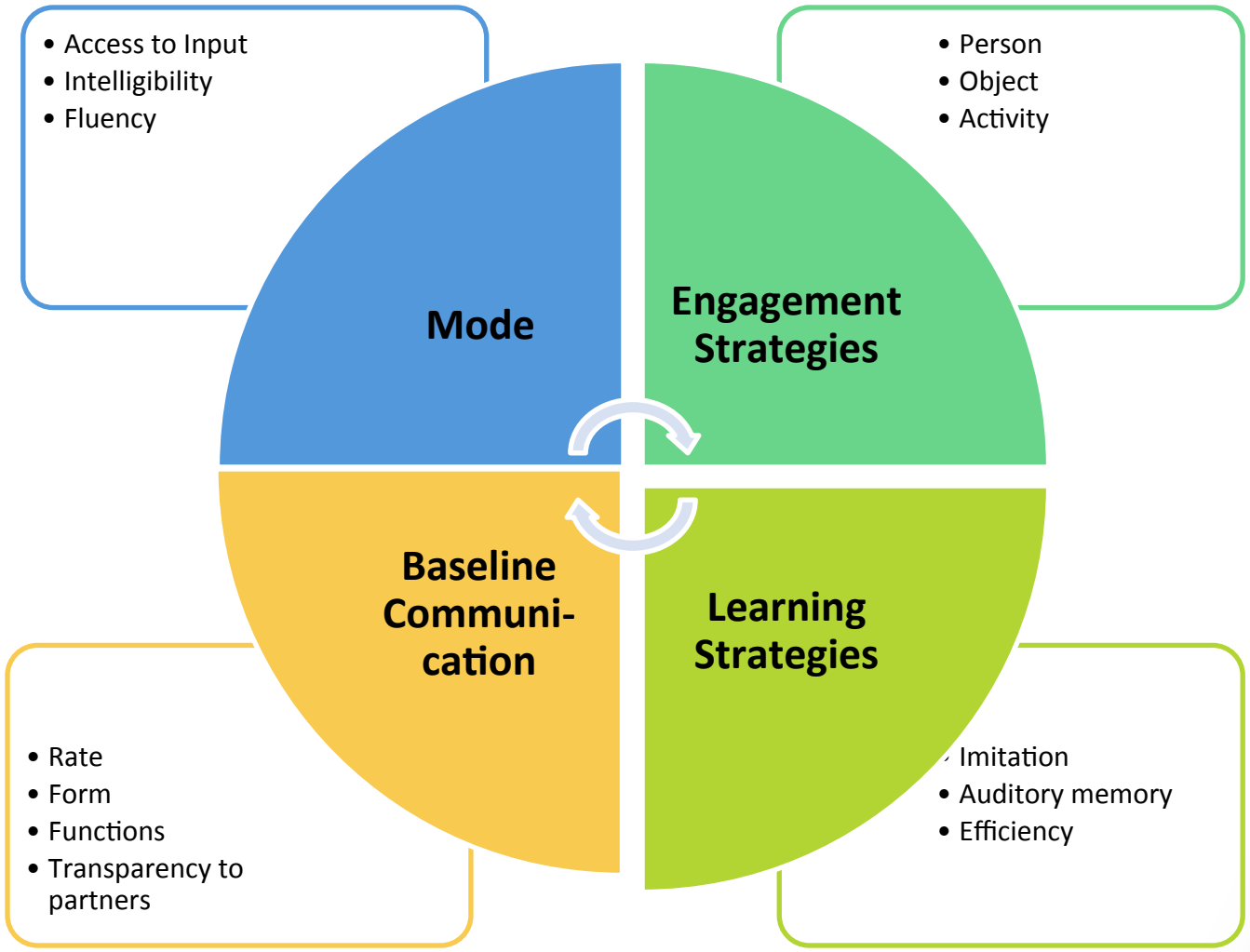
EMT Example

EMT Active Ingredients

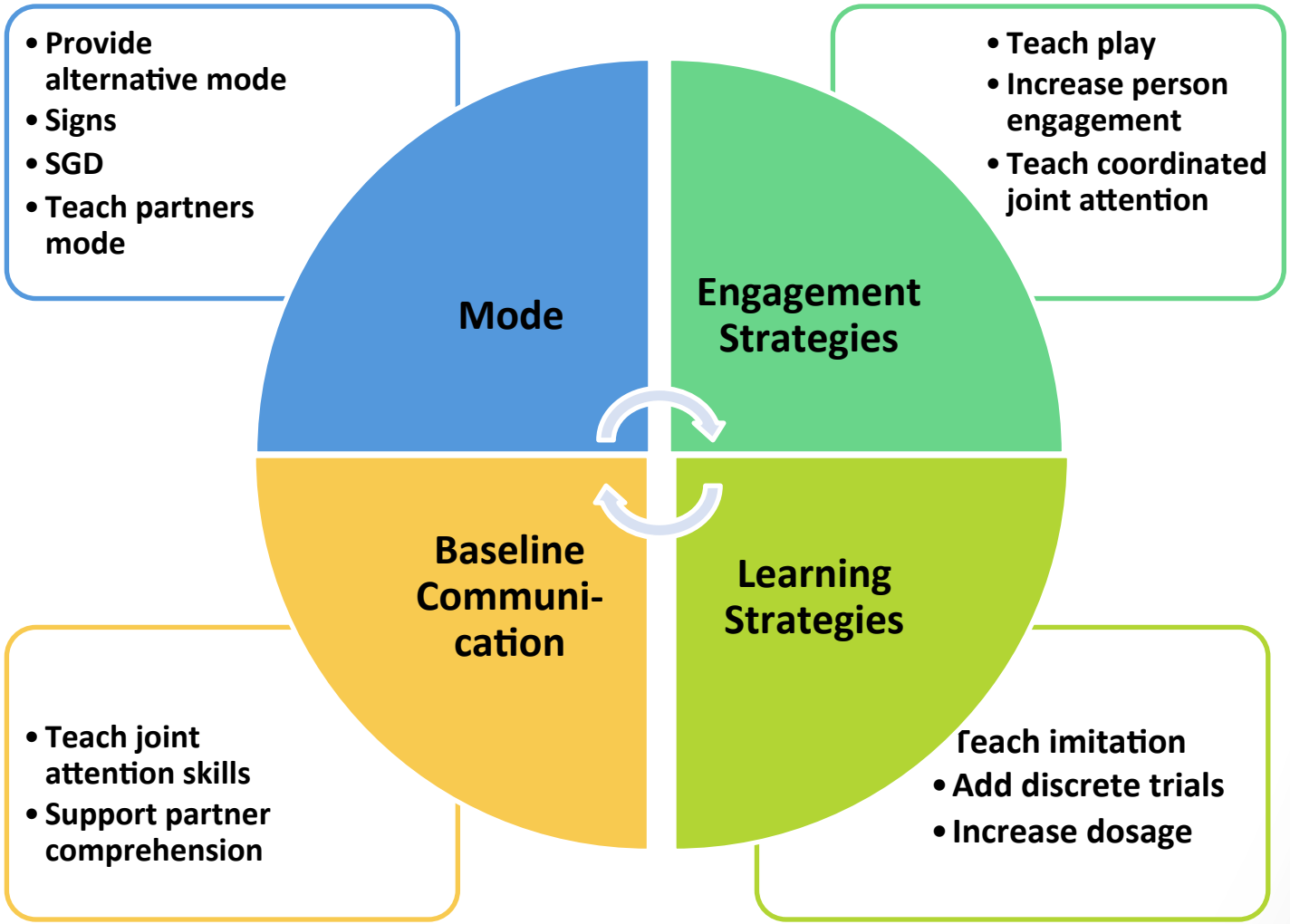
- **Environmental arrangement to promote communication**
- **Play and engage**
- **Follow child's lead in play and activity**
- **Respond to child communication**
- **Model language in context**
- **Expand child communication****
- **Use time delay to prompt requests or initiations**
- **Use Milieu Teaching Prompts to promote practice**
- **Teach across settings, activities and partners**

** In 2 randomized trials, expansion has been the ingredient most highly correlated with child outcomes (Kaiser & Roberts, 2012; Roberts & Kaiser, under review)

What Children Bring to EMT



EMT Modifications to Fit What Children Bring



EMT Active Ingredient
Play and engage
Follow child's lead in play and activity
Respond to child communication
Model language in context
Expand child communication
Use time delay to prompt requests or initiations
Use Milieu teaching prompts to promote practice

EMT Active Ingredient	Child Behavior Required to Access Active Ingredient
Play and engage	• Engages with objects, partners
Follow child's lead in play and activity	• Engages with objects, • Participates in activity
Respond to child communication	• Communicates verbally or nonverbally
Model language in context	• Engages with objects in play or activity • Imitates • Learns from observation • Engages with partners
Expand child communication	• Communicates pre linguistically (gesture) or linguistically • Mode is intelligible to partner • Imitates or learns from observation • Engages with partners
Use time delay to prompt requests or initiations	• Engages with partners • Interested in objects, • Has preferences • Learns to make choices
Use Milieu teaching prompts to promote practice	• Has mode for production • Responds to prompts (in least to most sequence) • Imitates, • Engages with partners • Learns from practice embedded in interactions

EMT Active Ingredient	Child Behavior Required to Access Active Ingredient	Modifications
Play and engage	• Engages with objects, partners	Teach play, Use person engaged activity to reinforce social engagement
Follow child's lead in play and activity	• Engages with objects, • Participates in activity	Teach play Provide more motivating materials, choices
Respond to child communication	• Communicates verbally or nonverbally	Modify mode Train partners to recognize communication, Target simple rate increases first
Model language in context	• Engages with objects in play or activity • Imitates • Learns from observation • Engages with partners	Teach imitation skills Modify modeling to fit speech or mode characteristics
Expand child communication	• Communicates pre linguistically (gesture) or linguistically • Mode is intelligible to partner • Imitates or learns from observation • Engages with partners	Teach prelinguistic skills (point, show, give) Increase intelligibility Make mode more transparent to partner
Use time delay to prompt requests or initiations	• Engages with partners • Interested in objects, • Has preferences • Learns to make choices	Modify time delay (lessen production demand) until child regularly responds Choose highly preferred objects
Use Milieu teaching prompts to promote practice	• Has mode for production • Responds to prompts (in least to most sequence) • Imitates, • Engages with partners • Learns from practice embedded in interactions	Teach responding to prompts and least to most support sequence, Increase reinforcement for responding

Modifications of EMT

- JASPER + EMT [J-EMT]
  - Teaches joint attention, symbolic play, regulation
- JASPER + EMT + AAC [J-EMT+ SGD ; Words + Signs]
  - Teaches joint attention, symbolic play, regulation
  - Includes speech generating device or signs for input and output
- Phonological Emphasis + EMT [PE-EMT]
  - Models speech targets
  - Recasts for speech
- + Discrete trial training [Rescue protocol]
- - Reduce prompt complexity, number of prompts [Simplify]
- + Increase Dosage [Dosage]
- + Support Partners to use mode and EMT [Partner]

Population Specific Modifications

Population	Modifications			
	Mode	Engagement	Learning Strategy	Baseline Communication
Toddlers with Rec/Express Delay	No	No		Support partner as teacher
Down syndrome	+ Sign	Teach play	+Dosage	Support partner comprehension
Cleft	+ Speech targets	No	+Recast + Speech practice	
Minimally Verbal ASD	+ SGD	Teach play, engagement	+Dosage +Rescue Protocol: imitation, receptive language	Teach joint attention skills

EMT Active Ingredient	Modification	EMT Type	Population	Study
Play and engage	Teach play, Use person engaged activity to reinforce social engagement	J-EMT	ASD Minimally verbal ASD	Kasari, et al., 2006 Kasari, Kaiser et al in press
Follow child's lead in play and activity	Teach play Provide more motivating materials, choices	J-EMT	ASD Minimally verbal ASD	Kasari, et al., 2006 Kasari, Kaiser et al in press
Respond to child communication	Modify mode Train partners to recognize communication Target simple rate increases first	Words & Signs J-EMT +SGD	DS ASD	Wright, Kaiser, Roberts & Reikowsky 2012; Kasari, Kaiser et al in press
Model language in context	Teach imitation skills Modify modeling to fit speech or mode characteristics	Rescue protocol PE-EMT Words + Signs J-EMT +SGD	Minimally verbal ASD Cleft toddlers DS	Kasari, Kaiser, Smith & Lord, in progress Scherer & Kaiser, 2011 Kaiser, Scherer, Frey, under review
Expand child communication	Teach prelinguistic skills (point, show, give) Increase intelligibility Make mode more transparent to partner	J-EMT+ SGD Words + Signs	Minimally verbal ASD DS	Kasari et al 2006 Kasari, Kaiser et al in press Wright et al 2012
Use time delay to prompt requests or initiations	Modify time delay (lessen production demand) until child regularly responds Choose highly preferred objects	EMT Words + Signs Simplify	Toddlers with receptive/expressive delay DS	Roberts & Kaiser 2012; Wright et al 2012
Use Milieu teaching prompts to promote practice	Teach responding to prompts and least to most support sequence, Increase reinforcement for responding	EMT Words + Signs Simplify	Toddlers with receptive/expressive delay DS Minimally verbal ASD Cleft toddlers	Wright et al 2012 Roberts & Kaiser, 2012 Kasari, Kaiser et al in press Scherer & Kaiser, 2011

The Effects of a Parent-Implemented Language Intervention for Children With Language Impairment

Megan Y. Roberts, PhD, CCC-SLP
Ann P. Kaiser, PhD

Toddlers with Receptive/Expressive Delays

Communication Challenges	Adaptations
Problem behaviors	Increase attention to positive behavior, plan routines, teach communicative alternatives
Low rates of talking	Use responsiveness strategies to increase rate
Low lexical diversity	Model expanded vocabulary before and during early syntax targets

Toddlers with Receptive/Expressive Delays

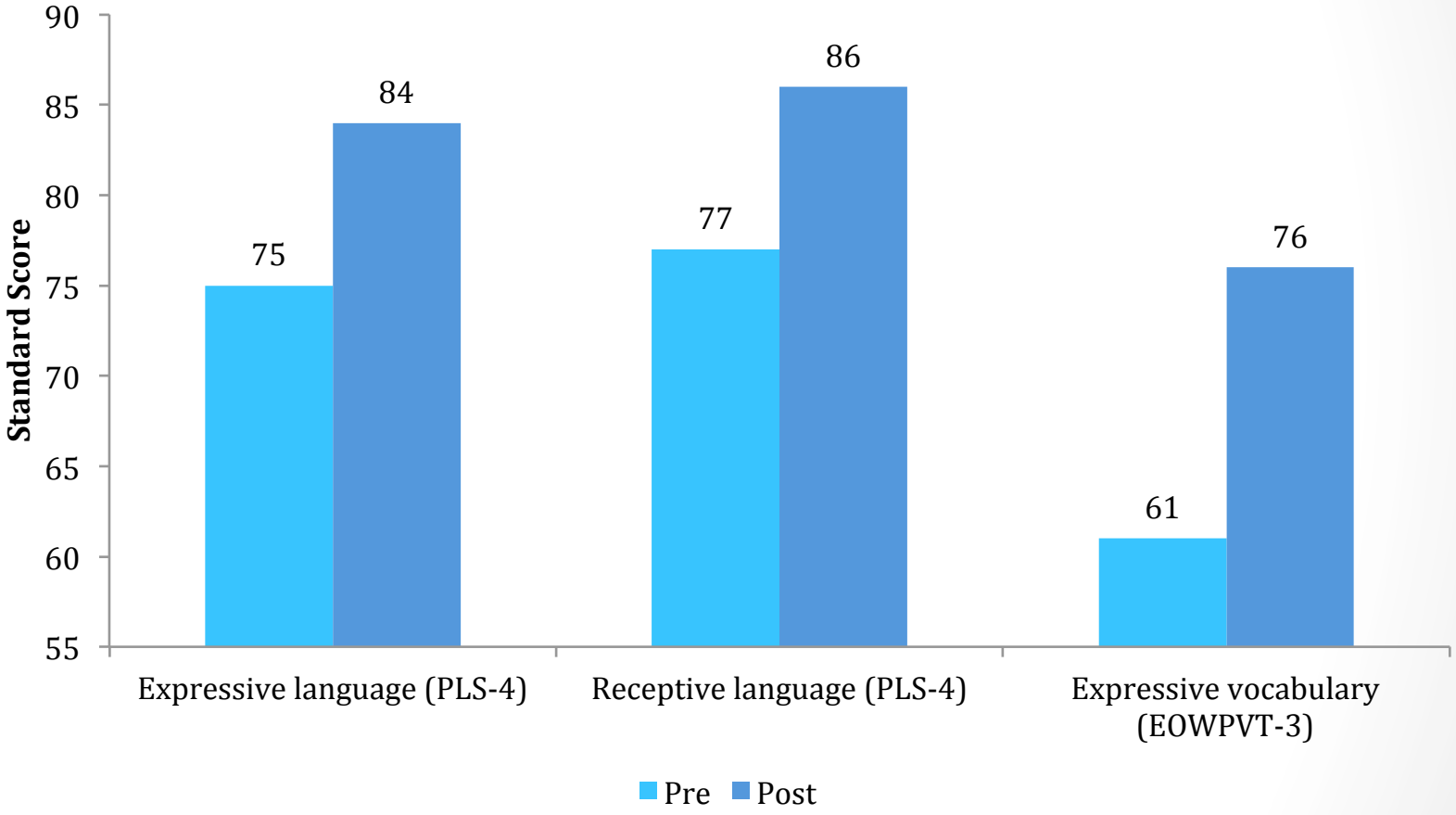
Study Component	Description
Design	Randomized Clinical Trial 45 Intervention , 43 Control
Intervention	EMT with Play Skills 28 sessions (4 workshops, 14 clinic, 10 home across routines) Parent + Therapist
Measures	Pre, 6 wks, 12 wks, 18 wks (end of intervention) Standardized, observational, parent report
Participants	Average age: 31 months Average Bayley Cognitive Score: 85 Gender: 83% male PLS-4: 70

Kaiser, Camarata, & Roberts (2011) IES R324A090181; under review

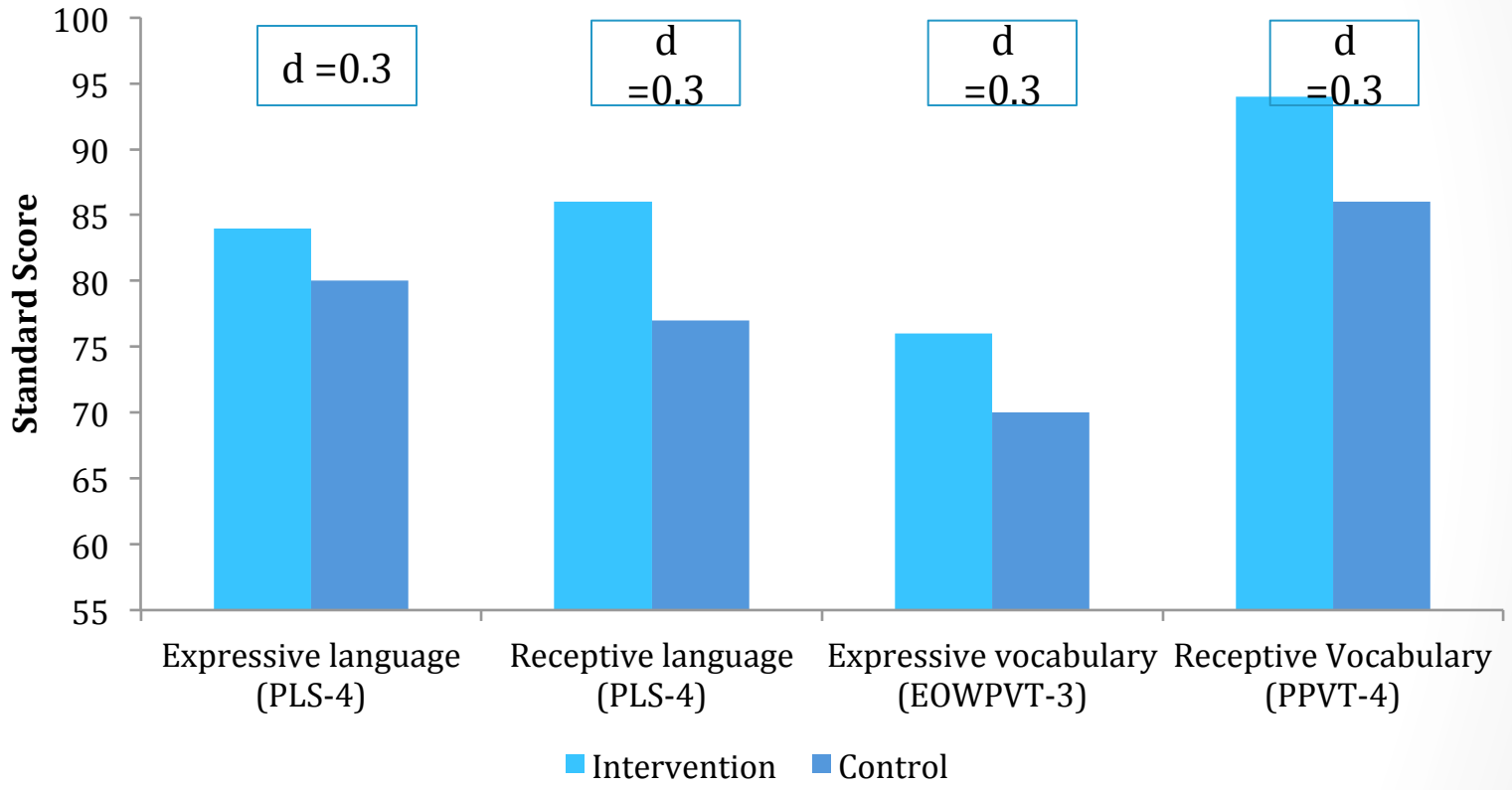
Parent + Therapist EMT

Enhanced Milieu Teaching with a Toddler

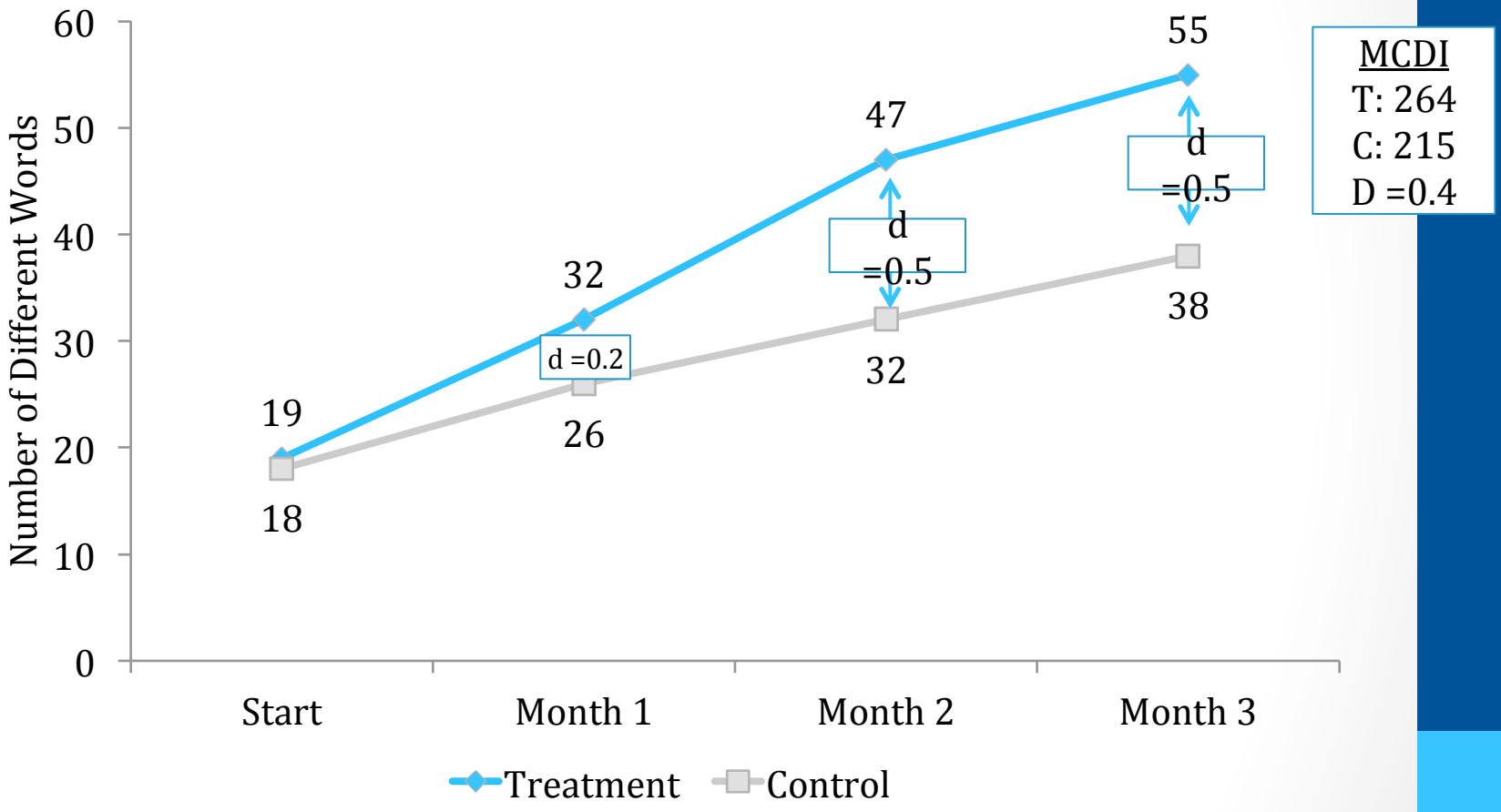
Intervention Group : Pre-Post Gains



Outcomes Intervention vs. Control



Outcomes Intervention vs Control: Number of Different Words



COMMUNICATION INTERVENTIONS FOR MINIMALLY VERBAL CHILDREN WITH AUTISM

Kasari, Kaiser, Goods, Nietfeld, Mathy, Landa, Murphy, & Almirall (in press).

Clinical Trials Number: NCT01013545.
This study was funded by Autism Speaks #5666, Characterizing Cognition in Nonverbal Individuals with Autism (CCNIA).

Children with Autism

Study Component	Description
Design	Randomized Clinical Trial; Multiple Baseline AAC, Verbal only
Intervention	EMT + Joint Attention and Symbolic Play 48 sessions in the clinic (24 therapist only, 24 parent + therapist)
Measures	Pre, Post, 6 months Standardized, observational, parent report
Participants	Average age: 6 years, 6 months Average Leiter: 61 Gender: 74% male PPVT: 32

Kasari, Kaiser, Landa et al, 2011 Autism Speaks 5566

Children with Autism

Communication Challenges	Adaptations
Difficulty with joint engagement	Model and teach joint engagement behavior
Few play skills and brief duration of play	Model and teach play skills
Requesting rather than commenting	Model commenting, limit requesting
Interfering behavior	Determine which behaviors are communicative; respond differentially
Very low rate spoken language	Add SGD

Children with Autism

Study Component	Description
Design	Randomized Clinical Trial
Intervention	EMT + Joint Attention and Symbolic Play (J-EMT) 48 sessions in the clinic (24 therapist only, 24 parent + therapist) with/ without SGD
Measures	Pre, Post, 6 months Standardized, observational, parent report
Participants	61 children with ASD Average age: 6 years, 6 months Average Leiter: 68.16 Gender: 74% male PPVT: 32 Mn words at pre: 16.6

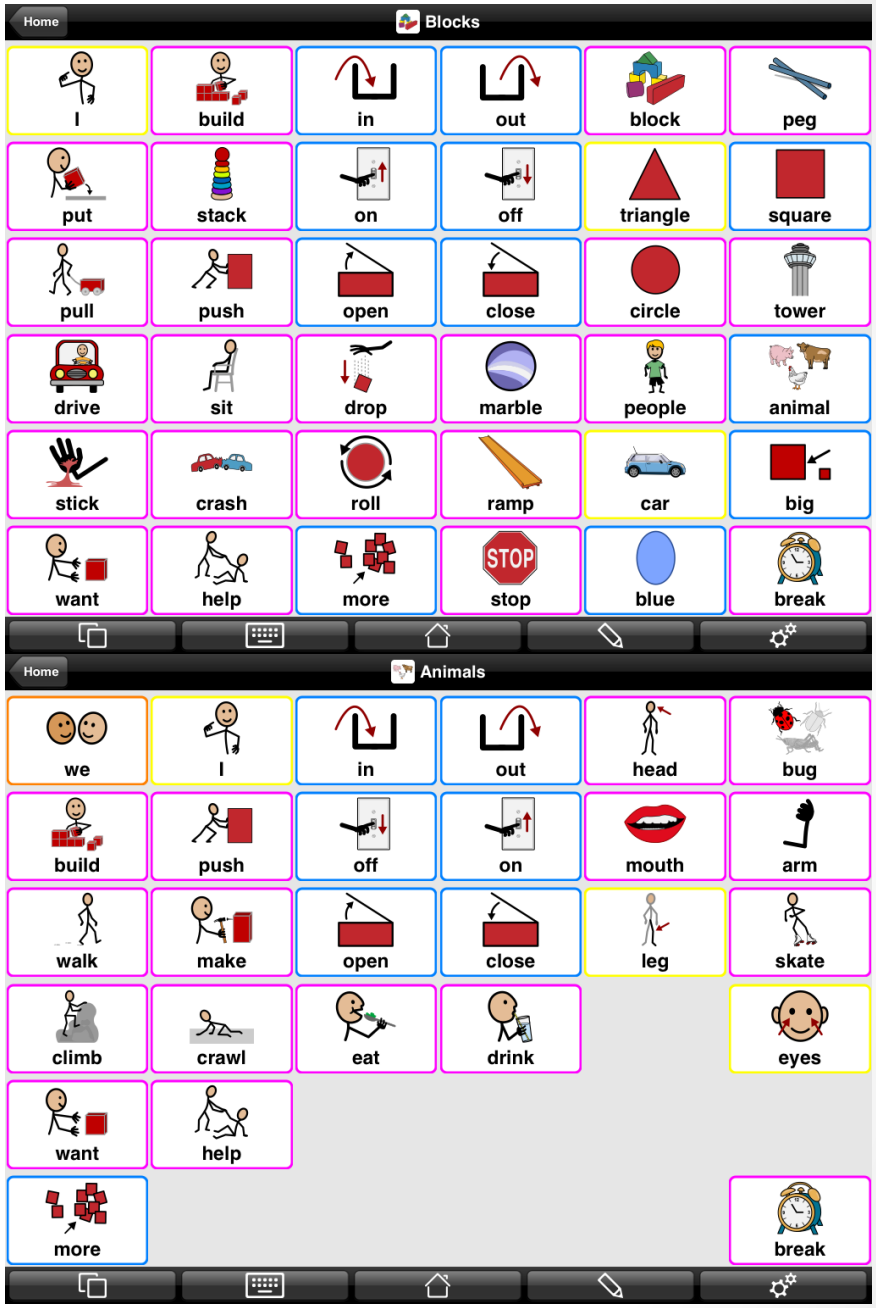
Kasari, Kaiser, Landa et al, in press Autism Speaks 5566

Intervention Variations

- **J-EMT Spoken Language Only**
- **J-EMT + SGD**
  - Speech Generating Device - Dynavox or iPad
  - Model using spoken language and SGD
    - At least 50% of utterances, 70% of expansions
  - Child could speak or use SGD to respond and communicate

Use of SGD

- SGD available to the child
- Programmed pages for toys sets
- Used communicatively with the child
  - 50% of adult utterance
  - 70% of adult expansions
- Child could respond to prompts with either SGD or spoken language
- Embedded in JASPER-EMT interactions



Results

- 70% of whole group met criterion for *response to treatment* at week 12
- Greater percentage of participants in the JASP + EMT+ SGD group (77%) were early treatment responders than in the JASP +SGD group (62%)

- Participants in the JASP + EMT +SGD group had :
  - more Social Communicative Utterances (SCU),
  - greater Number of Different Word Roots (NDW),
  - more comments (COM) than participants in JASP+ EMT group

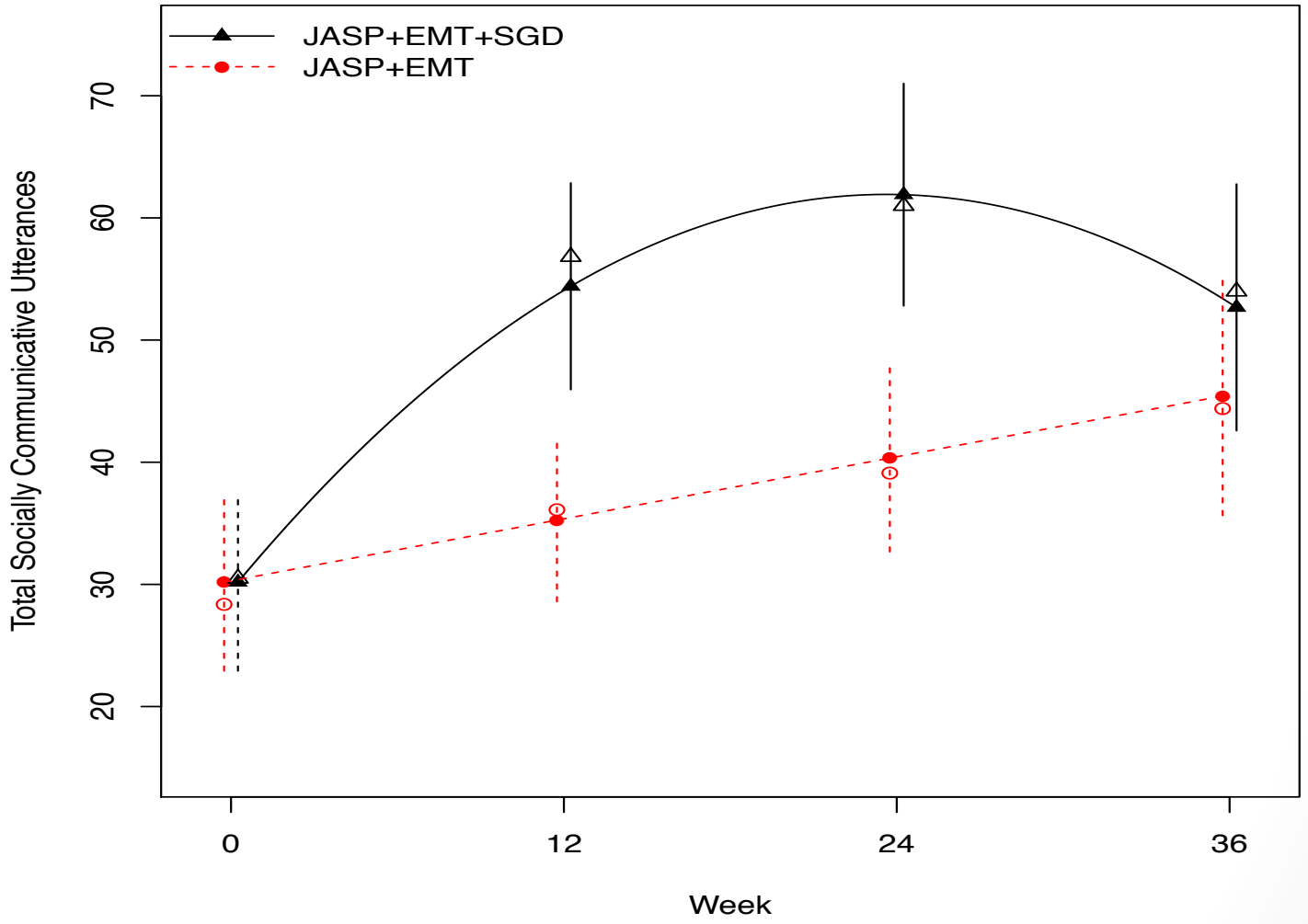
- Both groups shows gains over time in SCU and NDW; only the JASP +EMT+SGD group showed gains in COM

Results At 12 Weeks

	Baseline			12 weeks			Treatment Responders
	TSCU	TNDW	TCOM	TSCU	TNDW	TCOM	
JASP+ EMT	28.4	16.8	7.0	35.3	24.3	8.1	62.2%
JASP + EMT + SGD	30.5	17.6	5.1	54.4	33.1	14.1	77.7%
(difference)				19.1	8.8	6.0	15%
Effect Size				.57	.34	.51	
P value	NS	NS	NS	.00	.00	.00	0.20 NS

Social communicative utterances (TSCU), Number of different word roots(TNDW) and number of comments (TCOM)were derived from a naturalistic language sample with a blinded clinician

Primary aim results for the primary outcome (TSCU).



Open plotting characters denote observed means; closed denote model-estimated means. Error bars denote 95% confidence intervals for the model-estimated means.

EFFECTS OF NATURALISTIC SIGN INTERVENTION ON EXPRESSIVE LANGUAGE OF TODDLERS WITH DOWN SYNDROME.

Wright, C.A., Kaiser, A.P., Reikowsky, D.I., & Roberts, M.Y. (2013). *Journal of Speech, Language, and Hearing Research, 56*, 994-1008.

Children with Down Syndrome

Communication Challenges	Adaptations
Low rate of symbol infused joint attention	Model communication in joint engagement episodes
Poor articulation skills	Teach sign + word as mode
Poor auditory memory/ strong visual skills	Model words + sign
Poor generalization across partners, settings	Teach with multiple partners, settings, activities

Children with Down Syndrome

Study Component	Description
Design	Multiple Baseline Single Subject
Intervention	EMT Words + Signs 24 sessions at home Therapist + Parent
Measures	Pre, Post, ever 3 months Standardized, observational, parent report Use of signs
Participants	Gender: 1 male, 2 female Average age: 25 months (2.83) Average Mullen: 69 (8.04) Average PLS-Total Standard Score: 67.25 (5.32)

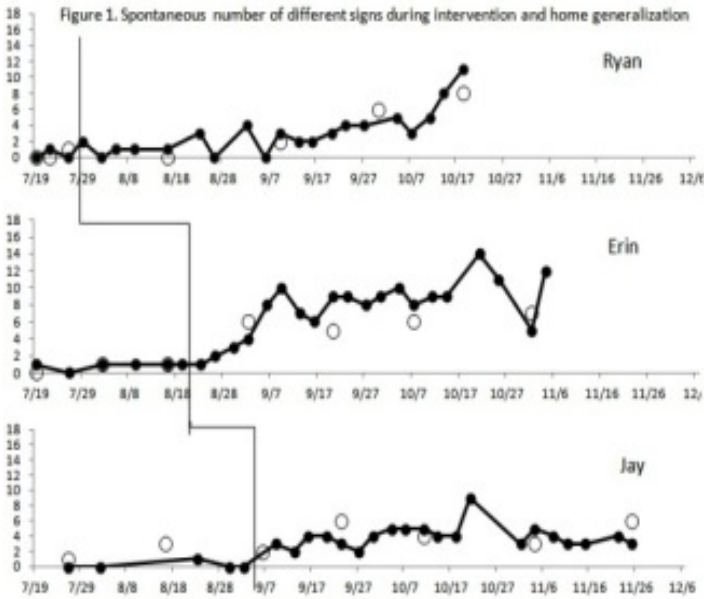
Intervention Variation

- EMT Words + Signs
- Simplify and reduce prompting
- Parent training after responding to prompts was established with therapist

EMT Words + Signs for Young Children with DS

3 Toddlers with DS 18-22 mos

- Multiple Baseline Design
- Taught by SLP in Clinic
- Generalization to home activities with parents
- Phase 2, teaching parents
- Wright et al, under review



	Parent Outcomes												Child Outcomes	
	% Matched Turns		% Targets		% Expansions		% Correct Time Delay		% Correct Prompting		% Target JA models		Number of Symbols Used	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Ryan	41%	90%	1%	74%	0%	48%	0%	83%	0%	94%	0%	82%	3	14.5
Erin	36%	82%	7%	64%	3%	57%	0%	100%	0%	100%	0%	66%	18.5	30.5
Jay	34%	95%	2%	75%	0%	60%	0%	100%	0%	100%	0%	80%	11	24

EFFECTS OF EMT+PE ON THE LANGUAGE SKILLS OF YOUNG CHILDREN WITH CLEFT PALATE

Kaiser, Scherer, Frey & Roberts (in preparation)

NIDCD 1R21DCOO9654

Children with Repaired Cleft

Communication Challenges	Adaptations
Low intelligibility	Recast unintelligible utterances, model phonological targets
Low rate of communication	Use responsiveness strategies to increase rate of communicating
Often shy, nonresponsive to prompting	Increase prompting after 12-24 sessions

Children with Repaired Cleft

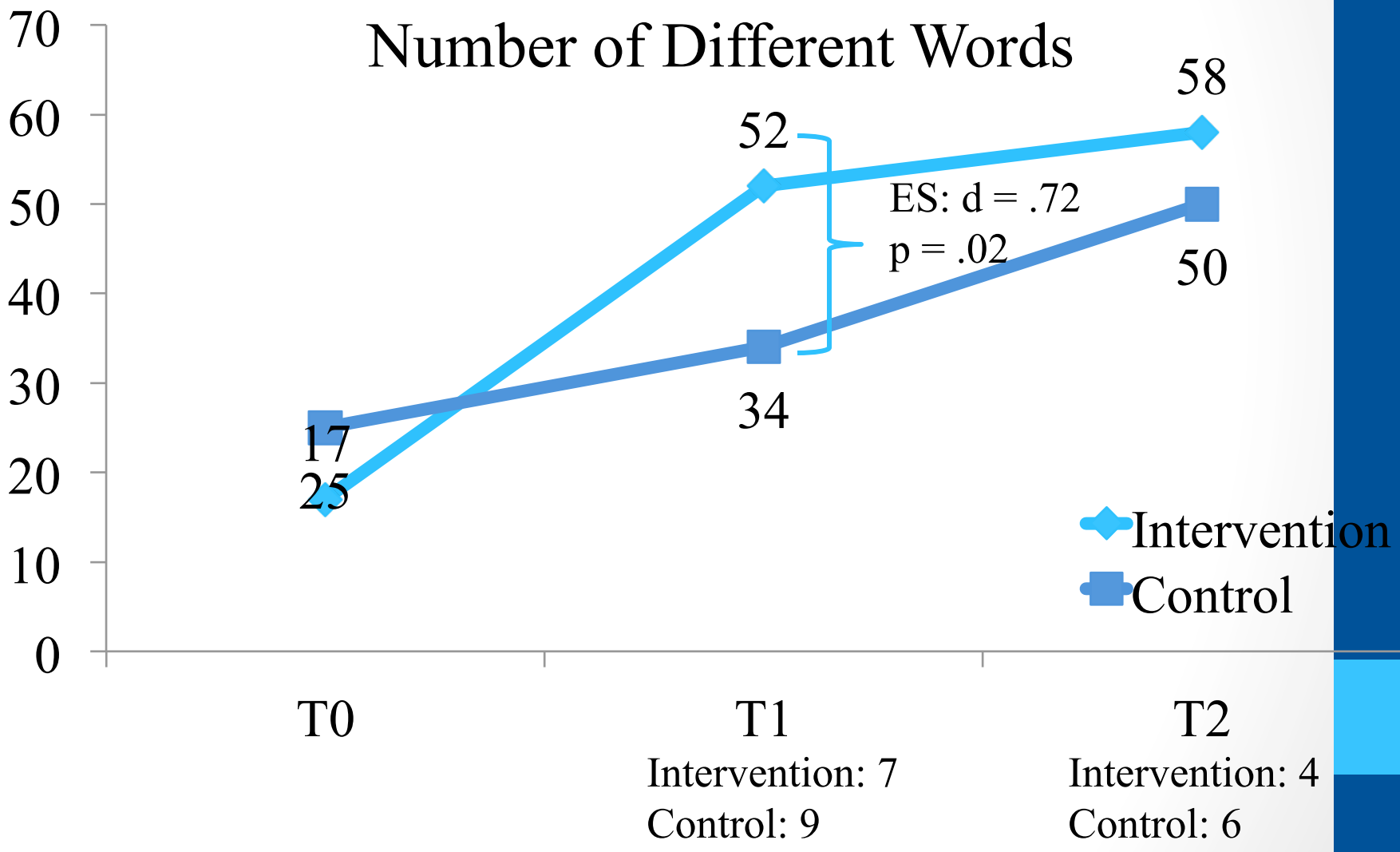
Study Component	Description
Design	Pilot Randomized Clinical Trial 7 Intervention , 9 Control
Intervention	PE-EMT 48 sessions in the clinic Therapist only
Measures	Pre, Mid, Post, 3 months, 6 months Standardized, observational, parent report
Participants	Average age: 25 months Average Bayley Cognitive Score: 101 Gender: 69% male PLS-4: 100

Scherer & Kaiser, 2010 NIDCD 1R21DC009654-01A1

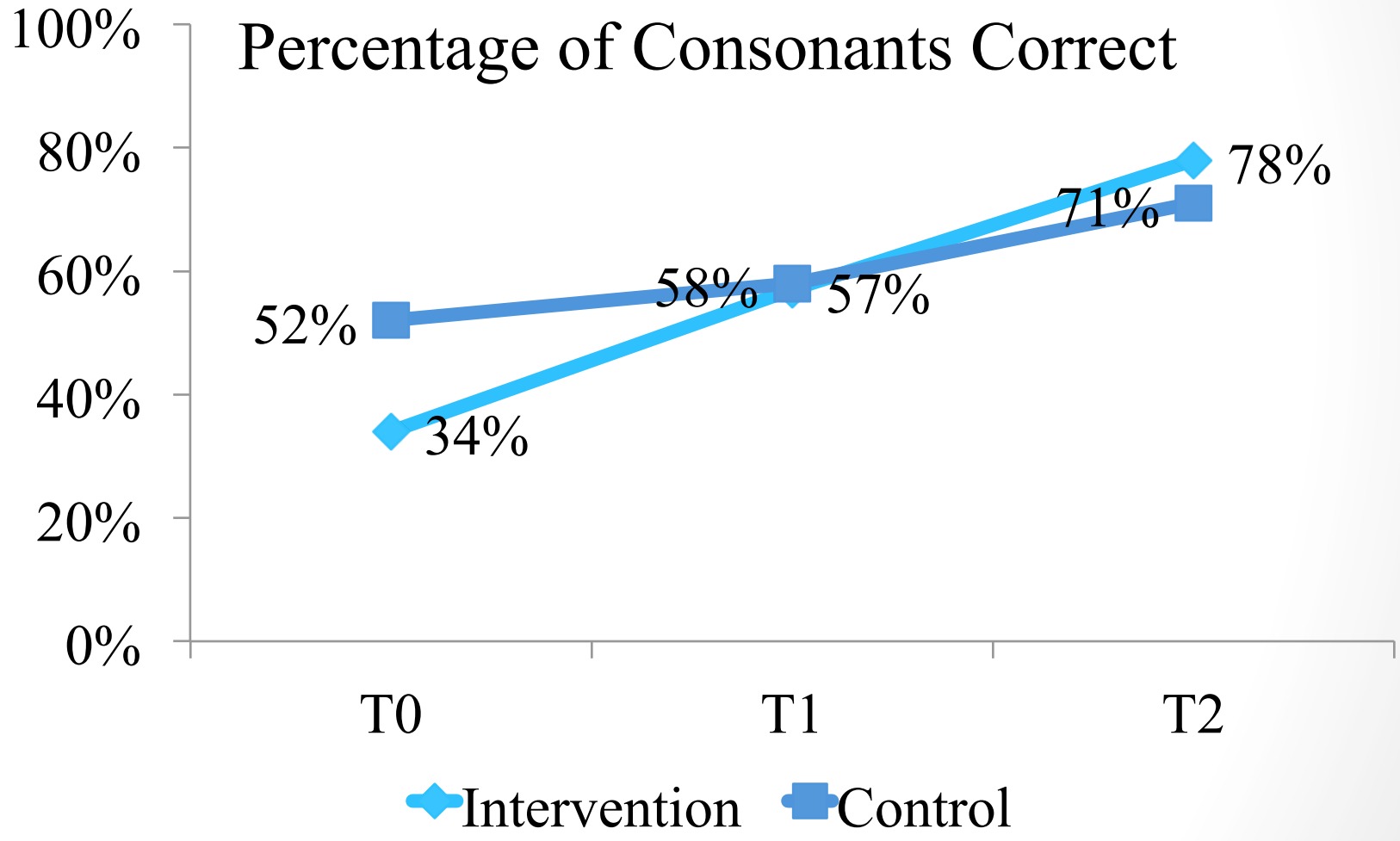
Intervention Variation

- Phonological Emphasis PE-EMT
- Choose word targets with target sounds
- Recast for phonological correctness
- Simplify prompt sequence

Children with Repaired Cleft



Children with Repaired Cleft



Tools for Practice
Skills Needed for Effective Intervention

- Fluent in the use of EMT*
- Skills for training parents and partners*
- Skilled in the additional components
  - JASPER http://www.interactingwithautism.com/section/treating/jasper
  - AAC (sign or SGD)
  - Speech recasting
  - Discrete trial training

* Information available at http://kc.vanderbilt.edu/kidtalk/

Tools for Practice
Assessment & Progress Monitoring

- Structured Play Assessment *
- Language Sample*
  - Transcribed
  - Coded for gesture
  - Words, MLU, rate of initiations, rate of communication, consonant production
- Speech assessments
  - Arizona, PEEPS or language sample with consonants transcribed
- Baseline EMT session*
  - Responsiveness to comments, TD, Prompts;
  - Prompted and spontaneous verbal imitation
  - Use of targets
- Imitation probe *
- Receptive language probe : receptive object and picture labeling
- Toy preference assessment (ongoing)

* Information available at http://kc.vanderbilt.edu/kidtalk/

Tools for Practice

Progress Monitoring is Essential

- Every child presents unique challenges in implementing EMT
- How child is responding to the intervention is the test of whether the fit is right
- Adaptive treatments are the 4th generation of language intervention
- Quick tools for monitoring:
  - IGDI http://www.igdi.ku.edu/
  - Trackers for session data for therapist and child *

Tools for Practice
Fidelity and Dosage Matter

- Is the intervention being delivered at fidelity?
- Is the dosage of components within in the intervention sessions sufficient?
  - Models, expansions, prompts
  - Is child responding to the active ingredients?
- Are sessions frequent enough, long enough?
- Do other partners need to be trained to increase dosage

Fidelity Measure	% Criterion	% Intervention Mean (SD)
Matched turns	>75	98 (2.8)
Talk at child's level	>50	83(12.5)
Recasted incorrect child utterances	>40	76(16.7)
Expanded child utterances	>40	55(16.0)
Time delay strategies	>80	98(8.0)
Prompting strategies	>80	98(12.4)
Words containing speech targets	>25%	34(17.3)

Last words

- EMT is a complex intervention
- The core of the intervention is always the social communicative connection between the child and the therapist
- The most important immediate outcome is communication
- Fine tuning interventions to child needs and characteristics can improve outcomes, but only when the core the of the intervention is working.

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