Naturalistic Early Communication Interventions: The Importance of Culture, Context and Partners

Ann P. Kaiser,
Vanderbilt University
Today’s Talk

- Early communication and evidence based intervention
- Enhanced Milieu Teaching (EMT)
  - Brief overview
  - Summary of research evidence
- EMT active ingredients
  - What children bring to EMT
  - Adapting EMT to fit learner characteristics: Two randomized trials
- The critical role of partners in EMT
  - Adapting to partners
    - Culture
    - Activity context
- Summary and Conclusions
Communication As A Developmental Marker

Communication is a key indicator of both positive and delayed development.

Complex behavior vulnerable to genetic and environmental influences.

Social communication deficits are an early indicator of autism as well as global developmental delay.

Early communication delays, even in children with typical cognition, have long term impacts on social and academic outcomes: reading, academic performance, social relationships.
Evidence-Based Treatments for Early Communication Delays

- Communication specific interventions are among the most established early interventions
- Results of recent meta analyses support the effectiveness of early language intervention
  - Hampton & Kaiser (2016)
    Spoken language outcomes for children with ASD
    - .26 ES (.11-.42) for overall language outcomes
    - .42 ES (.24-.60) for clinician plus parent
  - Roberts & Kaiser, 2011
    - .48 ES (.24-.63) Expressive vocabulary
    - .82 (.37-1.38) Expressive morpho-syntax
    Parent implemented intervention more effective across populations
    Walker et al et (in preparation; BWG network non parental caregivers)
Naturalistic Developmental Behavioral Interventions (NDBI) for Children with ASD

- Delivered in naturalistic and interactive social contexts, such as play and daily routines
- Involve child-directed teaching strategies, such as use of child-preferred materials
- Based on empirically-based intervention methods derived from both the principles of behavioral learning and developmental science

What is Enhanced Milieu Teaching?

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

- **Increases child use of language targets**
  - Early syntactic forms (Kaiser & Hester, 1994)
  - Moderately complex syntax (Warren & Kaiser, 1986)
- ** Increases child frequency of communication**
  (Warren et al, 1994; Kaiser et al, l993; Roberts & Kaiser, 2015)
- **Generalization** across settings, people, and language concepts
  (Warren & Bambara, 1989; Goldstein & Mousetis, 1989; Kaiser & Roberts, 2012; Wright et al., 2013)
- **Maintenance of newly learned targets** (Warren & Kaiser, 1986; Kaiser & Roberts, 2012;)
EMT Active Ingredients

• Environmental arrangement to promote communication
• Play and engage in share activity
• Follow child’s interests in conversation and activity
• Respond to child communication
• Model target language in context
• Expand child communication with targets
• Use Time Delays to elicit requests or initiations
• Use Milieu Teaching Prompts to promote practice
• Teach across settings, activities, and partners
EMT Example
What Children Bring to EMT

Mode
- Access to Input
- Intelligibility
- Fluency

Engagement Strategies
- Person
- Object
- Activity

Baseline Communication
- Rate
- Form
- Functions
- Transparency to partners

Learning Strategies
- Imitation
- Auditory memory
- Efficiency
EMT Modifications to Fit What Children Bring

- Provide alternative mode
- Signs
- SGD
- Teach partners mode

- Teach play
- Increase person engagement
- Teach coordinated joint attention

- Teach joint attention skills
- Support partner comprehension

- Teach imitation
- Add discrete trials
- Increase dosage
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 errors

- + Discrete trial training [Rescue protocol; preteaching protocol]

- + Support Partners to use EMT, child mode, [Parent Plus Therapist]
The Effects of a Parent-Implemented Language Intervention for Children With Language Impairments

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

# Toddlers with Receptive/Expressive Delays

<table>
<thead>
<tr>
<th>Communication Challenges</th>
<th>Adaptations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem behaviors</td>
<td>Increase attention to positive behavior, plan routines, teach communicative alternatives</td>
</tr>
<tr>
<td>Low rates of talking</td>
<td>Use responsiveness strategies to increase rate</td>
</tr>
<tr>
<td>Low lexical diversity</td>
<td>Model expanded vocabulary before and during early syntax targets</td>
</tr>
</tbody>
</table>
## Toddlers with Receptive/Expressive Delays

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

Kaiser, Camarata, & Roberts (2011) IES R324A090181; Roberts & Kaiser, 2015
Parent + Therapist EMT

Enhanced Milieu
Teaching with a Toddler
Outcomes Intervention vs. Control

- **Expressive language (PLS-4)**: Intervention 84, Control 80
- **Receptive language (PLS-4)**: Intervention 86, Control 77
- **Expressive vocabulary (EOWPVT-3)**: Intervention 76, Control 70
- **Receptive Vocabulary (PPVT-4)**: Intervention 94, Control 86

Effect size ($d$) for all comparisons: $d = 0.3$

Date: 8/17/16
Outcomes Intervention vs. Control: Number of Different Words

<table>
<thead>
<tr>
<th>Month</th>
<th>Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>Month 1</td>
<td>32</td>
<td>26</td>
</tr>
<tr>
<td>Month 2</td>
<td>47</td>
<td>32</td>
</tr>
<tr>
<td>Month 3</td>
<td>55</td>
<td>38</td>
</tr>
</tbody>
</table>

MCDI
T: 264
C: 215
D = 0.4

d = 0.2

MCDI
T: 264
C: 215
D = 0.4

LSIA August 2016 8/7/16
Number of Different Words
Outcomes at 6 and 12 months post intervention compared to typical children

Pre | Post | 6 months | 12 months
--- | --- | --- | ---
Treatment | Control | Typical
17 | 19 | 55 | 82
| 37 | 107 | 138 | 163
| 76 | d=.38* | d=-1.36* | d=-1.78*
| 102 | 109 | 109 | ns
| 100 | d=.47* | d=-1.33* | d=-1.25*

8/17/16
LSIA August 2016
Additional Outcomes

• Children receiving EMT
  • More talkative
  • Fewer behavior problems

• Pending
  • Kindergarten and Grade 1 outcomes for language, reading and behavior
COMMUNICATION INTERVENTIONS FOR MINIMALLY VERBAL CHILDREN WITH AUTISM


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

<table>
<thead>
<tr>
<th>Communication Challenges</th>
<th>Adaptations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty with joint engagement</td>
<td>Model and teach joint engagement behavior</td>
</tr>
<tr>
<td>Few play skills and brief duration of play</td>
<td>Model and teach play skills</td>
</tr>
<tr>
<td>Requesting rather than commenting</td>
<td>Model commenting, limit requesting</td>
</tr>
<tr>
<td>Interfering behavior</td>
<td>Determine which behaviors are communicative; respond differentially</td>
</tr>
<tr>
<td>Very low rate spoken language</td>
<td>Add SGD</td>
</tr>
</tbody>
</table>
Children with Autism

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

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th></th>
<th></th>
<th>12 weeks</th>
<th></th>
<th></th>
<th>Treatment Responders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TSCU</td>
<td>TNDW</td>
<td>TCOM</td>
<td>TSCU</td>
<td>TNDW</td>
<td>TCOM</td>
<td></td>
</tr>
<tr>
<td><strong>JASP+ EMT</strong></td>
<td>28.4</td>
<td>16.8</td>
<td>7.0</td>
<td>35.3</td>
<td>24.3</td>
<td>8.1</td>
<td>62.2%</td>
</tr>
<tr>
<td><strong>JASP + EMT + SGD</strong></td>
<td>30.5</td>
<td>17.6</td>
<td>5.1</td>
<td>54.4</td>
<td>33.1</td>
<td>14.1</td>
<td>77.7%</td>
</tr>
<tr>
<td>(difference)</td>
<td></td>
<td></td>
<td></td>
<td>19.1</td>
<td>8.8</td>
<td>6.0</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Effect Size</strong></td>
<td></td>
<td></td>
<td></td>
<td>.57</td>
<td>.34</td>
<td>.51</td>
<td></td>
</tr>
<tr>
<td><strong>P value</strong></td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.20 NS</td>
</tr>
</tbody>
</table>

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.
Total Social Communication and Initiated Joint Attention Pre, Mid, Post and 12 week Follow-up

Summary

• We have made and continue to make adaptations in EMT to fit the characteristics of child learners

• Those adaptations include:
  • Mode for communication: sign, SGD
  • Systematic emphasis on Joint Attention or social foundations
  • Systematic emphasis on symbolic representation
  • Combing direct instruction with naturalistic teaching
  • Adding targeted instruction for speech sounds

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<table>
<thead>
<tr>
<th>Population</th>
<th>Mode</th>
<th>Engagement</th>
<th>Learning Strategy</th>
<th>Baseline Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toddlers with Rec/Express Delay</td>
<td>None</td>
<td>None</td>
<td>-</td>
<td>Support partner as teacher</td>
</tr>
<tr>
<td>Down syndrome</td>
<td>+ Sign or SGD</td>
<td>Teach play, object engagement, sustained attention</td>
<td>+Dosage</td>
<td>Support partner comprehension and as teacher</td>
</tr>
<tr>
<td>Cleft</td>
<td>+ Speech targets</td>
<td>None</td>
<td>+Recast + Speech practice</td>
<td></td>
</tr>
<tr>
<td>Minimally Verbal ASD</td>
<td>+ SGD</td>
<td>Teach play, engagement</td>
<td>+Dosage +Recuse or Pre-teach Protocol: imitation, receptive language</td>
<td>Teach joint attention skills, symbolic play, Support partner as teacher</td>
</tr>
</tbody>
</table>
Partners in EMT

Communication is a partner activity
Communication Requires Partners
Hart & Risley (1995)

![Diagram showing language experience across different socioeconomic backgrounds.]
Including Parents in Intervention

- Quantity and quality of linguistic input provided by parents impacts child language development (Hart & Risley, 1995; Smith, Landry, & Swank, 2000; Tamis-LeMonda, Bornstein, & Baumwell, 2001)
- Teaching parents is cost effective (Gibbard, 2004)
- Including parents facilitates generalization to everyday contexts (Kashinath, Woods & Goldstein, 2006; Wright et al, 2013)
- Parent-implemented interventions have relatively consistent effects for children with expressive language impairment (Roberts & Kaiser, 2012)
  - Children have on average 53 more words (g=.38)
- Including parents of children with ASD improves spoken language outcomes (Hampton & Kaiser, 2016)
Parent- Implemented Enhanced Milieu Teaching

- Program of research
  - NICHD program project on children with intellectual disabilities; IES Goal 3 projects, Autism Speaks, OSERS
  - Broad population of children: ID, DS, ASD, language delayed, children at-risk due to poverty, children with CLP
  - Multiple methods: group, single subject
- Based on two assumptions
  - Communication is learned in interactions with partners
  - Changing partner support for communication can change child outcomes
- Goals:
  - Improving generalized communication outcomes for children
  - Understanding the conditions in which communication and language are learned
EMT Modifications to Fit What Partners Bring

Mode
- Home language
- Signs or SGD

Engagement Strategies
- Context (play, routines, daily living)
- Skill at engaging with child
- Expectations, Roles

Baseline Communication
- Frequency
- Fluency
- Responsiveness
- Comprehension

Teaching Strategies
- Natural adaptions
- Access to training
- Interest in specialized skills
EMT What Partners Bring

Roles: communication partnership, parenting, teacher, friend

Expectations: development, disability, change/learning

Values: connection, communication, intervention, learning

Resources: time, expertise, support, related skills

Stigma: disability, risk, poor parenting, language, poverty

Culture

Linguistic system and mode

Engagement Strategies

Baseline Communication

Teaching Strategies
What does extending EMT as an evidence based practice across cultures require?

Translating an evidence based practice is more like translating a poem than a recipe.
This study was funded by the Peabody Dean’s Office Small Grant Program, Vanderbilt, University.

CAREGIVER-IMPLEMENTED EMT EN ESPAÑOL STUDY
Why Adapt EMT?

- Low-income Spanish speaking children are at high risk for school failure
- Early vocabulary is a key indicator of risk
- Supporting vocabulary development in home language is a key foundational intervention
- Create a caregiver-implemented intervention that is culturally acceptable for low-income Spanish-speaking immigrant families
- Need for appropriate linguistic adaptations to match Spanish early language development and grammatical structure
EMT en Español: Adapting the Intervention to be Culturally Appropriate

1. Review of relevant literature
2. Interviews/surveys of Spanish-speaking parents and EI providers
3. Proposed adaptations of intervention strategies and caregiver training method to local families
4. Single-case research with three families to test effectiveness of intervention
What We Learned

- Relationship building
- Words matter: disability stigma
- Including all caregivers
- Location for training

Words matter:

stigma
**EMT Strategies: Setting a Context for Communication**

<table>
<thead>
<tr>
<th>Definition/Behaviors</th>
<th>Adaptations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sit on the floor</td>
<td>Play on the floor or at the table</td>
</tr>
<tr>
<td>Play together with toys</td>
<td>Playfully use familiar materials/ engage playfully in familiar routines</td>
</tr>
<tr>
<td>Limit questions and directions to the child</td>
<td>Notice child’s interest</td>
</tr>
<tr>
<td>Follow the child’s lead</td>
<td></td>
</tr>
</tbody>
</table>
**EMT Strategies: Responsive Interactions**

<table>
<thead>
<tr>
<th>Definition/Behaviors</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Mirror and map</td>
<td>• Use family dialect/words for mapping actions</td>
</tr>
<tr>
<td>• Notice and respond to all child communication</td>
<td>• Ask caregivers for specific input about child communication in every session (typical?)</td>
</tr>
</tbody>
</table>
EMT Strategy: Model Target Language

**Definition/Behaviors**

- Choose language targets based on child’s current communication
- Use target level language 50% of the time
- Use slightly above target level language 50% of the time

**Considerations**

- Use more verbs, model first person singular, first person plural, and third person singular inflection of verbs (Jackson-Maldonado, 2012)
- Adjust target levels to fit Spanish conventions allow more variability in target level
English Verb Inflections: An Illustration

To talk

- talk
- talked
- talks
- talking
Spanish Verb Inflections: An Illustration
Choosing Targets for Early Language Learners

hablar

hablà

hablo

hablamos
EMT Strategies: Expand Activities and Language

**Definition/Behaviors**

- Expand child’s engagement in play and activities by adding steps or modeling new ideas
- Expand child’s language by repeating child communication and adding a word

**Considerations**

- Add words to make phrase grammatically correct
- Add verbs, nouns, or descriptive words as natural
## EMT Strategies: Time Delay and Prompting

<table>
<thead>
<tr>
<th>Time Delay</th>
<th>Prompting</th>
<th>Adaptations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set up request</td>
<td>• Open question</td>
<td>• Teach procedures based on specific routines (e.g., give a choice in snack)</td>
</tr>
<tr>
<td>• Assistance</td>
<td>• Choice question</td>
<td>• Teach 1 procedure based on child current abilities (e.g., always start with open question)</td>
</tr>
<tr>
<td>• Inadequate portions</td>
<td>• Say prompt</td>
<td></td>
</tr>
<tr>
<td>• Pause in routine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Choice</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Study Design

- Single-case research design (N= 3 dyads)
- Multiple baseline across behaviors (Gast & Ledford, 2014)
- Replicated across three parent-child dyads
Participants

Mothers
• All mothers were of Mexican origin, immigrated to US
• All families had incomes below the US poverty line
• Spanish was the only or primary language spoken in the home
• Mothers had 9 or fewer years of formal education (Mn 8 yrs)

Children
• Ages 30-39 months (Mn age 35.3 mos)
• 1 girl, 2 boys
• Expressive or expressive and receptive language delays in Spanish and English
  • Mn Expressive score: 72
  • Mn Receptive score: 77
Intervention Components

• Parent training: Teach-Model-Coach-Review
• Therapist implemented EMT
• Parent implemented EMT
Parent Training Procedures

- Adaptation of Teach-Model-Coach-Review:
  - Therapist explains the intervention strategies (Teach: 5-15 minutes)
  - Therapist models the intervention strategy with the child (Model: 5-10 minutes)
  - Caregiver practices the strategy with her child with coaching from the therapist (Coach: 12-17 minutes)
  - Therapist reviews the session with the caregiver, summarizes the session, and answers the caregiver’s questions, and reflects on the effects of the intervention on the child (Review: 5 minutes).
Home Sessions

**Baseline**
- 2 times per week over 2-3 weeks
- No modeling, training or coaching
- Mothers were asked to interact with their child as they normally would
- 12 minutes of play/book coded

**Intervention**
- 2 times per week for approximately 12 weeks
- 12 minutes of play/book coded
Example of Intervention Visit

Notice and Respond: Book Sharing
Generalization and Follow-up

- 10 minute sample of parent-child interaction using an untrained set of materials
- Assessed at end of baseline, middle and end of intervention, 3 month followup, 6 month followup
Measures

- Parent use of EMT strategies during baseline, training, generalization, and followup
  - Matched turns and targets
  - Expansions
  - Time Delay and Milieu Teaching Prompts
- Child spontaneous use of new words
- Coded from video recorded and transcribed home sessions
  - Reliability on parent and child behavior assessed for 20% of sessions
  - Fidelity of therapist implementation (Model) and parent training procedures assessed for 20% sessions
  - Reliability on 20% of fidelity assessments
Mother 1
Mother 2
Mother 3
Number of Different Words (NDW) Used Spontaneous During Intervention

- Child 1  70 words (18 intervention sessions; 3.9/session)
- Child 2  74 words (16 intervention sessions; 4.6/session)
- Child 3  44 words (incomplete; 10 intervention sessions; 4.4/session)
Next Steps

• Complete generalization and follow up assessments
  • Parent use of EMT with untrained materials at home
  • Child spontaneous use of new words (NDW)
• Complete child post intervention assessments
  • PLS-5
  • Language sample
  • MCDI (parent report of words used and understood)
Social Validation

• Parent evaluation of the acceptability, feasibility and effectiveness of the EMT strategy (both EMT for child and TCMR for parent)
  • Caregiver report of use of strategies at home, of teaching strategies to other family members
• Professionals with experience with similar Spanish-Speaking families
Summary of Results

- Proof of concept demonstration
- Initial adaptation of cultural and linguistic adaptation of EMT
- Effective caregiver training
  - Caregivers learned strategies with brie training
  - Near criterion levels achieved in previous studies
- Modest effects on child vocabulary
  - Cumulative changes in child spontaneous vocabulary
What attempting to translate has taught us

- Essential features of EMT and criterion levels need an empirical analysis in cultural context
  - Balance of turns
  - Forms of linguistic modeling
  - Prompting
  - Connected communication
- Fidelity as a construct needs validation in a cultural context
- How to teach partners needs further research
- The role of the therapist should vary
  - As expert
  - As the child’s language teacher
  - As partner coach
What attempting to translate has taught us

- Challenges in obtaining a valid sample of child language skills
- Time required for therapist-parent relationship building
- Challenges in encouraging the parent to provide candid feedback
- Strategies for involving other caregivers and family members may vary
- Need to simplify explanations and criteria for EMT strategies
Summary: Building a Robust Evidence-Based Intervention

- **Adaptations to EMT instructional procedures**
  - + Add procedures to teach joint attention, symbolic play (JASPER)
  - + Add Discrete Trial Training to teach prerequisites
  - + Add Mode – SGD or Sign
  - + Add phonological targets and recasting
  - - Reduce or simplify prompting
  - + Individualize targets
  - + Adjust dosage

- **Adaptations in the provision of EMT**
  - + Emphasize positive behavior support strategies
  - + Adapt parent training to cultural and linguistic context
    - Train in home language
    - Teach parents EMT to support home language
    - Adjust linguistic targets to reflect typical development in home language
    - Adjust interaction style, activities to fit parent culture, home
**Last words**

- EMT is evolving with new individualized adaptations
- The core of the intervention is always the social communicative connection between the child and partner
- The most important immediate outcome is increased communication
- Fine tuning intervention to fit child characteristics and the partner can improve outcomes when combined with the core EMT and components are delivered at fidelity
Appreciation!

- KidTalk Research Team at Vanderbilt
- Families and children who participated in our studies
- Our collaborators
  - Connie Kasari (UCLA)
  - Danny Almirall (Univ of Michigan),
  - Rebecca Landa (Kennedy Kreiger, Johns Hopkins Univ)
  - Tristan Smith (Univ of Rochester)
  - Nancy Scherer (ASU)
  - Jennifer Frey (GWU)
  - Megan Roberts (Northwestern Univ)
  - Juliann Woods (FSU)
  - Michal Harty (UCT)
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- John Merck Foundation, HRSA
- For more information Ann.Kaiser@Vanderbilt.edu
- This talk will be posted at: http://kc.vanderbilt.edu/KidTalk/
- Follow us on Facebook: Vanderbilt Kidtalk