Enhanced Milieu Teaching: An NDBI-Based Intervention for Promoting Language Development

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Context: EMT Research Program

• *Language intervention* for children at the early stages of language learning
  • Average ages 15-42 months; Mn age approximately 30 mos
  • Typically fewer than 20 words, approximately 10th percentile on the MCDI
  • Not yet generatively combining words
  • Range of populations: ASD, DLD DS, Cleft Palate

• *Caregiver Plus Therapist implemented* naturalistic interventions
  • Systematic parent training (Teach-Model-Coach-Review)
  • Varied dosages of therapist intervention
  • Varied lengths of treatment
  • Combinations with other intervention components to maximize outcomes
Enhanced Milieu Teaching - A Naturalistic Developmental Behavioral Intervention (NDBI, Schriebman et al., 2017)

Enhanced Milieu Teaching (EMT)

- EMT is a widely studied intervention with consistently positive effects on various language forms and structures (Kaiser & Hampton, 2016).
- Gains in language have been observed in children with intellectual disabilities:
  - Classes of language structures (Goldstein & Mousetis, 1989; Warren, Gazdag, Bambara, & Jones, 1994),
EMT Principles and Strategies

1. **Promote adult-child communication now**
   - Notice and respond
   - Follow the child’s lead

2. **Expand the social basis of communicative interactions**
   - Arrange environment to increase engagement and communication
   - Teach joint attention strategies
   - Balance turns
   - Increase person engagement

3. **Increase child engagement with objects and activities**
   - Child preferred activities
   - Join the child in play and activity
   - Teach play and participation skills
   - Teach across play and routines

4. **Teach child language form and use**
   - Respond with target language
   - Model
   - Expand
   - Prompt

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EMT Active Ingredients

- Environmental arrangement to promote communication
- Play and engage
- Follow child’s lead in conversation and activity
- Respond to child communication
- Model target language in context
- Expand child communication
- Use Time Delays to elicit requests or initiations
- Use Milieu Teaching Prompts to promote practice
- Teach across settings, activities and partners
- Partner Training
Language Specific Focus

Linking social communication and linguistic systems

Progressive targets and input

Attention to receptive and productive language

Goal: improving Long-term language outcomes

Caregiver-Child Dyad as the basis

Fig. 1: Developmental landscape for language acquisition and intervention. Image adapted from Waddington (1957, p. 29).
EMT Child Communication Goals

• Increase duration of engagement
  • Social (joint engagement)
  • Objects (play)
  • Communicative (turns)
• Increase rate of communication
  • Emphasize spontaneous social initiations
• Increase diversity of communication
  • More words and phrases
  • More functions (requests, comments, questions)
  • Across more contexts
• Increase complexity of communication
  • Prelinguistic to linguistic,
  • Mean length of utterances
  • Complexity of utterance types
• Increase independence
  • Initiated social communication
  • Generalization across contexts, people
Promote adult-child communication

• Notice & Respond and Follow the Child’s Lead
Expand the social basis of communicative interactions

• Teach joint attention skills

• Balance Turns
Teach child communication target forms to advance language

• Respond with Target Language

• Expand

• Prompt
Tying it all together
JEMT in the real world
### Informed by NDBI Studies  Across Populations of Young Children

<table>
<thead>
<tr>
<th>Population</th>
<th>Age at Entry</th>
<th>Intervention</th>
<th>Implementers</th>
<th>Setting</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASD</td>
<td>24-36 mos</td>
<td>JASPER-EMT</td>
<td>Parent + Therapist</td>
<td>Home</td>
<td>RCT IES Goal 3</td>
</tr>
<tr>
<td>ASD  Pre/ Minimally Verbal</td>
<td>36-48 months</td>
<td>JASPER-EMT + DDT (PRN) w/AAC</td>
<td>Parent + Therapist</td>
<td>Home and Clinic</td>
<td>RCT HRSA</td>
</tr>
<tr>
<td>DLD English A</td>
<td>24-42 mos</td>
<td>EMT</td>
<td>Parent + Therapist</td>
<td>Home and Clinic</td>
<td>RCT IES Goal 3</td>
</tr>
<tr>
<td>DLD English B</td>
<td>30 mos</td>
<td>EMT- Sentence focused</td>
<td>Parent + Therapist</td>
<td>Home</td>
<td>RCT NIDCD U01 Ongoing</td>
</tr>
<tr>
<td>DLD Spanish</td>
<td>24-36 mos</td>
<td>EMT</td>
<td>Parent + Therapist</td>
<td>Home</td>
<td>RCT NIDCD R21, RCT IES Goal 3 Ongoing</td>
</tr>
<tr>
<td>Cleft Lip +/or Palate</td>
<td>15-24 mos</td>
<td>EMT- Phonological Emphasis</td>
<td>Therapist</td>
<td>Clinic Home + Clinic</td>
<td>RCT NIDCD R21 Proposed</td>
</tr>
<tr>
<td>DS</td>
<td>30-42 mos</td>
<td>JASPTER EMT w/AAC</td>
<td>Parent + Therapist</td>
<td>Home and community /school</td>
<td>RCT Merck</td>
</tr>
</tbody>
</table>

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Things we worry about in the night

• Treatment effects that have clinical and practical significance
• Accelerating the trajectory of development – closing the gap
• Advancing complex language development – cascading effects
• Improving response to treatment – decreasing the percentage of children that are low or non responders
The gap between children with language delays and typical children

Spoken language outcomes for children with ASD

.26 ES (.11-.42) for overall language outcomes
.42 ES (.24-.60) for clinician plus parent

Hampton & Kaiser, 2017

Hampton & Kaiser, 2017

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IPSyn Z Score for Treatment/Control

at Pre, Post, 6 months & 12 months

➢ Children who received treatment maintained their status relative to their peers; however, their expressive syntax remained severely delayed. \(Mean \ z = -2.88, 12\)-month follow-up).

➢ In contrast, children in the control group lost ground relative to age expectations. \(Mean \ z = -5.04, 12\)-month follow-up).
Assumptions about optimizing language intervention outcomes

• Phenotypic characteristics of specific populations generally predict communication and language development
• Phenotypic adaptations can optimize intervention outcomes
• Within populations (phenotypes), multiple factors influence individual children’s trajectories
  • Baseline characteristics, mode, learning strategies, related skills
• Child characteristics, especially stage of language learning and growth trajectory influence dosage and developmental precision required in intervention
• Partner characteristics influence child outcomes in dyadic development and intervention
  • Availability, interest, baseline skill, access to systematic training and support, role fit
What do children bring to intervention?

- Access to Linguistic Input
- Support for interaction

- Person
- Object
- Activity
- Self-regulation
- Social motivation

- Rate
- Diversity + Complexity
- Intelligibility
- Mode

- Imitation
- Auditory memory
- Efficiency
EMT Modifications to Fit Children With ASD

- Teach imitation
- Add discrete trials for teaching strategies, form
- Increase therapist engagement
- Increase person engagement
- Teach coordinated joint attention
- Social motivation
- Teach play
- Provide alternative mode
- Signs
- SGD
- Teach partners mode
- Teach joint attention skills
- Teach positive behavior support
- Baseline Communication
- Learning Strategies
- Engagement Strategies
- Mode

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Individualized systems of instruction to optimize early development

**Target Communication Skills**
- Rate
- Diversity & Complexity
- Intelligibility
- Mode

**Support Communication Partners**
- CORE EMT strategies
- Linguistic Input at child’s level
- Mode
- Co-intervention approach

**Increase Engagement**
- Person
- Object
- Activity/Routine
- Self-regulation
- Social motivation

**Teach Learning Strategies**
- Imitation
- Response to prompts
- Discrimination
- Generalization

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## 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, target increasing rate of social communication</td>
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</tbody>
</table>
## Examples of Phenotypic Specific Modifications

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<th>Learning Strategy</th>
<th>Baseline Communication</th>
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<tr>
<td>Pre or Minimally Verbal ASD Preschoolers</td>
<td>+ SGD</td>
<td>Teach symbolic play, Increase social and object engagement,</td>
<td>+Dosage +DTT for imitation, joint attention, receptive language + SGD (PRN)</td>
<td>Teach joint attention, receptives, strategies for learning SGD</td>
</tr>
<tr>
<td>Newly diagnosed Toddlers with ASD</td>
<td>No</td>
<td>Increase social and object engagement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toddlers with Receptive/Expressive Delay (English)</td>
<td>No</td>
<td>No</td>
<td>Increase access to partner input for complex language; change input over time +vocabulary diversity + increase noun+ verb combinations + increase diverse sentence structure + fine tune attention to environment/language</td>
<td>Support partners to provide specific and progressive linguistic input Emphasize receptive and productive skills</td>
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<tr>
<td>Down syndrome</td>
<td>+ Sign or SGD</td>
<td>Teach play and attention regulation</td>
<td>+Dosage +DTT/Matrix training for transition to word combinations</td>
<td>Support partner comprehension, use of SGD</td>
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<tr>
<td>Cleft Lip+/or Palate</td>
<td>+ Speech targets</td>
<td>No</td>
<td>+Recast for sound production at word level +Speech practice/priming with DTT</td>
<td>Increase rate of child talk and partner response</td>
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<tr>
<td>Pre or Minimally Verbal ASD Preschoolers (Hampton, Fuller &amp; Kaiser, under review)</td>
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<td>Teach joint attention, receptives, strategies for learning, SGD</td>
</tr>
<tr>
<td>Newly diagnosed Toddlers with ASD (Kaiser and Roberts, in preparation, 2019)</td>
<td>No</td>
<td>Increase social and object engagement Social motivation</td>
<td>+ Behavior supports + Shorter play routines with breaks +Tangible SR+ + Environmental modifications (PRN and faded)</td>
<td>Teach joint attention, receptives Teach partners positive behavior support</td>
</tr>
<tr>
<td>Toddlers with Receptive/Expressive Delay (English) (Roberts &amp; Kaiser, 2015; Kaiser, Roberts&amp; Hadley, ongoing)</td>
<td>No</td>
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<td>Increase access to partner input for complex language; change input over time +vocabulary diversity +increase noun+ verb combinations + increase diverse sentence structure +fine tune attention to environment/language</td>
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Why We Include 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, )

• Parent-implemented interventions have relatively consistent effects for children with expressive language impairment (Roberts & Kaiser, 2011)
  • Children have on average 53 more words \( (g=.38) \)

• Including parents of children with ASD improves spoken language outcomes (Hampton & Kaiser, 2017)
Maximizing Intervention Effects

Teach-Model-Coach-Review Parent Training
(Parent Intervention Roberts et al, 2014;)

- Based on 6 adult learning strategies (Dunst & Trivette, 2009).
- Simultaneous use of different methods has the largest effect (d=1.25).

<table>
<thead>
<tr>
<th>Coach</th>
<th>• Coached the caregiver while she practiced the strategy with the child</th>
</tr>
</thead>
</table>
| Review | • Last 10 minutes of each session  
       | • Discussed the session  
       | • Linked parent and child behaviors  
       | • Made a plan for home use of strategies |
Individualized Systems Of EMT for Young Children with ASD

**Individualization**

- Child social communication targets
- Child linguistic targets
- Child mode
- Direct teaching (DTT)
- Caregiver Training and Coaching
- Balance of Therapist Intervention/Caregiver-implemented intervention
- Progress monitoring and adaptations
- (Collaboration with other therapies and educational intervention)
Monitoring Child and Caregiver Progress: Adaptations

**CAREGIVER**
- Mastery of CORE EMT interaction strategies
- Mode fluency
- Model language at the child’s target level
  - Receptive targets
  - Expressive targets
  - Use of child mode
  - Use advanced modeling strategies (aka Juicy Talk: contingent, varied, grammatically correct at child level+)
- Changing targets based on child progress
- Generalized use of CORE EMT and targets across settings and routines
- Progressive maintenance (adaptation) of targets

**CHILD**
- Social foundations:
  - Sustained engagement with persons and objects,
  - Joint attention behaviors
  - Play
  - Turn taking, social responding with gesture, words, and/or SGD, social initiations
  - Rate of social communication
- Mode foundations
- Vocabulary (progressive goals)
  - 30 core words; 100 words,
  - 10 verbs, including general purpose verbs
  - 10 noun + verb diverse combinations; 30 diverse combinations
- Syntax (progressive goals)
- Decontextualized language and narratives
Summary

**EMT Adapted for Children with ASD**
- + Parents as co-therapists
- + Add procedures to teach joint attention, symbolic play (JASPER)
- + Add Discrete Trial Training to teach prerequisites
- + Add Mode – SGD or Sign
- + Add advanced linguistic input

**EMT for Adaptations for Individual Children**
- + Individualize targets, progressive targets over time
- + Adjust dosage dynamically
- + Emphasize positive behavior support strategies
- - Reduce or simplify prompting, adapt over time
- + Adapt parent training to cultural and linguistic contexts
  - Train in home language
  - Teach parents EMT to support home language
  - Use family routines and activities; adapt interaction to be consistent with parenting style
  - Adjust linguistic targets to reflect typical development in home language
Looking Back and Forward

What we have

• Evidence of EMT as parent plus therapist intervention across populations

• Evidence of effects of EMT for children with ASD, particularly when blended with additional intervention components

• Evidence of effectiveness of caregiver training procedures

• Precise methods for assessing fidelity of EMT, variations and caregiver training

What we need

• A comprehensive system for EMT intervention that articulates the decisions for tailoring related to general and specific characteristics of children with ASD

• Guidelines for integration of effective active ingredients with differentiated measurement

• Research on effectiveness of systems and integrated interventions

• Research on long term language outcomes: benchmarks, trajectories

• Research on adaptations for culture and linguistic background

• Accessible training in individualized interventions for practitioners
For more information

- Website: http://kidtalk.vkcsites.org/
  - Recent research
  - Information for parents and practitioners
  - This presentation and other related presentations
- Email me: Ann.Kaiser@Vanderbilt.Edu