Enhanced Milieu Teaching

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ABSTRACT
Enhanced milieu teaching (EMT) is a naturalistic, conversation-based strategy for teaching language and communication skills to children in the early stages of language development (mean length of utterance [MLU] 1.0–3.5). More than 50 empirical studies have provided evidence for the efficacy and effectiveness of EMT for preschool children with significant cognitive and language delays; children with autism spectrum disorders; and children from high-risk, low-income families. EMT is a hybrid intervention based on three components: environmental arrangement, responsive interaction (RI), and milieu teaching (MT). Effective use of EMT requires high fidelity in the implementation of these three components and precise teaching of specific child targets. This chapter describes EMT procedures and their theoretical and empirical bases with a specific emphasis on parent-implemented applications.

INTRODUCTION
EMT is a naturalistic language teaching procedure that combines RI strategies (contingent semantic feedback, modeling language targets in descriptive talk, expansions, balanced turn taking) and MT procedures to prompt language production (elicitive models, mands, time delays, and incidental teaching). EMT focuses on promoting children’s functional use of productive language skills in naturalistic interactions.

TARGET POPULATIONS AND ASSESSMENTS FOR DETERMINING TREATMENT RELEVANCE AND GOALS
EMT derives from a set of naturalistic teaching procedures that have been used since the middle 1970s (Hart & Risley, 1975; Hart & Rogers-Warren [Kaiser], 1978). EMT and its precursors have been used with a wide range of children in the early stages of communication development including children with mental retardation (Hamilton & Snell, 1993; Hemmeter & Kaiser, 1994; Warren & Bambara, 1989), children with autism (Hemmeter & Kaiser,

Although EMT can be used effectively for many children, children with the following characteristics are most likely to show rapid changes in their communication skills (Kaiser, Yoder, & Keetz, 1992):

- Children who are verbally imitative
- Children who have at least 10 productive words
- Children with MLUs between 1.0 and 3.5

Verbal imitation is a prerequisite because the core MT techniques (modeling, mand modeling, time delay, and incidental teaching) rely on adult modeling and child imitation to practice the response in a functional context. Children who already show some spontaneous production of single words present the adult using EMT with opportunities to both provide expanded models in response to the child and to practice the functional use of existing language within the scaffolded context of the EMT session. EMT appears to be ideally suited to teaching children who are in the early stages of language learning, particularly children who do not verbalize frequently and who are learning vocabulary or early semantic relationships.

In general, EMT is suitable for any parent who is willing to commit time and energy to learning and practicing the EMT intervention. Typically, the parents take 24–36 sessions to learn the intervention. This translates to approximately 3–5 months of the parent attending sessions twice per week. Parents must be willing to engage as learners and be coached by another adult. Some parents may feel uncomfortable with our direct teaching approach that includes feedback and coaching in every session. We feel that an important component of the intervention is working with parents and children in their home environment so they can apply the principles they learn to interactions with their child at home. Occasionally we have encountered parents who were not comfortable having a professional come to their home. In these cases, professionals need to decide how important a home component is for their intervention goals. Parents who participate in our EMT intervention have been willing to spend time, energy, and resources coming to our center. Self-selected parents may be different from parents in the general population. Among our middle income sample of parents, parents’ age, education, or gender has not been predictive of their success in learning the EMT intervention. With low-income parents, the amount of life stress they are experiencing is predictive of their success in completing the EMT program. Because our training is conducted one-on-one with parents, we individualize for a parent’s needs and learning styles. Professionals who conduct EMT in a group format may have to consider the skills and backgrounds of parents who can benefit from less individualized instruction.
THEORETICAL BASIS

EMT procedures derive from three distinct theoretical perspectives on early language learning. The MT procedures, which are used to prompt functional use of target language, reflect a behavioral perspective on language learning and instruction (Hart & Rogers-Warren, 1978). In this view, stimuli set the occasion for language, children’s responses are related to those stimuli, and the consequences that follow child communicative responses are important to the subsequent use of those forms. In everyday terms, the use of communication forms will occur in specific contexts when use results in desired positive consequences. The antecedent-behavior-consequence paradigm creates instructional opportunities from which children can learn new language skills. In a behavioral approach to language, modeling, imitation, and prompted practice of productive language skills are key processes. Basically, the adults who are teaching prompt children to use language by presenting antecedent stimuli (e.g., models, mand, time delays) that tell the child when to talk and what to say. Children responding to these prompts are reinforced by the consequences adults provide contingent on their communication. Reinforcement plays an important role in the behavioral modeling of language learning because it serves both to increase the frequency with which children make communicative responses and to provide differential feedback for relatively more effective and appropriate target language forms. Hart and Risley’s (1968, 1975) early adaptations of the behavioral paradigm to teach language in natural environments linked typical behavioral teaching/learning procedures to instruction in functional contexts for children. At its core, EMT remains grounded in behavioral principles for prompting, reinforcing, modeling, and shaping new language. Imitation and production practice with feedback are essential child behaviors for learning in this framework. Embedded in the four milieu teaching procedures (model, mand-model, time delay, and incidental teaching) are strategies for shifting control of the child responses from imitation (model), to responses to questions and mands (mand-model), to the child initiating requests and comments (time delay and incidental teaching). The behavioral paradigm dictates what will be taught in EMT: specific targets that are functional in the child’s immediate environment.

Selection of targets in EMT is, however, driven by both functional and developmental considerations. A general developmental sequence for semantic and syntactic forms is followed in selecting targets for the early stages of learning (e.g., Brown’s stages I–IV), and specific lexical items (e.g., nouns, verbs, modifiers) are typical words for early language learners. Targets are vocabulary, semantic, and early syntactic classes, but the specific examples taught are those that are immediately functional in the child’s environment. Thus, the behavioral emphasis on functional communication is maintained while the general content being taught is consistent with developmental sequences derived from observations of typical language learners.
The behavioral perspective dictates a strong interest in critical phases of learning: acquisition, generalization, and maintenance. Many children with significant language delays, particularly children with mental retardation, will have difficulty with generalizing newly learned forms to other contexts, people, and settings (Goldstein, 1993; Kaiser & Warren, 1987; Yoder & Warren, 1998). EMT embodies the core principles for promoting generalization that were first outlined by Stokes and Baer (1977), including teaching multiple exemplars, teaching with multiple trainers, teaching in multiple settings, loose training (allowing natural variations in stimuli and reinforcers to occur), and training specifically to promote generalization to functional contexts.

A second theoretical strand in EMT is a social interactionist perspective on the learning of language through meaningful communicative interactions (Bruner, 1975). From this perspective, language is learned in the context of social interaction, particularly interactions between children and their caregivers. The responsiveness of the caregiver to the child’s communicative attempts provides a framework in which models of new language (without prompts to imitate) occurring continguously with the child’s focus of attention and actions support the child’s learning new forms and meanings. The learning of language in this model is driven by the social purpose of communication, but the adult plays a critical role in reading the child’s intentions and providing language that maps the child’s interests and focus. The child’s ability to learn from adult models in social context is presumed to be based in the child’s emergent cognitive skills. Ideal targets would include those for which the child already has the underlying concept or some features of the concept. Modeling language in the context of the child’s attentional focus would be sufficient to assist the child in mapping his underlying knowledge and/or social intention with spoken language.

EMT emphasizes reciprocity, turn taking, following the child’s lead in play and conversation, semantically contingent (meaningful) feedback, and expansions of child utterances to model more complete forms. Language learning results from responsive modeling of increasingly complex forms in social, dyadic interactions. Developmental studies have shown these interactional strategies to be associated with optimal language learning in typical mother–child dyads (Moerk, 1992). It is relatively easy to blend procedures derived from behavioral and social interactionist perspectives because both perspectives maintain the importance of modeling language in context to promote acquisition of meaning and forms. Both teach new communication forms during ongoing social interaction and promote responding to children’s communication attempts while introducing more complex forms for communication contingent on children’s expressed intentions. The difference between the two perspectives lies in the explicit use of prompting strategies to promote production in a behavioral model versus relying on children’s spontaneous imitation of forms in the social interactionist model. In a behavioral perspective,
t in critical phases of many children with mental retardation, to other contexts, 987; Yoder & Waring generalization teaching multiple settings, loose events to occur), and contexts.

A perspective in the context of children and their communicative activities (without focus of attention means. The learning of communicative intentions and rules. The child's ability to be based in the those for which purposes of the contextual focus would knowledge and/or child's lead in play back, and expansion language learning forms in social, interactional typical mother--child--tended derived both perspectives to promote interaction forms during children's communicative communication interplay between the roles to promote spontaneous interactional perspective.

child practice in producing new target forms is presumed to be necessary for mastering those forms. In addition, while a behavioral perspective makes reinforcement an explicit process in learning, a social interactionist approach relies on social relationships between children and their caregivers to maintain children's interest in learning and using language. In the latter case, the child is presumed to be the active constructor of new language knowledge; cognition drives the child's analysis, acquisition, and integration of new language forms in his or her emergent communication repertoire. In sum, when these differences are seen as points on a common continuum representing learning forms and functions of language in social contexts, it is possible to anchor EMT in both theoretical perspectives, as we have done.

A third perspective that informs EMT, as described in this chapter, is the emphasis on parents as language teachers. Both behavioral and developmental social interactionist theories support the involvement of primary caregivers in child language intervention. The behavioral perspective emphasizes that language is learned when it is functional for communication; such learning occurs in environments that provide both stimuli (e.g., contexts, setting events, specific social communicative events) and contingencies for a child's attempts to communicate. Generalization is promoted when the stimuli and consequences of language occur in the natural environment; thus, parents in everyday settings are likely to use both naturally occurring stimuli (events, objects, interaction) to teach language and the child is likely to be reinforced by the functional consequences of his communication. In the social interactionist perspective, the ongoing interactions between child and parent provide social meaning, physical proximity, and an affective relationship that will be supportive of language learning. Parents are ideal teachers because of their likely responsiveness to child communicative attempts, ability to closely monitor child communicative attempts based on proximity to the child, and their ability to provide language that elaborates those attempts. In typical learners, parent linguistic modeling and responsiveness to communication shapes early language development; thus, a social interaction perspective on early intervention places parents in the key role as teachers of new language in the context of ongoing parent-child interactions.

EMPIRICAL BASIS

Since 1978, the authors have been engaged in a series of research studies investigating the effects of naturalistic language interventions implemented by parents, teachers, and therapists. In the course of this research, four approaches to naturalistic teaching have been developed and tested 1) MT, 2) RI, 3) EMT, and 4) blended EMT and behavior intervention (see Table 9.1). EMT is a hybrid of the MT and RI approaches. The synthesis of these approaches is ideal for parent implementation because it builds responsiveness
Table 9.1. Naturalistic teaching approaches

<table>
<thead>
<tr>
<th>Approach</th>
<th>Description</th>
<th>Key components</th>
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<tbody>
<tr>
<td>Milieu teaching</td>
<td>Parent teaches functional language in context of natural conversations.</td>
<td>Environmental arrangement</td>
</tr>
<tr>
<td>(Alpert &amp; Kaiser, 1992)</td>
<td>Prompts are used in conjunction with functional consequences</td>
<td>Modeling</td>
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<td></td>
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<td>Mand modeling</td>
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<td>Time delay</td>
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<td></td>
<td></td>
<td>Incidental teaching</td>
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<tr>
<td>Responsive interaction</td>
<td>Parent models developmentally appropriate language in conversational</td>
<td>Following child's lead</td>
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<tr>
<td>(Kaiser et al., 1996)</td>
<td>interactions.</td>
<td>Semantically responsive feedback</td>
</tr>
<tr>
<td></td>
<td>Models, meaningful recasts, and expansions are contingent on</td>
<td>Model talk at target level</td>
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<tr>
<td></td>
<td>child communication.</td>
<td>Expansions</td>
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<td></td>
<td></td>
<td>Balanced turn taking</td>
</tr>
<tr>
<td>Enhanced milieu teaching (EMT) (Hemmeter &amp;</td>
<td>Parent's use of milieu teaching prompt strategies are embedded in</td>
<td>Environmental arrangement</td>
</tr>
<tr>
<td>Kaiser, 1994)</td>
<td>responsive conversational interactions with child.</td>
<td>Responsive interaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milieu teaching</td>
</tr>
<tr>
<td>Blended EMT and behavior intervention</td>
<td>Parent uses the EMT approach and also positively supports the</td>
<td>Environmental arrangement</td>
</tr>
<tr>
<td>(Hancock, Kaiser, &amp; Delaney, 2002)</td>
<td>child's behavior.</td>
<td>Responsive interaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milieu teaching</td>
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<tr>
<td></td>
<td></td>
<td>Behavior support techniques</td>
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</tbody>
</table>

within the parent–child relationship while providing the child with specific support for language production. We developed the blended EMT and behavior intervention approach for children who present with both language delays and specific behavioral problems that make it difficult for the parent and child to play together. In this variation of EMT, we teach parents strategies for giving instructions effectively and ways to manage their child's behavior consistent with a naturalistic teaching paradigm (increased responsiveness to child's communication attempts, descriptive feedback about behavior, environmental arrangement to promote engagement).

**Milieu Teaching**

MT is a conversation-based model of early language intervention that uses child interest and initiations as opportunities to model and prompt language use in everyday contexts (Hart & Rogers-Warren, 1978). Experimental applications of MT typically have included four sequential steps: 1) arranging the environment to increase the likelihood that the child will initiate to the adult; 2) selecting specific language targets appropriate to the child's skill level; 3) responding to the child's initiations with prompts for elaborated lan-
language consistent with the child's targeted skills; and 4) functionally reinforcing the child's communicative attempts by providing access to requested objects, continued adult interaction, and feedback in the form of expansions and confirmations of the child's utterances.

More than 50 studies incorporating variants of MT have been conducted (see Kaiser et al., 1992, for a partial review). Our model of MT extended and specified the incidental teaching model of Hart and Risley (1968, 1975) to include four related procedures: 1) elicitive model, 2) mand-model, 3) time delay, and 4) incidental teaching.

In an early efficacy study, Alpert and Kaiser (1992) investigated the effects of teaching six mothers of preschoolers with language impairments to use these four milieu language training procedures: model, mand-model, time delay, and incidental teaching. The children participating in the study were all boys between the ages of 35 and 51 months who had at least a 10-month expressive delay (range = 11–27 months) at the beginning of the study. Additionally, four of the six boys had a severe articulation disorder. A multiple baseline design across pairs of mother–child dyads and within each dyad across milieu techniques was used to evaluate the effects of training. All mothers learned the milieu procedures; all children in the study increased their use of total and spontaneous targets during their mothers’ implementation of the MT procedures. All mothers used MT during home observation sessions. Mothers also generalized use of these techniques to two nontraining situations (domestic chore and television on) and showed acceptable levels of maintenance 3 months after training was completed. Comparison of child language behaviors at baseline and maintenance showed improvements in three areas for four of the six children: 1) average monthly gains in MLU exceeded or were approximately equal to the increase predicted for normally developing children; 2) number of total words produced and number of novel words produced more than doubled; and 3) increases occurred in the number of children's communicative requests. Two of six children did not show clinically significant gains on these developmental measures. Note that developmental measures were collected by an adult not involved in training. Transcription was completed by trained coders who were not otherwise associated with the study. The findings of this study suggested that mothers could be taught to correctly apply milieu language teaching procedures and that use of these procedures may have a positive effect on children's acquisition of new vocabulary, early syntactic/semantic forms, and appropriate use of requests.

**Responsive Interaction**

RI includes a set of behaviors (e.g., following the child’s lead, responding to the child's verbal and nonverbal initiations, providing meaningful semantic feedback, expanding the child's utterances) that maintain the child's interest
in the conversation and provide linguistic models slightly in advance of the child's current language (Kaiser & Delaney, 2001). We began by comparing MT with RI in a series of studies with parents and teachers. In one of the early efficacy studies, Kaiser and colleagues (1990) compared the effects of parent-implemented RI with parent-implemented MT on children's language outcomes. Thirty-six preschool-age children with developmental disabilities and their parents were randomly assigned to either the RI condition ($N = 18$) or MT ($N = 18$). Parents in both groups completed 24 individualized sessions and similar child language targets were taught in the RI and MT interventions. The majority of parents reached preset criterion levels for the strategies taught in their assigned intervention group. No main effects for treatment type were observed; children in both groups showed improvements in language skills from pre- to posttesting. Children at the lower end of the language continuum of children enrolled in the study (MLU < 1.8) appeared to respond better to the MT intervention while children at the upper end of the language continuum of children enrolled in the study (MLU > 3.0) responded somewhat better to the RI intervention.

In one of the later efficacy studies, Kaiser and colleagues (1996) evaluated the effectiveness of parent-implemented RI on the language and communication skills of preschool children with disabilities. Twelve parents participated in individual training sessions. A multiple baseline design across groups of families was used to evaluate the parents' use of the intervention strategies and the effects of the intervention on the children's language skills. Results indicated that all parents learned to use the procedures after 20 sessions in the clinic and generalized their use of the procedures to interaction sessions conducted in the home. Although there was variability in child outcomes, positive effects were observed for all children. Maintenance sessions conducted with nine of the 12 parents 6 months after the end of training indicated that all of these parents maintained their use of the procedures. In addition, seven of the nine children who participated in the maintenance sessions were observed to use their targeted language spontaneously at levels comparable to or higher than the levels achieved during intervention. All parents indicated that they were highly satisfied with their participation in the intervention and the effects of the intervention on the language and communication skills of their children.

**Enhanced Milieu Teaching**

Although these comparison studies did suggest differential treatment effects for some children, they also suggested that the majority of children could benefit from either RI or MT. Based on these findings, EMT emerged. EMT is the third generation of naturalistic teaching strategies, building on the principles of incidental teaching (Hart & Risley, 1968) and MT (Hart & Rogers-Warren, 1978) and adding systematic principles for responsive conversational
EMT blends three components: 1) environmental arrangement to support language learning and language teaching (i.e., choosing activities of interest to the child, arranging for natural opportunities to prompt language, and natural positive consequences of using language); 2) RI; and 3) limited MT episodes.

In an early efficacy study, Hemmeter and Kaiser (1994) examined the effects of training four parents to use EMT with their preschool-age children with developmental delays. A multiple baseline design across three intervention strategies was used to assess the parents’ acquisition of the strategies. A multiple-probe design across two families, replicated across two additional families, was used to assess the effects of parents’ implementation of the strategies on their children’s communication skills. The parents learned to use the strategies in the clinic and generalized them to the home. Positive effects were observed on children’s spontaneous communication and target use and on parent and child affect. Evidence of positive effects on language development measures was observed for three of the four children. Three of four children showed gains of 12 months or more (> 2 standard deviations [SD]) on their receptive skills as measured by the Sequenced Inventory of Communication Development-Revised (SICD-R; Hedrick, Prather, & Tobin, 1975); two children showed gains on their expressive skills as measured by the SICD-E (> 1.5 SD). All children had more spontaneous words at the posttest; three children more than doubled their spontaneous words in the language sample. MLU increases were not significant for any of the children.

In a later efficacy study, Kaiser and Hancock (2000) compared parent-implemented RI with EMT implemented by parents and EMT implemented by therapists. Seventy-three preschool-age children in the early stages of language learning (performance on standardized tests indicating approximately 24 months language age; 10 productive words) with significant cognitive and language delays and their parents were recruited to the study. Children were then randomly assigned to one of the three intervention conditions: 1) RI-Parent (N = 18), 2) EMT-Parent (N = 19); 3) EMT-Trainer (N = 18), or 4) a non-treatment control group (N = 18). Child participants were an average of 45 months of age (range = 30–77 months), had an IQ of 66 (range = 40–119), and had an MLU of 1.58 (range = 1.00–2.43) at the beginning of the study. A typical parent was a Euro-American mother who was married and had a high school education. The mean age of parents was 34 years. Parents in the four groups did not differ significantly in age, education, or family resources. For the intervention groups, child and parent measures were collected during baseline (5–7 sessions), treatment (24 sessions), follow-up (once per month for 6 months), and home generalizations were conducted pre- and posttreatment.

RI and EMT implemented by both therapists and parents were effective in teaching language targets during the intervention. All three intervention approaches produced positive effects on language development (e.g., MLU,
productive syntax measured by the SICD-E, Peabody Picture Vocabulary Test–Revised [PPVT-R]; Dunn & Dunn, 1981) assessed 6 months after the intervention. Children whose parents were trained to use RI or EMT performed better on measures of productive language (SICD-E, MLU) at the 6-month follow-up than did the EMT-Trainer group who got the intervention directly from a clinician (the effect size, or \( d = .3 \) for parent versus trainer-implemented interventions). Differences between the two parent-implemented interventions on measures of children’s productive syntax were small, with children in the EMT-Parent group gaining an average of 1.2 months for every month of intervention versus children in the Parent-RI group gaining an average of 0.73 months for every month of intervention.

Kaiser et al. (1990) observed that children with lower language skills benefited more from the MT intervention whereas children with higher language skills learned more from the RI intervention. Kaiser and Hancock (2000) did not replicate this aptitude by treatment interaction, however. There are two possible explanations for the failure to replicate. First, the sample of children enrolled in the Kaiser and Hancock (2000) study were relatively homogeneous in terms of language skills at the beginning of the study (ranging between 24 and 28 months for receptive and productive language age). Second, the addition of RI strategies to the MT procedures to form the EMT hybrid model used in this study may have reduced critical differences between the two procedures such that the procedures no longer affected children with varied aptitudes differentially.

Presently, we are investigating how EMT can affect communication development not only in preschool children with significant disabilities, but also in children who are at risk because of poverty and early emergent language delays and behavior problems. These are two very different populations of children; children with significant cognitive delays in the early stages of learning (MLU < 2.5) and children with no specific cognitive delays but general language delays and clinical or subclinical levels of behavior problems (MLUs ranging from 2.0 to > 3.5).

**Blended EMT and Behavior Intervention**

Our recent work specifically examines how children with early emergent behavior problems and delayed language are affected by naturalistic teaching of both language and positive social behavior. Into the EMT model we have embedded strategies for giving children instructions and following through on compliance and noncompliance that are consistent with naturally occurring communication in everyday settings. We teach parents to give instructions that match the child’s communication skills, to map child compliance with descriptions of child behavior as well as praise, and to reframe their child’s noncompliance, at least in part, as a breakdown in communication.

In a later efficacy study, Hancock and colleagues (2002) used an AB single-subject design replicated across five participants to assess the effects
of an EMT and behavior intervention that taught parents to support their preschool children's communication skills and manage their behavior. Children with language delays and emergent behavior problems and their parents from low-socioeconomic status backgrounds participated. Parents attended 30 individual sessions and were taught to be responsive to their children's communication and to provide contingent consequences for their children's behavior. Generalization to interactions at home and maintenance of intervention efforts were assessed. Parents learned the strategies, generalized these strategies to interactions at home, and maintained positive changes 6 months after the intervention. Children showed positive changes in language and behavior during the intervention, but maintenance and generalization of these effects were more variable. For example, children's average MLU during the baseline sessions was 2.25. At the end of intervention, their average MLU had increased to 3.00, and during the follow-up sessions their average MLU was 3.04, approximately the same MLU observed at the end of intervention. All children decreased their frequency of noncompliant/negative behavior from baseline (average = 3.7) to the end of intervention (average = 1.8) to the follow-up sessions (average < 1). Three of the five children generalized their gains from the training setting to interactions with parents at home. The other two children showed limited evidence of positive changes in communication with their parents at home. The average frequency of noncompliant/negative behavior observed at home before the intervention began was 5.5 per session and after the intervention 1.6 per session.

Throughout these studies, and in the evolution of our model of EMT, we have been almost equally concerned with two issues: 1) improving children's language development and communication use, and 2) changing the support for language learning provided by significant partners. Thus, our concern has been with the child, the parent, and the transactions that support teaching and learning.

**PRACTICAL REQUIREMENTS**

Learning EMT procedures generally takes parents from 20 to 36 individual sessions, depending on the parent's entry skills and the child's communication level. Typically, parents require about 20 sessions to reach the criterion on all components of the procedures. Thus, the 36 sessions allow a substantive period of time in which the parent implements EMT at criterion levels to teach child targets. Child-specific language targets are usually introduced within the first five sessions. Parent and child data during clinic interaction sessions are monitored continuously throughout the training as a basis for feedback to parents. We have conducted training sessions in our clinic, in parents' homes, in an extra room at child care centers, or in schools. We have conducted training sessions with parents in a group context and individually, but for the last 10 years we have primarily conducted EMT interventions with parents in individual, criterion-based training sessions.
A typical EMT parent session lasts approximately 45 minutes to 1 hour. The first 15 minutes is devoted to reviewing child and parent progress and introducing new information. Role playing or viewing videotapes may be used to provide concrete examples of EMT procedures. The parent is invited to ask questions, report progress or concerns at home, or modify the proposed agenda to fit his or her concerns. Typically, the child is not present during this parent-teaching period. The child joins the parent for a period of practicing the new EMT procedure for approximately 15–20 minutes. The professional coaches and gives brief feedback while the parent and child interact in a play-based context. Parent–child interactions are videotaped for review by the professional after the session. During the last 10–15 minutes of the session, the parent is invited to reflect and evaluate the practice session. The clinician provides information in response to parent comments and concerns and supplies additional feedback about the parent’s implementation of the procedures. A few minutes are spent helping the parent plan for interactions at home, and brief homework assignments are given. Instruction on how to use EMT at home, handouts on home activities, and discussion of parent use of EMT at home are included in each session. Sessions always end with summary-level positive feedback to the parents about their progress in implementing EMT procedures and their children’s language progress.

We have examined applications of EMT by therapists, parents, and classroom teachers, but our research has focused primarily on examining changes in child communication skills resulting from parent-implemented EMT and related naturalistic communication approaches. We have also conducted studies addressing strategies for training professionals to work with parents (Hester, Kaiser, Alpert, & Whiteman, 1996; Kaiser, Hester, Alpert, & Whiteman, 1995). In the course of conducting these studies, we have trained more than 40 early childhood professionals, special educators, psychologists, social workers, and speech pathologists who have taught more than 200 parents in our research programs. From both a research perspective and our clinical experience, we have learned that there is a minimal set of skills needed for professionals to be effective in teaching EMT strategies to parents. These skills can be grouped into two general areas: 1) skills in applying EMT strategies directly with children and 2) skills in teaching parents the intervention.

**EMT Skills**

Professionals need knowledge of and experience in applying the EMT procedures they will teach parents. We have found that professionals need to have intervened with a minimum of three children individually before they have the experience necessary to teach parents. Simply put, professionals cannot teach what they do not know. The professional’s skills and experience in the EMT intervention allow him or her to model the procedures with the child, provide the practical knowledge about the types of adaptations that may be
required for this child to learn, and establish with the parent the credibility of both the EMT procedures and the professional’s skill.

Skills with Parents

Teaching parents requires skills that are different from those required to teach children, but most training programs do not address professional skills that are important when working with adults. We have specifically investigated strategies for training professionals to work with parents and found that parent learning and performance were directly linked to the use of 1) positive examples and 2) coaching and feedback (Hester et al., 1996). Verbal instructions and explanations were found to be less effective than examples provided through in vivo modeling by the professional, videotaped examples of other parents demonstrating EMT techniques, or role playing EMT procedures with the parent. When the professional is able to model new skills and join in the ongoing parent–child interaction without overwhelming the parent, in vivo modeling can be an excellent way of providing positive examples. Role playing, in which the parent assumes the roles of both interventionist and child across several practice opportunities, can assist the parent in gaining insight into the child’s need for models, prompts, and feedback to support new communication skills and the time to practice the specific steps of each strategy without the demands presented by the child.

Professionals must have skills in coaching and giving parents feedback in their use of EMT skills. Coaching supports the parents in being immediately successful in implementing newly learned EMT strategies. Professionals must provide assistance to parents while staying in the background of the parent–child interactions. In order to coach effectively and give differential feedback about the parent’s use of procedures, the professional must know each step of the intervention procedures and be able to offer specific suggestions during the course of the parent–child interaction. Coaching is most effective when professionals offer support while parents are practicing; however, this requires mastery and fluency in EMT and skill in tactfully providing precise information to parents. Effective feedback and coaching require that the professional has good adult interaction skills, a conceptual understanding of the purpose of each component of EMT, the ability to problem solve as issues arise in the parent–child interaction, and the ability to give precise feedback about parent behavior. The degree to which the professional is able to be precise, supportive, and clear about critical behavior changes greatly influences how quickly a parent learns EMT strategies.

KEY COMPONENTS

The components of EMT are taught sequentially, with environmental arrangement taught first, followed by RI strategies, and lastly MT procedures. Parents do not move to the next skill in the sequence until they master the skill
they are being taught. Criterion performance for each skill is set in advance and the parent demonstrates the criterion for the current strategy for two consecutive sessions before moving to the next skill. See Table 9.2 for the specific sequence of strategies as they are generally introduced to parents in an EMT intervention. Table 9.3 describes the criteria the parent needs to meet for each strategy before being taught the next strategy in the sequence.

The component of environmental arrangement is designed to increase the child’s engagement with the physical setting which then can provide more frequent opportunities for the parent to communicate with the child, to elicit communicative responses, to model appropriate language forms, and to respond contingently to the child’s verbal and nonverbal communication attempts. Parents are taught to select toys and materials that are of interest to the child and will provide the child a reason to talk, to arrange the materials in a way that will elicit initiated communication by their child, and to manage the toys so their child maintains play engagement and there are functional reasons for their child to communicate. Table 9.4 summarizes the environmental arrangement principles and gives examples for selecting, arranging, and managing toys and materials.

In the RI component of EMT, emphasis is placed on developing a conversational style of interaction that promotes balanced communication between parent and child as well as models of appropriate language.

Table 9.2. Sequence for enhanced milieu teaching (EMT) intervention

<table>
<thead>
<tr>
<th>Session*</th>
<th>Content</th>
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<tbody>
<tr>
<td>Session 1</td>
<td>General principles of interacting with your child, play and routines as a context for child learning, following your child’s lead</td>
</tr>
<tr>
<td>Session 2</td>
<td>Choosing materials that interest your child and arranging the environment to promote your child’s engagement and requesting</td>
</tr>
<tr>
<td>Sessions 3 and 4</td>
<td>Turn-taking strategies: nonverbal turn taking (mirroring) and verbal turn taking (pausing)</td>
</tr>
<tr>
<td>Sessions 5 and 6</td>
<td>Respond to what your child communicates</td>
</tr>
<tr>
<td>Sessions 7 and 8</td>
<td>Talk at your child’s target level</td>
</tr>
<tr>
<td>Session 9</td>
<td>Expansions</td>
</tr>
<tr>
<td>Sessions 10 and 11</td>
<td>Expansions at the child’s target level</td>
</tr>
<tr>
<td>Sessions 12 and 13</td>
<td>Principles of environmental arrangement to build child initiations and requests</td>
</tr>
<tr>
<td>Session 14</td>
<td>Identifying your child’s verbal and nonverbal requests</td>
</tr>
<tr>
<td>Sessions 15–18</td>
<td>Incidental teaching I: using models after child requests</td>
</tr>
<tr>
<td>Sessions 19–22</td>
<td>Incidental teaching II: using mand/models after child requests</td>
</tr>
<tr>
<td>Sessions 23 and 24</td>
<td>Choice-making mands/questions versus open-ended mands/questions</td>
</tr>
<tr>
<td>Sessions 25 and 26</td>
<td>Time-delay procedure</td>
</tr>
<tr>
<td>Sessions 27–30</td>
<td>Putting it all together: balancing responsiveness and milieu teaching</td>
</tr>
</tbody>
</table>

*This is an approximate timeline for teaching the EMT intervention to parents. In our program, decisions about moving to the next strategy are data driven. Total number of sessions needed depends on the entry skill level of the parent and can vary from 20 to 30 total sessions.
### Table 9.3. Criteria for parent strategy use before introducing a new strategy

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Measure</th>
<th>Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balanced parent/child turns</td>
<td>Discrepancy of turns (based on number of parent verbal turns minus number of child verbal and nonverbal turns). This is not a matched-turns criterion (adult takes a turn then child takes a turn) but is total number of turns taken by the adult or the child.</td>
<td>0</td>
</tr>
<tr>
<td>Parent pausing for child initiations</td>
<td>Number of parent pause errors (i.e., two or more consecutive parent utterances without a 5-second pause for child to respond)</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Parent responsiveness to child verbal behavior</td>
<td>Percentage of child verbalizations followed by responsive feedback</td>
<td>&gt; 80%</td>
</tr>
<tr>
<td>Parent talk at the child's target level</td>
<td>Percentage of all parent utterances that are at the child's targeted level (i.e., no more than two or three words longer than the child's target construction) (total frequency of parent target utterances/total frequency of parent utterances)</td>
<td>&gt; 50%</td>
</tr>
<tr>
<td></td>
<td>Number of different child targets used (usually three to four different targeted forms)</td>
<td>All</td>
</tr>
<tr>
<td>Parents expansions of child utterances</td>
<td>Percentage of child utterances that parent expanded</td>
<td>≥40%</td>
</tr>
<tr>
<td>Milieu teaching procedures</td>
<td>Number of episodes attempted</td>
<td>&gt; 5 and &lt; 10</td>
</tr>
<tr>
<td></td>
<td>Percentage of episodes that included correctly executed steps and at the child's target level</td>
<td>≥80%</td>
</tr>
</tbody>
</table>

learn basic principles of interaction (responsiveness, following the child's lead, facilitating turn taking, matching, and extending the child's topic) and basic language modeling strategies (matching the child's linguistic level, imitating or mirroring the child, expansions of child utterances, descriptive talk). To some extent, these strategies extend the basic principles learned in the environmental arrangement component and apply them in ways that enrich the child's language learning environment and provide a basis for conversational interaction.

The RI component of EMT greatly enhances the naturalistic qualities of MT. RI sets a social context for language in the same way that environmental arrangement sets a physical context. Together, responsive conversational style and environmental arrangement create a supportive interactional context for conversation-based teaching. MT, the third component of EMT, is a prompting procedure in which the child's interest in the environment is used as a basis for eliciting elaborated child communicative responses. MT in EMT is embedded in the arranged environment and the conversational style taught in the first and second components of the model. The MT episodes should be relatively few and carefully matched to the child's interest and intended lan-
Table 9.4. Environmental arrangement principles for parents

Selecting materials
1. Select toys/materials that are high preference and interesting to your child.
2. Select toys with multiple parts (such as Legos, Mr. Potato Head) or add-ons (for example, add the barnyard animals to your child's bathtub).
3. Select toys that require assistance opening (such as playdough) or putting together (like a train track).
4. Select toys/tasks that require you to be a partner with your child (like throwing and catching a ball, hiding and finding an object). Nonverbal turn taking provides a foundation for verbal turn taking (balanced conversation).

Arranging materials
1. Limit the number of materials/toys you make available to your child at any one time. Limiting materials helps your child attend to the toys you are playing with rather than being overwhelmed by too many toys. It also may provide an opportunity for your child to request additional materials.
2. Have some toys in your child's view but out of reach (like on a high shelf or in plastic containers up on a counter).
3. Keep toys in containers that your child will need assistance opening.

Managing materials
1. Be a gatekeeper. Place yourself between your child and the materials or keep some portion of the materials in your control.
2. When your child seems to start losing interest, add in materials to keep the play going. Have fun and be creative as you mix toys and materials that may not generally go together. For example, add food coloring to water play or have the barnyard animals go through the car wash made for the Matchbox cars.
3. When you do not give your child all of the toys or materials at once, there is an opportunity for your child to request more. For example, give him or her two Lego blocks instead of the whole container of Legos.
4. You can also provide an opportunity for your child to communicate with you by not providing all the materials he or she might need for an activity. For example, you could give your child paint but no paintbrush, or a paintbrush but no water so he or she will need to ask for the material.
5. Your child may communicate with you when something happens that he or she does not expect. For example, if you put Mr. Potato Head's arm where his eye goes, your child may use language to tell you that it is wrong or to move it to the right location.

Language functions. Generally, we limit MT to 8–10 episodes per 20-minute EMT interaction. This is based on our clinical experience in maintaining a naturalistic, responsive interaction. We focus on using prompts in response to child requests so that the episode is functional for the child and there is a natural limit to the number of episodes. Using a high number of prompts in a short amount of time can feel like "drill and practice," and the responsive nature of the interaction may be lost.

There are four core MT procedures: 1) modeling, 2) the mand-model procedure, 3) the time-delay procedure, and 4) the incidental teaching procedure. Modeling may be considered the most fundamental MT strategy. The parent first establishes joint attention by focusing attention on the child and on the child's specific interest. Next, the parent presents a verbal model
that is related to the child's interest. If the child imitates the model correctly, immediate positive feedback (which includes an expansion of the child's response) and the material of interest are given to the child. If the child does not respond to the initial model or responds with an unintelligible, partial, incorrect, or unrelated response, the parent establishes joint attention again and presents the model a second time (a corrective model). A correct child response again results in immediate positive feedback and expansion of the child's response and access to the material. If an incorrect response follows the corrective model, the parent provides corrective feedback by stating the desired response and then gives the material to the child. All milieu procedures have a modeling component that includes the steps described here (see Table 9.5 for an example of the model procedure).

The mand-model procedure differs from modeling by including a verbal prompt in the form of a question (e.g., "What do you need?") or a choice (e.g., "We have milk or juice; which one would you like?") or a mand (e.g., "Tell Mommy what you want."). The presentation of corrective models of appropriate responses when a child responds incorrectly or fails to respond to the mand (i.e., question, choice, or request) is identical to the sequence in the model procedure. When the parent and child are playing together, for example, the parent can use a mand to give the child a choice of play materials ("Do you want to play with the cars or the balls next?"). If the child gives an appropriate response, the parent can respond positively and descriptively (e.g., "You want to play with the race cars") and provide the requested material. If the child does not respond or gives an incorrect response, the parent provides a model for the child to imitate. By presenting choices among interesting materials, toys, or activities, the parent allows the child to make

<table>
<thead>
<tr>
<th>Steps</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish joint attention by attending to the child’s focus of interest</td>
<td>Hunter and his mom, Celia, are playing with cars that go down a track. Hunter is looking at the box of cars his mom is opening.</td>
</tr>
<tr>
<td>Present a verbal model</td>
<td>Celia prompts, “Say ‘want car.’”</td>
</tr>
<tr>
<td>If the child responds correctly, acknowledge response with expansion and material</td>
<td>When Hunter responds with “Want car,” Celia expands with “You want the blue car” and gives him the car.</td>
</tr>
<tr>
<td>If the child doesn’t respond or doesn’t repeat the model exactly, give another model</td>
<td>When Hunter answers with only a partial response such as “Car,” Celia again prompts, “Say ‘want car’” and really emphasizes want since Hunter missed that part the first time.</td>
</tr>
<tr>
<td>If the child responds correctly, acknowledge response with expansion and material</td>
<td>If Hunter then responds with “Want car,” Celia expands with “You want the race car” and gives him the car.</td>
</tr>
<tr>
<td>If the child doesn’t respond or doesn’t repeat the model exactly, state the correct response and give the child the material.</td>
<td>If Hunter doesn’t respond or responds with only a partial response such as “Car,” Celia says, “Want car” and gives Hunter the car.</td>
</tr>
</tbody>
</table>
language immediately functional in indicating his or her choice (see Table 9.6 for an example of the mand-model procedure).

Conversation should involve not only responding to another person's models and mands for verbalization but also initiating communication about various aspects of the environment. The time-delay procedure was developed to establish environmental stimuli for child initiation instead of simply presenting models and mands as cues for verbalization. The effects of the time-delay procedure alone were experimentally demonstrated in studies by Halle and his colleagues (Halle, Baer, & Spradlin, 1981; Halle et al., 1979). Adults in these studies (e.g., caregiving staff members and teachers) were instructed to attend to individual students by introducing a time delay in situations where the students were likely to need assistance or materials (see Table 9.7 for an example of the time-delay procedure).

Time delay may be especially useful with children who are echolalic (e.g., frequently imitate or repeat the exact words spoken to them). Often children with autistic characteristics repeat the last words of a prompt. These echoic repetitions can be functional; that is, the child may be communicating a specific intention such as greeting the parent or indicating agreement with a parent statement or signaling that he or she does not understand the parent's request. By observing the context in which the child uses an echoic utterance, it may be possible to use the occasion to prompt for a more standard, spontaneous utterance that serves the same function. The use of this nonverbal prompting helps avoid the automatic echoing of a response and teaches the child to respond to nonverbal cues for initiating language.

### Table 9.6. An example of the mand-model strategy

<table>
<thead>
<tr>
<th>Steps</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish joint attention by attending to the child's focus of interest</td>
<td>Hunter and his mom, Celia, are playing with Mr. Potato Head. Hunter watches as she picks up the hat and the glasses.</td>
</tr>
<tr>
<td>Present a verbal mand/question</td>
<td>Celia can use a mand, &quot;Tell me what you want, Hunter&quot; or a choice question, &quot;Do you want the hat or the glasses?&quot;</td>
</tr>
<tr>
<td>If the child responds correctly, acknowledge response with expansion and material</td>
<td>When Hunter says, &quot;Want hat,&quot; which is a target, Celia says, &quot;You want the baseball hat&quot; and gives him the hat.</td>
</tr>
<tr>
<td>If child doesn't respond or doesn't respond to the mand at the targeted level, give another mand or a model depending on level of support the child needs</td>
<td>When Hunter points to the hat without responding verbally, Celia prompts him: &quot;Say 'want hat.'&quot;</td>
</tr>
<tr>
<td>If child responds correctly, acknowledge response with expansion and material</td>
<td>When Hunter repeats her model exactly, Celia expands with &quot;You want the funny hat&quot; and gives him the hat to put on Mr. Potato Head.</td>
</tr>
<tr>
<td>If child doesn't respond to the mand at the targeted level, or doesn't repeat the model exactly, state the correct response and give child the material</td>
<td>When Hunter responds to the model or mand with &quot;Hat,&quot; which is not complete and at the target level, Celia corrects with &quot;Want hat&quot; and gives him the hat.</td>
</tr>
</tbody>
</table>
The fourth MT strategy, incidental teaching, was developed for teaching more elaborate language and for improving conversational skills about particular topics. Incidental teaching is used when a child makes a request. The first step in the incidental teaching procedure is for the parent to arrange the environment in ways that encourage the child to request materials and assistance. The child who verbally or nonverbally requests materials or assistance is identifying the reinforcer at that moment. The parent responds by modeling, manding, or delaying for a more elaborated response or for a targeted language response. When the child responds appropriately, the parent gives the item of interest while affirming and repeating the answer in an expanded fashion, thereby presenting a model of more complex language for future child responses (see Table 9.8 for an example of the incidental teaching procedure).

If the child does not respond appropriately to the time-delay prompts, the parent can either provide a model for the child to imitate or give a mand, cuing the child about possible responses. The parent then confirms the accuracy of the child's response, expands what the child said, and gives the child whatever he or she requested. Because teaching to a reinforcer is possible only as long as the item or event is really of interest to the child, episodes are brief and positive in nature. Ability to request verbally or nonverbally and ability to imitate target forms are the only prerequisite child skills for incidental teaching (see Figure 9.1 for the core milieu pattern).

Two general guidelines apply when parents are selecting which one of the four milieu procedures is most appropriate. First, parents should select the procedure that is the most natural to the ongoing interaction with their child.
Table 9.8. An example of the incidental teaching strategy

<table>
<thead>
<tr>
<th>Steps</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrange the environment to encourage the child to request assistance or materials.</td>
<td>Hunter and his mom, Celia, enjoy painting together. Celia gives him a paintbrush and paper but no paint.</td>
</tr>
<tr>
<td>Wait for the child to initiate a request or comment.</td>
<td>Hunter looks at Celia and says, “Want paint.”</td>
</tr>
<tr>
<td>If the child initiates a verbal or nonverbal request, respond by using model, mand, model, or time-delay procedures, depending on the level of support needed by the child.</td>
<td>Celia smiles at Hunter, gives him the paint, and says, “You want the paint box.” If Hunter points to the paint without speaking or says, “Paint,” which is not a target, Celia can respond with the procedure she thinks is the most appropriate support for Hunter.</td>
</tr>
</tbody>
</table>

For instance, asking a question (using the mand-model procedure) is natural when a child’s intentions or desires are not clear or when asking for specification would be unusual (e.g., “Would you like milk or juice?”). The model procedure is used whenever the child does not know the appropriate response. If the child does not know the name of an object, however, it is appropriate for the parent to begin by modeling the label for the child to imitate (e.g., “These are Lego blocks”).

Second, parents should use the procedure that provides the level of support their child needs to make an appropriate communicative response. Modeling provides maximum support for a child’s response. The mand-model procedure provides a middle level of support and can be tailored to fit a child’s skills by either asking a question only or providing two named choices followed by a question (e.g., “I have a cheese sandwich and a peanut butter sandwich. What do you want?”). Time delay provides no initial verbal support.

Incidental teaching differs from the other three procedures because it always follows a child request. Thus, incidental teaching should be used by parents only when their child has made a request. Requests can be verbal, vocal, or gestural. How the parent responds to the child’s request in order to prompt elaborated language depends on the level of support the child requires to respond appropriately. In all uses of the milieu procedures, incomplete or incorrect child responses are followed by support for a correct response (i.e., if a child cannot respond to a mand, a model of the correct response is offered). Every episode includes a positive consequence, continuing communication, and modeling of an expanded form of the prompted response. The goals in all applications of the procedures are to ensure that the interaction is as communicative, natural, and positive as possible and that interactions end with the child gaining the specified reinforcers.

EMT is more complex and more naturalistic than earlier versions of MT (Alpert & Kaiser, 1992). The emphasis on responsiveness shifts the focus from proactive teaching to responsive teaching and embeds prompts into con-
Figure 9.1. Core milieu pattern. *Prompt, mand, model, time delay. **Corrective, mand, model, time delay; repeated.

versations and engaging play interactions. These changes, although subtle, require teaching parents a different approach to communicating with their child and require a high level of skill and extensive experience with EMT procedures by the professional who is working with parents.

**ASSESSMENT METHODS TO SUPPORT ONGOING DECISION MAKING**

In our research studies, child outcomes of EMT are assessed from both pre- and poststandardized measures as well as session-by-session observational measures. Standardized measures have included general receptive and expressive skills, receptive and expressive vocabulary, and MLU and vocabulary diversity derived from language samples. Observational data from individual sessions generally include frequency measures of total child utterances, spontaneous utterances, total target language, elicited target language, spontaneous target language, dyadic turn taking, MLU, and diversity. Typically, language targets are vocabulary, early syntactic/semantic forms (e.g., agent-
action–object constructions, and requests at the child’s target level). Multiple exemplars of these classes of targets are taught in the intervention. The activity and the child’s focus of interest always determine specific exemplars.

We have found it useful to generate lists of examples for targets (e.g., examples of modifier + noun; agent–action–object; preposition–object) and to provide parents with specific examples that can be taught with a particular toy. For a toy race track with cars, for example, the list of examples for an agent–action target might include: I/you/we race; Car roll; Car stop; Cargo; I/you push; Car crashes; We crash. Table 9.9 shows some measures of child language outcomes that can be obtained from language samples. We have frequently taught students and classroom teachers to collect language samples and analyze them using Systematic Analysis of Language Transcripts (SALT; Miller & Chapman, 1998).

Parent training in EMT is criterion based so assessment of parent use of the strategies drives the timing of when the next skill in the sequence is introduced. Parent behaviors that are assessed include frequency of pause errors, frequency and percentage of responsive feedback, frequency and percentage of expansions, frequency and percentage of language at the child’s targeted level, and frequency and correctness of MT episodes.

Our research has emphasized generalization to home interactions and maintenance of parent and child gains over time. Parents and children are observed before, during, and after training at home during typical household activities and play. Follow-up observations at home and in the clinic extend over 6–18 months. The same observational measures used in the training setting are used to estimate generalization and maintenance. We further examine child generalization and maintenance through probes across other

<table>
<thead>
<tr>
<th>Measure</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean length of utterance</td>
<td>1.83</td>
</tr>
<tr>
<td>Total number of utterances</td>
<td>145</td>
</tr>
<tr>
<td>Number of different words</td>
<td>62</td>
</tr>
<tr>
<td>Number of one-word utterances</td>
<td>51</td>
</tr>
<tr>
<td>Number of two-word utterances</td>
<td>27</td>
</tr>
<tr>
<td>Number of three-word utterances</td>
<td>12</td>
</tr>
<tr>
<td>Number of four- and four-word utterances</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Target frequency</th>
<th>Spontaneous</th>
<th>Prompted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Two-word request</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>2. Action–object</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>3. Modifier + noun</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Target examples</th>
<th>Spontaneous</th>
<th>Prompted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Two-word request</td>
<td>Want milk</td>
<td>Want bubbles</td>
</tr>
<tr>
<td>2. Action–object</td>
<td>Play ball</td>
<td>Blow bubbles</td>
</tr>
<tr>
<td>3. Modifier + noun</td>
<td>Red ball</td>
<td>Little bubble</td>
</tr>
</tbody>
</table>

*Automatically calculated by Systematic Analysis of Language Transcripts (SALT).

*Counted from transcript.
adults. We are just beginning to measure children's generalized use of target forms systematically in peer and sibling interactions.

Additionally, informal assessment of parent and child progress takes place at the beginning and end of each intervention session. At the beginning of the session, the therapist asks the parent about the use of EMT at home since the last training session, what worked, and what may have been problematic. The therapist is able to assess the parent's understanding of EMT principles and use this information to help the parent build on his or her working knowledge, to troubleshoot any problems, and possibly as a frame for where the parent might need support in the upcoming session with the child.

At the end of the session, the therapist conducts an informal assessment of how the parent felt about implementing the strategies with the child. This gives the therapist the opportunity to again troubleshoot and help the parent integrate the strategies in a way that makes sense for his or her child and context. The therapist also asks about how the parent is going to implement the newly learned strategy at home before the next session, and this is an opportunity for the therapist to troubleshoot and help the parent apply the strategies to the home environment.

Without systematic data collection and review of the implementation of EMT procedures, even the most experienced professional is likely to be inconsistent or imprecise in training parents. Ideally, implementation data are collected in each session by the professional (and occasionally by a second person), plans are written for every meeting with the parent, and accomplishments are evaluated after each session. The EMT implementation checklist (see Table 9.10) is one tool the professional can use to evaluate the parent's use of procedures. Data on child behavior are the anchor for each training session. Data on parent performance are used to support specific targeted feedback and planning for future sessions. Data can be collected in a variety of ways, but data collection and use directly affect how quickly children will learn new language and how well parents will learn EMT procedures.

**CONSIDERATIONS FOR CHILDREN FROM CULTURALLY AND LINGUISTICALLY DIVERSE BACKGROUNDS**

When using EMT with different cultural and linguistic groups we must consider the intersect between the cultural or linguistic group and 1) specific EMT strategies, 2) specific EMT behavioral outcomes, and 3) the venue for EMT intervention, including toys and materials used in the play-based interaction.

**EMT Strategies**

EMT is an intervention that is anchored in a responsive, contingent adult–child interaction. When considering the appropriateness of applying an EMT intervention within any culture, it would be important to consider the
<table>
<thead>
<tr>
<th>Strategy</th>
<th>Not observed</th>
<th>Needs more practice</th>
<th>Satisfactory</th>
</tr>
</thead>
</table>
| **1. Environmental arrangement**  
- Play area is well organized  
- Appropriate selection of materials  
- Arrangement encourages engagement  
- Arrangement encourages initiations | | | |
| **2. Parent style and affect**  
- Parent responds quickly to child  
- Parent is warm and positive  
- Parent listens to child  
- Parent often at child's eye level | | | |
| **3. Parental responsiveness**  
- Parent engages in child's activity  
- Parent allows child to lead play activity  
- Parent engages in conversation with child  
- Parent balances turns with child  
- Parent pauses for child to initiate  
- Parent talks about what child is doing  
- Parent responds to content of child's talk  
- Parent asks for clarification when child not understood  
- Parent talks at child's target level  
- Parent expands child's utterances  
- Parent expands at child's target level | | | |
| **4. Milieu teaching**  
- Parent teaches in response to child requests  
- Parent prompts language at child target level  
- Parent follows through on prompts for language  
- Parent stops prompting when child loses interest  
- Parent prompts no more than once per minute  
- Parent prompts all of child's target forms  
- Accuracy of model procedure  
- Accuracy of mand-model procedure  
- Accuracy of time delay procedure  
- Accuracy of incidental teaching procedure | | | |
| **5. Overall quality of session** | | | |
norms for responsiveness within that culture, especially as they relate to adult–child interactions. It would be particularly important to consider the culture’s norms around behaviors that are foundational to responsiveness, such as eye contact, touch, and physical closeness. If the professional is unfamiliar with a culture, some of this information may be determined by observing naturally occurring parent–child interactions within that culture. The families with whom we are working have some baseline rate of the strategies we are trying to teach, but we are often asking them to implement the strategies more frequently or more systematically than they are using them in their natural interactions. A cultural informant independent from the parent may also provide some helpful information that will allow the professional to determine the appropriateness of EMT strategies within that culture and if what is being observed with the parent may be individual variation within that culture.

**EMT Outcomes**

A second consideration when determining the appropriateness of EMT for members of a specific cultural/linguistic group involves the language forms targeted for the EMT intervention. Successful language outcomes of EMT are often driven by the extent to which the adult can model and elicit developmentally appropriate targets for individual children. One implicit requirement in implementing EMT successfully is that adults must be relatively competent in the language in which they will teach children. Competence includes sufficient vocabulary and grammatical knowledge to make the adjustments needed when talking at the child’s targeted language level. The teaching adult’s language skills can be an issue when the parent’s first language is other than English, but issues can also arise when parents themselves have learning or language-related difficulties. We have had parents who were English speakers who were not metalinguistically sophisticated enough to be able to teach their child’s specific targets. These parents had difficulty when children’s targets were longer than 3 words (e.g., agent–action–preposition–object). Although these parents did learn to increase their responsiveness and to globally expand their children’s utterances, they had difficulty modeling specific linguistic structures and sometimes giving systematic corrective feedback during MT episodes. It is important, regardless of cultural background or first language, to determine if a parent’s language competence will support teaching specific linguistic targets beyond a three-word level.

**EMT Venue**

Because the EMT intervention generally occurs within a play context, it is important for an interventionist to select culturally appropriate toys and materials. Often this may mean supplementing existing toys so there are more
culturally appropriate choices. For example, when we are working with African American families, we use African American dolls and add culturally appropriate hair products to our hairdressing play scheme. Open communication with parents from all backgrounds and gathering information from cultural informants can be helpful in determining creative and appropriate ways to supplement toys and materials or to choose activities that are familiar to the child and parent. In addition, in some cultures, sustained play with a child does not occur in the home. Although the goal of EMT is to use across everyday environments, initially teaching and practicing EMT skills is easiest using play as a context. We discuss our rationale for this approach with parents. We ask them to participate in play during training and encourage them to create a comfortable context for engaging with their child at home to practice the EMT strategies.

We have systematically asked every parent in our project to give us written and informal verbal feedback about our teaching procedures, the materials and toys, and expectations for practice at home. Although these assessments have been uniformly positive, we believe there is much to be learned about adapting EMT for families from varied cultures.

APPLICATION TO AN INDIVIDUAL CHILD

Our current research has two foci. First, we are studying the effects of combining therapist and parent-implemented EMT to maximize child communication development across settings and time with preschool children with developmental disabilities. Second, we are examining the preventive effects of teaching low-income parents of preschoolers with language delays and behavior problems to support their children’s communication and social skills. The following two case studies are composites of children we have worked with who represent the typical course and outcome of EMT with each of these two distinct populations.

Child with Developmental Disabilities

Hunter was 42 months old when he participated in our intervention and had been diagnosed with autism. He had some spoken language but much of what he said was rote; for instance, when he met someone new he said, “Hi Hunter.” He often made his needs known by taking his mother’s hand and leading her to what he wanted. He enjoyed playing with cause-and-effect toys such as the cars that go down the race track and the balls that go down a series of chutes. Hunter’s mom, Celia, agreed to participate in the EMT intervention research study, which meant she came with Hunter to our center twice each week for individual sessions which lasted for approximately 6 months. During this intervention phase, we visited Celia and Hunter at home at least six times and
helped her apply EMT principles to her everyday activities at home. At the end of the intervention, she agreed for us to complete booster sessions, once per month for an additional 6 months, which we have learned is important support for parents in their continued use of EMT. Before the intervention began, Hunter was assessed with the Preschool Language Scale–3 (Zimmerman, Steiner, & Pond, 1992), the PPVT-R, and the Expressive Vocabulary Test (Williams, 1997), and a language sample was also completed. Hunter’s standardized test scores were all more than 2 SD below the expected mean. His MLU during the language sample was 1.45 and his diversity of word roots was 65. Five parent–child play interaction sessions were videotaped before beginning the intervention phase, in order to obtain a baseline on Celia and Hunter’s communication and interaction behaviors before we taught Celia any of the EMT strategies. Celia and Hunter appeared to have a good time playing during these sessions. Celia sat close to Hunter and tried to engage him in the play and conversation. She asked lots of questions and directed his attention to the toys: “Look, Hunter. This race car can go really fast down this track. Vroom. Vroom. The race car is loud! Why don’t you take the red race car and mommy will take the green race car? How does that sound?” Hunter usually looked at Celia when she tried to engage him in this way but did not respond verbally.

At the beginning of intervention, we talked to Celia about environmental arrangement and balancing her turns with Hunter. We showed her videotapes of other parents, role played with her, and gave her handouts that she took home and read at her convenience. Instead of allowing Hunter full access to all toys and materials, we instructed Celia to put the race cars within his sight, but out of reach in plastic containers that required adult assistance, since this set up a functional reason for him to communicate with her. We also instructed her to wait until Hunter initiated communication either verbally or nonverbally (e.g., when he reached for the toys) and then respond to his initiation with an brief, related comment. By about the fifth intervention session, Celia was consistently following Hunter’s lead and responded contingently to his communicative initiations. The next step was for her to talk frequently at Hunter’s target level. From the pretesting and transcriptions of Hunter’s communicative utterances in the language sample and the play sessions with his mom, we determined that Hunter’s target level was generally two-word utterances that specifically included: 1) agent–action verb, 2) action verb–object, 3) adjective–noun, and 4) requests, specifically want + object. (See Table 9.11 for a target handout given to Celia.) Celia quickly incorporated Hunter’s target-level utterances in all of the responsive strategies she learned, including expanding what Hunter said. By session 12, we began to teach milieu prompts, starting with models, then mand-models, time delays, and lastly the incidental teaching procedure. Generally, Celia used milieu prompts no more than 10 times during a session so it felt playful
and responsive to Hunter. Before we began the MT phase, Hunter initiated twice as much to his mother as he had before the intervention began, but he was only using target language at a slightly higher rate. After the third session in which Celia used milieu prompts, Hunter’s use of targets doubled in the session and continued to increase at a steady rate.

By the end of intervention, Celia was using all of the EMT procedures at a high rate of accuracy, and the interaction between her and Hunter looked very natural. At posttesting, Hunter made substantial gains on the standardized language assessments (e.g., his pre-PPVT-R standard score was 68 and his post-PPVT-R standard score was 78 (a gain of > 2 SEM). Additionally, his MLU on the language sample was 2.20 (versus 1.45 preintervention) and diversity of word roots almost doubled from his preintervention rate (65 preintervention to 125 postintervention). More importantly, Celia reported that Hunter now initiated communication with other adults (something he had not done before intervention) and had stopped taking her hand to get what he wanted because he could verbalize many of his immediate needs.

### Child Who Is at Risk

Destiny was 39 months old when she first participated in our intervention and was attending a daily child care program that primarily served families who were low income. Her mother, Gina, worked hard to provide for her fami-
ily and better her circumstances. She took adult classes to help her pass her General Educational Development (GED) exam and was employed at a local retail center earning the minimum hourly wage. Destiny had no contact with her father but did spend time with her maternal grandmother and several cousins. When our program offered a free language and behavior screening for all preschool children enrolled in Destiny's child care program, Gina promptly returned her permission form allowing us to assess Destiny. She had some concerns about Destiny's frequent temper tantrums and aggression toward other classmates, and she had questions about whether Destiny's language skills were at the level expected for her age. Destiny's tested language skills were about 1.5 SD below the expected mean. Both her teacher and her mother rated her problem behavior in the clinical range; aggression and noncompliance were the two most problematic areas. We met with Gina and explained the EMT program and what would be involved if she decided to participate. We proposed to meet with Gina and Destiny at the child care center before Gina's GED classes. We told her if she and Destiny came twice each week, it would take about 12 weeks to complete the program. Gina was concerned about trying to fit these sessions into her very full schedule. Destiny's teacher told her about other families who had participated in the program. After talking to her mother, who offered to pick Destiny up from child care two afternoons per week to give Gina more time to study or work at her job, Gina decided to participate in the program.

Although Gina was shy at first, over time she built a relationship with Barbara, her EMT therapist. Gina later told us that after a few weeks she really looked forward to the sessions. She could tell a difference in how Destiny was talking after about 10 sessions. Destiny was also minding her better, which made Gina's life easier. Barbara worked with Gina to adapt the environmental arrangement strategies to Gina and Destiny's needs. Barbara taught Gina several things she could do to get Destiny talking more so she could practice her language skills. Barbara also showed Gina some ways she could arrange the environment at home so she would not have to worry about Destiny's safety all the time. Making her home safer then decreased the number of instructions Gina was giving Destiny. By the middle of training, the few instructions Gina did give were almost always followed by a consequence, so Destiny seemed to obey her more often. Barbara talked to Gina about RI and how important it was for her to respond when Destiny talked to her. Nobody had ever told Gina that she was Destiny's most important language teacher. After hearing about her important role in her daughter's learning, Gina took the responsibility very seriously. Now when she talked to Destiny, she tried to use language that was as descriptive as possible, with lots of labels and adjectives. Talking at Destiny's target level also included giving instructions at her target level to ensure that Destiny would understand what Gina was asking her to do. During the play session, Barbara purposefully changed toys several times so Gina could practice giving Destiny short, direct instructions.
for putting away each toy during the transitions. When it was time for Gina to learn the milieu prompting strategies, Barbara focused mainly on choice questions. This not only served to support Destiny in using language to communicate her wants and needs but also gave her some control over her environment. Gina's use of the EMT procedures both supported Destiny's developing language skills and helped set boundaries for appropriate behavior. Gina was extremely proud of the EMT certificate she was given at the end of 28 intervention sessions. Six months after the intervention ended, Destiny's language skills were assessed and her results showed a gain of 0.66 SD. Her behavior as rated by her parent and teacher decreased by 1 SD, which was now close to or within normal limits. More importantly, Gina felt less stressed by parenting Destiny, more competent in her role as a parent, and now enjoyed playing with her child.

FUTURE DIRECTIONS

A relatively unexplored aspect of parent-implemented EMT is the effect of this intervention on the parent–child relationship and subsequent effects on the child’s social interactions with peers. In the first generation of parent-training studies, concerns were raised about the potential of parent-implemented interventions disrupting or inhibiting the naturally occurring relationship between children and caregivers (Hanson & Hanline, 1990; Vincent & Beckett, 1993). Although there has been little empirical evidence of negative effects of parent-implemented interventions, controversy about the effects of these interventions on parent–child relationships remains (Kaiser et al., 1999; Kelly & Barnard, 1999; Mahoney et al., 1999; Winston, Sloop, & Rodriguez, 1999). There are indications that parent-implemented EMT may have positive effects on parent–child relationships (Kaiser, 1993; Kaiser, Hancock, & Hester, 1998). First, parents’ evaluations of parent-implemented interventions consistently refer to positive changes in their relationship with their child (Henneman & Kaiser, 1994; Kaiser et al., 1998; Kaiser & Delaney, 2001; Kaiser & Hancock, 2003; Kaiser et al., 2000). Second, generalized changes in parental responsiveness, especially when those changes are sustained over time, may be an indicator of potentially positive changes in the parent–child relationship (Delaney & Kaiser, 2001; Hancock et al., 2002; Kaiser et al., 2000). Parental responsivity has been a key variable assessed as an indicator of quality of parent–child interactions with young children who have developmental disabilities (Dunst & Trivette, 1986; Mahoney & Powell, 1988) as well as in facilitation of language development (Yoder, McCathren, Warren, & Watson, 2001; Yoder & Warren, 2001). Third, whereas parent-implemented EMT has focused on improving children’s use of language in naturalistic communication contexts, there are a number of similarities between this approach to supporting communication and more general strategies for improving parent–child
relationships (Barnard & Martell, 1995; McCollum & Henrieter, 1997). Fourth, there is some evidence that parents who participate in EMT training report less stress related to parenting and more positive social behavior by their children (Hancock et al., 2002).

Interactions with peers are a second important type of social relationship in the lives of young children (Hartup, 1992). Children with developmental disabilities typically have difficulty in peer interactions and many of these difficulties are related to their deficits in communication development (Guralnick, 1999). Although there is a literature on peer-mediated strategies for increasing verbal interactions between children with developmental disabilities and their typical peers (Brown & Conroy, 2001; Odom et al., 1999), there is little known about the effects of EMT by parents on children's interactions with their peers.

RECOMMENDED READINGS


REFERENCES


