EMT EN ESPAÑOL PARA AUTISMO: A SINGLE CASE DESIGN STUDY

By

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CHAPTER 1

Introduction

1.1 Background

The estimated prevalence of autism among 4-year-old children in Tennessee in 2020 was 1 in 36 (Shaw et al., 2021). At least 1 in 20 people in Tennessee, approximately 430,000 people, identify as Hispanic or Latino (U.S. Census Bureau, 2020–2022). Taken together, these statistics indicate that there are many young children who are Latino, autistic, and potentially dual language learners of Spanish and English. Unfortunately, Latino families or families speaking a language other than English at home are more likely than non-Latino White families to have no treatment hours or unmet service needs for their children with autism (Magaña et al., 2013; Morgan et al., 2016; Zuckerman et al., 2017).

Only a small proportion of intervention research involving young children with autism focuses exclusively on the needs and preferences of Latino Spanish-speaking (LSS) families (DuBay, 2022; Sandbank et al., 2020). DuBay (2022) identified 19 studies investigating parent-mediated interventions for LSS children with autism. Seven of these studies involved children under 5 years of age and only two involved interventions that specifically targeted children's early communication skills (Gevarter et al., 2022; Meadan et al., 2020). Communication skills are crucial intervention targets for children with autism because difficulty with social communication is one of the defining characteristics of autism (American Psychiatric Association, 2013).

In one of these communication-focused intervention studies for families of children with autism, Gevarter et al. (2022) conducted a single-case design study of a naturalistic developmental behavioral intervention (NDBI; Schreibman et al., 2015). NDBIs have been identified as the category of interventions with the most support for a range of outcomes for young children with autism (Sandbank et al., 2020; Schreibman et al., 2015). NDBIs involve the use of behavioral principles to teach developmentally appropriate skills in naturalistic settings. Common features of NDBIs include natural reinforcement, child-initiated teaching opportunities, environmental arrangement, and balanced turn-taking in interactions (Schreibman et al., 2015). In the Gevarter et al. (2022) study, the NDBI was implemented by three English-speaking Latino parents with coaching from developmental specialists in their homes or via telehealth when COVID-19 policies were implemented. The children's parents learned to use the NDBI strategies of linguistic modeling and communicative turn-taking with their children. During intervention, the children increased their use of individualized intervention targets, including use of signs and gestures when interacting with their parents. Of note, the parents who participated in this study spoke English, and communication between participants, providers, and researchers primarily occurred in English throughout the study; thus, the results may not generalize to parents who speak only or primarily Spanish.

In the other early communication intervention study identified by DuBay (2022), Meadan et al. (2020) conducted a one group pretest-posttest study to test the feasibility and potential effectiveness of a parent-mediated NDBI. Parents participated in seven sessions overall, four of which were in-person training sessions focused on teaching naturalistic communication strategies (modeling, mand-modeling, environmental arrangement, and time delays). Each training session included a group format portion including education and practice with a strategy, and three of the

training sessions also included individual coaching with their child. While pre-post changes in parents' frequency of strategy use were small, the participants reported large perceived impacts of intervention, specifically in their understanding of their children, their expectation for their children to communicate, their children's confidence, and their children's attempts to communicate. The parents also reported liking the group format, visual examples, and coaching on strategy use. These studies provide preliminary evidence that, when taught NDBI communication strategies, Latino caregivers implemented the strategies with their children with autism and reported the strategies to be socially valid and meaningful.

1.2 *EMT en Español*

Although intervention research involving LSS children with autism is limited, additional studies have tested interventions with LSS young children with or at risk for language disorders (Durán et al., 2016; Larson et al., 2020). *EMT en Español* is an NDBI that has been researched with LSS preschool children with developmental language disorders (Peredo et al., 2018, 2022). *EMT en Español* is a cultural and linguistic adaptation of Enhanced Milieu Teaching (EMT), an NDBI uniquely focused on improving child language and communication development for children with a variety of etiologies of language impairments (Kaiser & Hampton, 2017; Kaiser et al., 2021; Roberts & Kaiser, 2015; Wright et al., 2013). There are six language facilitation strategies and four child communication goals associated with EMT. The language facilitation strategies are environmental arrangement, responsive interaction, modeling target-level language, expansions, time delays, and milieu prompting procedures. The child communication goals are to increase the frequency, diversity, complexity, and generalized functional use of communication (Kaiser & Hampton, 2017).

Research has shown that LSS caregivers implement *EMT en Español* strategies with their children with developmental language disorders when provided with systematic instruction. Using a single-case experimental design, Peredo et al. (2018) demonstrated that three Spanish-speaking mothers from Mexico applied *EMT en Español* strategies with their preschool children with developmental language disorders when the mothers were taught using a Teach-Model-Coach-Review (TMCR) approach (Kaiser & Roberts, 2013). The mothers generalized use of most *EMT en Español* strategies to a novel context at home. The participating mothers reported using the *EMT en Español* strategies at times throughout the week in addition to the intervention sessions. Child communication (frequency of unprompted communication, number of different words) increased over the course of the intervention, but the relation between adult use of intervention strategies and child communication was unclear from this study. Results for caregivers were also positive in a small randomized trial of *EMT en Español* (Peredo et al., 2022). Twenty LSS caregivers and their children with developmental language disorders (age range 29–43 months) were randomized to a 24-session intervention at home (n = 10) or waitlist control group (n = 10). There were large, statistically significant intervention effects for caregivers' use of matched turns, expansions, and linguistic targets (d = 1.24–1.90). No significant effects for caregiver responsiveness were observed; however, responsiveness was high across caregivers in both the treatment and control groups at baseline. Although this pilot study was not powered to detect child effects, group assignment significantly predicted children's scores on a standardized receptive vocabulary measure with a moderate effect size at a 3-month follow-up ($p < .05$, d = 0.67). Children in the *EMT en Español* group also scored higher than the control group on frequency of communication with their caregivers at follow-up (d = 0.66) and a standardized measure of expressive vocabulary at post-test (d = 0.52), although these

differences were not statistically significant. In sum, both studies testing the effectiveness of caregiver-implemented *EMT en Español* have shown consistently positive effects on caregiver use of the strategies and emerging evidence of effects on communication outcomes for children with developmental language disorders.

1.3 Cultural and Linguistic Adaptation of EMT

EMT en Español was systematically adapted to be congruent with cultural and linguistic experiences and values of many Latino families (Peredo et al., 2018, 2022). The culturally adapted components of *EMT en Español* can be framed using the Ecological Validity Model (EVM; Bernal et al., 1995). This model describes eight dimensions to consider when adapting an intervention to be culturally sensitive: Language, Persons, Metaphors, Content, Concepts, Goals, Methods, and Context. The EVM has been used to illustrate the dimensions of cultural adaptation of parent-involved interventions for LSS children with autism (DuBay et al., 2018; DuBay, 2022; Martinez-Torres et al., 2021). The components of the EVM and the *EMT en Español* adaptations of EMT are shown in Table 1.

First and foremost, families must have access to intervention providers who speak their primary home language (DuBay et al., 2018; DuBay, 2022; Martinez-Torres et al., 2021). This addresses the Language and Persons components of the EVM. Often bidirectional communication between therapists and families who do not speak English is limited because of the lack of bilingual professionals and because intervention occurs in a clinic or school setting when families are not present (DuBay et al., 2018). Verbal and written materials appropriate for families' specific dialects and education levels are also important, which addresses the Language component of the EVM (DuBay, 2022; Martinez-Torres et al., 2021). In studies of *EMT en*

Español, verbal and written information about the intervention is presented in Spanish in clear, plain language (Peredo et al., 2018, 2022). Interventionists routinely asked families about dialect-specific vocabulary to use in intervention. In the Peredo et al. (2022) study, interventionists were Latina, fluent in Spanish, and parents of young children. These characteristics mirrored those of the caregivers who participated in the study.

EMT en Español involves caregiver implementation of intervention strategies, making it important to consider *how* caregivers are taught (i.e., the Methods component of the EVM). Martinez-Torres et al. (2021) recommended making explicit connections between children's characteristics and the goals of the intervention when working with caregivers. In the TMCR (Kaiser & Roberts, 2013) approach used to teach caregivers to implement *EMT en Español*, caregivers are reminded of the rationale for strategy use in each session—interventionists provide verbal explanations during the Teach and Review portions, draw attention to child responses while modeling intervention, and give feedback when coaching caregivers as they practice with their children.

The EVM also addresses the content of the intervention (Content, Concepts, and Goals components). Development of *EMT en Español* has included two important adaptations in the Content and Concepts domains: (a) teaching linguistic targets aligned with typical child Spanish language development and (b) allowing caregivers to choose activities rather than strictly following the child's preferences (Peredo et al., 2018, 2022). Other concepts that may be important for LSS families are the common cultural values of *personalismo*, *confianza*, *respeto*, and *familismo* (Martinez-Torres et al., 2021). To build rapport and reflect *personalismo* and *confianza*, providers take time at the beginning and end of sessions for conversation (Martinez-Torres et al., 2021). Reflecting *familismo*, LSS caregivers report wanting more involvement for

themselves and their extended family members in intervention (DuBay et al., 2018; Martinez-Torres et al., 2021). These values are reflected in *EMT en Español* through the high level of caregiver involvement and empowerment during intervention for their child, the emphasis on generalization to daily living activities, and including other family members.

Another specific adaptation across the Peredo et al. studies has been to incorporate the value of *respeto*. Many LSS children are expected to learn *respeto* and obedience and deference to authority (Calzada, 2010). This value can appear to be incongruent with the "follow the child's lead" approach in EMT and other NDBIs (Kaiser et al., 2017; Schreibman et al., 2015). Peredo et al. (2018) addressed this potential incongruence by teaching caregivers to select activities for the practice interactions and then to comment on the child's focus within that activity. In this way, the function of following the child's lead (matching language to child interest) was preserved while also giving parents authority by letting them choose the activities.

The Context dimension of the EVM addresses the environment in which the intervention is delivered. Extended family members and community members can be important contextual factors in different ways, providing either a source of support or a source of negative judgment due to stigma around autism diagnoses (DuBay et al., 2018; Martinez-Torres, 2021). Scheduling, transportation, and childcare barriers have been barriers to intervention for LSS families across studies (DuBay, 2022). *EMT en Español* is delivered in the home or community setting chosen by the parent to reduce these burdens on families. Contextual strengths, such as the support of family members, can be acknowledged and incorporated into the overall intervention plan. For example, in *EMT en Español* multiple family members may be invited to participate in the intervention.

In summary, *EMT en Español* is a communication intervention adapted to be congruent with the values, priorities, and needs of LSS families. Adaptations occur at both the cultural and individual levels (see Table 1). LSS caregivers of children with developmental language disorders have implemented the *EMT en Español* strategies when taught using the TMCR approach. There is modest evidence indicating that when LSS caregivers implement *EMT en Español,* there are improvements in their children's language skills.

1.4 *EMT en Español Para Autismo*

The current study tests *EMT en Español Para Autismo,* an iteration of *EMT en Español* with additional adaptations to address the specific needs of LSS families of children with autism. One adaptation has to do with enhancing caregiver knowledge about autism itself. Studies have shown that LSS parents of children with autism often enter the process of diagnosis or treatment with limited knowledge about autism, which can lead to self-blame for their children's challenges (Chlebowski et al., 2018; Zuckerman et al., 2017). Thus, intervention programs should include some amount of education about the specific characteristics, strengths, challenges, intervention practices, and resources related to having a child with autism. *EMT en Español* includes educational workshops for caregivers at regular intervals. The *EMT en Español Para Autsismo* workshops also included educational content specific to autism.

Positive behavior support to promote child engagement is a second area in which *EMT en Español* may require adaptations for children with autism and their families. Children with autism have some degree of difficulty with social communication and demonstrate restricted and repetitive behaviors and/or interests (American Psychiatric Association, 2013). Positive behavior support is a common early need for children with autism and a common intervention target for

this population (Wong et al., 2015). LSS caregivers in the Meadan et al. (2020) intervention study also recommended including more content in the intervention related to challenging behavior. In addition to addressing these caregiver requests, positive behavior support may be a relevant component of *EMT en Español* when implemented with children with autism for at least two other reasons. First, challenging behaviors can interfere with children's abilities to maintain joint engagement, a skill that is critical for language learning (Adamson et al., 2009). Intervention studies have shown that children's responses to communication interventions can depend on child characteristics such as interest in toys, joint attention, and presence of challenging behaviors (Fuller, 2018; Mcduffie et al., 2012; Yoder & Stone, 2006). In other words, challenging behaviors may interfere with parents' implementation of *EMT en Español* strategies and/or their children's ability to benefit fully from those strategies. Second, supporting positive behaviors such as completing expected household tasks may be especially important to some LSS caregivers who consider *respeto*, obedience, and deference to authority important values to instill in their young children (Calzada, 2010). Given that positive behavior support may be necessary for joint engagement and language learning, as well as prioritized by LSS families, this may be an important area to address specifically at the beginning of intervention.

1.5 Purpose

The primary purpose of this study was to assess the effects of teaching LSS caregivers to implement *EMT en Español Para Autismo* and to examine variability in implementation across caregivers of young children with autism. A single-case experimental design was used to teach and quantitatively measure caregivers' use of *EMT en Español Para Autismo* strategies with their young children with autism as well as changes in children's communication frequency and

diversity (e.g., frequency of social communication, number of different words). Information from semi-structured interviews was summarized to assess the social validity of the intervention. We posed the following research questions:

(a) Primary: Do LSS caregivers use *EMT en Español Para Autismo* intervention strategies with their children with autism when taught using a TMCR approach?

(b) Secondary: Do LSS caregivers increase the fidelity with which they use *EMT en Español Para Autismo* with their children with autism when taught using a TMCR approach?

(c) Secondary: Do LSS children with autism increase their frequency and diversity of social communication with their caregivers when their caregivers are taught *EMT en Español Para Autismo* strategies?

(d) Secondary: Do caregivers generalize their implementation of *EMT en Español Para Autismo* to sessions without TMCR?

(e) Social validity: What were caregivers' positive and negative experiences of the TMCR approach and implementing the *EMT en Español Para Autismo* strategies with their child with autism?

(f) Social validity: What do caregivers perceive regarding their children's communication during and after the intervention?

(g) Exploratory: What is the dosage of *EMT en Español Para Autismo* intervention strategies that children receive when caregivers are taught using a TMCR approach?

CHAPTER 2

Methods

2.1 Participants

We recruited caregiver-child dyads who met the following criteria and wished to participate in the study: (a) Spanish was the primary language spoken in the home; (b) the child had received a diagnosis of autism from a qualified provider or flagged on an autism screening measure; (c) the child was 30–42 months old at the beginning of intervention; (d) the child had a Total Language Score at least 1.5 SDs below the mean standardized score on the PLS-5 Spanish; and (e) at least one caregiver was willing and able to participate in the intensive intervention for several months. Participants were recruited from a list of caregivers who had consented to being contacted for future research opportunities. These participants were assessed for eligibility for an ongoing randomized controlled trial (Kaiser & Peredo, 2019–2024) but were excluded because the children already had an autism diagnosis or exhibited signs of autism based on the *Screening Tool for Autism in Toddlers and Young Children* (STAT; Stone & Ousley, 2008). We called these participants to tell them about the study, asked whether they were interested in participating, and determined whether they were eligible by asking them questions corresponding to the inclusion criteria for the study (i.e., home language, child age, diagnostic status, availability and desire to participate). For dyads who met criteria following the phone screening, in-person eligibility assessments were conducted in the family's home or another preferred location. If children demonstrated characteristics of autism based on the STAT but did not yet have a diagnosis, and their family was interested in participating in the study, they were provided

with a full evaluation by qualified providers on the research team and at Vanderbilt. We performed in-person screening assessments for five participant dyads. Four of these dyads enrolled in the study. Two dyads completed the study. Participant characteristics are summarized in Tables 2 and 3.

Dyad 1 was a 31-month-old boy and his mother. The mother was from Honduras and was 39 years old. Child 1 was diagnosed with autism when he was 1 year old. Child 1 used a few words spontaneously and communicatively; he more often repeated words that he heard from others or on TV, especially letter names and numbers. He enjoyed movement, bubbles, and sensory activities, such as water play, sand play, or flipping pages in board books. Child 1 was receiving several home-based therapies at the beginning of the study, including speech-language therapy and occupational therapy. He started school when he reached his third birthday. Just before starting school, Dyad 1 discontinued participation in the study, because his mother believed that going to school and having home-based therapy would be tiring for the child.

Dyad 2 was a 33-month-old boy and his maternal grandmother (51 years old). The child's mother and father also observed some sessions and participated in interviews, but they were not coached in using *EMT en Español Para Autismo* strategies. The grandmother and mother were from Mexico, and the father was from Cuba. Child 2 was on a waiting list for an autism evaluation when they enrolled in the study, and he received a diagnosis during the study from the research team and colleagues at Vanderbilt. Child 2 communicated by vocalizing, leading others by the hand, and giving objects. During the study, Child 2 began using augmentative and alternative communication (AAC) in the form of Proloquo2Go on an iPad mini. He enjoyed playing with a variety of toys, including bubbles, blocks, shape sorters, pop-up toys, food toys, and musical instruments. Child 2 also enjoyed movement, especially running, jumping on

trampolines, and independent book-reading. Eating and taking baths were preferred household routines for him. Child 2 was not receiving any additional services at the beginning of the study, but he began school once he reached his third birthday. English was the primary language spoken at school. Dyad 2 completed all study activities.

Dyad 3 was a 31-month-old boy and his mother. His mother was from Venezuela and was 40 years old. Child 3's paternal grandmother was often also present and participated during intervention sessions, although she was not coached in using *EMT en Español Para Autismo* strategies. Child 3 demonstrated signs of autism during our screening and he was diagnosed at an evaluation arranged by the research team during the study. Child 3 communicated by vocalizing, using gestures such as reaching and giving, and a few spoken words. During the study, Child 3 began using Proloquo2Go on an iPad mini. He enjoyed shared book reading, playing with blocks, and playing with play-doh. Preparing and eating food, getting dressed, and combing hair were preferred routines for Child 3. Child 3 attended daycare on weekdays (English and Spanish), occupational therapy 30 min per week in English, and speech-language therapy 60 min per week in English. His mother also had monthly telepractice consultations in Spanish regarding strategies to support him at home. Dyad 3 completed all study activities.

Dyad 4 was a 31-month-old girl and her mother, who was from Ecuador. Child 4 had an autism diagnosis at the beginning of the study. Child 4 primarily communicated using spoken language. She enjoyed a variety of activities, including shared book-reading, playing with toys, painting or drawing, and singing songs. She was receiving home-based early intervention services in English and Spanish at the beginning of the study. After approximately 1 month in the study, Child 4 was going to start receiving additional home-based early intervention services,

and her mother decided to drop out of the study to avoid tiring the child when those services began.

Prior to any study activities, we obtained consent from primary caregivers indicating that they wished to participate and that they gave consent for their children to participate. Written consent forms and verbal explanations of the consent forms were in Spanish. Enrolled families received toys and books at the beginning of the study both as an incentive for participation and to ensure the families had materials with which to practice intervention strategies at home during, between, and after intervention. All study procedures and materials were approved by the Vanderbilt Institutional Review Board (IRB). This study was funded by a Vanderbilt University Scaling Success Grant awarded to Dr. Ann P. Kaiser and Dr. Tatiana Nogueira Peredo (2022–2023).

2.2 Eligibility and Baseline Measures

Eligibility and baseline measures (summarized in Table 4) served three purposes: (a) eligibility determination, (b) description of participants, and (c) intervention planning. All data for pre-intervention measures were collected in the participating families' homes.

2.2.1 *Screening Tool for Autism in Toddlers and Young Children*

The *Screening Tool for Autism in Toddlers and Young Children* (STAT; Stone & Ousley, 2008) was used to screen children for eligibility for the study. The STAT is a criterion-referenced assessment that indicates risk for autism and provides information about the child's autism characteristics. For children who were administered the STAT during the screening

process for the ongoing randomized trial in the preceding 3 months, we used their previously measured scores rather than readministering the assessment.

2.2.2 *Preschool Language Scales, 5th edition Spanish*

The second assessment was the *Preschool Language Scales, 5th edition Spanish* (PLS-5 Spanish; Zimmerman et al., 2012). The PLS-5 Spanish is standardized and norm-referenced to monolingual and bilingual Spanish-speaking children in the United States. In the dual language administration, the assessment measures the children's language proficiency in both English and Spanish. The PLS-5 yields standard scores and age equivalency scores for three subscales: (a) Auditory Comprehension, (b) Expressive Communication, and (c) Total Language. We used the Total Language Score to determine eligibility for the study and all three subscales to describe the child's baseline language skills. The PLS-5 was administered and scored by the author or another trained bilingual research team member in the children's homes.

2.2.3 *Leiter International Performance Scale—Revised*

The remaining child assessments were administered to gather information for describing children's baseline characteristics and for intervention planning. The first assessment was the *Leiter International Performance Scale—Revised* (Leiter-R; Roid & Miller, 1997). The Leiter-R is a nonverbal assessment of cognitive abilities. It is suitable for children with various language exposure backgrounds because all tasks are presented nonverbally by the examiner through pantomime, gesture, and facial expressions. We administered the Brief IQ Screener of the Leiter-R to measure the child's baseline cognitive skills. The four subtests are (a) Figure Ground, (b) Form Completion, (c) Sequential Order, and (d) Repeated Patterns. The Leiter-R was

administered by the author in family's homes. In cases when children were not able to attend to stimuli, compromising the validity of the assessment, the assessor ended the assessment.

2.2.4 Structured Play Assessment

The second descriptive assessment was the Structured Play Assessment (SPA; Ungerer & Sigman, 1981). The SPA is a semi-structured assessment to elicit the child's highest and most frequent levels of play. Information from the SPA supported selection of appropriate toys and target play levels for play-based interactions during the intervention. The author administered the assessment in families' homes. A speech-language pathologist trained to score the SPA to research criterion watched the video of the SPA administration and recorded the child's play levels. She then calculated the most frequent and highest play levels within and across the five toy sets.

2.2.5 Language Samples

Language samples were gathered from play-based, semi-structured interactions with an examiner. The examiner spoke Spanish during one 20-min language sample and English during another 20-min language sample, administered on separate days approximately one week apart. The play-based language sample protocol, shown in Appendix A, was developed for an ongoing group experimental study of *EMT en Español* (Kaiser & Peredo, 2019–2024). The primary measures from the language samples were children's mean length of utterance in words (MLUw) and number of different words (NDW). Language samples were transcribed using Systematic Analysis of Language Transcripts (SALT) software, Version 20 (Miller & Iglesias, 2020). MLUw and NDW were used to determine children's targets for intervention using the tiered

framework for language target skills developed by Peredo et al. (2022). Although children may have language levels in different tiers for Spanish and English, Spanish tier 1 targets were most relevant for intervention planning for this study, as shown in Table 5.

2.2.6 Demographics and Community Services Surveys

Finally, caregivers completed a demographics survey and a community services survey prior to the study (Appendix B). The demographics survey contained questions such as parental education level, language use at home, country of origin, and family members living in the home. The community services survey was used to gather information about therapies and educational programs (e.g., private speech-language therapy) the child was attending at the beginning of the study.

2.3 Dependent Variables

2.3.1 Primary Dependent Variable

The primary dependent variable was frequency of caregivers' use of *EMT en Español Para Autismo* strategies during coached interactions with their children. The caregiver's use of each strategy was measured via direct observation with continuous recording during a 10-min period. Definitions of the dependent variables are in Table 6.

The first strategy was the caregiver's use of *contingent target level language modelin*g. Target level language for the current study was based on Spanish language levels developed and used in an ongoing *EMT en Español* study with LSS children with developmental language disorders (Kaiser & Peredo, 2019–2024). To be counted, language models had to be contingent

and responsive to child communication, one of the key language facilitation strategies of EMT (Kaiser & Hampton, 2017). To be contingent, language modeling occurred in matched turns, related turns, or extra turns. Matched turns were adult verbal turns that followed a child's communicative turn within 3 s and were related to the child's focus of attention. Related turns were a second adult verbal turn following a matched turn within 3 s that was semantically related to the preceding matched turn. For example, the adult could say, "No son galletas. Son tortillas," or "They're not cookies. They're tortillas." The second utterance in this example is a related turn. Extra turns were also counted when they followed 3-s intervals in which the child did not take a communicative turn. In summary, the first strategy measured as part of the primary dependent variable was the number of times the caregiver used a target level language model either in response to child communication or after providing the child an opportunity to communicate.

The second strategy was the caregiver's use of *contingent higher level language modeling.* This strategy included contingent modeling of proximal Spanish language targets (see Table 5) and expanding the child's language. Like target level language, proximal targets were only counted when they occurred in matched, related, or extra turns. Proximal language targets are language structures that are slightly more advanced than target level language structures. Proximal target forms include specific noun + present tense verb combinations (e.g., "El perro ladra", or "The dog barks"), past tense verbs (e.g., "Comió", "He ate"), and reflexive verbs (e.g., "Me duermo", and "I fall asleep"). More proximal target structures and examples are in Table 5. Expansions were coded when the caregiver responded to child verbal communication by adding words without changing the child's meaning. For example, while pretending to feed a baby doll, if the child said "bebé" (baby), the adult could respond within 3 s and say, "la bebé está comiendo" (the baby is eating). This example would be both an expansion and a contingent

proximal target. Contingent higher level language modeling strategies were intended to provide language input within the child's zone of proximal development, or slightly more advanced than what the child was currently able to produce independently. These strategies were also intended to support receptive language growth.

The third strategy was *communication elicitation*. The purpose of communication elicitation was to support children to communicate more frequently at their target language level. Ideally, communication elicitation strategies were used when the child was engaged in the shared activity and/or conversation with the adult, were embedded in the flow the activity or conversation, and were not disruptive to the interaction. There were three forms of communication elicitation: (a) time delays, (b) milieu teaching episodes, and (c) questions with follow-through during book reading.

Time delays and milieu teaching episodes are least-to-most prompting sequences that elicit or provide opportunities to model requests at the child's target language level (e.g., Peredo et al., 2022; Roberts & Kaiser, 2015). Time delays begin with nonverbal cues, such as holding up two different toys (to elicit choice-making), pausing within a turn-taking routine, or creating a situation in which the child needs assistance. Milieu episodes begin with verbal cues, such as asking an open question ("¿Qué quieres?", What do you want?) or a choice question ("¿Quieres el gato o el perro?", Do you want the dog or the cat?).

Book-reading questions are prompting sequences that elicit or provide opportunities to model language about the book's content at the child's target language level (e.g., Dillehay et al., 2022). To use this strategy, the adult would ask a question about the book's content to elicit a target level response. If the child responded with a target, the adult used a linguistic expansion. If the child responded incorrectly, the adult modeled the response and repeated the question up to

two more times, providing the child additional opportunities to respond correctly with the adult model. For example, the adult could ask "¿Qué es?" (What is it?) while pointing to a picture to elicit a target level noun response: "la mariposa" (butterfly). If the child responded with the target, the adult could expand and say, "La mariposa azúl" (the blue butterfly). If the child did not respond or responded incorrectly, the adult modeled the target ("la mariposa") and repeated the question up to two more times.

Communication elicitation procedures were scored based on the quality of implementation. Only high-quality communication elicitations were counted. High quality communication elicitation episodes occurred when the child was engaged in the activity when the prompt occurred, ended with a model of the target language structure (if the child did not produce it) or a higher-level language structure (an expansion following child production of the target), and were abandoned if the child lost interest. Communication elicitation procedures were chosen based on which ones were most effective and most appropriate for the child and caregiver.

2.3.2 Secondary Dependent Variables

Secondary dependent variables included (a) the caregivers' fidelity in delivering the *EMT en Español Para Autismo* intervention (referred to here as *EMT en Español Para Autismo* fidelity), (b) child communication during intervention sessions, and (c) frequency of caregiver use of strategies in generalized contexts. Intervention fidelity was measured using the checklist in Appendix C. This checklist was developed in a study training English-speaking caregivers to deliver EMT to young children with autism (Bailey et al., submitted) and adapted to be specific to *EMT en Español Para Autismo* for children with autism and their Spanish-speaking

caregivers. This 20-item checklist included items related to the quality of the interaction and the caregiver's use of strategies to promote child engagement (e.g., minimizing distractions, using timers, selecting preferred materials). The checklist also captured whether the caregiver used *EMT en Español Para Autismo* strategies at minimum criterion levels (see Appendix C). The checklist yielded a score for each section of the fidelity checklist (i.e., environmental arrangement, modeling target language, modeling higher level language and play, and communication elicitation), as well as a summary score for overall fidelity of implementation. For clarity, we distinguish *EMT en Español Para Autismo* fidelity discussed here (fidelity of the adult in delivering the intervention to the child) from *procedural* fidelity (fidelity of following procedures in each experimental condition; Barton et al., 2018). Procedural fidelity measures and data collection are described in a later section of this report.

Another secondary dependent variable was child communication during 10 min of the coaching sessions. Child communication was measured via direct observation and continuous event sampling, similar to the primary dependent variable. Child communication variables included: (a) number of total words (NTW), (b) number of different words (NDW), and (c) overall frequency of social communication. Social communication included communicative acts or utterances containing gestures, vocalizations, and words. These variables reflect core child communication goals of EMT. Specifically, they align with increasing the frequency, diversity, and functional generalized use of communication (Kaiser & Hampton, 2017). We also selected these variables because we expected them to be areas of need for the children with autism and significant language impairments.

The final secondary dependent variable was the caregiver's frequency of strategy use in generalized contexts. Generalization measurement sessions were conducted by the

interventionists, but no coaching was provided. Prior to beginning the 15-min recording, the interventionist asked the caregiver to interact with their child during play (10 min), book-reading (2–3 min), and a household routine selected from three options (2–3 min). Generalization was measured during the caregiver training phase of the study at least once in the baseline phase and before introducing each new set of *EMT en Español Para Autismo* strategies.

2.4 Exploratory Variables

To describe the quantity and quality of *EMT en Español Para Autismo* received by each child, we measured intervention dosage in two ways: (a) teaching instances (i.e., correct use of *EMT en Español Para Autismo* strategies) per session as measured by continuous recording and (b) sessions delivered with high fidelity (per the fidelity checklist in Appendix C). The first dosage variable (teaching instances) was similar to the primary dependent variable (frequency of caregiver use of each *EMT en Español Para Autismo* strategy), but it included all intervention delivered by the therapist *and* the caregiver. The second dosage variable was the number of sessions with a rating of at least 80% on the fidelity checklist across both therapist- and caregiver-child interactions. These variables were based on recent research delivering EMT to English-speaking families of children with autism (Bailey et al., in preparation).

2.5 Design

The experimental quantitative design was a single-case multiple baseline design across behaviors replicated across two caregiver child-dyads. In multiple baseline designs across behaviors, participants are taught to use functionally similar but independent behavior sets with a time-lagged introduction of intervention for each behavior set (Gast et al., 2018). Multiple

baseline designs do not require withdrawal of the intervention; thus, they are appropriate for teaching behaviors that are not expected to reverse in the absence of the intervention (Gast et al, 2018).

In the current study, there were four sequential phases: (a) baseline, (b) therapist-child intervention, (c) baseline, and (d) Teach-Model-Coach-Review (TMCR) intervention. The multiple baseline across behaviors design was implemented in phases (c) and (d). It is unusual to have two baseline phases in a study involving a single case design; however, measuring baseline performance prior to and after therapist-child intervention was intended to detect any change in caregiver use of strategies from simply watching the therapist use the strategies but without the TMCR intervention. For each caregiver-child dyad in the current study, the multiple baseline design included three tiers (i.e., behavior sets) corresponding to the primary dependent variable: (a) contingent target level language modeling, (b) contingent higher-level language modeling, and (c) communication elicitation strategies (see Table 6). The first tier also included instruction in using environmental arrangement strategies to support child engagement and communication, such as eliminating distractions, using a timer, and having additional or alternative materials available. Use of the three targeted sets of EMT behaviors were measured observationally and use of the related strategies (e.g., environmental arrangement) were measured with the *EMT en Español Para Autismo* Fidelity Checklist (Appendix C).

2.6 Procedures

All sessions occurred in families' homes and were video recorded using a camcorder. Research team members traveled to families' homes and collected data in person except for one interview that was collected via videoconference due to family illness. A graduate student

assistant sometimes attended sessions with the interventionist to assist with materials management and video recording. After the session, the interventionist uploaded videos to a secure server for transcription and coding. Sessions occurred up to 3 times per week. Procedural fidelity checklists for each type of session are in Appendix D.

There were two primary therapists for this study. The first was the author, a doctoral candidate in Special Education and a speech-language pathologist with 3 years of clinical experience in school-based settings and 4 years in research settings. The author was a non-native proficient Spanish speaker, a native English speaker, and a lifelong resident of the United States. She identified as Korean and White. The second therapist was a research team member with more than 20 years of clinical experience in language and behavioral interventions for young children, including children with autism. She had a master's degree in psychology, and she had bilingual professional training in early intervention. She was a native Spanish speaker, a non-native fluent English speaker, and had been a resident of the United States and Mexico. She identified as Latina.

2.6.1 Baseline Sessions

Baseline sessions occurred three times prior to therapist-child intervention sessions and three times immediately before beginning TMCR intervention with tier 1 strategies. The purpose of these sessions was to measure the caregiver's use of *EMT en Español Para Autismo* strategies prior to any intervention. The therapist video recorded the caregiver and child interacting in typical play or book-reading contexts for 15 min. At the first session, families were provided with standard toys including blocks, a shape sorter, two bilingual children's books, and bubbles. These materials were part of the incentives for participating families and ensured that caregivers

had materials for interacting with their children during baseline sessions in activity contexts that would be similar to intervention contexts.

2.6.2 Therapist-Child Intervention Sessions

The second phase was *therapist delivery of the intervention with the child*. This phase was 8 sessions per participant and occurred 2 or 3 times per week in families' homes (i.e., approximately 1 month total). The primary purposes of this phase were to: (a) provide a foundation for the child in the intervention context as a recipient of the *EMT en Español Para Autismo* strategies, and (b) determine the most effective strategies for supporting the individual child's engagement, positive behavior, and communication. Each session was 25 min, including 20 min of play with toys and 5 min of book-reading. The caregiver was invited to observe the session, but it was not required. No caregiver coaching occurred in this phase.

2.6.3 Family Interviews

Interviews occurred four times for each family. The English versions of the interview protocols are in Appendix E. The Family Values and Activities Interview (FVAI; Peredo, 2016) occurred after all baseline sessions and prior to any caregiver instruction. The FVAI was administered by a research team member experienced in ethnographic interviewing using the FVAI protocol. This semi-structured protocol involved a series of primarily open-ended questions about the family values, goals, and beliefs about communication, as well as activities that were frequently occurring, important to the family, or both. The therapist followed open-ended questions with more specific questions to encourage participants to elaborate or clarify meanings (Guest et al., 2013). The therapist and family collaborated to select materials (within

the $50 budget per family) that would be engaging for the child and facilitate communicative interactions. These materials were in addition to the standard set of toys and books provided before baseline sessions. Based on the therapist's experiences interacting with the child, the therapist suggested several potential toy options and the family either selected from this menu or suggested their own ideas for materials to purchase. These toys were then purchased as soon as possible after the FVAI and incorporated into intervention sessions. Dyad 2's toy selections included toys representing various foods and cooking tools, board books, and a pop-up toy. Dyad 3's selections were puppets, books, and a Play-Doh set. For both Dyad 2 and Dyad 3, the families and therapist discussed introduction of a speech-generating device (a type of augmentative and alternative communication, or AAC) during the FVAI. Overall, the FVAI was an important tool for connecting with the family and collaborating to plan for intervention.

Each family participated in two smaller mid-intervention interviews throughout the caregiver intervention phase of the study (Appendix E). These interviews occurred prior to introduction of the second two strategy sets (higher level language modeling, communication elicitations). During these interviews, the interventionist asked the families how they felt about the intervention, their child's progress, and any changes in activities that might be relevant to intervention. When families had concerns about frequently occurring activities that were not going to be included in intervention contexts, the therapist brainstormed solutions with the families and provided materials when appropriate. For example, at one of the mid-intervention interviews, Dyad 2 expressed difficulty with their daily tooth-brushing routine. The therapist and the family discussed and arrived at a potential solution of changing the order of routines so that tooth-brushing, the nonpreferred activity, immediately preceded bath time, the preferred activity. The mid-intervention interview was also a time for the therapist to learn about new ways the

child was communicating with the family and strategies that had been helpful or not helpful to their communication.

After all caregiver instruction sessions were complete, the families participated in exit interviews. Exit interviews were conducted by members of the research team in families' homes. Each family's therapist was not present at these interviews to encourage honest feedback. The exit interview (Appendix E) included questions related to the relative utility of *EMT en Español Para Autismo* strategies, whether the trained caregiver taught strategies to other caregivers, approximately how often they practiced use of the strategies each week, and how the intervention could be improved for families who participate in the future.

2.6.4 Workshops

At the introduction of each set of *EMT en Español* strategies, the therapist conducted a workshop with the caregiver to teach them the target strategies. Workshops were initially developed for previous *EMT en Español* studies with families of children with developmental language disorders (Peredo et al., 2018, 2022). Workshops for the current study were adapted based on feedback from focus groups consisting of LSS caregivers of young children with autism. A deidentified example of the workshops is in Appendix F. During the workshops, the therapist showed the caregiver PowerPoint slides on a laptop and explained the specific *EMT en Español Para Autismo* strategy, provided a rationale for its use in supporting the child's participation and communication, related the strategy use to their child's skills and needs, and showed video examples of the strategy being used. Whenever possible, the video examples were of the therapist using the strategy with the child, clipped from videos of direct therapist-child intervention sessions. Workshops lasted approximately 20–30 min. All written materials were

provided in Spanish and verbally explained by the therapist in Spanish. The therapist discussed examples with the caregiver and answered caregiver questions throughout the workshop.

2.6.5 Teach-Model-Coach-Review Sessions

The majority of sessions with each family followed the teach-model-coach-review (TMCR) approach to individual caregiver instruction and coaching (Peredo et al., 2018; Roberts & Kaiser, 2015). Sessions occurred 2–3 times per week in the families' homes. Cultural adaptations developed and tested in previous studies with children with developmental language disorders (Peredo et al., 2018, 2022) were integrated into every session (see Table 1). Sessions typically lasted approximately 1 hour. All intervention activities were conducted in Spanish, the families' primary home language as in previous *EMT en Español* studies. For children who used AAC, the therapist and caregiver collaborated regularly about vocabulary and added to the Proloquo2Go pages on an ongoing basis.

2.6.5.1 Teach

Workshops introducing *EMT en Español Para Autismo* strategies were part of the Teach component of TMCR. Additionally, there was a brief (5–10 min) review of the target strategies at the beginning of each intervention session. The therapist provided a recap of how to use the strategy, the rationale for using the strategy, and active learning around the strategy in the form of discussion of hypothetical scenarios, video examples, or intervention planning.

2.6.5.2 Model

In the Model segment of each TMCR session, the therapist modeled use of the strategy with the child during play for 10 min. Before modeling, the therapist explained to the caregiver what to observe for (e.g., "note the different specific words I use during this activity"). After

modeling, the therapist asked the caregiver what they noticed and discussed how use of the strategies influenced the interaction with the child. During modeling using TMCR in previous *EMT en Español* studies, the therapist typically explained use of strategies to the caregiver in the moment, immediately after they occurred during play. For the current study, the therapist waited until the end of the modeling portion to discuss with the caregiver, because the children's joint engagement in activities with the therapist was typically somewhat fragile and could be disrupted easily if the therapist took several seconds to speak to the caregiver.

Throughout the entire TMCR phase of the study, the therapist modeled all *EMT en Español Para Autismo* strategies during the Model segment of each session. In other words, the therapist used the comprehensive *EMT en Español Para Autismo* intervention every session. This was intended to maximize the dosage of strategies received by the child. However, to minimize behavioral covariation across tiers (Gast et al., 2018), the therapist only discussed their use of strategies that had already been introduced to the caregiver. For example, in the higher-level language modeling tier, the therapist used communication elicitations but did not provide any instruction to the caregiver about these procedures. The therapist also used augmented input as much as possible when modeling and implementing the intervention with children who used AAC (Biggs et al., 2018; Chazin et al., 2021).

2.6.5.3 Coach

During the Coach segment, the caregiver practiced implementing the targeted strategies with the child in play, routines, and book-reading contexts. This segment lasted for at least 15 min during each training session, with 10 min of play, 2–3 min of book-reading, and 2–3 min of a routine. For all three contexts, the caregiver and therapist collaborated to make the activities as enjoyable and engaging as possible for both the child and the caregiver. Play materials were

selected based on caregiver preference, child preference, child play level (based on the SPA and observation during sessions), and the conduciveness of the toys to communicative interactions. Books were selected based on child interests. The caregiver and the therapist collaborated to select routines that occurred frequently and that the child enjoyed or that were important to the caregiver. For Dyad 2, the routine was typically preparing and eating a snack, and for Dyad 3, the routine was typically combing hair or brushing teeth. The order and timing of activities during the session depended on family preference and child attention span. For example, 10 min of play was often divided into two shorter 5-min segments with visual timers for the child.

The role of the therapist during the Coach segment of TMCR sessions was to support caregivers' use of the intervention strategies with the child through suggestions and immediate feedback on use of the newly taught skill and other skills that have been taught to that point. The therapist provided general positive feedback at least 5 times during the 15 min and specific feedback at least 3 times. Specific feedback could include praising the caregiver and explaining how they used the strategy (e.g., "Muy bien. Añadió una palabra a lo que dijo" / Very good. You added a word to what he said.) or making suggestions about how the caregiver could use strategies in the moment ("Porque dijo una palabra 'carro', puede añadir unas palabras así 'el carro está lleno'" / Because he said one word "car", you can add words like "the car is full"). The therapist also supported the caregiver in management of the materials and facilitation of child engagement. The therapist encouraged the caregiver to use augmented input with the child's speech generating device as much as possible and assisted with keeping the device accessible to the child.

2.6.5.4 Review

In a brief (5–10 min) Review segment at the end of the session, the caregiver and therapist reviewed and reflected on the session. They discussed how the caregiver might use the strategies with their child at home before the next session. The therapist included time and opportunities for the caregiver to ask questions as well as describe and reflect on their experience of the session. As shown in the fidelity checklist for TMCR sessions (Table D3), the therapist began by asking an open question about how the session felt that day. If appropriate, she asked follow-up questions about what went well or felt easy about the session, as well as what went poorly or felt difficult. She also gave specific "homework" for practicing in between sessions. This could be to practice the strategies each day within a brief 5-min routine.

2.6.6 Generalization

Generalization sessions occurred four times for each family that completed the study—once before each workshop introducing a new set of strategies, and once before the exit interview. Generalization sessions were 15 min and conducted by the therapist in the family's home. They were similar to baseline sessions in that the therapist did not provide any coaching or instruction before, during, or after the session. However, similar to TMCR sessions, the therapist asked the family to engage in the three activity contexts: play (10 min), book-reading (2–3 min), and routine (2–3 min). The therapist kept time for the activities.

2.6.7 Individualization of the Intervention

In addition to the cultural adaptations that have been made previously to *EMT en Español* from the original version of EMT for English-speaking families, several components of the

intervention were adapted to each individual family in this study through a collaborative process. We tracked these individualization components in session logs.

The first individualization component was the selection of the specific routine or activity in which we coached the caregivers. *EMT en Español* has been implemented in play, routines, and book-reading contexts. In previous *EMT en Español* studies, caregivers and therapists have typically discussed preferred activities and routines in which to conduct intervention during the FVAI at the beginning of the intervention. In this study, there were additional mid-intervention interviews. These interviews gave families and therapists the opportunity to make changes in the contexts and routines in which the intervention was implemented to adapt to the child's changing interests and the family's preferences.

Second, caregivers provided input about the opportunity for and extent of involvement of other family members in the intervention sessions. Family members can be a source of support, and some caregivers may wish to involve other family members in the child's intervention. For other caregivers, however, family members may be a source of stress related to their child's intervention possibly because of individual's stigmatizing beliefs about autism (DuBay et al., 2018). Ultimately, the inclusion or exclusion of other family members in the intervention depended on the individual caregiver's preferences and situations (e.g., availability of other family members at the time the intervention occurred). We collected data only on the primary caregiver's implementation of *EMT en Español Para Autismo*. In the current study, no other family members received coaching on use of the strategies, but family members were often present during sessions for both Dyad 2 and Dyad 3, and multiple family members participated in most of the interviews.

Third, the therapist individualized the type of communication elicitation procedure(s) to implement with the target child: (a) time delays, (b) milieu prompting episodes, or (c) question prompts (if the activity is book-reading). Previous findings about caregiver use and preference for communication elicitation procedures are mixed. In the single-case design study by Peredo et al. (2018) and the caregivers of children with developmental language disorders did not generalize the milieu prompting episodes outside the coaching context, whereas the caregiver who was taught the time delay strategy did generalize its use. Across studies, LSS caregivers have indicated appreciation for communication elicitation procedures. In the Peredo et al. (2022) *EMT en Español* study, caregivers gave time delays and verbal prompts the highest ratings of the strategies. In the mixed methods study by DuBay et al. (2018), LSS caregivers of children with autism reported that time delay strategies were the most difficult for them to implement, whereas prompting was one of the most appreciated strategies. Similarly, in the study by Meadan et al. (2020), caregivers more frequently used mand-model strategies than modeling or time delay strategies in interactions with their children, and they reported more confidence using mand-models than time delays. Given this mixed evidence, in the current study, the therapist determined which elicitation procedure would be likely to be the most beneficial for the child and family. A procedure was not selected if it appeared likely to decrease the child's engagement or if the child did not respond or objected to the prompt. The therapist's experience during the therapist only condition, during the modeling portion of the intervention sessions, and observations of the child's behavior across sessions were considered in making these adaptations. Questions were limited to book-reading contexts. They were only taught to caregivers if the child enjoyed and could easily remain engaged in shared book-reading.

The therapist and caregiver formally discussed procedural adaptations at least three times: during the FVAI before the introduction of the first target behavior and before introduction of the next two target behavior sets (mid-intervention interviews). The open-ended questions that the therapist asked during these meetings are in Appendix E. Frequent meetings were intended to foster open communication between caregivers and therapists, which LSS families of children with autism have expressed to be crucial (DuBay et al., 2018). Frequent collaboration was also meant to encourage caregivers to reflect on connections between the intervention and their day-to-day lives to support alignment between the intervention and their values, as well as to support the likelihood of generalization of strategy use beyond the intervention session context, ultimately resulting in higher dosage of intervention for their child.

2.6.8 Data Collection and Management

After each session, videos were compressed and uploaded to secure servers. The author then clipped 10-min segments to be transcribed and coded, so that coders could remain naïve to what occurred throughout the session. When the session or interaction consisted of multiple activities or contexts, segments of the session for each activity were coded that were approximately proportional to the amount of overall time dedicated to each activity. These segments were from the middle of each intervention context that occurred in a session. For the Coach segment of TMCR sessions, the middle 8 min of 10 min of play, the middle 1 min of 2–3 min of book-reading, and the middle 1 min of 2–3 min of routines were coded. For 15-min baseline sessions, the middle 10 min of the caregiver-child interaction was transcribed and coded (beginning 2.5 min after the timer was started). For 25-min therapist-child intervention sessions, the middle 2 min of book-reading and 8 min of play were clipped for transcription and coding.

Because the therapist-child interaction in the Model segment of TMCR sessions was 10 min, this entire segment was transcribed and coded.

For all continuously recorded data (e.g., language sample variables, therapist use of strategies, caregiver use of strategies), sessions were transcribed and coded from video using Systematic Analysis of Language Transcripts (SALT) software, Version 20 (Miller & Iglesias, 2020). Transcription and coding were performed by native Spanish speakers who did not participate in delivery of the intervention. These transcribers and coders were undergraduate students or bachelor's or master's level research staff who had been trained to transcribe and code similar interactions from video for *EMT en Español* projects. Transcribers and coders were unaware of when phase changes occurred to mitigate potential bias (Ledford et al., 2018). Although it was difficult to conceal the change from baseline to intervention in the first tier because of the lack of coaching in baseline and the presence of coaching in the intervention, coders were less likely to know when interventions for subsequent tiers were introduced. Transcription and coding for caregiver-child interactions (from the Coach segment of TMCR sessions) occurred as soon as possible after each session, allowing for response-guided decision-making about moving to the next tier based on the primary dependent variable (Barton et al., 2018; Ledford, 2018). Lower priority session data (i.e., therapist-child interaction data for exploratory analyses) was transcribed and coded at the end of the study. After coding of each transcript was complete, the author entered summary level data into a secure REDCap database (Harris et al., 2009, 2019).

EMT en Español Para Autismo fidelity checklists (Appendix C) for secondary analyses of caregiver implementation and exploratory analyses of intervention dosage were completed from video by master's level bilingual research team members trained to implement *EMT en*

Español. Raters watched the same 10-min clips of caregiver-child interactions or therapist-child interactions as those that were transcribed and coded for primary data; however, raters were not blind to phase changes for fidelity checklists. Therapists did not rate *EMT en Español Para Autismo* fidelity for therapist-child interactions in which they participated, although they did sometimes rate caregiver-child interactions or therapist-child interactions for another therapist. *EMT en Español* fidelity checklists were completed on an ongoing basis; however, primary count data were prioritized for coding before checklist data. Checklists were completed and stored in a REDCap database (Harris et al., 2009, 2019).

Transcription of caregiver interviews was completed using Sonix automatic transcription software (Sonix, Inc., 2023) and then reviewed and edited by transcribers on the research team. Transcription occurred after participants completed the study. All graphs were produced using GraphPad Prism 10 for macOS verion 10.0.0 (GraphPad Software, LLC, 2023).

2.7 Procedural Fidelity and Interobserver Reliability

Procedural fidelity refers to the extent to which each experimental condition was executed as planned (Barton et al., 2018). In this study, procedural fidelity refers specifically to the research team's behavior throughout baseline, therapist-child intervention, TMCR sessions, and generalization sessions. Procedural fidelity was measured using checklists for each session type (Appendix D) and calculated as the percentage of checklist items that were administered correctly.

Procedural fidelity checklists were completed by trained members of the research team other than the therapist. For each type of session (baseline, therapist, TMCR, or generalization), 33% of sessions were randomly selected for procedural fidelity measurement by a research team

member who did not participate in carrying out sessions. Randomization was conducted using the RAND() function in Excel. For TMCR sessions, random selection occurred in blocks of nine sessions, because the total number of sessions was response-guided and was not predetermined. Whenever possible, randomly selected sessions were rated as soon as possible after the session occurred so that the therapist could correct procedures, if needed. Raters watched the video of the entire session and completed the checklist in REDCap. The therapist was unaware of which sessions were randomly selected for procedural fidelity measurement until after the session occurred. Procedural fidelity overall was 89.8% (75.0–100.0%) on average across 36 sessions.

Interobserver reliability is the extent to which there is agreement between two or more coders (Yoder et al., 2018). In the current study, point-by-point interobserver reliability was measured for a randomly selected sample of 33% of sessions for continuously recorded data from caregiver-child interactions (the primary dependent variable) and therapist-child interactions. Similar to procedural fidelity, random selection of sessions was distributed evenly across session types (baseline, therapist, TMCR, generalization) and dyads. Random selection of sessions for interobserver reliability coding was conducted by the author but was otherwise similar to how sessions were selected for procedural fidelity ratings. Whenever possible, reliability coding occurred as soon as possible after primary coding, so that coders could discuss and correct any systematically occurring discrepancies at their weekly meetings (Yoder et al., 2018). Coders were unaware of which sessions were randomly selected for interobserver reliability until after primary transcription and coding were complete. Interobserver reliability for 29 caregiver-child interactions was 89% on average (78–96%) for adult data and 87% on average (73–95%) for child data across sessions. Interobserver reliability for 15 therapist-child

interactions 88% on average (60–96%) for adult data and 86% on average (53–97%) for child data across sessions.

There were concerns regarding low interobserver agreement for some sessions, especially toward the beginning of the study. For example, one session with low interobserver agreement (60% for adult codes and 53% for child codes) was from the first therapist session to be coded. Many disagreements were related to determining whether child vocalizations had communicative intent and whether the adult gave the child enough time to respond. Error patterns were reviewed, discussed, and consensus coded at weekly meetings throughout the study. Consensus codes were revised in the primary data. These regular discussions also led to refinements in the code. Approximately halfway through the study, to ensure consistency of coding over the course of the study, a trained coder reviewed and verified coding of sessions that had been transcribed and coded up to that point. Sixty-six caregiver-child interactions (out of 80 coded sessions, 83%) and 16 therapist-child interactions (out of 46 coded sessions, 35%) were verified.

2.8 Analysis

2.8.1 Primary Analysis

The purpose of this analysis was to answer our first research question: Do LSS caregivers use *EMT en Español Para Autismo* intervention strategies with their children with autism when taught using a TMCR approach? We analyzed the quantitative data formatively to inform decision-making and summatively to determine the presence or absence of a functional relation for each dyad (Barton et al., 2018). Throughout the study, we graphed and analyzed the level, trend, and variability of caregiver data within conditions to determine when to begin intervention

on the next set of strategies. Only the primary dependent variable (caregiver frequency of use of *EMT en Español Para Autismo* strategies) was used to make decisions related to the design. The criteria for introducing the intervention in each tier was (a) stable data for at least three sessions for taught strategies and (b) stable data in baseline for all untaught strategies.

Summative data analysis for the primary dependent variable occurred after intervention for all behaviors was introduced and data were relatively stable. We visually analyzed the graphed data to detect the presence or absence of a functional relation between the independent variable (the TMCR approach to teach *EMT en Español Para Autismo* to caregivers) and the dependent variable (caregivers' use of the strategies in interactions with their child, as measured by continuous recording). We determined that a functional relation was present when there was a shift in the level, trend, and/or stability of the data when the intervention was introduced for each behavior set with no covariation of behavioral data in different tiers (Barton et al., 2018; Gast et al., 2018).

In addition to visual analysis, we measured the magnitude of change for each demonstration of effect using log response ratio (LRR) effect sizes. LRRs are advantageous compared to other effect sizes used with single-case data (e.g., percentage of nonoverlapping data) because of the relative insensitivity to procedural variables such as number of sessions per phase, length of session, and recording method (Pustejovsky, 2019). LRRs can also be conceptualized as percentages of change over baseline, which makes them relatively easy to interpret in applied contexts (Pustejovsky, 2018). LRRs were calculated using RStudio version 4.0.2 (R Core Team, 2020) and the batch_calc_es() function in the SingleCaseES package (Pustejovsky et al., 2021).

2.8.2 Secondary Analyses

Three secondary analyses were performed, addressing the research questions: (a) Do LSS caregivers increase the fidelity with which they use *EMT en Español Para Autismo* with their children with autism when taught using a TMCR approach?, (b) Do LSS children with autism increase their frequency and diversity of communication with their caregivers when their caregivers are taught *EMT en Español Para Autismo* strategies? And (c) Do caregivers generalize their implementation of *EMT en Español Para Autismo* to sessions without TMCR?

2.8.2.1 Caregiver Intervention Fidelity

We graphed fidelity percentages based on intervention checklists from the same 10-min clips that were used to collect primary data. Unlike the primary dependent variable, in which each target behavior was measured separately, checklists included all targeted behaviors in the same measure. Visual inspection of the graphs was used to analyze whether and how intervention fidelity improved over time as strategies were sequentially introduced to the caregivers.

2.8.2.2 Child Outcomes

Similar to the analysis for caregiver intervention fidelity, child outcome variables were graphed and visually analyzed for progress over time. Based on past findings (e.g., Peredo et al., 2018) we did not expect clear demonstrations of effects at each phase change for child communication. This may be because of the logic of the intervention, in which therapist coaching leads to change in caregiver behavior (the primary dependent variable), which then leads to changes in child behavior.

2.8.2.3 Generalization

Frequency of caregiver use of targeted *EMT en Español Para Autismo* strategies was measured in generalization sessions and graphed alongside primary data. If the caregiver's rate of strategy use was nearly as high during the generalization sessions as during the intervention sessions, then we concluded that the caregiver fully or partially generalized their use of the strategies to independent use.

2.8.3 Social Validity

Social validity was assessed to answer the two research questions: (a) What were caregivers' positive and negative experiences of the TMCR approach and implementing the *EMT en Español Para Autismo* strategies with their child with autism? and (b) What do caregivers perceive regarding their children's communication during and after the intervention?

To answer these questions, we summarized responses from families during interviews before, during, and after the intervention. For the current study, we focused on uncovering caregivers' experiences of participating in the intervention (what was easy, difficult, helpful, et cetera), their perceptions of how their child was communicating, and their perceptions of the effects of the intervention on their child's communication and participation. The first author reviewed all transcripts and looked for themes in their responses. A full qualitative analysis was not performed, due to limited availability of bilingual transcribers and qualitative coders. However, the first author used NVivo qualitative analysis software to organize categories and themes in the interviews (QSR International, 2019).

2.8.4 Exploratory Data Analysis

Dosage data were used descriptively to characterize the dosage of all teaching opportunities (i.e., occurrences of *EMT en Español* teaching strategies) during therapist sessions, dosage during caregiver sessions, and the cumulative dosage. These exploratory analyses were conducted via visual analysis of graphed data and estimating the cumulative doses of each intervention strategy the child received. Because transcribing and coding all the sessions would be prohibitive, data were sampled both within and across sessions. For caregiver interactions, all sessions were transcribed and coded, but a 10-min portion of the 15-min Coach or baseline session was coded (See "Data Collection and Management"). For therapist-child interactions, coders collected data for 46 sessions (59% of the 78 sessions that occurred). The full 10-min therapist-child interactions from the Model portion of TMCR sessions were transcribed and coded. In the eight therapist-child sessions prior to the TMCR phase, 10-min of the 25-min sessions were transcribed and coded.

Because portions of the caregiver-child interactions and some of the entire therapist-child interactions were not coded, estimates of total dosage were calculated. For caregiver-child interactions, the number of times the caregiver used the strategy in the 10-min coded caregiver-child interaction was multiplied by 1.5 to estimate the number of teaching instances in the full 15-min session. For example, if the caregiver used 20 contingent proximal targets in the 10-min session, the estimate of dosage for that session would be 30. Then the estimated number of teaching instances for each variable was summed across all caregiver-child interactions. For therapist-child interactions, the counts of strategy use in the eight therapist-child initial sessions was multiplied by 2.5 to estimate dosage for the 25-min session (i.e., 8 expansions measured in 10-min would correspond to 20 expansions estimated in 25 min). For 10-min therapist-child

interactions from TMCR sessions, each uncoded interaction was assigned a value equal to the average of the variable from the coded sessions. The cumulative estimate of teaching instances from therapist-child interactions was then summed across all therapist-child sessions. Finally, dosage estimates across therapist and caregiver interactions were summed to estimate total dosage for each intervention strategy. Analyses were conducted using basic statistical functions in RStudio Version 4.0.2 (R Core Team, 2020).

Dosage was also explored via the *EMT en Español Para Autismo* Fidelity Checklists (Appendix C). Overall fidelity scores of the therapist and caregiver for each 10-min coded session were graphed. Basic summary statistics (mean, range) were also calculated. Finally, the number of high-fidelity sessions was estimated across caregiver and therapist-child interaction sessions for each child.

CHAPTER 3

Results

3.1 Primary Research Question

3.1.1 Do LSS caregivers use *EMT en Español Para Autismo* intervention strategies with their children with autism when taught using a TMCR approach?

3.1.1.1 Dyad 2

Primary data for Dyad 2 are graphed in Figure 1. Dyad 2 completed all planned study activities. Data for the tier 1 strategy of modeling contingent target level language were low and stable in baseline (M = 2.5, range 0–8). When the strategy was taught, data immediately increased from fewer than 10 to more than 50 contingent targets in 10 min. Vertical visual analysis indicated that contingent proximal target language (a tier 2 behavior) also increased from near 0 levels (range 0–2) to approximately 20 when tier 1 strategies were introduced. Linguistic expansions and communication elicitations remained low throughout the tier 1 intervention phase.

TMCR intervention continued with a focus on tier 1 strategies for six sessions, and then tier 2 strategies (contingent higher level language modeling, including proximal target language and linguistic expansions) were taught. Contingent proximal target language increased slightly and became more variable. There was a significant amount of overlap in the data between baseline and intervention for this behavior because of the increase in proximal target language in baseline when tier 1 strategies were taught. Caregiver 2 did not show a clear increase in her use of linguistic expansions until the tenth session after introduction of this behavior set. Despite the

relatively long latency, Caregiver 2 steadily increased her use of linguistic expansions after this point. The increase corresponded with higher rates of verbal communication from the child and thus, more opportunities for the caregiver to practice this skill. Vertical analysis showed that Caregiver 2's use of tier 1 strategies decreased when tier 2 strategies were introduced. This was expected, given Caregiver 2's high rate of contingent target level language prior to introduction of proximal target level language in tier 2. The number of contingent utterances that the caregiver could use in a 10-min observation was limited by the child's communicative behavior and the duration of the observation. Thus, when the caregiver increased her use of proximal target level language (tier 2), she decreased her use of target level language.

Caregiver 2's use of communication elicitations was zero in all baseline sessions. The types of communication elicitations taught were time delays, including pauses in routines and presentation of choices. Communication elicitations were not added to the book routine. Child 2 preferred to engage with books independently rather than with the caregiver; potentially adding demands to shared book-reading in the form of questions to elicit communication could have decreased his engagement with books. Also, Child 2 often left the area during play. Increasing explicit demands in the form of "say" prompts (e.g., "say block"/ "di el bloque") was posited to potentially decrease the child's engagement in play with his caregiver. Time delays, in comparison, were less demanding nonverbal cues for communication and could be abandoned easily if the child was uninterested in the requesting opportunity presented to him. Caregiver 2's time delay attempts increased to 2 in the second session after the strategy was introduced and her correct implementation of time delays increased to 5 (out of 5 attempts) in the third session. She continued using between 2 and 6 correctly implemented time delays for the remaining sessions (M = 4.6, n = 7). Her number of attempts were more variable than her rate of correct attempts,

increasing to 15 attempts in one 10-min session. With this high rate of communication elicitation attempts, there was a corresponding reduction in the number of contingent targets the caregiver used. Intervention then focused on reducing the number of elicitation attempts to target levels (around 1 attempt per 2 min) and completing each episode correctly while maintaining the child's attention.

Overall, Dyad 2 increased her use of contingent targets by 883% over baseline (*LRRi* = 2.30) and her use of proximal targets by 211% over baseline (*LRRi* = 1.13) with the TMCR intervention. The effect sizes for expansions and communication elicitations were not interpretable because her use of these strategies was nearly 0 in baseline.

3.1.1.2 Dyad 3

Primary data for Dyad 3 are graphed in Figure 2. Dyad 3 completed all planned study activities. Contingent target level language modeling was somewhat variable in both the baseline and intervention phases. Child 3 demonstrated challenging behavior in some sessions, including leaving the area, screaming or crying, and throwing objects. The need to focus on strategies related to environmental arrangement, positive behavior support, and engagement in specific sessions explains some of the variability in the tier 1 data across sessions.

Caregiver 3's use of target level language models ranged from 2 to 16 instances per 10 min session in baseline (*M* = 7.2). When the strategy was introduced in tier 1, her use of targets immediately increased to 21 in the first session and ranged between 6 and 46 for the intervention sessions overall (*M* = 26.3). Caregiver 3's use of targets was highly variable after the strategy was introduced but became more stable over time. TMCR intervention continued in tier 1 for 10 sessions. No change was observed in behaviors in the other two tiers when instruction in tier 1 was introduced.

Tier 2 strategies were low in baseline (3–11 proximal targets, 0–1 expansions). Proximal targets increased to 17 in the first session after the strategy was taught and ranged from 8 to 24 instances in the remaining sessions (M = 15.1). Expansions increased to 11 in the second session after the strategy was introduced. The caregiver's use of expansions decreased slightly over time, but she continued to use an average of 3.4 expansions per session (range 0–11) out of an average of 8.9 opportunities (child expandable verbal turns). TMCR intervention for Tier 2 strategies continued for 9 sessions.

Caregiver 3's correct use of communication elicitations was low and stable in baseline, ranging from 0 to 2 instances in 10 min (M = 0.2). The primary type of communication elicitation taught to Caregiver 3 was milieu teaching episodes. Milieu episodes with "say" prompts were selected because Child 3 spontaneously communicated clear requests to his mother or the therapist during play (e.g., giving a closed container of play-doh to request help opening it). These were considered good opportunities for verbally prompting the child to say the word using his AAC device. Although Child 3 sometimes became frustrated quickly, he was able to engage in highly preferred activities (e.g., play-doh, puppets) for extended periods of time. Therefore, it was not anticipated that verbal prompts would interfere with his engagement in these activities. However, similar to time delays for Child 2, milieu episodes were promptly abandoned if the child lost interest in the requested object or activity. Caregiver 3's first session after being taught to use milieu teaching episodes was an outlier with 11 correct communication elicitations out of 12 attempts. As occurred for Caregiver 2, the high rate of elicitations corresponded to a decrease in use of target level language. In remaining 7 sessions, Caregiver 3 used 0–2 correct elicitations out of 0–5 attempts per session.

Overall, Dyad 3 increased her use of contingent targets by 250% over baseline (*LRRi* = 1.25) and her use of proximal targets by 168% over baseline (*LRRi* = 0.99) with the TMCR intervention. The effect sizes for expansions and communication elicitations were not interpretable because her use of these strategies was nearly 0 in baseline.

3.2 Secondary Research Questions

3.2.1 Do LSS caregivers increase the fidelity with which they use *EMT en Español Para Autismo* with their children with autism when taught using a TMCR approach?

Caregiver intervention fidelity for Dyads 2 and 3 are in Figure 3. No fidelity data were available for Dyads 1 and 4. For Dyad 2, overall fidelity was relatively low in baseline sessions (*M* = 60%, range 54–64%, *n* = 6). As expected, her overall average fidelity steadily increased after introducing strategies for tier 1 (*M* = 75%, range 65–84%, *n* = 6), tier 2 (*M* = 79%, range 56–89%, *n* = 17), and tier 3 (*M* = 83%, 66–93%, *n* = 10), although variability within each tier remained high. The pattern for overall fidelity was nearly identical for Dyad 3. Average overall fidelity steadily increased from baseline (*M* = 46%, range 36–60%, *n* = 6) to the sessions following introduction of tier 1 strategies (*M* = 60%, range 46–73%, *n* = 10) and tier 2 strategies (*M* = 74%, range 62–81%, *n* = 9). There was a slight decrease in overall fidelity after tier 3 strategies were introduced (*M* = 69%, range 60–83%, *n* = 8), although fidelity remained higher than in baseline.

For Caregiver 2, the scores on items related to environmental arrangement were relatively high throughout both baseline (*M* = 87%, range 78–100%, *n* = 6) and intervention (*M* = 94%, range 80–100%, *n* = 33). For Caregiver 3, use of environmental arrangement strategies was low

in baseline (*M* = 62%, range 55–75%) and increased throughout the intervention to an average of 89% in the final 6 sessions (range 82–100%). Caregivers' patterns of scores on items relating to contingent target level language modeling and contingent higher level language modeling were similar to the count data represented in Figures 1 and 2. Both sets of strategies increased with introduction of the strategies for both caregivers, although Caregiver 2 demonstrated increases in higher level language modeling prior to introduction of those strategies. Finally, Caregiver 2's fidelity to elicitation components of the intervention was low in baseline with no observed elicitations. Her fidelity and correct use of elicitations increased and became variable (*M* = 52%, range 0–100%) in tier 3. Caregiver 3 used some correctly executed elicitations in baseline (*M* = 22%, range 0–67%); however, her fidelity using communication elicitations increased to an average of 48% (range 0–100%) in tier 3 of intervention.

For Dyad 2, 17 of 43 sessions (40% of sessions) were delivered at 80% fidelity or higher. For Dyad 3, 5 of 37 sessions (14% of sessions) were delivered at 80% fidelity or higher.

3.2.2 Do LSS children with autism increase their frequency and diversity of social communication with their caregivers when their caregivers are taught *EMT en Español Para Autismo* strategies?

Child communication outcomes during 10-min caregiver-child interactions for Dyads 2 and 3 are displayed in Figures 4 and 5. There are important things to note regarding child outcome data. First, only data for Child 2 and Child 3 are presented, as Child 1 and Child 4 participated in relatively few intervention sessions. Second, Child 2 and Child 3 began using speech-generating devices at the beginning of the TMCR intervention. They were not using AAC during baseline, which influenced their ability to communicate in that phase. Third, the coding

team had difficulty reaching reliability on whether child vocalizations and use of AAC were communicative. To increase consistency and reliability, a coding decision was made to score child vocalizations or activation of AAC buttons as communicative if the caregiver responded contingently. Therefore, as the caregiver progressed in the intervention and gained more skills in responding to both nonverbal and verbal communication, it is possible that a greater proportion of child vocalizations and AAC activations were coded as communicative in later sessions than in earlier sessions. Thus, increases in child communication in these later sessions may reflect increases caregiver responsiveness to child AAC use in addition to differences in child behavior.

3.2.2.1 Number of Total Words

With the caveats discussed above, we interpreted the graphs using visual analysis. Nearly all words Children 2 and 3 used were communicated via AAC. The total number of words per session for both Child 2 and Child 3 increased and became more variable throughout the intervention. Child 2's communication with words remained near 0 until tier 2 of intervention, when the caregiver began using more proximal targets and linguistic expansions. From halfway through tier 2 of intervention to the end of the study (n = 18), Child 2 used an average of 27 total words per session (range 0–76). Child 3 communicated using words fewer than 10 times per session until the middle of tier 1 of intervention when he used 24 words in one session. For the remaining sessions (n = 19), he used an average of 20 words per session (range 6–36). Although Child 3 primarily used AAC to communicate, he verbally said "no" in some instances.

3.2.2.2 Number of Different Words

The number of different words used per session showed a similar pattern for both children. Child 2 used fewer than 10 different words per session until the middle of tier 2 of TMCR, when he used 13 different words in one session. His number of different words in the

subsequent sessions was highly variable (*M* = 13, range 0–26, *n* = 15). Child 3 used 5 or fewer words in each session until the middle of tier 1 of TMCR, when he used 15 words in one session. His number of different words was variable in remaining sessions (*M* = 11, range 4–21, *n* = 19).

3.2.2.3 Social Communication

The number of social communication acts per session was the cumulative number of times the child communicated using vocalizations, gestures, and words (spoken or AAC). For Child 2, frequency of social communication was variable even in baseline (range 4–30). There was a decreasing trend in baseline and data remained variable through the middle of tier 2 of intervention. For the remaining sessions (part of tier 2 and all of tier 3), there was a clear increasing trend in the number of times Child 2 communicated with his caregiver during sessions, although data continued to be variable (range 4–54). Child 3 increased his frequency of social communication steadily throughout the study. Social communication acts were low and somewhat variable in baseline (range 5–29). Data remained variable but increased to between 19 and 51 socially communicative acts per session in tier 3 of the TMCR intervention.

3.2.3 Do caregivers generalize their implementation of *EMT en Español Para Autismo* to sessions without TMCR?

Generalization sessions are represented by triangle symbols or gray bars in Figures 1 and 2. During these sessions, caregivers interacted with their children without coaching and feedback. Caregivers 2 and 3 both used contingent target level language models and linguistic expansions at similar rates during generalization sessions as they used during coached interactions. Both caregivers had more difficulty generalizing their use of proximal target level language modeling to independent interactions, with 1 or 2 generalization session data points

visibly lower than their performance in intervention sessions. Each caregiver participated in 2 generalization sessions after expansions were introduced. Caregiver 2 generalized her use of expansions to these unsupported interactions, using 6 expansions out of 9 opportunities in one session and 4 expansions out of 10 opportunities in the other generalization session. Caregiver 3 generalized her use of expansions in the first generalization session (4 expansions out of 6 opportunities) but used fewer expansions in the final generalization session (2 expansions out of 10 opportunities). There was only one generalization session after communication elicitations had been introduced. Caregiver 2 demonstrated similar levels of communication elicitations in the generalization session as she did during coached sessions, but Caregiver 3 did not use any elicitations during the generalization session.

3.3 Social Validity Outcomes

Social validity questions were addressed by synthesizing responses from the families across all interviews. Item level responses from exit interviews are summarized in Appendix G.

3.3.1 What were caregivers' positive and negative experiences of the TMCR approach and implementing the *EMT en Español Para Autismo* strategies with their child with autism?

Both families expressed satisfaction with aspects of the *EMT en Español Para Autismo* intervention strategies and participating in TMCR sessions. One family spoke in particular about beginning to notice their child's communication and understanding how to communicate with him better: "Hoy es diferente y sabemos que él se comunica con nosotros. Ponemos más atención a sus sonidos, a todo, a todo, todo, todo [Now it's different and we know that he communicates with us. We pay more attention to his sounds and to everything, everything, everything]. They

mentioned throughout multiple interviews the importance of learning to have patience in their interactions with their child. Although only one caregiver from each family participated in TMCR sessions throughout the study, both caregivers reported that multiple family members used the strategies with the child. Caregiver 2 reported that even the target child's two elementary-aged siblings had begun using *EMT en Español Para Autismo* strategies. Caregiver 3 reported teaching the rest of the family to use matched turns: "Yo le digo a todos que esperen tres segundos para hablarle" [I tell everyone to wait 3 seconds before talking to him].

There was a specific question in the exit interview about which components of the TMCR approach were most beneficial for learning the strategies. The caregivers reported that observation (the Model component) and practice with feedback (the Coach component) were most beneficial. For one caregiver, it was important to see the strategy being used first and then have an opportunity to practice it. For the other, practicing was the most beneficial.

Both families mentioned aspects of implementing the *EMT en Español Para Autismo* intervention that were challenging outside of TMCR sessions. In particular, both families had some difficulties incorporating AAC into daily life. Child 2's family said that he would sometimes become so focused on his tablet that he would not engage in other activities. This happened at mealtime when he was exploring the device and was not eating his food. Child 3's mother said that the only thing about learning the intervention that was difficult for her was learning to model with AAC. She was reluctant at the beginning of the study to try out use of AAC, as well.

Both families described challenges in using the *EMT en Español Para Autismo* strategies successfully with their child. It was especially difficult for the caregivers when they felt their child was not paying attention to them. One caregiver expressed: "Que a mí me pasaba al

principio se me hacía muy frustrante. Yo veía a [therapist] y entonces cuando me tocaba mi turno y me desesperaba y yo decía él no me hace caso, él no se quiere quedar quietecito" [What happened to me is that at first I became frustrated. I saw the therapist and then when I took my turn, I despaired and I said, he doesn't pay attention to me. He doesn't want to stay calm]. She said that she thought other parents applying in the intervention would need to practice for a while before seeing the value of it. The caregivers also stated that all the strategies were helpful and easy to learn except for limiting instructions and questions. One family felt these strategies were not effective or appropriate when asked at the interview. The other family said that these strategies were effective but difficult to understand at first.

The families were asked about recommendations for how to improve the intervention. One family stated that the intervention was too short and they recommended a longer intervention in the future. One family recommended incorporating music into the intervention for helping the child to relax and concentrate.

3.3.2 What do caregivers perceive regarding their child's communication during and after the intervention?

Frequently across interviews, families reported observing progress in their child's communication skills. One family noted multiple times throughout the study that their child was increasing his use of eye contact with others. One caregiver observed increases in her child's imitation of sounds. They reported that the children gradually related the symbols on the device to people and things in the environment. Both children independently sought out and carried their devices at times. Despite the families' difficulties with AAC, one caregiver reported during the exit interview that she was convinced to continue using AAC when she saw how it affected

her child: “Ahora eso es una lucha que tengo con él, pero le sirvió mucho la tablet… a ver su alegría de que uno lo entiende” [Now that is a fight that I have with him, but the tablet serves him greatly… to see his happiness that someone understands him]. Both families also commented on spoken words their children said during the intervention, even when it was only one instance.

In addition to communication skills, families often commented on changes in their child’s skills other than communication. One family noted that their child became more relaxed and calm, indicating that because they were being more patient in their interactions with him, he was less stressed. One caregiver expressed that her child was staying in one place to play. He had learned that when the therapist was coming, he understood that he was going to play: “a él también le encanta su terapia porque me imagino que lo ve como un juego. Pues como imagino que él dice como, ‘Llega [therapist], voy a jugar un rato’” [also he loves his therapy because I imagine that he sees it as play. Well, I imagine he said something like, [therapist] is coming, I’m going to play a while].

3.4 Exploratory Outcomes

3.4.1 What is the dosage of *EMT en Español Para Autismo* intervention strategies that children receive when caregivers are taught using a TMCR approach?

In addition to recording the number of times caregivers used *EMT en Español Para Autismo* strategies and measuring fidelity using checklists during caregiver-child interactions, we measured these variables for a representative portion of the therapist sessions (46 sessions coded of the 78 sessions that occurred, 59%) for Dyads 2 and 3. The sample of coded sessions was

distributed approximately evenly across study phases and dyads. Therapists delivered *EMT en Español Para Autismo* during the initial 8-session therapist-child phase of baseline as well as during the Model segment of every TMCR session. Graphs of therapist use of targeted strategies are in Figures 6 and 7, and therapist *EMT en Español Para Autismo* fidelity results are shown in Figure 8.

Dosage count estimates are in Table 7. Throughout the study, Child 2 participated in 530 min of intervention with the therapist and 645 min of intervention with their caregiver. Cumulatively across the caregiver and therapist, Child 2 received approximately 3,021 contingent models of language targets; 2,498 contingent models of proximal language targets; 371 linguistic expansions; and 130 communication elicitations. Child 3 participated in 480 min of intervention with the therapist and 555 min of intervention with their caregiver. Child 3 received approximately 2,998 contingent models of language targets; 1,442 contingent models of language targets; 350 linguistic expansions; and 126 communication elicitations.

Fidelity checklist total scores for therapist sessions are graphed in Figure 8. Fidelity was rated for 23 therapist-child interactions with each child, including the initial 8 sessions prior to intervention. For Dyad 2, the average overall therapist fidelity was 85% (range 72–100%). Fidelity was slightly lower during the initial 8 sessions (M = 81%, range 72–92%), than during the Model portion of intervention sessions (M = 87%, range 76–100%). For Dyad 3, the average overall therapist fidelity was 77% (range 59–90%). Like for Dyad 2, fidelity for Dyad 3 was slightly lower during the initial 8 sessions (M = 73%, range 59–80%), than during the Model portion of intervention sessions (M = 79%, range 65–90%). For Dyad 2, 70% (n = 16) of the 23 coded therapist-child interactions were rated to have at least 80% total fidelity; for Dyad 3, 35% (n = 8) of the 23 coded therapist-child interactions were rated to have at least 80% total fidelity.

Across caregiver-child interactions and therapist-child interactions, Child 2 received an estimate of 46 sessions at high fidelity (55% of interactions), and Child 3 received an estimate of 18 sessions at high fidelity (25% of interactions).

CHAPTER 4

DISCUSSION

The primary purpose of the current study was to test the effects of the TMCR intervention approach on use of *EMT en Español Para Autismo* strategies by Latino Spanish-speaking caregivers with their toddlers with autism. We also measured (a) caregivers' fidelity of *EMT en Español Para Autismo* during supported interactions, (b) children's communication with their caregivers during these interactions, and (c) caregivers' generalization of strategy use to unsupported interactions. We gathered information about the social validity of the intervention for this population by synthesizing family comments during interviews during and after the intervention. Finally, we explored overall dosage of the intervention by measuring and reporting estimates of therapist use of strategies with the child throughout the intervention in addition to caregiver delivery of the intervention. This study extends the small but growing research base on culturally and linguistically adapted early communication interventions for Latino Spanish-speaking families and their children with autism.

4.1 Discussion of Primary Findings

For two caregivers who finished the study, there was a functional relation between use of the TMCR approach and the caregiver's use of *EMT en Español Para Autismo* strategies. Both caregivers increased use of contingent target level language modeling immediately after introduction of the strategy. Caregiver 3 also increased her use of contingent proximal level language models when the strategy was introduced; however, Caregiver 2 began using

contingent proximal targets at a higher rate before they were explicitly introduced. Caregiver 2 began using shorter, grammatically correct utterances when tier 1 strategies were introduced. Use of expansions differed across caregivers in the current study. Expansions gradually increased over time (Caregiver 2) or increased immediately and remained variable throughout intervention (Caregiver 3). In the third and final tier of intervention, both caregivers demonstrated immediate increases in use of the specific communication elicitation procedures they were taught, although their use of elicitation procedures remained variable.

The findings from the current study are consistent with the findings of the Gevarter et al. (2022) study. In that study, Latino caregivers were taught NDBI strategies in English. After training, the caregivers used the strategies with their toddlers with autism. The current findings are also consistent with those of previous studies of *EMT en Español* with caregivers of children with developmental language disorders. In the Peredo et al. (2022) small randomized trial, caregivers in the intervention groups used significantly more matched turns, target talk, and expansions than caregivers in the control group. In the Peredo et al. (2018) single case design study, caregivers showed immediate increases in the level of their use of matched turns and target talk. Target talk included both exact target level and proximal target level language in that study. Given the covariation between targets and proximal targets for Caregiver 1 in the current study, it may be that target and proximal target level language are not functionally independent behaviors (Gast et al., 2018). There are some instances in adult-child interactions when only target level language or only proximal target level language would be contextually and grammatically appropriate to use. Therefore, it may be better to teach target and proximal target level language concurrently in future studies.

For expansions, there was an immediate shift in level for caregivers in the Peredo et al. (2018) study. By contrast, use of expansions increased gradually for Caregiver 2 and was variable for Caregiver 3. Two factors may have contributed to the differences in use of expansions across caregivers and studies. One factor was the difficulty interpreting the communicative intent of Child 2 when he used AAC to communicate. The child often activated the same word many times in a row, and the word was not always related to the ongoing activity in a way that was clear to the communication partner. This may have made it challenging for Caregiver 2 to interpret the child's intent and respond with an expanded utterance. Another factor influencing consistent use of expansions was that the adult's opportunities to expand were dependent on the child's rate of verbal communication. Children in the Peredo et al. (2018) study used words frequently, thus providing many opportunities for caregivers to expand language and demonstrate the skill. In the current study, children's rates of AAC use were low at first and increased gradually over time. In earlier sessions, caregivers had fewer opportunities to practice delivering linguistic expansions (for Caregiver 2, 0–6 opportunities per session in the first 6 sessions after the strategy was introduced); thus, they needed more sessions to demonstrate a moderate and consistent level of use of expansions. Caregiver 3's variability using expansions may have been influenced by the variable rate of child presented opportunities to expand and Child 3's intermittent challenging behavior.

Consistent with the Peredo et al. (2018) study, caregivers in the current study used communication elicitation procedures after they were taught, but their use was variable. This variability was expected to some degree. Caregivers were taught to use elicitations only when the child was highly engaged in the activity. For the two children in the current study, their engagement in intervention activities varied from day to day, providing variable opportunities for

their caregivers to use communication elicitations. There were also sessions in which caregivers used more communication elicitations than would be recommended in a responsive interaction. Each caregiver had one session in which they used more than 10 communication elicitations in a 10-min period. Using communication elicitations at such a high rate may have negatively affected child engagement with the caregiver and the activity. It also seemed to negatively affect caregivers' use of contingent target level language models in the current study. Thus, the variability across sessions reflects the caregivers' selection of moments in which to use the communication elicitations and children's presentation of opportunities to do so.

4.2 Discussion of Secondary Findings

4.2.1 Caregiver Fidelity Using *EMT en Español Para Autismo*

In addition to count data, fidelity checklists were used to gain a comprehensive picture of caregivers' delivery of *EMT en Español Para Autismo* directly to the child. The fidelity checklist evaluated caregivers' target strategy use relative to standards for adequate implementation. It also evaluated foundational interaction strategies that are not captured by event-based data, such as removing distractions from the environment, re-engaging the child when necessary, and avoiding overly directive language (see Appendix C). Reporting fidelity data in addition to count-based measures of key ingredients is recommended in describing caregiver implementation of NDBIs (Bailey et al., in preparation). Caregivers differed in their baseline fidelity implementing environmental arrangement components of the intervention. One caregiver used environmental arrangement and behavior support strategies naturally in play with her child during baseline, while the other did not use the environmental arrangement strategies until she

was taught them during the intervention. Fidelity in delivering key components of the intervention (modeling target level language, modeling higher level language, and eliciting communication) increased as caregivers were taught to use more strategies and practiced implementing them cumulatively.

Most of the sessions that the caregivers delivered with high fidelity were in the second half of intervention. In the earlier phases of the intervention, fidelity was lower because they had not yet been taught all of the intervention components. This finding suggests the potential importance of continued direct delivery of intervention from a trained therapist throughout all TMCR intervention while the caregiver is being taught the intervention and gradually increasing their overall fidelity. The relatively short time the therapist delivered the intervention in each session provided a modest, stable dose of the key intervention components at generally high fidelity. This dose might prime child language use and ultimately might support or even optimize the effects of teaching the caregiver. This is an area for further analysis in future studies.

4.2.2 Child Language and Communication

Children's frequency and diversity of communication increased during the intervention phases of the study. In baseline, children did not have access to speech-generating devices (which is a potential limitation to the study findings), and their rate of communication was low. The number of total words and number of different words used in each session increased noticeably for both children during intervention. Consistent with the increased use of signs and gestures by children in the Gevarter et al. (2022) study, children's rates of social communication (communicative vocalizations, gestures, and words) increased for both children in this study, although these behaviors remained variable throughout the intervention.

These findings are largely consistent with previous *EMT en Español* studies involving children with developmental language disorders. In the Peredo et al. (2018) single case design study, two out of three children showing an increase in their NTW and NDW approximately mid-way through the intervention, after their caregivers were taught to use linguistic expansions. In the Peredo et al. (2022) group study, children in the intervention group scored nonsignificantly higher than children in the control group with moderate effect sizes on outcomes such as unprompted NTW and receptive vocabulary scores. That study was focused on caregiver outcomes and underpowered to detect child effects.

4.2.3 Generalization

Both caregivers generalized their use of most *EMT en Español Para Autismo* strategies to unsupported interactions. Use of contingent target level language and expansions was similar in TMCR sessions and generalization sessions. Proximal target level language was slightly lower in some generalization sessions than during TMCR sessions for both caregivers. Caregiver 2 used time delay communication elicitations in the generalization session, and Caregiver 3 did not use milieu episodes. It is important to note that the generalization contexts were similar to the TMCR session contexts in that they both involved play with the child, book-reading, and a routine. The primary difference was that the therapist provided feedback and support (e.g., managing materials) in the moment during TMCR sessions, and the therapist provided no support during generalization sessions. Generalization findings may differ if caregivers were asked to use the strategies in contexts involving entirely different activities or personnel.

In the Peredo et al. (2018) single case design study, the three caregivers were observed interacting with their children during a standard “picnic” scenario with provided materials. This

generalization context involved different materials and structure from intervention sessions, in addition to not including support from the therapist. The caregivers used matched turns, target talk, and expansions at levels similar to intervention sessions or levels that were lower than intervention sessions but higher than baseline levels. One caregiver in the Peredo et al. (2018) study generalized use of time delays to the picnic interaction, but the two caregivers who were taught prompting procedures did not use prompts in the generalization setting. Overall, generalization findings were similar across studies, although the generalization context was more proximal to the intervention context in the current study.

4.3 Discussion of Social Validity Findings

The adaptation and individualization approaches implemented in this study were based on previous research findings with Spanish- and English-speaking populations and ecological theory (Bernal et al., 1995). In the current study, we interviewed families before, during, and after the intervention about their experiences implementing the *EMT en Español Para Autismo* intervention strategies and their perception of their child's communication and other skills across the period of the study. Multiple members of each family (parents and grandmothers) typically participated in interviews. Both families expressed satisfaction with the intervention overall. Both families commented that multiple members of the family used the strategies. The sense of shared responsibility among family members expressed by these two families may reflect the value of *familismo* that is a strength of many Latino communities (Cycyk & Hammer, 2020), highlighting the importance of involving multiple family members in intervention.

When asked directly about specific strategies, caregivers typically approved of the strategies they were taught; however, one caregiver did not approve of the strategy of avoiding

questions and directions. This caregiver's preference for a more caregiver-led directive interaction with their child is consistent with social validity findings from previous *EMT en Español* studies (Peredo et al., 2018, 2022) as well as from other research groups involving caregivers of children without communication disabilities (Cycyk & Huerta, 2020). Peredo et al. (2020) reported that LSS caregivers from low-income backgrounds in their study tended to have directive, responsive, and warm interaction style with their children with language delays. The caregivers in the Peredo et al. intervention studies rated limiting instructions to be the least culturally congruent of the *EMT en Español* strategies. Among LSS caregivers participating in focus groups about early childhood education, Cycyk and Huerta (2020) found that caregivers sometimes approved of child-directed strategies but tended to feel there should be a limit (e.g., allowing children to select between a limited number of choices). By contrast, Dubay (2018) found that Latino caregivers of children with autism reported following the child's lead to be a strategy that was helpful and natural to them. Across studies and across caregivers in the current study, there was variability in degree to which caregivers approved of child-directiveness in therapeutic interactions. Further examination of how this core strategy of NDBIs might be adapted for heterogeneous LSS families is needed.

In responses to open-ended questions about their experiences, families commented on the positive impact of waiting to allow their child time to respond and noticing the different ways that their children were already communicating with them. One family in particular spoke often about learning patience and understanding how to communicate with their child. They noticed their child making eye contact more frequently and reported that he seemed more relaxed. The other family noticed and commented on how the child seemed to enjoy the routine of playing with the therapist and with his caregiver. These changes that the families noticed in their children

did not typically include the increased frequency of verbal communication that were apparent in the quantitative data. Changes that were noticed and appreciated by the families were related to the child's attention, emotions, and relation to family members.

When asked about the TMCR approach, the caregivers considered the Model and Coach components to be the most helpful. These findings are consistent with reports from previous studies including TMCR and caregivers of children with developmental language disorders (Peredo et al., 2018, 2022; Roberts & Kaiser, 2015). However, caregivers of children with autism in the current study also said that aspects of the intervention were at first challenging or frustrating, or that they simply took time to learn. Both families indicated that navigating and using AAC was challenging at the beginning. For one family, using new strategies to engage their child's attention was frustrating. These feelings of frustration may be related both to the caregivers' experience with the intervention and to their children's initial low rates and limited diversity of communication forms. At the beginning when the caregivers had less training and practice with the intervention strategies and children were communicating infrequently, caregivers may not have seen the benefit of the intervention. This was expressed by one caregiver who reported that she believed other parents would need to time before they felt the strategies were appropriate for them. As caregiver training progressed and the child began to communicate more, caregivers may have become more satisfied with intervention for two reasons. First, they could perceive both how their own behavior and their child's communication was changing over time. This was reflected in one family's comments about their child's increase in eye contact and attention to others in the family. Second, the families may have become more satisfied with the strategies as their child was providing them with more opportunities to respond. These trends have implications for when and how caregivers should be

asked to evaluate their own satisfaction and their children's progress in the intervention. Early evaluations and feedback might focus on choices for practice, supports for learning, and child goals. After the mid-point in an intervention, questions of the observed child change and caregivers' evaluation of the intervention training methods and the intervention itself might be more reflective of caregivers' overall experiences. Alternatively, asking caregivers about their experiences after they have achieved mastery at the end of the intervention may not reveal some of the challenges they encountered early in the training phase.

4.4 Discussion of Exploratory Findings

We estimated the overall dosage of intervention that the child received during their participation in the study. When their caregivers were taught *EMT en Español Para Autismo* using TMCR, children were likely exposed to thousands of contingent examples of target level language and proximal target level language and hundreds of linguistic expansions and communication elicitations over the course of the intervention. They received different numbers of sessions delivered at high overall fidelity (46 for Child 2 and 18 for Child 3) as their caregivers were taught the complete set of intervention components over time and as the therapist continued delivering the intervention directly to the child for 10 min of each session.

Fine-grained reporting of dosage of intervention received by the child is rarely reported in caregiver-implemented NDBIs (Kaiser et al., in preparation). These data are critical, however, in understanding variability in child communication outcomes. Some variability is likely due to differences in caregiver acquisition of the NDBI strategies and ability to implement the strategies with fidelity. In addition, variability in dose for NDBI strategies may be due in part to children's rate of communication, and the secondary impact of child rate on frequency with which the

caregiver can use NDBI strategies in interaction with the child. For example, caregivers cannot practice use of linguistic expansions unless the child attempts to say a word. Expansions of gesture and vocalizations are possible (e.g., modeling a word in response to nonverbal or vocal communication attempts), but *linguistic* expansions depend on the child's use of a word or close approximation of a word with relatively clear social intention.

Similarly, children who are not engaged with the caregiver or the activity may offer fewer opportunities for contingent responding and modeling of words. For example, Child 3 had episodes of challenging behavior and sessions in which he was difficult to engage in play activities in the current study. These sessions are reflected most clearly in the sudden decrease in Caregiver 3's use of contingent target level language around session 20 in Figure 2. Variability in engagement may also help explain the relatively low number of sessions at high fidelity for Child 3. The therapist for Dyad 3 commented that it was often difficult to model proximal targets when the child's engagement was fragile. The caregiver and therapist needed to respond quickly to child communication by verbally responding or by giving the child a desired object or action before the child shifted his attention away from the caregiver or became frustrated. The additional effort required to maintain the child's engagement influenced the caregiver's and therapist's ability to simultaneously monitor their own linguistic input during those sessions.

In addition to challenges in maintaining engagement and preventing frustration for the child, the relatively low proportion of sessions at high fidelity for Dyad 3 may be related to measurement. As mentioned above, this study is the first to measure dosage of intervention using a fidelity checklist at each TMCR session. The *EMT en Español Para Autismo* fidelity checklist was adapted from an English language version of the checklist (Bailey et al., submitted) and a procedural fidelity checklist used in an ongoing *EMT en Español* study. The fidelity checklist for

monitoring dosage of *EMT en Español Para Autismo* may need to be refined further to capture aspects of high-quality delivery of the intervention. For example, one item that contributed to reduced fidelity scores for Dyad 3 in several sessions was a low proportion of proximal targets in adult input. Especially at the beginning of intervention, the child's lower rate of verbal communication provided fewer opportunities for responding with proximal targets (e.g., expanding an utterance). It could also be that for children who use AAC and have fragile engagement in shared activities, using relatively more target-level utterances (e.g., single nouns) may be optimal for both maintaining engagement and providing salient language models. The caregiver and therapist for Child 3 may have been naturally responding in ways that were more contingent to the child's language level and engagement. More research is needed to address the transactional aspect of NDBIs and to refine the use of the *EMT en Español Para Autismo* fidelity checklist to appropriately balance child presented opportunities with criteria for use of key linguistic intervention components.

4.5 Contributions of the Study

One of the key contributions of this study is that it provides a documented example of adapting an evidence-based early communication intervention on multiple levels—cultural, linguistic, and individual. Few language interventions have been adapted specifically for Latino Spanish-speaking families with toddlers with autism (DuBay, 2022). *EMT en Español Para Autismo* was developed from previous and ongoing research that culturally and linguistically adapted *EMT en Español* for LSS families of children with developmental language disorders (Peredo et al., 2018, 2022). These adaptations aligned with components of the Ecological Validity Model (Bernal et al., 1995), such as delivering all verbal and written materials in

Spanish, conducting sessions in homes, and explaining the rationale of each strategy in parent-friendly language (see Table 1).

Additional adaptations to *EMT en Español Para Autismo* made the intervention highly individualized for each family. There were two unique components of the design that helped plan the intervention: (a) the direct therapist-only phase of intervention prior to caregiver training and (b) the family interviews before and during the intervention. The direct therapist-only phase of intervention allowed the therapist time to try out behavior support strategies that would support the child during therapy activities, drawing from evidence-based practices such as teaching within preferred activities, keeping activities brief, and using timers and other visual supports (Wong et al., 2015). The direct therapist intervention phase also allowed the therapist to understand the child's baseline level of communication and engagement. Video examples from the therapist delivering intervention to the child during this phase could also be used in workshops so that the caregiver could see the strategy being used with their child in their home, as opposed to seeing the strategy used with a different child. This therapist-only phase prior to TMCR with the caregiver allowed the therapist to begin to tailor the intervention strategies and materials to the family. This is important given the frustration that the caregivers reported experiencing during the early TMCR sessions. Their frustration could have been exacerbated if the therapist had not spent earlier sessions interacting with and getting to know the child, thereby reducing the need for trial-and-error during caregiver coaching sessions.

The therapist-child intervention sessions also helped the therapist to prepare for the FVAI with the family. During the FVAI, the family was involved in collaborative planning and decision-making for the caregiver-training phase of the study. The therapist came to the FVAI with an understanding of some of the play activities and toys the child liked, their

communication level, and positive behavior support strategies that might be effective and needed for the child. The therapist and the family then decided together which toys to purchase to use in remaining sessions, based on child preference, caregiver preference, and therapist expertise. They also discussed different methods of behavior support that the family would be comfortable implementing, both in intervention sessions with the therapist and in other daily living activities. For example, using visual supports, making activities shorter, and changing the order of activities were behavior supports used across intervention and home routines for Dyad 2. Finally, the family was asked what home routines and play activities they enjoy and engage in frequently with the child. These activities were changed if needed after collaborating with the family at mid-intervention interviews. For Dyad 2, therapist teaching using TMCR procedures frequently involved toys and home routines related to preparing and eating food. For Dyad 3, TMCR sessions most often involved sensory play with play-doh and combing the child's hair. Both of these activities were highly preferred by the child. The differences in preferred activities across dyads illustrates the importance of providing opportunities for families and therapists to work collaboratively to individualize activities as contexts for teaching and practicing the intervention.

The child's entire family was invited to participate in interviews and intervention sessions. In this study, multiple family members participated in nearly all interviews, and additional family members were often present to observe parts of intervention sessions. In interviews, both families discussed sharing the strategies with other family members. One family shared in an interview that the child and his siblings were interacting more easily with one another. This level of family involvement is consistent with *familismo*, a common value among Latino Spanish-speaking families (Calzada et al., 2013; Cycyk & Hammer, 2020; Martinez-Torres et al., 2021). When teaching caregiver-implemented NDBIs to LSS families of children

with autism, it may be especially important to respect and capitalize on *familismo* for a few reasons. First and most importantly, Latino Spanish-speaking families have reported wanting to be more involved in services for their child with autism (DuBay et al., 2018). The current study demonstrates one way in which families can be highly involved in planning and intervention. Second, families may be dealing with stigma around their child's autism diagnosis (DuBay et al., 2018; Martinez-Torres, 2021). This stigma could lead to isolation, feelings of shame, and limited access to supports inside or outside the family. Intentionally involving the entire family in planning and intervention activities may help empower families to recognize their unique ability to support the child together. Third, involving the entire family may be important for buy-in related to intervention practices. For example, beginning to use AAC is often a significant decision for families of children with autism. Communication partner support is crucial for making AAC an effective mode for the child to learn and use language (McNaughton et al., 2008). Among members of LSS families, it may be especially important to ensure that all family members are on board with supporting and communicating with their child using AAC.

The decision to use AAC with the *EMT en Español Para Autismo* strategies was an important collaborative and individualized component of the intervention in the current study. There is little research in general involving LSS families, their young children with autism, and AAC. Most caregivers interviewed by DuBay et al. (2018) preferred intervention prioritizing development of spoken language. In line with that study, one caregiver in the current study was initially reluctant to use AAC. However, introduction of AAC was important to give both children access to a mode for speech output, as they used few words (0–1 per session) in baseline. The caregiver agreed to allow the therapist to trial the speech-generating device with the child, and she eventually decided to try using it herself in interactions with her child. In the

exit interview, she commented on the happiness that she saw in her child when he had access to AAC and others could understand him. Not only was AAC ultimately important for providing children a mode for communicating with their families, but it also provided opportunities to caregivers to practice use of language facilitation strategies with their child. This reciprocal interaction between children's rate of communication and the family's practicing *EMT en Español Para Autismo* strategies to communicate with their child and support their child's language development may have been a critical aspect of their experience the intervention.

4.6 Limitations

There were several limitations to the current study. The first major limitation was the number of participants. Four families enrolled in the study, but only two families completed the intervention. Both families that dropped out said that they did not want to tire their child by having them in too many therapies. This speaks to the time and effort that families must contribute to participating in an intensive early childhood intervention, even when some specific barriers (e.g., transportation, insurance billing) are removed. It may also be that early in the intervention, the return value of the time and effort required may not be evident, as discussed above. Although the two families who finished the study ultimately expressed satisfaction, the high rate of attrition early in the study may indicate that the intervention is socially valid for some but not all families.

It is worth considering, however, the burden that research adds to the delivery of an intervention. Paperwork, baseline sessions, interviews, and the delivery of the intervention by the therapist together delayed the caregiver training for more than four weeks at the beginning of the study. Many research studies are also conducted under funding deadlines necessitating a more

condensed intervention timeline. In the current study, families were asked to participate up to 3 times a week, which may be too frequent for many busy families. In early intervention, weekly visits could be delivered over a longer period. Researchers and clinicians should continue to investigate ways to reduce burdens on families participating in early interventions and in research studies investigating early interventions. Solutions may include a greater degree of collaboration between the multiple providers (Part C developmental therapists, speech language pathologists, and others), more efficient use of therapy time, limited baselines and paperwork in research, and continuously greater understanding of what families prioritize when selecting services.

A second major limitation was that children in the current study did not have access to AAC in baseline. Therefore, some of children's gains in language and communication after baseline may be attributable to access to AAC rather than the TMCR approach and the *EMT en Español Para Autismo* strategies taught to their caregivers. The decision to introduce AAC was a collaborative and culturally sensitive process, as discussed above. Introducing AAC in the first baseline session prior to discussion and relationship-building with the family could have lowered the family's confidence in the therapists. Especially given one family's rejection of AAC when she was first asked, introducing AAC prior to any discussion with the family or interaction with the child could have indicated that the therapist was not interested in the family's input. In future studies, researchers should continue to consider cultural factors such as potential stigma around AAC and autism when introducing AAC to LSS families. An emphasis on education around AAC, decision-making earlier in the timeline of the research, involvement of the whole family in decision-making (incorporating *familismo*), and an established trusting relationship between the

therapist and family prior to discussing AAC as an option may be important for success in future studies of *EMT en Español Para Autismo*.

The third limitation was related to measurement of caregiver and child outcomes. There were sessions with low interobserver agreement for coding of both caregiver-child interactions and therapist-child interactions. For the children in the study, it was often difficult to determine whether child acts were communicative or non-communicative. This was addressed in three ways. First, the coding for a significant number of interactions was verified by the lead coder, who reviewed the transcript while rewatching the video to check for errors and/or disagreements. Second, for sessions with particularly low interobserver agreement, the team consensus coded behaviors with a high frequency of coder disagreements and changed the primary data to reflect the consensus codes. Third, changes were made to the coding manual and protocols throughout the study to reflect the consensus decisions and to make subsequent decision-making more objective. For example, after having difficulty with reliably scoring child communication acts, whenever the caregiver responded contingently to the child's potentially communicative behavior, the child's immediately preceding behavior was scored a communicative act. This decision may have inflated the measured rate of child communication when the caregivers began to notice and respond contingently more frequently to children's potentially communicative behaviors.

A fourth limitation was that the dosage analyses were exploratory. We calculated dosage estimates rather than precise measurements of overall dosage. The time required for transcribing and coding adult-child interactions (approximately 1.5 hours for each 10 min sample) limited the feasibility of transcribing and coding all sessions. We instead sampled therapist-child interactions and made dosage estimates based on the number of overall sessions. Additionally,

the *EMT en Español Para Autismo* fidelity checklists were based on versions that had been used in previous *EMT en Español* studies; however, they have not previously been used to continuously characterize the fidelity of the EMT intervention and to indicate fidelity by individual tier or component of the intervention. In reviewing the fidelity data for individual components of the intervention, it appears that the weighting of individual checklist items in the overall total needs to be validated and potentially revised to create a more balanced and sensitive measure of caregiver fidelity. Similarly, 80% fidelity was considered the criterion for high fidelity in the current study. It has not been established empirically what criterion level of fidelity is needed for children to optimally respond to the intervention. Future studies need to examine the relation between dosage of key intervention components, fidelity in delivering these components and child outcomes for specific caregiver-implemented NDBIs, such as *EMT en Español Para Autismo*.

4.7 Implications for Research

The current study contributes to the small research base on culturally and linguistically adapted family-centered interventions for LSS families with children with autism. The findings underscore the effectiveness of the TMCR approach to teach LSS caregivers' a complex set of language support strategies with their children with autism in play, book-reading, and routine contexts. Future research should build on the current study by involving more LSS families from diverse backgrounds. Future studies might involve families with different countries of origin, socioeconomic backgrounds, and locations of residence in the United States. Children with autism are heterogeneous as well, with different personalities, interests, and abilities, including language and engagement levels. The collaborative interview process and other individualization

components of the current study are a model and starting point for future studies to individualize *EMT en Español Para Autismo* for diverse LSS participants. More research on adaptive implementation is also needed as a foundation for practice.

Another direction for future research is the further development of components of the intervention involving AAC. As discussed, introduction of AAC was determined to be necessary for the children and families in this study. Researchers should continue to develop materials for teaching LSS caregivers about the various types of AAC, the evidence to support its use by children with autism, and instruction in how to model language using AAC. These materials should be culturally and linguistically adapted specifically for LSS families, including examples of caregiver-child communication in Spanish. The workshops for the current study were reviewed in focus groups prior to the study to gain the perspectives of LSS families of children with autism. Educational materials regarding AAC in caregiver-child interactions might be similarly refined in consultation with LSS families. These additions to the *EMT en Español Para Autismo* intervention materials may help to address some of the challenges around AAC expressed by the caregivers in the current study.

A third direction for future research is to develop and test a bilingual version of *EMT en Español Para Autismo*. In the current study, the focus was on teaching LSS caregivers to learn strategies to support Spanish language communication. For toddlers, communication with their families in their home language is most critical, and studies continue to show that Latino children with disabilities are more likely than children without disabilities to experience loss of skills in their home language if it is not supported (del Hoyo Soriano et al., 2023). It will still be important for LSS children with autism in the United States to learn English as well as Spanish for academic and social success. Future research on *EMT en Español Para Autismo* could

include a direct therapist intervention component delivered in English in addition to Spanish. A similar bilingual intervention model is currently being tested in a randomized trial of *EMT en Español* for toddlers with developmental language disorders (Kaiser & Peredo, 2019–2024).

4.8 Implications for Practice

Multiple findings from the current study could be relevant to practitioners working with LSS families and children with autism. First, TMCR is a systematic approach based on principles of adult-learning (Kaiser & Roberts, 2013). This approach has been shown to be effective and socially valid when teaching LSS caregivers to use NDBI strategies (Peredo et al., 2018, 2022). The Model and Coach components of TMCR have been especially appreciated by families who have participated in TMCR studies. Thus, practitioners should be sure to prioritize these components of the TMCR intervention approach.

Second, practitioners could apply the collaborative interview process when working with LSS families and children with autism using the protocols in Appendix E. Conversations or interviews prior to family-centered intervention have been recommended when working with this population (Cycyk & Iglesias, 2015; Peredo, 2016). In the current study, we extended these interviews to systematically occur at regular intervals throughout intervention. Intervention should ideally be provided by practitioners that speak Spanish when that is the family's home language. However, even practitioners working with interpreters or with limited proficiency in the families' home language could use similar interview questions to structure conversations to better understand family values, frequent activities, and preferences. These dedicated times for discussion with families are invaluable for establishing and maintaining trust, as well as continually planning for, evaluating, and modifying the specific intervention. Modifications to

the intervention might involve changing activities, materials, schedules, behavior support needs, and family members involved.

Third, practitioners may consider a direct intervention component when working with LSS families with toddlers with autism. A direct therapist intervention phase prior to caregiver coaching could support planning and collaboration by giving the practitioner a better understanding of potentially needed supports (e.g., AAC, behavior supports). A continued direct intervention throughout the caregiver coaching phase, either via the Model component of TMCR or additional direct intervention sessions, could support overall dosage of intervention received by the child. According to fidelity data (Figure 3) and caregiver report during interviews, caregivers needed practice and experience with the *EMT en Español Para Autismo* strategies before they used them with high fidelity. During this time, direct therapist intervention can help ensure that children continue to receive high dosage of intervention at all phases.

CHAPTER 5

Conclusion

Few intervention studies have focused specifically on the experiences, needs, and preferences of Latino Spanish-speaking families with children with autism. This study demonstrates effective application of the teach-model-coach-review approach to teach caregivers a culturally, linguistically, and individually adapted intervention. The caregivers in the current study implemented *EMT en Español Para Autismo* strategies with their children with autism, generalized use of most of the strategies to unsupported interactions, and gave positive feedback about their experience with the intervention. The children in the study increased the frequency and diversity of communication with their caregivers over time. This study contributes to the literature on family-centered naturalistic, developmental behavioral interventions for diverse families and children with autism. More systematic inquiry is needed to understand and address the inequities that these families face in accessing and participating in research and services.

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Table 1

EMT en Español Para Autismo Components and Adaptations

Ecological Validity Model Component	***EMT en Español Para Autismo* Components**	**Individualized Components (individual/family/community-level adaptations)**
Language	*EMT en Español Para Autismo* focuses on increasing the rate and complexity of child communication in their home language through both direct intervention with the child and caregiver coaching.	Interventionists discuss dialect-specific vocabulary and phrases with the caregivers and use them throughout intervention (see Teach-Model-Coach-Review fidelity checklist in Appendix G).
	All intervention sessions are conducted in Spanish. All written materials are provided in Spanish.	Dialect-specific and family-specific vocabulary are programmed on AAC devices.
Persons	Interventionists are trained to fidelity to provide the *EMT en Español Para Autismo* intervention.	Multiple caregivers can be involved in intervention and interviews, depending on the family's preferences. Only one caregiver is designated for data collection purposes.
	Interventionists and assessors speak Spanish and English. One of the interventionists is Latina.	
Metaphors	Not applicable.	Because of the diversity among Latino families in the [redacted] area, meaningful metaphors (e.g., *dichos*, songs) could vary significantly from one family to another. There is no systematic incorporation of metaphors into the current intervention.

Content and Concepts	Child language targets align with typical Spanish language developmental sequences. The interventionists provide education about autism and rationale for all communication facilitation strategies and activity contexts (see workshops in Appendix F). Sufficient intervention time is scheduled to intentionally allow sessions to be un-rushed to build rapport. Caregivers are taught to select activities and then follow children's interests within each activity, rather than allowing children to select activities or materials.	The FVAI and other interviews helps the research team understand the family's unique values, priorities, and language-learning contexts.
Goals	Caregivers learn and use strategies shown to support child communication: 1. Environmental arrangement 2. Modeling target level language 3. Modeling higher level language 4. Eliciting child communication Target level language is based on typical child Spanish language development.	Caregivers collaborate with the interventionist to determine what activities to use in intervention. The FVAI helps the team to understand the family's overall goals for the child's participation and communication. Therapists use experience working with child to determine what type of communication elicitation procedure will support child communication and engagement.

Methods	Sessions have a Teach-Model-Coach-Review structure. Caregivers are reminded of the rationale for each strategy at each session to help draw connections between child characteristics/behaviors and *EMT en Español Para Autismo* strategies and goals.	Caregivers select materials for intervention in collaboration with the interventionist. The most appropriate modes of communication for the child are selected in collaboration between the therapist and the family.
Contexts	All assessments and intervention activities occur in the families' homes or other preferred community locations.	Caregivers collaborate with interventionists to select contexts (household routines, play routines, and preferred books to read) during which to implement the intervention, based on frequent and enjoyable activities for the family. During the FVAI, the interventionist and caregiver(s) discuss relevant contextual factors (time constraints, etc.) that may influence their intervention and access to other services.

Note. FVAI = Family Value and Activities Interview (see Appendix E).

Table 2

Caregiver Characteristics

Caregiver	Relation to Child	Age [a]	Country of Origin	Highest Formal Education Completed	Occupation
Caregiver 1	Mother	39 years	Honduras	Primary school	Construction, part-time
Caregiver 2	Grandmother	51 years	Mexico	Some college	Employed full-time
Caregiver 3	Mother	40 years	Venezuela	College	Public accountant, full-time
Caregiver 4	Mother	Not reported	Ecuador	High school	Restaurant worker, part-time

[a] at time of screening

Note. SPA = Structured Play Assessment.

Table 3

Child Characteristics

Child	Age in months [a]	Gender	PLS-5 Spanish Standard Scores	Language Sample	Brief IQ Composite Score [c]	Highest Play Level [b]	Most Frequent Play Level [b]
Child 1	31	Boy	Auditory: 50 Expressive: 54 Total: 50	NDW: 3 MLUw-S: 2.29 MLUw- E: 1.00	Unable to complete	general combination	indiscriminate
Child 2	33	Boy	Auditory: 50 Expressive: 50 Total: 50	NDW: 1 MLUw-S: 0 MLUw-E: 1.00	Unable to complete	specific combination	general combination
Child 3	31	Boy	Auditory: 50 Expressive: 67 Total: 55	NDW: 0 MLUw-S: 0 MLUw-E: 0	76	substitution	general combination
Child 4	31	Girl	Auditory: 56 Expressive: 88 Total: 70	NDW: 71 MLUw-S: 1.33 MLUw-E: 1.44	102	single scheme sequence	specific combination

[a] at time of screening. [b] measured in the Structured Play Assessment (SPA).

Note. PLS = Preschool Language Scales. NDW = Number of different cumulative conceptual words across Spanish and English. MLUw-S = mean length of utterance in words in Spanish. MLUw-E = mean length of utterance in words in English.

Table 4

Eligibility and Baseline Measures

Measure	Participants	Purpose	Variables
Screening Tool for Autism in Toddlers and Young Children (STAT; Stone & Ousley, 2008).	Child and examiner	Eligibility	Presence of autism characteristics
Preschool Language Scales, 5th edition Spanish (PLS-5 Spanish; Zimmerman et al., 2012)	Child and examiner	Eligibility	Auditory Comprehension Expressive Communication Total Language Score
Leiter International Performance Scale, 3rd edition (Leiter-3; Roid & Miller, 2013)	Child and examiner	Descriptive	Brief IQ Composite Score
Structured Play Assessment (SPA; Ungerer & Sigman, 1981)	Child and examiner	Descriptive	Highest play level Most frequent play level
Semi-structured language sample – Spanish	Child and examiner	Descriptive Intervention tailoring	MLUw NDW Target language tier
Semi-structured language sample – English	Child and examiner	Descriptive Intervention tailoring	MLUw NDW Target language tier
Demographics survey	Caregiver	Descriptive	Demographics data
Community services survey	Caregiver	Descriptive	Time each week receiving speech-language or related services in addition to *EMT en Español Para Autismo*

Table 5

Child Spanish Language Targets and Proximal Targets

Language Level	Linguistic Structures	Examples
Target	Article + singular noun (common nouns)	La pelota (the ball) El elefante (the elephant) El arroz (rice)
	Inflected (common) verbs in the present and present progressive forms	Corre (it/he/she runs) Comemos (we eat) Estás cantando (you are singing)
Proximal Target	Article + noun + present or present progressive common verb	El avión está volando (the plane is flying)
	Reflexive verb	Me cepillo (I brush [my teeth]).
	Preterit or other verb tense	Bailó (it/he/she danced)
	Verb + direct or indirect object (can be attached or unattached clitic)	Lo comiste (you ate it) Hacemos una hamburguesa (we make a hamburger)
	Article + noun + modifier	La torre grande (the big tower) El arroz está caliente (the rice is hot)

Note. These targets were developed as Spanish Tier 1 language targets and proximal targets for the randomized controlled trial testing *EMT en Español* for families of children with developmental language disorders (IES award number R324A190177) and adapted for this proposed study. All children are assumed to use fewer than 50 different words overall and fewer than 1.5 words per utterance on average across two 20-min language samples.

Table 6

Dependent Variables

Variable	Definition
Primary Dependent Variable	Frequency count of caregiver use of *EMT en Español Para Autismo* strategies during 10-min coached interactions with their child. Measured by direct observation and continuous recording from video.
Caregiver frequency of contingent target level language models	The number of times during the 10-min coding period the caregiver used target language level utterance (see Table 5) following a child's communicative turn within 3 s (matched turn), following their own matched turn that was directly related in content (related turn), or following 3 s in which the child did not take a communicative turn (extra turn).
Caregiver frequency of contingent proximal target level language models	Identical to above, except that the utterances were proximal target level (see Table 5).
Caregiver frequency of linguistic expansions	Aggregate number of the following: The number of times the caregiver responded to child utterances without changing the child's communicative intent by… (a) Adding 1–3 words to the utterance (b) Recasting the child's semantically incorrect or nonspecific (e.g., esto [this]) word (c) Recasting the child's grammatically incorrect word or utterance
Caregiver frequency of correctly administered communication elicitation procedures	Time Delays: Least-to-most prompting sequences that include *nonverbal* cues to elicit requesting at the child's target language level. May include creating situations in which the child needs assistance, presenting two choices (e.g., holding up two objects the child is likely to want), or pausing within a routine.

	Milieu Prompting Episodes: Least-to-most prompting sequences that include *verbal* cues to elicit requesting at the child's target language level. Verbal cues may be open questions ("¿Qué quieres?" / What do you want?), choice questions ("¿Quieres ___ o ___?" / Do you want ___ or ___?), or model prompts ("Di ___" / Say ___). Questions (asked during book-reading): question sequences that the adult asks during shared book-reading for which the expected response is at the target language level. Questions might be "¿Qué es?" (What is it?) or "¿Qué están haciendo?" (What are they doing?). If the child does not respond correctly, the adult models the correct response and repeats the question up to 2 times. If the child responds correctly, the adult responds with a linguistic expansion.

Secondary Dependent Variables

Caregiver *EMT en Español Para Autismo* fidelity	Total score on the *EMT en Españo Para Autismo* Fidelity Checklist (Appendix C). Complete checklists were completed for each session regardless of the phase of intervention and which strategies the caregiver had been taught.
Child number of total words (NTW)	Number of total words (spoken or AAC) the child used during the 10-min session. Measured by direct observation and continuous recording from video.
Child number of different words (NDW)	Number of different words (spoken or AAC) the child used during the 10-min session. Measured by direct observation and continuous recording from video.
Child frequency of social communication	Number of utterances or acts in which the child used spontaneous and elicited words (spoken or AAC), communicative vocalizations, or communicative gestures during the 10-min session. To be considered communicative, gestures such as reaches had to be accompanied by a vocalization or eye contact. Measured by direct observation and continuous recording from video.

Generalization of caregiver strategy use	Generalization of caregiver use of strategies without coaching. Measured by direct observation and continuous recording from video.
Exploratory Variables	
Dosage of *EMT en Español Para Autismo* teaching instances	Cumulative number of all *EMT en Español Para Autismo* strategies the therapist used during 10-min Model sessions with the child and the caregiver used during 10-min Coach sessions with the child.
Dosage of high fidelity *EMT en Español Para Autismo* sessions	Number of 10-min caregiver-child interactions and therapist-child interactions with a total score >79% on the *EMT en Español Para Autismo* Fidelity Checklist (Appendix C).

Table 7

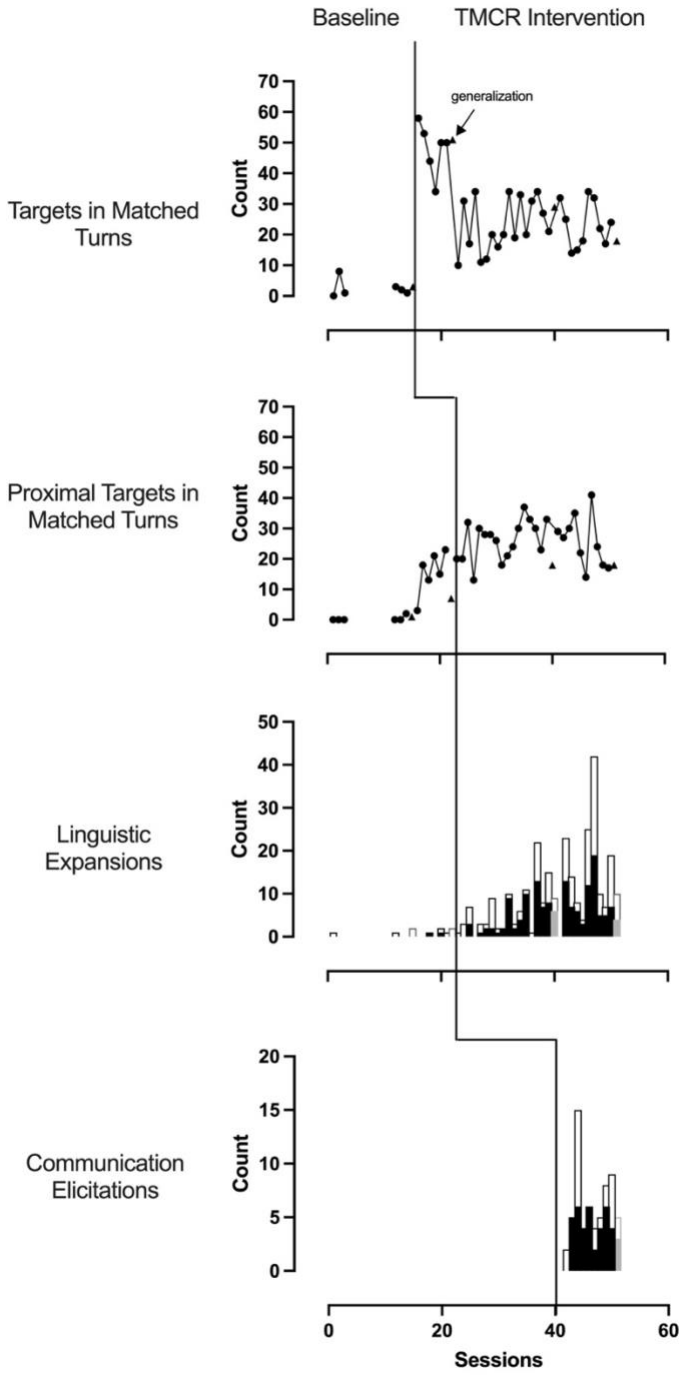
Dosage Estimates for EMT en Español Para Autismo Strategies

Dyad	Interaction Partner	Sessions	Minutes	Targets	Proximal Targets	Expansions	Communication Elicitations
2	Caregiver	43	645	1,542	1,263	230	60
	Therapist	41	530	1,479	1,235	141	70
	Cumulative		**1,175**	**3,021**	**2,498**	**371**	**130**
3	Caregiver	37	555	1,233	572	98	38
	Therapist	36	480	1,765	870	252	88
	Cumulative		**1,035**	**2,998**	**1,442**	**350**	**126**

Note. Values for targets, proximal targets, expansions, and communication elicitations are estimates based on all caregiver-child interaction sessions and a sample of therapist-child interaction sessions.

Figure 1

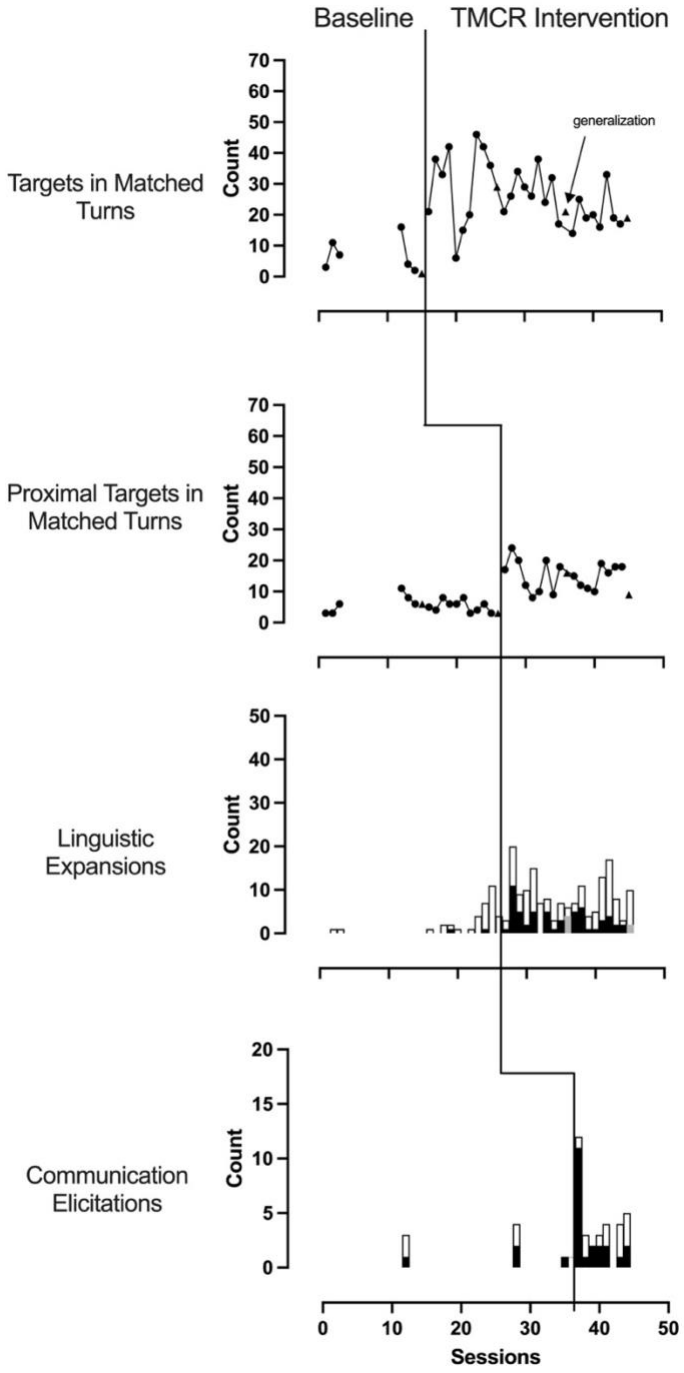
Caregiver 2 Use of EMT en Español Para Autismo Strategies



Note. Solid bars represent counts of the use of the target strategies (expansions and high-quality communication elicitations). White bars represent opportunities (for expansions) or overall attempts (for communication elicitations). Gray bars represent generalization sessions.

Figure 2

Caregiver 3 Use of EMT en Español Para Autismo Strategies



Note. Solid bars represent counts of the use of the target strategies (expansions and high-quality communication elicitations). White bars represent opportunities (for expansions) or overall attempts (for communication elicitations). Gray bars represent generalization sessions.

Figure 3

Caregiver Intervention Fidelity Total Scores

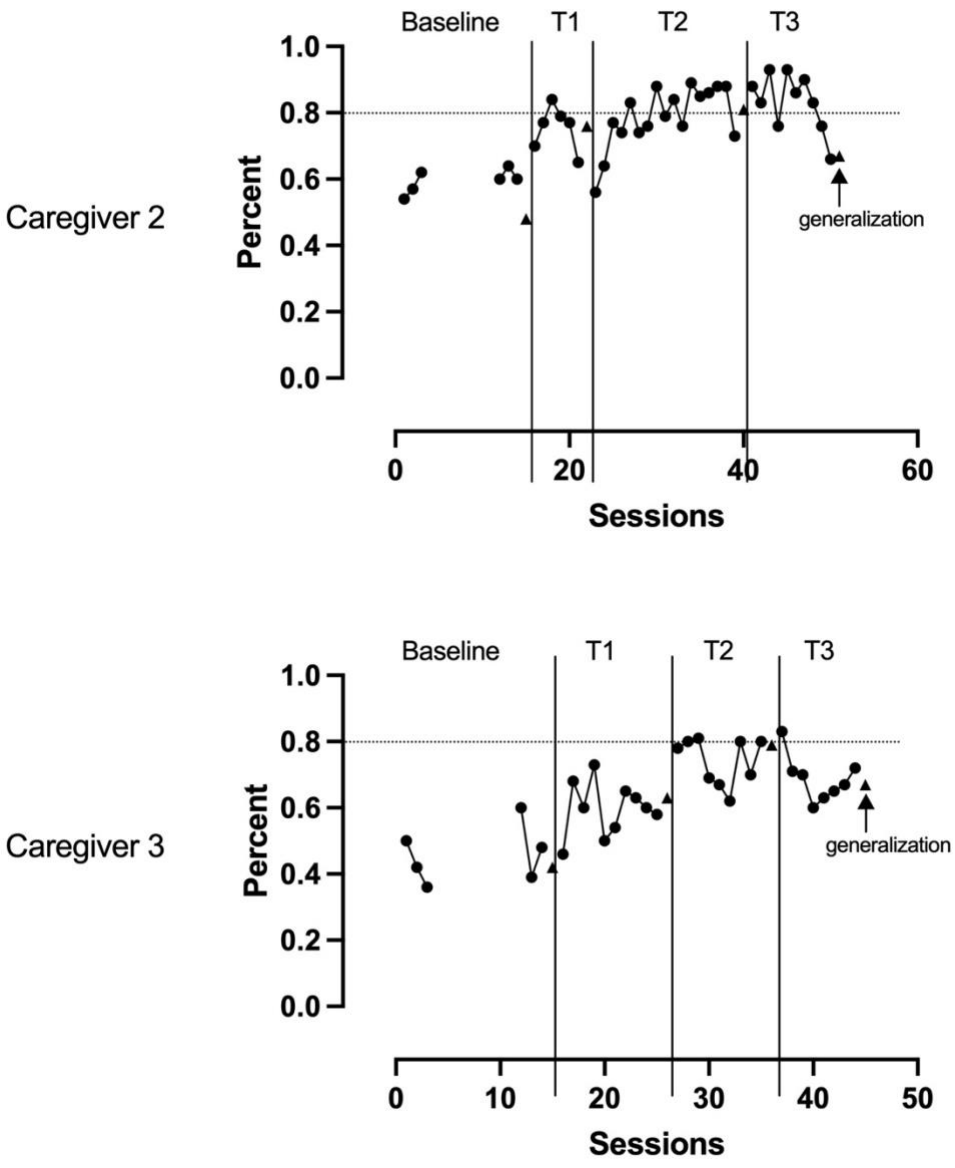


Figure 4

Child 2 Communication With Caregiver

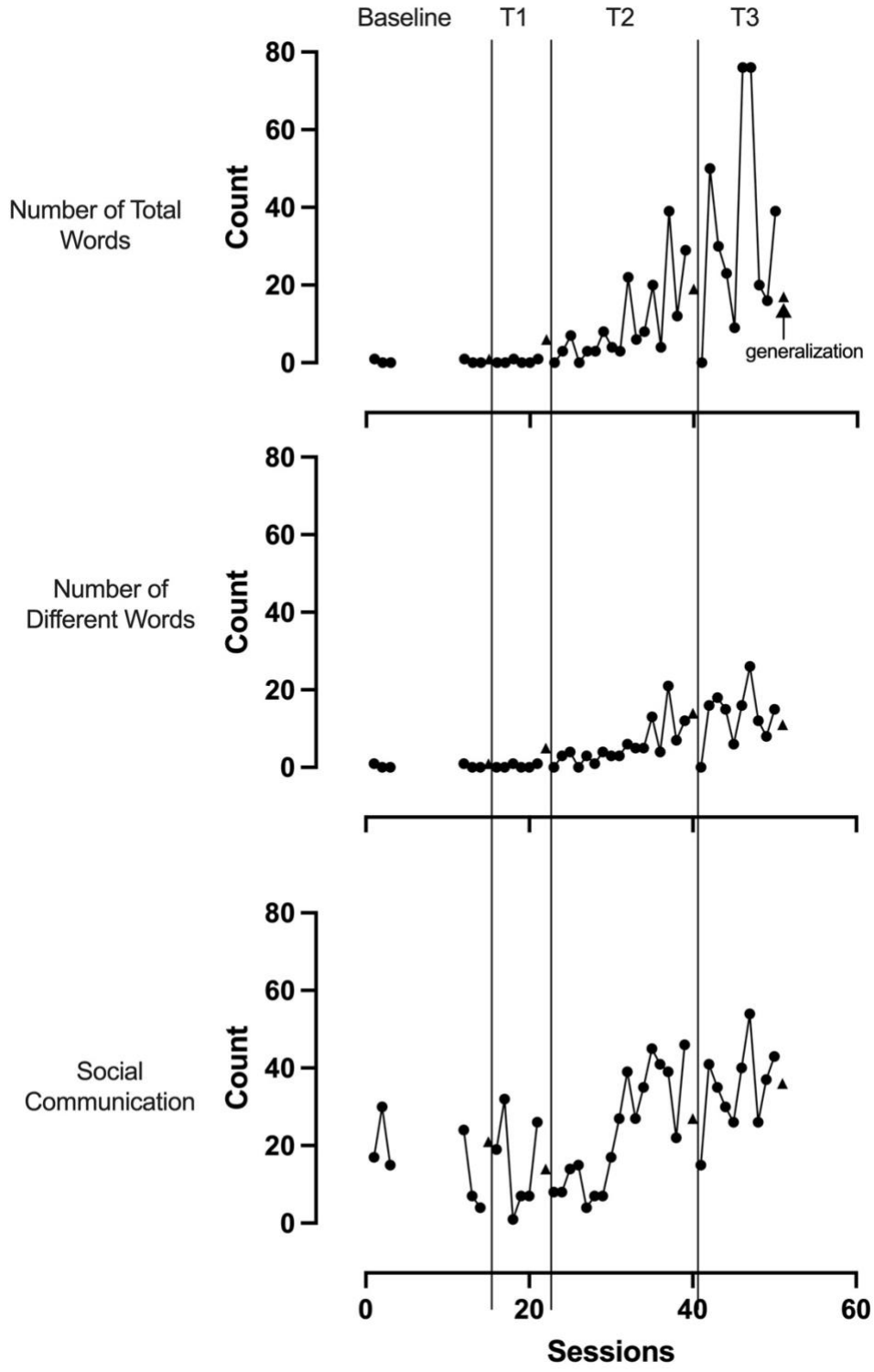


Figure 5

Child 3 Communication With Caregiver

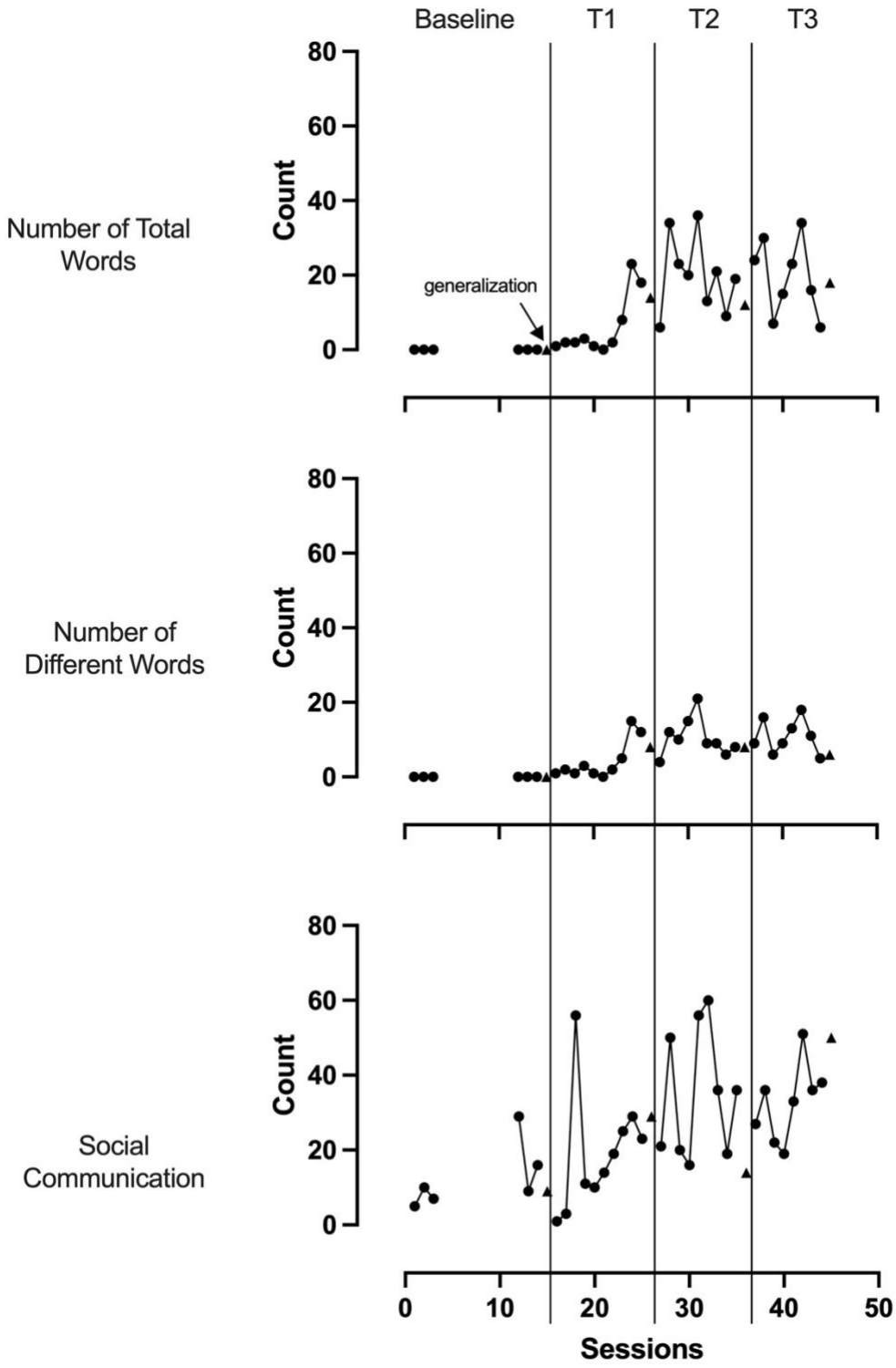
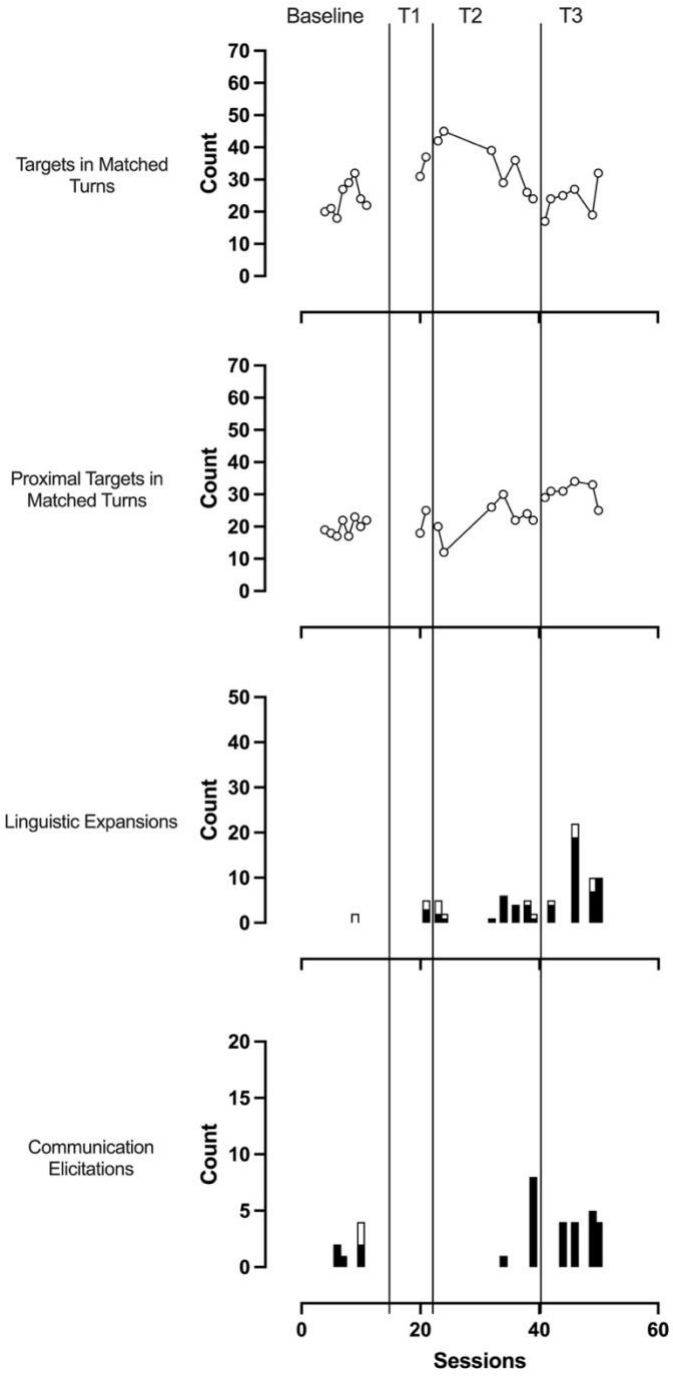


Figure 6

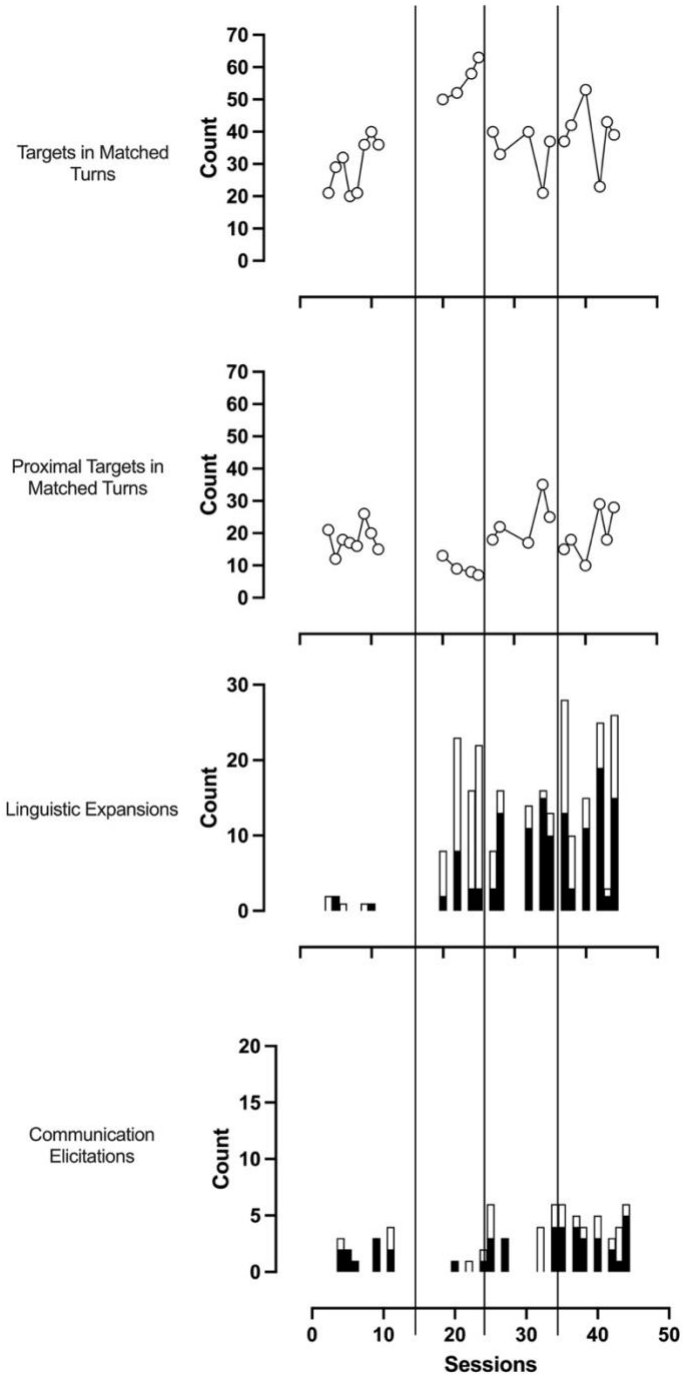
Therapist Use of EMT en Español Para Autismo Strategies With Dyad 2



Note. Solid bars represent counts of the use of the target strategies (expansions and high-quality communication elicitations). White bars represent opportunities (for expansions) or overall attempts (for communication elicitations).

Figure 7

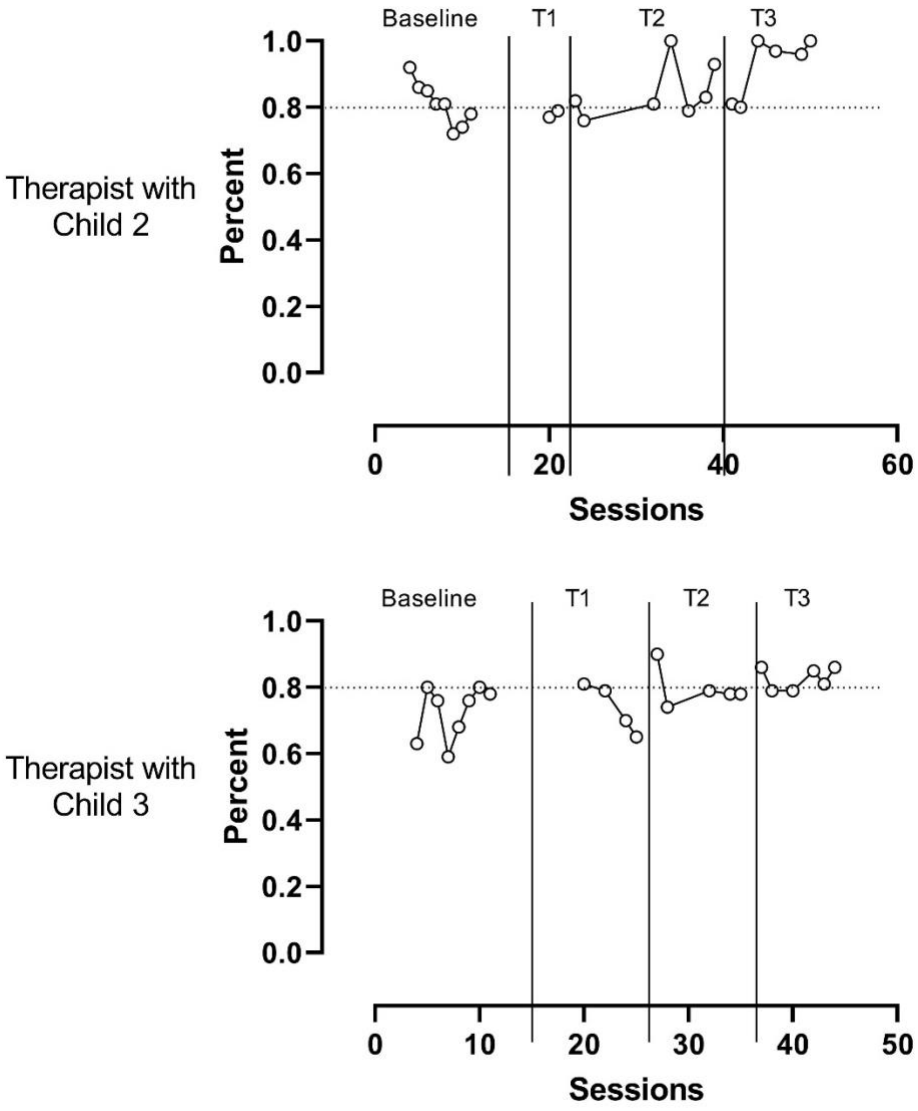
Therapist Use of EMT en Español Para Autismo Strategies With Dyad 3



Note. Solid bars represent counts of the use of the target strategies (expansions and high-quality communication elicitations). White bars represent opportunities (for expansions) or overall attempts (for communication elicitations).

Figure 8

Therapist Intervention Fidelity Total Scores



Appendix A

Play-Based Language Sample Protocols

Purpose of the Language Sample

The purpose of the language sample is to provide every child with a similar opportunity for language use with a fun play partner. All language samples use the same toys, similar play acts, and the same language is modeled by the adult. Child language measures (lexical diversity, mean length of utterance in words, total words, prompted/elicited/unprompted words, syntax) are also collected from these interactions. The language sample will be administered twice – once in Spanish and once in English.

Length of the Assessment

The language sample should last for exactly 20 minutes.

Materials

The following materials are used to ensure uniformity and maintain comparable assessment situations across children; it is important to use the same set of materials and toys with minimal substitutions. Materials include:

Toy Set Theme	Toys
Babies and feeding	Girl baby doll Boy baby doll Baby doll feeding set (dishes, bibs, bottles) Mini blankets
Teatime	Tea set in a case Pretend wooden cookies Baking sheet Toy spatulas Toy oven mitt
Building and cars	Duplo blocks Toy cars
Book	*The Very Hungry Caterpillar* board book, by Eric Carle Caterpillar puppet
Art	Sketch pad Stamps and inkpad Crayons

Administration steps

1. Ensure both the child and caregiver feel comfortable with you in their home.
2. Play with the child for 2–5 minutes so the child can warm up to you if needed. You may use bubbles, other reinforcers, or the child's own materials at home.
3. Ask the caregiver what the best area of the home will be for you to play with the child with our toys with no or limited distractions. The space should be away from other toys and other children if possible. Ask caregiver to turn off any distractions such as TV or music.
4. Setup video camera so the child can be seen. It is important to see the child's face and any gestures the child might make.

5. Ask the caregiver to not interact or talk to the child during this 20-minute assessment. Explain that we say and do the exact same things for all kids during this play assessment to see what language children use.
6. Set your timer for 20 minutes.
7. Turn on the camera.
8. Start timer and interaction.

During the Assessment

- Make sure the Language Sample lasts exactly 20 minutes.
- Present all toy sets to the child, aim for 4 minutes with each toy set. You may put away a toy set if the child is not interested in it after 1 minute and go back to a preferred toy set/ go to a next toy set.
- Model only the language scripted below for each toy set.
- Read the text in the book in the language of administration as long as the child is attending to it
- You may use non-specific language and praise the child for playing/ engaging throughout.
- You may use behavior regulating directions and behavior supports (visual timer) as needed.
- Say something every 15 seconds.
- Repeat any words or phrases you hear the child say in a commenting tone.
- If the child asks a question, answer the child but without using specific language (e.g. child says "¿que es esto?" you can respond with "no se, ¿que creas que es?")
- Say all introductions, comments, and questions *in the chosen language for the administration (Spanish or English).* Imitate anything the child says in the language the child uses but answer any questions the child has in the language you are using during the assessment. If the child code switches and says something, imitate exactly what the child said. If the child code switches while asking you a question, answer in the language you are using during the assessment.

Administration Procedures

Spanish Administration				
Introduce the activity: "*Mira todos los jugetes, ¡Vamos jugar!"*				
Toy Set	Opening comment/ question	Play acts to model (lowest to highest level play, model 2 acts based on child's play level)	Comment	Example Question
Toy set 1: babies and feeding	*Mira los bebes, que quieres hacer?*	• Cover baby with blanket • Rock the baby • Kiss the baby • Feed the baby with a spoon or bottle • Baby feeds him/herself	*Voy a darle un besito a mi bebé.* *Duerme bebe.*	[in intro]
Toy set 2: Tea time	*Vamos a comer galletas y tomar té.*	• Stack tea cups or put frosting on cookies • Cut cookies • Pretend to eat the cookie • Pretend to pour tea	*Me gustan las galletas!* *Te sirvo.*	*¿Qué te gusta comer?*
Toy set 3: Building and cars	*Mira estos bloques, qué quieres hacer?*	• Push cars • Stack blocks • Build cars • Build restaurant/house • Pretend to eat pizza • Have people eat pizza	*Hacemos una torre.* *Está muy rica la pizza!*	[in intro]
Toy set 4: book	*Vamos a mirar este libro sobre la oruga.*	• Tickle the child with the puppet or other social play with puppet if needed for engagement, puppet can also "eat" items in book to sustain engagement for at least 1 minute • Point to 1 picture in every page in the book	*Tiene mucha hambre!* *Veo un/a _____*	*¿Qué fruta te gusta?*
Toy set 5: art	*Vamos a dibujar!*	• Show child how to stamp/ hand over hand stamp • Draw a circle • Draw a sun, cloud, rainbow	*Hago una luna con la estampilla.* *Estamos dibjuando.*	*¿Qué quieres dibujar?*

English Administration				
Introduce the activity: "*Look at all the toys, let's play!"*				
Toy Set	Opening comment/ question	Play acts to model (lowest to highest level play, model 2 acts based on child's play level)	Comment	Example Question
Toy set 1: babies and feeding	*Look at these babies, what do you want to do?*	• Cover baby with blanket • Rock the baby • Kiss the baby • Feed the baby with a spoon or bottle • Baby feeds him/herself	*I'm going to give my baby a kiss.* *Go to sleep baby.*	[in intro]
Toy set 2: Tea time	*Let's eat cookies and tea.*	• Stack tea cups or put frosting on cookies • Cut cookies • Pretend to eat the cookie • Pretend to pour tea	*I like cookies!* *I'll serve you.*	*What do you like to eat?*
Toy set 3: Building and cars	*Look at these blocks, what should we make?*	• Push cars • Stack blocks • Build cars • Build restaurant/house • Pretend to eat pizza • Have people eat pizza	*We can make a tower.* *Pizza is yummy.*	[in intro]
Toy set 4: book	*Let's look at this book about the caterpillar.*	• Tickle the child with the puppet or other social play with puppet if needed for engagement, puppet can also "eat" items in book to sustain engagement for at least 1 minute • Point to 1 picture in every page in the book	*She's very hungry!* *I see a _____*	*What fruit do you like?*
Toy set 5: art	*Let's draw!*	• Show child how to stamp/ hand over hand stamp • Draw a circle • Draw a sun, cloud, rainbow	*I'm stamping a moon.* *We are drawing.*	*What do you want to draw?*

Troubleshooting

- Make sure you are set up in a location where you can keep the child in the interaction/camera frame (corner of room, sitting at the table if needed).
- Make sure no other toys or materials are available for the child. If the caregiver gave the child something like a snack or toy, wait for the child to finish or set a timer to end that activity before starting the LS.
- If something happens in the middle of the interaction (e.g. child has to use the bathroom, another family member or friend walks in the room), pause the timer and restart when appropriate.
- If the child is upset or showing any negative behaviors before you begin, wait for the child to calm down before beginning the interaction. You may switch tasks and go back to the LS later in the visit or complete this interaction at a different visit.
- Try the following if a sibling comes into the LS:
    - Use a nonverbal gesture to indicate for the child to wait or go to another area (point towards the caregiver).
    - Tell the child it's not their turn yet, but they can play with the toys when the timer beeps.
    - Ask the caregiver for help keeping the child out of the interaction, you may try a reinforce that the sibling can engage in with the parent (e.g. bubbles).
    - Bring activities/ reinforces to help distract siblings and give them their own "special" toys to play with.
    - If you cannot get the sibling out of the LS interaction, the interaction will need to be redone. You may bring another person with you to the homevisit to do this.
- If the child walks away from the interaction for more than 10 seconds, pause the timer and restart once you can get the child engaged again. If necessary, consider changing locations (e.g., sitting at a table instead of on the floor, moving to a corner/ less distracting area of the room).
- If the camera shuts off and you are unsure how much of the interaction was captured, give the child a break/ move to another activity, fix the camera issues (plug in, switch batteries, etc.), and then restart the interaction (full 20 minutes).

Appendix B

Demographic and Community Services Surveys

Demographic & Medical History Form

ID _____ Date _____

1. The person filling out this form is the child's:

____ Mother

____ Father

____ Grandmother

____Aunt

____Uncle

____ Grandfather

____ Other (please describe_____)

The information in this survey will be used to help us learn more about factors affecting the development of your child. Please provide an answer for all questions, even if it represents your "best guess."

Information about Your Family:

Answers to the following questions will help us know that children from a variety of backgrounds are represented in the study. We appreciate you sharing this information with us.

2. Are you of Latino, Hispanic, or Spanish origin?

____yes _____no

If yes, what is your country of origin? (e.g. Mexico, Spain, Puerto Rico, Dominican Republic, Venezuela, etc.) _____

3. Do you or any members of your family speak any other languages besides Spanish and English? ____yes _____no

If yes, what language(s)?

4. What is your **racial** background (select one or more)?

____ American Indian or Alaska Native ____ White

____ Asian ____ Other: _____

____ African American

5. Were you born in the United States?

____yes ____no

If no, how many years have you lived in the U.S? _____

6. Your date of birth: ____/_____/_____

7. What is your child's **racial** background (select one or more)?

____ American Indian or Alaska Native ____ White

____ Asian ____ Other: _____

____ African American

8. Was your child born in the United States?

____yes ____no

If no, how many years has he/she lived in the U.S? _____

9. What is your highest level of education completed? (circle one):

a. No schooling
b. Some elementary school
c. Finished elementary school
d. Some years of secondary school
e. Finished secondary school
f. Some years of high school
g. Finished high school
h. GED certificate
i. Vocational training (not university)
j. Some years of community college
k. Finished community college
l. Some years of university (not vocational training)
m. Finished university (e.g. BA, BS)
n. Graduate study

10. What is your occupation: _____

11. What is your current employment status: (circle one)

a. Not employed
b. Employed part-time
c. Employed full-time
d. Self-employed part-time
e. Self-employed full-time
f. Employed full-time and second job

12. Do you work outside the home?

____No ____Part-time ____Full-time

13. Does this child have another caregiver that lives in the home?

____No (go to question 23) ___Yes

14. What is the other caregiver's relation to the child?

____ Mother ____ Father

____ Grandmother ____Aunt

____Uncle ____ Grandfather

____ Other (please describe_____)

15. Is the other caregiver of Latino, Hispanic, or Spanish origin?

____yes _____no

If yes, what is the country of origin? (e.g. Mexico, Spain, Puerto Rico, Dominican Republic, Venezuela, ect) _____

16. What is the caregiver's **racial** background (select one or more)?

____ American Indian or Alaska Native

____ Asian

____ Native Hawaiian/ Pacific Islander

____ African American

____ White

____ Other: _____

17. Was the caregiver born in the United States?

____yes ____no

If no, how many years has he/she lived in the U.S? _____

18. What is the caregiver's highest level of education completed? (circle one):

a. No schooling
b. Some elementary school
c. Finished elementary school
d. Some years of secondary school
e. Finished secondary school
f. Some years of high school
g. Finished high school
h. GED certificate
i. Vocational training (not university)
j. Some years of community college
k. Finished community college
l. Some years of university (not vocational training)
m. Finished university (e.g. BA, BS)

19. What is the caregiver's occupation: _____

20. What is the caregiver's employment status: (circle one)

a. Not employed
b. Employed part-time
c. Employed full-time
d. Self-employed part-time
e. Self-employed full-time
f. Employed full-time and second job

21. Does the caregiver work outside the home?

____No ____Part-time ____Full-time

22. Caregiver's date of birth: ____/_____/_____

23. What is your family income (circle one letter)?

	Full Year	**Monthly Average**	**Weekly Average**
A	less than $5,000	$0 - $417	$0 - $100
B	$5,001 - $10,000	$418 – $833	$101-$200
C	$10,001 - $15,000	$834 - $1,250	$201 - $300
D	$15,001 - $20,000	$1,251 - $1,667	$301 - $400
E	$20,001 - $25,000	$1,668 - $2,083	$401 - $500

F	$25,001 - $30,000	$2,084 – $2,500	$501 - $600
G	$30,001 - $35,000	$2,501 – $2,917	$601 - $700
H	$35,001 - $40,000	$2,918 - $3,333	$701 - $800
I	$40,001 - $50,000	$3,334 - $4,167	$801 - $1,000
J	$50,001 - $60,000	$4,168 - $5,000	$1,001 - $1,200
K	$60,001 - $70,000	$5,001 - $5,833	$1,201 - $1,400
L	$70,001 - $80,000	$5,834 - $6,667	$1,401 - $1,600
M	$80,001 - $90,000	$6,668 - $7,500	$1,601 - $1,800
N	$90,001 - $100,000	$7,501 - $8,333	$1,801 - $2,000
O	$100,001 or more	$8,334 or more	$2,001 or more

_____don't know

_____don't wish to answer

24. How many people live in your house? _____

Number of adults over 21 yrs.: _____

Number of children less than 21 yrs.: _____

25. During the past year, has your family moved?

____ No ____Yes If yes, how many moves? _____

26. During the past year, has there been a change in your child's primary caregiver?

____No ____Yes If yes, briefly explain: _____

27. During the past year, has there been a change in the parent's marital status?

____No ____Yes

_____Newly married

_____Separated

_____Divorced

28. During the past year, has there been a change in child custody?

____No ____Yes If yes, briefly explain: _____

Fill in the information requested or select the relevant response:

Yes, No, NK=Not Known or Not Available

Medical History

1. Complications during pregnancy? __Yes __No __NK

   If yes, describe_____

2. Birth weight _____lbs._____ oz. __NK
3. Birth length _____(inches) __NK
4. Full term? __Yes __No __NK

   If No, how many weeks gestation? _____

5. Number of days in hospital after birth _____
6. Number of days, if any, spent in NICU after birth_____
7. Has your child had a formal eye exam in the past 12 months? __Yes __No __NK

   Results: _____

8. Has your child had a formal hearing exam in the past 12 months? __Yes __No __NK

   Results: _____

9. How many ear infections has your child had?_____

   How many in the last year?_____

   Age of onset_____Most recent_____

10. Has your child had PE (ear) Tubes surgically placed? __Yes __No __NK

    How many sets of tubes has your child had placed?_____

    Does your child currently have them? __Yes __No __NK

11. Does your child have any allergies, special diet or nutritional needs? __Yes __No __NK

If yes, please explain

_____

_____

_____

_____

12.. Does your child have any other medical concerns not previously addressed? __Yes __No __NK

If yes, please list here

_____

_____

_____

_____

13. Has your child been diagnosed with any speech and/or language disorder (for example dysarthria or apraxia)? __ yes __ no __ NK

14. Have you received any training or educational program on language therapy strategies? __ yes __ no __ NK

15. Please list any other hospitalizations your child has experienced

Dates	**Reason for hospitalization**

Community Services Survey

ID _____ Date: _____ Person completing this form: _____

1. Has your child received these programs?

Program	**Did your child participate**	**Which language was the program in?**	**How many hours per week does your child currently receive this therapy or program?**
Early intervention	____Yes ____ No	____ English ____English and Spanish ____Spanish	
Speech/ language therapy	____Yes ____ No	____ English ____English and Spanish ____Spanish	
Occupational therapy	____Yes ____ No	____ English ____English and Spanish ____Spanish	
Physical therapy	____Yes ____ No	____ English ____English and Spanish ____Spanish	
Headstart	____Yes ____ No	____ English ____English and Spanish ____Spanish	
Other educational program	____Yes ____ No	____ English ____English and Spanish ____Spanish	

Appendix C

EMT en Español Para Autismo Fidelity Checklist

Item Number	Item Criteria	Scores
Environmental Arrangement and Engagement (7–11 points total)		
1	The adult sets up a play and book sharing space to optimize child engagement. For children who can easily engage in play and books this can be an open space on the floor, for those having difficulty with engagement this might be sitting at a table, in between options may be arranging body positioning/ toys to minimize space to wander/ distractions, moving to a corner of the room, etc. The adult changes the physical space during the session if needed.	1 = yes 0 = no
2	The adult sits within 3 feet from the child and stays at the child's level for the majority of the session. The child may also be in the adult's lap if not distracting.	1 = yes 0 = no
3	The adult removes distractions and unused materials.	1 = yes 0 = no NA = not applicable
4	The adult uses positive behavior support measures if necessary. These may include timers, first-then board, redirecting, etc.	1 = yes 0 = no NA = not applicable
5	The adult uses strategies to re-engage the child when necessary. These can include bringing objects (puppets, other toys/ materials) into book sharing, adding in a song or a person engagement game (e.g., tickles, peek-a-boo) in book or play, dropping/ simplifying play level, and modeling new play.	1 = yes 0 = no NA = not applicable

6	The adult physically interacts with the materials the child is playing with and engages in child's activity with the toy for the majority of the session (rate for play only)	1 = yes 0 = no
7	The adult uses language to be playful and to engage, redirect, provide behavioral expectations 30% or less of the time (includes: asking the child a question, giving a play or behavioral direction, singing a song, making a sound effect, etc.).	1 = yes 0 = no
8	Rate for play: The adult only mirrors and maps language onto play acts that are functional and appropriate for the majority of the session. Nonexamples might include: throwing toys, crashing cars together repeatedly, pushing buttons on a cause/effect toy	2 = only mirrors and maps functional play 1 = mostly mirrors and maps functional play with brief instances of nonfunctional play 0 = engages in nonfunctional play multiple times throughout the session
9	Rate for book-reading: The adult takes balanced turns with the child and takes turns that refer to the book content (not regulating behavior). Note: Reading the book text after a 3-s pause is appropriate as long as the child is engaged in the book.	1 = yes 0 = no NA = not applicable
10	The adult uses language and inflection in a way that mirrors typical conversation, avoiding speech patterns that are robotic, monotone, or sing-songy for the majority of the session.	1 = yes 0 = no
Modeling Target Language (9 points total)		
11	The adult uses Spanish throughout the session with minimal code switching. The number of times the adult code switched in this session was [coded data].	1 = yes 0 = no

12	The adult responds within 2 s to all child communicative attempts (vocalizations, gestures, signs, approximations, words) with a related response or repeats the child's utterance. In this session, the adult responsiveness percentage was [coded data].	3 = 80% or more 2 = 60–80% 1 = 40–60% 0 = less than 40%
13	The adult pauses for at least 3 s after the majority of utterances to give the child an opportunity to take a communication turn. Percentage of turns after which the adult paused: [coded data]	3 = 80% or more 2 = 60–80% 1 = 40–60% 0 = less than 40%
14	The adult models targets at the child's level for at least 35% of utterances.	2 = 35% or more 1 = 25–35% 0 = less than 25%
Expanding Language and Play (2–5 points total)		
15	The adult uses proximal targets for the child for at least 35% of all adult utterances. Percentage of proximal targets out of all adult utterances: [coded data]	2 = 35% or more 1 = 25–35% 0 = less than 25%
16	The adult appropriately expands words the child uses at least 40% of opportunities. Percentage of expansions in this session: [coded data] Number of expansion opportunities in this session: [coded data]	3 = 40% or more 2 = 30–39% 1 = 20–29% 0 = less than 20% NA = not applicable, 0 opportunities to expand
Eliciting Communication (0–9 points total)		
17	Rate for play: The adult uses 1–5 time delays (TDs) and/or milieu episodes (MEs) in 10 minutes coded time. This can be coded NA if engagement was fragile for the entire play session but should receive a rating of 0–2 if there was any opportunity. Number of high-quality TDs: [coded data]	2 = 1–5 1 = >5 0 = none NA = not applicable, engagement was too fragile

	Number of total TDs: [coded data] Number of high-quality MEs: [coded data] Number of total MEs: [coded data]	
18	Rate for play: Milieu prompting and TD episodes are high quality. Of the total number executed, what percentage were a score of 2 or greater? This can be coded NA if criterion above is met, if criteria is not met and there are no attempted episodes, code this a 0. Percentage of high-quality TDs: [coded data] Percentage of high-quality MEs: [coded data]	3 = 90% 2 = 80% 1 = 70% 0 = < 70% or none were attempted despite good child engagement NA = not applicable, none were attempted because engagement was too fragile
19	Rate for book-reading: The adult asked at least 1 question per 5 min if appropriate, based on child engagement (NA if the child is still working on engagement during shared book-reading). Number of high-quality questions: [coded data] Number of total questions: [coded data]	1 = yes 0 = no NA = not applicable, engagement was too fragile
20	Rate for book-reading: The majority of book sharing question episodes are scored Q3. This should be scored NA if still working on engagement. Percentage of high-quality questions: [coded data]	3 = majority were Q3 2 = about half were Q3 1 = less than half were Q3 0 = none were Q3 or none were asked despite good child engagement NA = not applicable, none were asked because engagement was too fragile

Appendix D

Procedural Fidelity Checklists

Table D1: *Procedural Fidelity Checklist for Baseline Sessions*

Item	Score
The therapist greets the parent and asks how the parent and child are doing.	1 = yes 0 = no
The therapist explains the timeline of the baseline visit: • Observing a 15 min interaction with their child	1 = yes 0 = no
The therapist allows parent to choose location in home for play.	1 = yes 0 = no
Baseline: The therapist gives the parent (first session) or helps the parent gather the provided toys/books (subsequent sessions). Note: yes as long as the trainer does not tell the family where to play	1 = yes 0 = no
The therapist asks the parent to get 1–2 additional toys or materials that the child enjoys for the interaction. The trainer gives the parent (first session) or helps the parent gather the provided toys/books (subsequent sessions). NA if there are already at least 4 different toys and books available in the area. Provided toys/books: (1) mega bloks, (2) wooden shape sorter and bead maze, (3) small contained of bubbles, (4) book: Siesta, (5) book: What Can You Do With A Paleta?	1 = yes 0 = no NA = not applicable
The therapist does not provide any supportive EMT teaching strategies with the parent (no "teach" segment).	1 = yes 0 = no
The therapist tells the parent to play as they normally would and to play until the timer beeps, which occurs after 15 minutes. Example: "*Esta actividad durará 15 minutos. Vamos a observar cómo se comunican usted y su hijo(a) con juguetes y libros. Juegue o lea con su hijo(a) como jugarían si no estuviera aquí. Le diré cuando ya hayan pasado 8 minutos para que sepa que ya están a medio camino de terminar. ¿Alguna pregunta?"*	1 = yes 0 = no
The therapist does not provide any coaching to the parent (no "coach" segment).	1 = yes 0 = no

The therapist does not provide any feedback or suggestions relating to EMT strategies (no "review" segment).	1 = yes 0 = no
The therapist nonverbally supports the family during the entire visit by smiling, nodding, making general positive comments, and ensuring the family feels comfortable throughout the observation.	1 = yes 0 = no
The therapist asks the parent how the session felt to them.	1 = yes 0 = no
The therapist confirms next appointment with the family.	1 = yes 0 = no

If other family members (e.g., sibling) are present, they can participate in the interaction as well. As much as possible, interaction should capture however interactions would typically occur for the family.

Table D2: *Procedural Fidelity Checklist for Therapist-Child Sessions*

Item	**Score** (0=no, 1=yes)
The therapist greets the parent and asks how the parent and child are doing.	1 = yes 0 = no
The therapist explains the timeline of the visit: • Therapist intervention with the child for 25 min	1 = yes 0 = no
The therapist tells the caregiver they are welcome to observe but that it is not necessary.	1 = yes 0 = no NA = not applicable, primary caregiver not present
The therapist does not provide any supportive EMT teaching strategies with the parent (no "teach" segment).	1 = yes 0 = no
The therapist does not provide any coaching to the parent (no "coach" segment).	1 = yes 0 = no
The therapist does not provide any feedback or suggestions relating to EMT strategies (no "review" segment).	1 = yes 0 = no

The therapist nonverbally supports the family during the entire visit by smiling, nodding, making general positive comments, and ensuring the family feels comfortable throughout the observation.	1 = yes 0 = no
The therapist asks the parent how the session felt to them or how they thought their child was communicating.	1 = yes 0 = no NA = not applicable, parent not present or parent offers information unprompted
The therapist confirms next appointment with the family.	1 = yes 0 = no

Table D3: *Procedural Fidelity Checklist for Teach-Model-Coach-Review Sessions*

Item Criteria	**Scores**
Environmental Arrangement and Teach	
<u>Greeting</u> Therapist asks the caregiver how intervention (pt session 2 and up) OR how communicating in play, book sharing and routines has been going at home (pt session 1)	1 = yes 0 = no NA = not applicable, parent offers information unprompted
<u>Review</u> Therapist reviews intervention strategies previously addressed OR reviews focus for today based on workshop (when session follows a workshop).	1 = yes 0 = no
<u>Session Focus</u> Therapist selects 2 strategies for current home session.	2 = both strategies 1= one strategy 0 = no strategy
<u>Rationale</u> Therapist reviews the rationale behind the strategies	2 = both strategies 1= one strategy 0 = no strategy
<u>Teaching</u>	2 = both strategies

The therapist engages the parent in active learning by doing one of the following: 1) looking at videos and asking the caregiver to describe the strategy use 2) asking "what if" scenarios/open questions 3) working on a handout/ plan for the session with the parent	1= one strategy 0 = no strategy
Asks for Questions Therapist asks if the caregiver has any questions	1 = yes 0 = no
Responds to Questions If the caregiver asks questions, the therapist provides an appropriate correct response and supportive feedback	1 = yes 0 = no NA = caregiver had no questions
Language Caregiver training is all done in Spanish.	1 = yes 0 = no
Dialect Therapist checks in about dialectical differences at least once during session by asking the caregiver what word or phrase they would use.	1 = yes 0 = no
Physical Space The therapist helps the caregiver set up a play and book sharing space to optimize child engagement. For children who can easily engage in play and books this can be an open space on the floor, for those having difficulty with engagement this might be sitting at a table, in between options may be arranging body positioning/ toys to minimize space to wonder/ distractions, moving to a corner of the room, etc.	1 = yes 0 = no
Physical Space Modifications The therapist suggests changing the physical space during the session if needed. The therapist collaborates with the parent about the play/ book sharing environment. NA if not necessary or applicable.	1 = yes 0 = no NA = not necessary
Model	
Model Therapist models strategies in play for 10 minutes (uses a timer to keep exact time)	1 = yes 0 = no
Introduces Modeling Portion Prior to modeling, the therapist engages the parent in active watching by explicitly telling the caregiver what to look for during the model.	1 = yes 0 = no
Model Explanations After modeling, the therapist engages the caregiver in discussion about what the caregiver noticed during the modeling and/or what the therapist did and how the child responded.	1 = yes 0 = no

Coach	
Introduces Coaching Portion Therapist gives clear instructions to let the caregiver know it is their turn to play with the child for 10 minutes, conduct shared book-reading for 2–3 min, and do a routine for 2–3 min (should equal 15 min overall).	1 = yes 0 = no
Therapist Support Therapist supports the interaction (if needed; e.g., EA, behavior supports) so the parent can successfully engage the child for 10 minutes	1 = yes 0 = no
General Positive Feedback Therapist gives caregiver general positive feedback at least 5 times during the 15-min caregiver session.	5 = 5 times 4 = 4 times 3 = 3 times 2 = 2 times 1 = 1 time 0 = 0 times
Specific Feedback Therapist gives caregiver specific feedback on caregiver use of target strategies at least 3 times.	1 = yes 0 = no
Book-Sharing Occurs Book sharing occurs for at least 2 minutes. This time can be all therapist (for children in pre-book sharing stage); split between the therapist and parent in a transition phase; or just the parent.	1 = yes 0 = no NA = not applicable
Book-Sharing Strategy Review Therapist reviews strategies for book (if different than play/ routine strategies for the session).	1 = yes 0 = no NA = not applicable
Book-Sharing Specific Feedback Therapist gives caregiver specific feedback on caregiver use of target strategies at least once per strategy OR points out her use of the strategies while engaging with the child	2 = 2 times 1 = 1 time 0 = no times NA = not applicable
Book-Sharing General Feedback Therapist gives caregiver general positive feedback at least 2 times per 2 minutes of a reading session, rate NA if therapist conducting the whole session	2 = 2 times 1 = 1 time 0 = no times NA = not applicable

Review	
Review Therapist summarizes how the caregiver used the targeted strategies	1 = yes 0 = no
Effect of Strategies on Child Behavior Therapist relates one example of caregiver behavior to child behavior	1 = yes 0 = no
Reflection Therapist engages the caregiver in reflective discussion by asking at least 1 probing question, OR, if parent initiates reflective talk, therapist gives reflective feedback in response. Questions 1. How did that session feel? 2. What went well or what felt easy? 3. What went poorly or felt difficult?	1 = yes 0 = no
Planning for Generalization Therapist gives the caregiver specific homework to practice at least once for 5 minutes on their own in between sessions. (N/A if it's the last PT session).	1 = yes 0 = no NA = last session
Duration Home visit lasts no more than 75 minutes.	1 = yes 0 = no

Table D4: *Procedural Fidelity Checklist for Generalization Sessions*

Item	Score
The therapist greets the parent and asks how the parent and child are doing.	1 = yes 0 = no
The therapist explains the timeline of the baseline visit: • Observing a 15 min interaction toys (10 min), books (2–3 min), and routines (2–3 min) without coach support	1 = yes 0 = no
The trainer asks the parent to choose a routine from 3 options: (a) dressing routine (e.g., putting on or taking off shoes) (b) preparing/having a snack (c) picking up toys	1 = yes 0 = no
The therapist allows parent to choose location in home for play. Note: yes as long as the trainer does not tell the family where to play	1 = yes 0 = no

The trainer helps the parent gather the provided toys/books. NA if there are already at least 4 different toys and books available in the area. Provided toys/books: (1) mega bloks, (2) wooden shape sorter and bead maze, (3) small contained of bubbles, (4) book: Siesta, (5) book: What Can You Do With A Paleta?	1 = yes 0 = no NA = not applicable
The therapist asks the parent to get 1–2 additional toys or materials that the child enjoys for the interaction. NA if there are already at least 4 different toys and books available in the area.	1 = yes 0 = no NA = not applicable
The therapist does not provide any supportive EMT teaching strategies with the parent (no “teach” segment).	1 = yes 0 = no
The therapist tells the parent to play as they normally would and to play until the timer beeps, which occurs after 10 minutes.	1 = yes 0 = no
The therapist does not provide any coaching to the parent during play (no “coach” segment).	1 = yes 0 = no
The trainer tells the parent to enjoy books with their child as they typically would for 2–3 min.	1 = yes 0 = no
The trainer does not provide any coaching to the parent during book-reading (no "coach" segment).	1 = yes 0 = no
The trainer tells the parent to complete the routine with their child (selected ahead of time) as they typically would for 3 min. If it is difficult to make the routine last 3 min, just make sure there is at least 2 min. The caregiver can do multiple routines from the options (dressing, snack, picking up).	1 = yes 0 = no
The trainer does not provide any coaching to the parent during the routine (no "coach" segment).	1 = yes 0 = no
The therapist does not provide any feedback or suggestions relating to EMT strategies (no “review” segment).	1 = yes 0 = no

The therapist nonverbally supports the family during the entire visit by smiling, nodding, making general positive comments, and ensuring the family feels comfortable throughout the observation.	1 = yes 0 = no
The therapist asks the parent how the session felt to them.	1 = yes 0 = no
The therapist confirms next appointment with the family.	1 = yes 0 = no

Appendix E

Interview Protocols

Family Values and Activities Interview Questions

Note. This is an English translation. The interview will be conducted in Spanish.

Beginning the Family Values and Activities Interview and notetaking

The interviewer can begin the Family Values and Activities Interview by saying something like, "*The purpose of this Family Values and Activities Interview is for us to gain a better understanding of (CHILD's NAME) and your family. This will be an informal conversation about your family, (CHILD's NAME) history, personality and strengths, and your goals for (CHILD's NAME). You can choose what information you want to share. This information will be treated with respect and confidentiality. You do not have to share any information that you wish to keep private and can choose not to answer any question."*

It is very helpful to take notes during the Family Values and Activities Interview so that the interviewer can remember important information about the family and use the notes to write functional and measurable goals. Any notes taken should be things that would be shared with the family. Note taking should be brief and not interfere with listening to the caregiver/s. The interviewer can say something like this to ease the caregiver/s about note taking, *"I will be taking some notes while we talk of some of the important things you say. These notes will help us to plan intervention and goals for (CHILD'S NAME) and I am happy to share them with you. If you have any questions at any point, please feel free to ask me."*

Family Values and Activities Interview opening questions and suggested follow-up questions

Set 1: Getting to know the family

1. Tell me about your family.
    - Who lives in the home with [CHILD's NAME]?
    - Tell me about your extended family.
    - Are there other children in the family?
    - Where does [CHILD's NAME] fall in birth order?

Set 2: Caregivers to be involved in intervention

1. Who participates in caregiving or parenting [CHILD's NAME]?
    - Who do you go to when you want parenting advice?

Set 3: Cultural beliefs about parenting and expectations of children

1. What are your beliefs about parenting young children?
    - How should [CHILD'S NAME] behave at home?
    - How should [CHILD'S NAME] behave in the community?

- What are your expectations for [CHILD'S NAME] with (napping or bedtime, feeding or eating, potty training, ect.)?

2. What are your strengths as a caregiver?

Set 4: Child medical/developmental history and social context

1. What have been some significant life events for [CHILD'S NAME]?
   - What prompted or concerned you to have your child evaluated?
     a. How old was [CHILD]?
     b. Did they ever seem to lose skills?
     c. Does [CHILD] have any siblings with autism?
   - Tell me about how [CHILD] got diagnosed. (e.g., professionals involved, how parent felt about it, whether they had to wait very long)
   - Have there been any major illnesses or hospitalizations?
   - Tell me about your pregnancy with [CHILD].
   - How was [CHILD's] feeding after they were born? How is it now?
     a. Does [CHILD] follow any special diet?
   - How was [CHILD's] sleeping after they were born? How is it now?
   -

Set 5: Getting to know the child

1. Tell me about [CHILD's NAME].
   - How would you describe [CHILD's] personality?
   - What are things [CHILD] likes?
   - What are things [CHILD] dislikes?
   - What are [CHILD'S] strengths?

Set 6: Family support systems

1. Tell me about your support system.
   - Besides (people already mentioned), are there other friends or individuals that have been supportive?
   - Are there other things or systems that are supportive?

Set 7: Family activities

Show the caregiver/s the "family activities" table. Tell the caregiver/s these are some examples of activities come caregivers do with their children.

1. Ask the caregiver/s to review the activities and add any that might not be included that they do in their family.
2. Ask the caregiver/s to put a star next to each activity that is important to them.

3. Ask the caregiver/s to put a star next to each home activity that they do with their child a minimum of 3 times per week or each community activity that they do a minimum of 1 time per week.
4. Ask the caregiver/s to put a star next to each activity that either is enjoyable to their child or currently challenging to their child and something they would like to work on.
5. Ask the caregiver to circle any activities that have at least 2 stars next to them.
6. For each circled activity ask, who participates in the activity?
7. For each circled activity ask, how does [CHILD] participate in the activity?
8. For each circled activity ask, if you could magically change one thing about this activity what would it be?

Set 8: Other goals/information

1. Besides some of the things we just talked about with your family activities, what are some of your other goals for [CHILD]?
    - What would you like to get out of participating in this program?
    - If I could change one thing for you to make your life better, what would it be?
    - What have been some successful interventions for your child?
    - What qualities did your child's favorite therapist or teacher have?
    - Is there anything else we have not covered that you would like to share?

Ending the Family Values and Activities Interview

Summarize the interview. Emphasize the positives and thank the caregiver for sharing his/her story. An example statement might be, "*Thank you so much for participating in this interview. I loved hearing about how excited [CHILD's NAME] gets when she sees her grandfather, it's wonderful that she is so connected to your dad. It was also so great to hear that you and [CHILD's NAME] already have some established activities that are fun for both of you. That story about how [she/he] plays and communicates with you in the bathtub is so cute and a great place to start teaching some language. I heard you say how challenging having a child with a disability has been for you and that you often feel like you do not know if what you are doing is the best for her. It also sounds like to me that you are very resourceful and involved. It's great that you started getting her intervention at such a young age and are so involved with all of her therapies."*

Family Activities

Play Activities	**Community Activities**	**Caregiving Activities**
● Play with toys ● Sensory play (sand, playdoh, water) ● Dramatic/dress up play ● Outdoor play	● Going to the park ● Going to the grocery store ● Going to a restaurant ● Visiting family or friends ● Going to religious or spiritual services/ceremonies	● Cooking/preparing meals ● Setting the table ● Eating meals ● Putting shoes on/off ● Dressing/undressing ● Bath ● Brushing hair ● Brushing teeth

Academic or Pre-Academic Activities	**Chores**	**Other Activities:**
● Reading books ● Listening to music ● Singing songs ● Dancing ● Playing musical instruments ● Puzzles ● Games ● Drawing ● Writing	● Feeding pets ● Sweeping/vacuuming ● Doing laundry ● Picking up the mail ● Cleaning dishes	

Mid-Intervention Interview Protocols

Numbered questions are the primary questions. Lettered questions are follow-up, if needed.

1. How does the program feel for you?
    a. What has been easy?
    b. What has been difficult?
    c. What about for [other family member involved]?

2. What has your child been doing well with lately?
    a. In the intervention?
    b. Throughout their day?

3. What has your child been struggling with lately?
    a. In the intervention?
    b. Throughout their day?

4. What has changed about the activities your family participates in regularly? (look at same list as before)
    a. Are there any additional activities your family has been enjoying lately?
    b. Are there any that are not relevant anymore?
    c. Who participates in the activities now?
    d. How does your child participate in activities now?
    e. What would you magically change?

5. What do you still hope to get out of participating in this program?
    a. If I could change one thing for you to make your life better, what would it be?

6. How does your child typically communicate?
    a. With you?
    b. With others?

7. How do you typically communicate with your child?
    a. What helps them understand?

b. What helps them respond?
c. Do you communicate with your child the same or differently than with other children? How so?

Exit Interview

Hello [Parent name], we would like to ask about your experiences participating in the Kidtalk EMT en Español program. Please answer honestly, we will use this information to improve the program for other families. We want to know what did not work for you or your family or your child as well as what worked well.

Do you have any questions for me before we begin? [if yes, answer parent's question; if no, continue]

1. Approximately how many hours per week did you practice using the EMT en Español strategies at home?

2. Did you teach any of the strategies you learned to anyone else who interacts with your child?

3. How comfortable do you feel using EMT en Español strategies on your own now that you have completed all the coaching sessions?

4. Which part of the intervention did you think was the most effective in helping you learn the strategies?
   a. Workshops
   b. Observing the therapist play with my child
   c. Practice with my child with coaching from the therapist
   d. Reviewing/talking about the strategies with the therapist before/after interacting with your child

5. Which part of the intervention did you think was the least effective in helping you learn the strategies?
   a. Workshops
   b. Observing the therapist play with my child
   c. Practice with my child with coaching from the therapist
   d. Reviewing/talking about the strategies with the therapist before/after interacting with your child

6. What types of activities do you use EMT en Español strategies with? How often do you use the strategies in those activities?

Type of routine	Practice? Y/N	Some of the time (less than 30%)	Half of the time (about 30-60%)	Most of the time (above 60%)
Play routines (e.g. play with toys, bubbles, tickle games,				

sensory play, outside play)				
Pre-academic routines (coloring/ drawing, book sharing, music)				
Caregiving routines (washing hands, bath, mealtimes, dressing)				
Household chores (laundry, feeding pets, cleaning)				
Community activities (visiting friends/family, going to a restaurant, shopping, going to the park)				

6. Do you think this intervention helped your child?

7. What could we do differently or better?

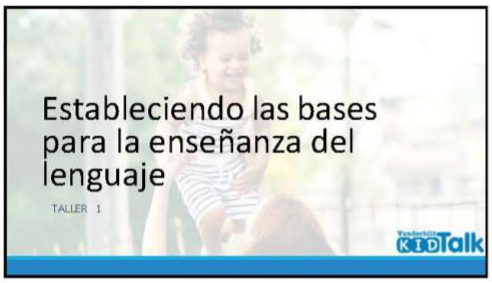
I will now ask you to rate specific strategies that you were taught from 1-5. 1 means not effective/not appropriate at all, 2=not very effective/appropriate, 3= somewhat effective/appropriate, 4=effective and appropriate, 5=very effective/appropriate. You may also respond that you don't know. I'll remind you of what the choices are as we go through each item. I'll also ask you about any additional comments you have about each strategy.

Question	Rating	Comments
How effective/appropriate was the strategy notice and respond?	1 2 3 4 5 NA	
How do you think other Spanish-speaking caregivers would view notice and respond?	1 2 3 4 5 NA	
How did notice and respond fit or not fit with your views of how to interact with/educate your child?	1 2 3 4 5 NA	
How effective/appropriate was the strategy mirror and map?	1 2 3 4 5 NA	
How do you think other Spanish-speaking caregivers would view mirror and map?	1 2 3 4 5 NA	
How did mirror and map fit or not fit with your views of how to interact with/educate your child?	1 2 3 4 5 NA	
How effective/appropriate was not giving your child instructions during activities?	1 2 3 4 5 NA	
How do you think other Spanish-speaking caregivers would view not giving instructions during activities?	1 2 3 4 5 NA	
How did not giving instructions fit or not fit with your views of how to interact with/educate your child?	1 2 3 4 5 NA	
How effective/appropriate was the strategy balancing your communication turns with your child?	1 2 3 4 5 NA	
How do you think other Spanish-speaking caregivers would view balancing communication turns?	1 2 3 4 5 NA	
How did balancing communication turns fit or not fit with your views of how to interact with/educate your child?	1 2 3 4 5 NA	
How effective/appropriate was not asking your child as many questions in the activities?	1 2 3 4 5 NA	
How do you think other Spanish-speaking caregivers would view not asking as many questions?	1 2 3 4 5 NA	
How did not asking as many questions fit or not fit with your views of how to interact with/educate your child?	1 2 3 4 5 NA	
How effective/appropriate was the strategy target talk with your child?	1 2 3 4 5 NA	
How do you think other Spanish-speaking caregivers would view target talk?	1 2 3 4 5 NA	

How did target talk fit or not fit with your views of how to interact with/educate your child?	1 2 3 4 5 NA	
How effective/appropriate was the strategy expansion with your child?	1 2 3 4 5 NA	
How do you think other Spanish-speaking caregivers would view expansion?	1 2 3 4 5 NA	
How did expansion fit or not fit with your views of how to interact with/educate your child?	1 2 3 4 5 NA	
How effective/appropriate was the strategy prompting (for example, giving options or help) with your child?	1 2 3 4 5 NA	
How do you think other Spanish-speaking caregivers would view prompting (for example, giving options or help)?	1 2 3 4 5 NA	
How did prompting fit or not fit with your views of how to interact with/educate your child?	1 2 3 4 5 NA	
How effective/appropriate was the strategy questions in books with your child?	1 2 3 4 5 NA	
How do you think other Spanish-speaking caregivers would view questions in books?	1 2 3 4 5 NA	
How did questions in books fit or not fit with you views of how to interact with/educate your child?	1 2 3 4 5 NA	

Appendix F

Deidentified Individualized Workshop Example



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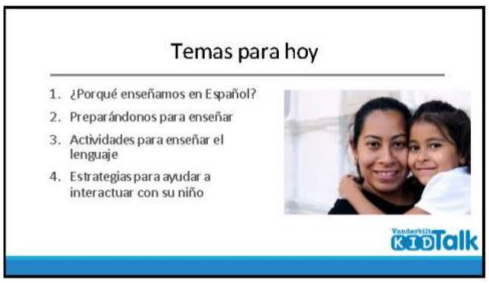

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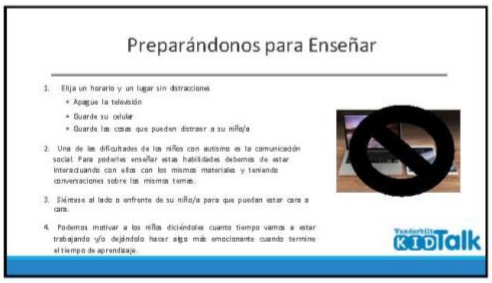

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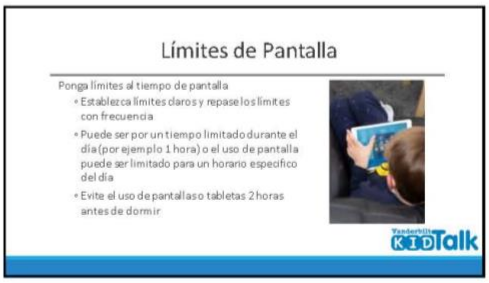

6

¿Cómo y cuándo usaremos las motivaciones?

1. No queremos frustrar a ___.
2. Cuando ___ se frustra, no usará su comunicación y perderemos su interés.
3. Cuando estemos trabajando para que el niño se involucre e interese en la actividad, no es un buen momento para usar las motivaciones.
4. Las motivaciones deben usarse <u>con</u> <u>ver</u>, cuando el niño está <u>muy interesado y motivado</u> para usar la comunicación.
5. Las motivaciones son solo una estrategia más. ¡Nuestras estrategias más poderosas son las que ya está usando!
6. Cuando respondemos usando palabras y frases específicas, tomando turnos y extendiendo, estamos enseñando nuevas palabras y ampliando su comunicación.

7

¿Cómo vamos a usar *pausa en rutina*?

1. Use una pausa para incentivar a ___ a comunicarse durante la hora de comer.
2. Antes de servirle la comida, haga una pausa y muéstrale la comida cerca de la cara.
3. Espere hasta que ___ se comunique usando una seña, una vocalización, su iPad, o palabras verbales.

8

¿ Cómo vamos a usar *pausa en rutina*?

3. Si el niño no usa palabras:
   - diga una palabra específica.
   - Ej: di *la salchicha* y sírvesela
4. Si el niño usa una palabra:
   - extienda la comunicación del niño.
   - Ej: la salchicha está rica.
5. Si el niño no tiene interés (no quiere la comida):
   - Sigue con la rutina y sirve la comida

9

¿Cómo vamos a usar *opciones*?

1. Use la estrategia de opciones para incentivar a ___ a comunicarse durante la hora de comer u otra actividad que le gusta mucho (ej. mirar un video).
2. Muéstrale 2 opciones diferentes, una que le gusta mucho y una que no le gusta tanto.
   - ej. el arroz y el agua
3. Espere hasta que ___ se comunique usando una seña, una vocalización, su iPad, o palabras verbales.

10

¿ Cómo vamos a usar *opciones*?

4. Si el niño no usa palabras:
   - diga la palabra específica.
   - Ej: di *el arroz* y sírveselo
5. Si el niño usa una palabra:
   - extienda la comunicación del niño.
   - Ej: quiero el arroz.
6. Si el niño no tiene interés (no quiere una de las opciones):
   - Sigue con la rutina y sírvele la comida

11

¿Una pregunta?

12

La comunicación aumentativa y alternativa

- La comunicación aumentativa y alternativa les da a los niños una manera visual para acceder palabras y frases para comunicarse.
- Puede ser un iPad, un teléfono, un tablero, o dibujos.
- A los niños con autismo, la comunicación aumentativa y alternativa no le impide hablar.

13

Preparamos el iPad

- Elegimos vocabulario para ____ en cada actividad:
  - El juego
  - Los libros
  - Una rutina
- Guided access

14

Estructurar el ambiente

1. Elija un lugar con menos distracciones para que su hijo sepa donde debe estar
   - Con ____ vamos a usar la mesita
2. Guarda todos los juguetes y distracciones en esta área
3. Con ____, vamos a dejar solamente dos juguetes disponibles
   - Cuando hay muchas opciones es mas difícil concentrarse y quedarse en el mismo lugar para tomar de turnos con una persona

15

Siguiente Sesión y Preguntas

1. Hoy y para las siguientes sesiones, usted va a interactuar con su niño(a) por 15 minutos
   - Haremos 10 minutos de juego
   - De 2 a 4 minutos de libro
   - Y de 1 a 3 minutos de rutina, o según elegir
2. ¿Alguna pregunta?

16

Estimulación del Lenguaje

TALLER 2

1

Temas para hoy

1. Metas de lenguaje
2. Estrategias EMT para enseñar lenguaje
   - Observar y responder
   - Toma de turnos
   - Uso de palabras y frases específicas

2

Metas de Lenguaje

1. Aumentar la comprensión de palabras y frases.
2. Aumentar el número de veces que el niño se comunica.
3. Incrementar la diversidad de comunicación del niño.
4. Aumentar la independencia de la comunicación del niño.
   - Aumentar la comunicación espontánea.
   - Disminuir la dependencia a las preguntas de los adultos.

3

Estrategias EMT en Español

4

Observar y Responder

1. Observar y responder le enseña a su niño(a) que su comunicación es importante para usted.
2. Cuando usted nota los intereses de su niño/a y lo que está comunicando y responde a esa comunicación, usted lo/la está reforzando a querer seguirse comunicando.
3. Entre más se comunique y más practique su comunicación, más fácil le será.

5

¿Cómo observar y responder?

1. No haga muchas preguntas.
2. No le de muchas instrucciones a su niño/a.
3. Hable acerca de las cosas que su niño/a esté viendo, señalando o hablando de.

video of therapist using strategy with child

6

Toma de turnos para Comunicarse

1. La toma de turnos brinda a los niños la oportunidad de comprender las palabras y frases que decimos dándoles tiempo para comunicarse.
2. Cuando tomamos muchos turnos, no le damos la oportunidad al otro de intentar decir algo.
3. Los niños con dificultades en el lenguaje necesitan un poco mas de tiempo para que su cerebro procese las palabras o frases que les estamos diciendo.

7

¿ Cómo Tomar Turnos?

1. **Diga una cosa y espere por lo menos 3 segundos para decir algo más.**
   - Esto le enseña a su niño/a a tomar su turno y le dá una oportunidad para comunicarse

video of therapist using strategy with child

8

Imitar y Describir

Con juguetes, usamos la estrategia de ***imitar y describir*** para tomar de turnos

- Imita lo que hace ___ y usa una palabra o frase para describir lo que hacen
- Por ejemplo:
  - ____ pone un bloque en la torre
  - Usted pone un bloque en la torre y di "construimos" o "el bloque"

video of therapist using strategy with child

9

Uso de palabras y frases específicas

1. Usamos las rutinas, los juguetes y los libros para enseñarle a su niño/a palabras y frases nuevas que aún no conoce o que todavía no usa espontáneamente.
2. Usamos palabras y frases específicas que son gramaticalmente correctas.
3. Las palabras y frases que enseñamos dependen del nivel de lenguaje de su niño/a.

10

¿ Cómo usar palabras y frases específicas?

Un tercio del tiempo usaremos palabras y frases al nivel de lenguaje de ____

11

____ está en el nivel 1

• Artículo + sustantivo • Verbos en: presente o presente progresivo	**Ejemplos para lavarse las manos** El agua Las manos El jabon La toalla lavo/ lavamos	**Ejemplos para el juguete de helado** El helado El dinosaurio La cuchara Como/come/comemos

12

Comunicarse con el iPad

- Usamos las palabras y frases especificas con el iPad también
- Es importante mantener el iPad muy cerca
- Siempre decimos la palabra o la frase especifica también cuando empujamos el botón

13

Ejemplos:

video of therapist using strategy with child

video of therapist using strategy with child

video of therapist using strategy with child

14

¿Preguntas?

¡VAMOS PRACTICAR!

15

Lenguaje más avanzado

TALLER 3

1

Temas para hoy

1. Repasar las estrategias previamente enseñadas.
2. Extensiones.

2

Repaso

¿Cómo le ha ido con las estrategias que hemos estado trabajando?

1. Eligiendo un horario y un lugar sin distracciones
2. Limitando el uso de preguntas e instrucciones
3. Respondiendo a la comunicación de _
4. Usando la estrategia de toma de turnos
5. Estrategias de conducta
6. Usando palabras y frases específicas

3

Estrategia: Palabras y frases especificas más avanzadas

4

Uso de palabras y frases más avanzadas

1. Ya hablamos sobre el uso de palabras y frases específicas al nivel de _____ que creemos que puedarepetir
2. Ahoravamos enfocartambién en el uso de palabras y frases más avanzadas

5

¿ Cómo usar palabras y frases específicas?

Use la regla de tercios para enseñar palabras y frases específicas a su niño.

6

NIVEL 1

- Artículo + sustantivo
- Verbos en: presente o presente progresivo

- Frases sencillas
- Verbos en: pretérito y reflexivos
- Plurales

- Preguntas
- Instrucciones
- Palabras y frases sociales
- Palabras y frases de afecto
- Otras palabras y sonidos

7

Ejemplos

Video of caregiver 2 using the strategy with child 2

8

Estrategia: Extensiones

9

¿Qué son las extensiones?

1. Son palabras que agregamos a la comunicación del niño.
2. Las extensiones más eficaces incluyen la intención del niño.
3. Si el niño no dice la palabra claramente, en vez de agregar palabras, repetiremos la palabra o las palabras que dice el niño claramente.

10

¿Por qué usamos extensiones?

1. Las extensiones conectan la comunicación del niño de manera inmediata a una forma de comunicación más avanzada.
2. El lenguaje de su niño mejorará entre más escuche y use formas más complejas de comunicación.
3. Las palabras que añadimos son relacionadas a algo que le interese al niño.
4. Las extensiones le ayudan a su niño a aprender palabras nuevas y a hablar en frases más complejas.

11

¿Cómo extender la comunicación?

- Agregue 1 o 2 palabras
- Agregue un verbo, un sustantivo con artículo o un adjetivo

El gato

El perro

Está cantando

El gato duerme

El perro grande

La niña está cantando

12

Ejemplos

Video of therapist using the strategy with child 2

13

Vamos a practicar las extensiones para juguetes, **para un libro y para una rutina.**

14

Actividad:_____

Palabras/frases que dice	Extensiones
El bloque	
La torre	
Más	

15

Estimulación de la Comunicación

TALLER 4

1

Temas para hoy

1. Repasar las estrategias previamente enseñadas.
2. Motivaciones para la comunicación.

2

Repaso

¿Cómo le ha ido con las estrategias que hemos estado trabajando?

1. Eligiendo un lugar sin distracciones.
2. Limitando el uso de preguntas e instrucciones.
3. Respondiendo a la comunicación de ____ y tomando turnos.
4. Usando la estrategia de imitar y describir.
5. Estrategias de conducta.
6. Usando palabras y frases específicas.
7. Extensiones.

3

Estrategia: Motivaciones para la Comunicación

4

¿Qué son las motivaciones?

therapist using strategy with child 2

Son estrategias que incentivan a su niño a comunicarse con usted. Para ___ utilizaremos 2 tipos:

1. Pausa en rutina: pausar en medio de una rutina para señalar a ___ que es su turno para comunicarse (ejemplo)
2. Opciones: Dar opciones a ___ mostrándole dos cosas y esperar a que el niño comunique cual quiere.

5

¿Por qué usamos las motivaciones?

1. Las motivaciones dan al niño más oportunidades para practicar su comunicación.
2. Aumentan el número de veces que el niño se comunica.
3. El adulto tiene más oportunidades para reforzar y enseñar nuevas palabras respondiendo y extendiendo la comunicación del niño.

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¿Cómo y cuándo usaremos las motivaciones?

1. No queremos frustrar a ___.
2. Cuando ___ se frustra, no usará su comunicación y perderemos su interés.
3. Cuando estemos trabajando para que el niño se involucre e interese en la actividad, no es un buen momento para usar las motivaciones.
4. Las motivaciones deben usarse <u>con</u> <u>ver</u>, cuando el niño está <u>muy interesado y motivado</u> para usar la comunicación.
5. Las motivaciones son solo una estrategia más. ¡Nuestras estrategias más poderosas son las que ya está usando!
6. Cuando respondemos usando palabras y frases específicas, tomando turnos y extendiendo, estamos enseñando nuevas palabras y ampliando su comunicación.

7

¿Cómo vamos a usar *pausa en rutina*?

1. Use una pausa para incentivar a ___ a comunicarse durante la hora de comer.
2. Antes de servirle la comida, haga una pausa y muéstrale la comida cerca de la cara.
3. Espere hasta que ___ se comunique usando una seña, una vocalización, su iPad, o palabras verbales.

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¿ Cómo vamos a usar *pausa en rutina*?

3. Si el niño no usa palabras:
   - diga una palabra específica.
   - Ej: di *la salchicha* y sírvesela
4. Si el niño usa una palabra:
   - extienda la comunicación del niño.
   - Ej: la salchicha está rica.
5. Si el niño no tiene interés (no quiere la comida):
   - Sigue con la rutina y sirve la comida

9

¿Cómo vamos a usar *opciones*?

1. Use la estrategia de opciones para incentivar a ___ a comunicarse durante la hora de comer u otra actividad que le gusta mucho (ej. mirar un video).
2. Muéstrale 2 opciones diferentes, una que le gusta mucho y una que no le gusta tanto.
   - ej. el arroz y el agua
3. Espere hasta que ___ se comunique usando una seña, una vocalización, su iPad, o palabras verbales.

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¿ Cómo vamos a usar *opciones*?

4. Si el niño no usa palabras:
   - diga la palabra específica.
   - Ej: di *el arroz* y sírveselo
5. Si el niño usa una palabra:
   - extienda la comunicación del niño.
   - Ej: quiero el arroz.
6. Si el niño no tiene interés (no quiere una de las opciones):
   - Sigue con la rutina y sírvele la comida

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¿Una pregunta?

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Appendix G

Exit Interview Responses

Question	Dyad 2 Response	Dyad 3 Response
Approximately how many hours per week did you practice using the strategies at home?	2–3 each day	Unsure, but every day
Did you teach any of the strategies you learned to anyone else who interacts with your child?	All of them, even the siblings	Everyone in the family
How comfortable do you feel using strategies on your own now that you have completed all the coaching sessions?	Very comfortable	Tries to use them often throughout the day, does not find them difficult
Which part of the intervention did you think was the most effective in helping you learn the strategies?	Observing the therapist	Practicing with the child with help of the therapist
Which part of the intervention did you think was the least effective in helping you learn the strategies?	None	None
What types of activities do you use strategies with? How often do you use the strategies in those activities?	Play: about half the time Book-reading: sometimes Music: almost always at bedtime Caregiving routines (e.g., eating, bathing): most of the time Household routines (e.g., cleaning): no Community activities: sometimes	Play: about half the time Pre-academic activities: sometimes Caregiving routines (e.g., eating, bathing): most of the time Household routines (e.g., cleaning): sometimes Community activities: most of the time
Do you think the intervention helped your child?	Yes	Yes, he began to say more words
What could we do better or differently?	Have music as part of the intervention to help with concentration	More time, because it is a process. Even if at the end the visits faded to once a month.

Strategy	Dyad 2 Thoughts About the Strategy	Dyad 3 Thoughts About the Strategy
Notice and respond	It helped a lot to observe how to have patience and try to remove distractions. For other parents, they might need to practice for a while. It was frustrating at first until they understood the strategy a little better. It fit with their views of how to interact with their child because they did not know it before.	Very effective and appropriate, and other parents would probably think so too.
Mirror and map	Effective. The child began to imitate them. Again, other parents might have to wait but then they would probably see that it was effective.	Effective, good, and appropriate.
Not giving instructions	Excellent because it did not make the child stressed. Other parents should also understand the giving instructions puts stress on the child and frustrates him.	Ineffective and inappropriate. One needs to give instructions. Instructions are valuable. Other Latino parents would agree that not giving instructions is ineffective and inappropriate.
Balancing communication turns	Perfect. It helps to communicate with the child. The caregiver used to not wait, and there was no response, so she kept talking. However, when she waited "él respondía con un ruido, con un sonido, con un gesto, con una mirada" [he responded with a noise, a sound, a gesture, a look]. They were things they did not used to pay attention to.	Very effective for communicating with the child. Other parents would agree. It fits well with their ideas.
Not asking as many questions	Effective, but other would have to go through the process to see its value. It was a bit difficult at first to understand.	Ineffective and inappropriate, because one needs to ask questions and give instructions or they cannot teach the child.
Target talk	They learned the importance of using articles. The child comprehends more, like	Excellent. Other parents would think so, and it fits well with their current ideas.

	the word caliente (hot). This is especially important because it helps him stay safe.	
Expansions	Other parents would have to learn that they are necessary. They fit with their ideas of how to interact with their child.	Excellent. She is very satisfied with the program. At first he only said a few words, but little by little…
Prompting/time delays	The family talked about first-then strategies here as well and how they used them. Giving choices worked well and other parents would like the strategy.	Very effective.

Note. Responses have been translated to English and paraphrased from transcripts of the exit interviews.