

Funder: Institute of Education Sciences, National Center for Special Education Research

Project Title: *EMT en Español*: Comprehensive Early Intervention to Support School Readiness Skills for Spanish-Speaking Toddlers with Language Delays

Overview

Our proposed study is an RCT design to compare the effects of *EMT en Español* to a community BAU control group. The target population of children for this study is Spanish-speaking children with RE language delays. Difficulties include: comprehending meaning (semantics; syntax); small base of receptive vocabulary; potential limitations in auditory processing, attention, memory, recall; may need more opportunities to learn; pairing events with words; general cognition may be strong, but specific language learning difficulties.

The proposed theory of change is derived from: 1) theoretical and empirical descriptions of transactional and linguistic input processes foundational to early language learning; 2) research describing how these processes may be disrupted in children with RE delays; 3) previous research demonstrating how hybrid therapist plus parent implement EMT intervention improves caregiver transactional and linguistic input processes which improve language in children with RE delays; 4) adaptations to support Spanish as a home language; 5) data on teaching caregivers to implement in EMT in previous RCTs and pilot studies. We supplement this general theory of change with information specific to Spanish speaking children from low SES backgrounds and their caregivers.

To account for the multiple tests needed to answer our research questions, we will control for the false discovery rate (i.e., the expected proportion of false positives) with Benjamini-Hochberg corrections (Benjamini & Hochberg, 1995; Schochet, 2009), which are a more sophisticated alternative to Bonferroni corrections and better account for multiple simultaneous significant parameters.

Covariates will be added to models to balance baseline differences between conditions and to improve the multiple correlation of the baseline variables with the outcome to improve power. Across models, we will include the covariates of a baseline measure (T00) of the outcome measure, the PLS-5 score at baseline, the Leiter-R score, child age, and a cumulative risk index value when appropriate. We will compare use of services between conditions at each time point, and if differences are found, we will add a covariate to control for this in our models. Preliminary data suggest that there will be no differences at entry on language scores by gender, so we do not include gender as a covariate; however, if gender differences do appear, we will add this variable into the analysis models. We will examine baseline differences between conditions to test their equivalence; if differences are found, then we will keep those covariates in the models. We will also examine the multiple correlation with the outcome variable. If there are no baseline differences and no consequential value added for the multiple correlation with the outcome, we will adapt our models to reduce covariates.

First, all data will be checked for out-of-range values. Distributions will be examined and transformed if skewed or flat. Descriptive analyses will examine correlations within-time across measures and across-time for each measure to establish whether a reduced set of data points is supported empirically and conceptually and best fits the particular research questions that we plan to investigate. We will use zero-order correlations, looking for correlations of .7 or greater, and exploratory factor analyses with and without rotation using factor loadings of .6 or greater to create new latent constructs when appropriate. Table 4 provides a summary of research questions and specific analyses for each aim; descriptions of specific analyses follow.

Research Aims

AIM 1: To examine the effects of EMT en Español on the children's expressive and receptive vocabulary at the end of intervention

RQ1: Do children in the intervention group use more different words at the end of intervention than children in the control group?

H1: Children in the intervention group will demonstrate a larger expressive vocabulary (number of different words [NDW] in Spanish and English if applicable) than the control group at the end of the intervention.

RQ2: Do children in the intervention group use more rich language target words than children in the control group?

H2: Children in the intervention group will use more rich language targets (specific nouns, inflected verbs, morphological markers indicating number and gender, descriptive words) than children in the control group at the end of the intervention.

RQ3: Do children in the intervention group have larger conceptual receptive vocabularies than children in the control group?

H3: Children in the intervention group will have larger receptive vocabularies (total conceptual vocabulary in Spanish and English) than children in the control group at the end of the intervention.

(This proposal is altered from a successful proposal by Ann Kaiser (PI) and Tatiana Peredo (co-PI) of Vanderbilt University. Edits are the responsibility of the presenters and should not be attributed to Drs. Kaiser or Peredo).

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AIM 2: To examine the long-term effects of the intervention on child language outcomes

RQ4: Do children in the intervention group use more different words at the 6 and 12-month follow up than children in the control group?

H4: Children in the intervention group will have larger expressive vocabulary (number of different words [NDW] in Spanish and English if applicable) than the control group at the 6 and 12-month follow up.

RQ5: Do children in the intervention group use more rich language targets than children in the control group at the 6 and 12-month follow-up?

H5: Children in the intervention group will use more rich language targets than children in the control group at the 6 and 12-month follow up.

AIM 3: To examine the effects of the intervention on caregiver use of naturalistic language teaching strategies

RQ6: Do caregivers who receive intervention use more naturalistic language teaching strategies in a generalization context than caregivers in the control group at the end of intervention?

H6: Caregivers who receive training will use more naturalistic language teaching strategies than caregivers in the control group after intervention.

RQ7: Do caregivers who receive intervention use more rich linguistic input and naturalistic language teaching strategies in a generalization context than caregivers in the control group at the 6 and 12-month follow up?

H7: Caregivers who receive training will use more rich linguistic input and naturalistic language teaching strategies than caregivers in the control group at the 6 and 12-month follow up.

RQ8 (Mediation): Does caregiver use of linguistic input and naturalistic language strategies mediate child expressive vocabulary at the 6 and 12-month follow-ups?

H8: Child expressive vocabulary at the 6 and 12-month follow up will be mediated by caregiver use of language support strategies at the end of the intervention.

AIM 4 (Exploratory): To examine the long term effects of the intervention on children's school readiness skills

RQ9: Do children in the intervention group show more growth in receptive vocabulary than children in the control group?

H9: Children in the intervention group will have more growth in receptive vocabulary (Spanish and English conceptual vocabulary) than children in the control group.

RQ10: Do children in the intervention group have better language skills across English and Spanish than children in the control group at the 12-month follow up?

H10: Children in the intervention group will have better language skills across English and Spanish (Standard scores on the BESA) than children in the control group at the 12-month follow up.

RQ11: Do children in the intervention group have more expressive conceptual vocabulary across English and Spanish than children in the control group at the 12-month follow up?

H11: Children in the intervention group will have expressive conceptual vocabulary across English and Spanish than children in the control group at the 12-month follow up.

RQ12: Do children in the intervention group have more growth in executive functioning skills? *H12: Children in the intervention group will have more growth in executive functioning skills than children in the control group.*

AIM 5 (Exploratory): To examine long term cross-linguistic influence of the intervention.

RQ 13: Does the intervention moderate the effect of children's expressive vocabulary skills in Spanish at the end of intervention on children's expressive vocabulary skills in Spanish and English at the 6- and 12-month follow up?

H13: The intervention will moderate the effect of children's expressive vocabulary skills in Spanish at the end of intervention on children's expressive vocabulary skills in Spanish and English at the 6- and 12-month follow up.

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Funder: Institute of Education Sciences, National Center for Special Education Research **Award period:** 5 years - 07/01/2019-06/30/2024

Project Title: Comprehensive Early Intervention to Support School Readiness Skills for Spanish-Speaking Toddlers with Language Delays: *EMT en Español*

OVERVIEW

25% of children entering kindergarten in the U.S. are Hispanic, with over half living in low-income households and nearly three quarters speaking Spanish at home. Children's caregivers are Spanish-speaking immigrants who are likely to face discrimination based on their own language use (Schwartz, Unger, Zamboanga, & Szapocznik, 2010) as well as cultural and linguistic barriers in accessing needed services for their children, particularly those with developmental delays and disabilities (Gaitan, 2012). For school readiness, this carries particular impacts on long-term educational success for these vulnerable children. While there have been interventions for young dual language learners, these have been designed based on normal language development. At present, there are no evidence-based interventions for Spanish-speaking children with already-identified language disabilities. Without such support, it will not be possible to ensure school readiness and later academic success for this vulnerable population.

Our *long-term* goal is to promote successful education experiences for children with developmental delays, particularly for those from marginalized backgrounds. Our *objective* in this proposed project is to establish an intervention for children with established receptive language delays in both English and Spanish. *Enhanced Milieu Teaching* (EMT) (Kaiser & Hampton, 2016) is an evidence-based naturalistic language intervention, proven effective in improving language outcomes for English-speaking toddlers with language delays (Kaiser & Roberts, 2013; Roberts & Kaiser, 2015). EMT uses environmental arrangement, responsive interaction strategies, language modeling and expansions, and systematic prompting procedures to teach functional spoken language. We recognize that caregivers play critical direct and indirect roles in children's language development, therefore, *EMT en Español* is designed to promote home language and improve children's language use in daily home routines, play, and book sharing in individual sessions with a therapist and in caregiver training sessions.

Our *hypothesis* is that a home-based *EMT en Español* based on naturalistic teaching strategies will result in immediate and longer-term language improvements in both Spanish and English for both children and caregivers in monolingual Spanish homes as compared to those in their normal environments without the intervention. We are well prepared to build on our two preliminary studies of *EMT en Español* (Peredo, Zelaya, & Kaiser, 2017; Kaiser & Peredo, 2018) and EMT with English-speaking toddlers with receptive and expressive language delays (Roberts & Kaiser, 2015). Our preliminary work also provides assurances that caregivers are both willing and able to use a Teach-Model-Coach-Review approach to deliver the *EMT en Español* intervention in families' homes in Spanish. We will measure vocabulary size by number of different words in both Spanish or English. Language targets in both languages will be measured by specific nouns, inflected verbs, morphological markers indicating number and gender, and descriptive words.

Research Question 1: What are the impacts of *EMT en Español* on the children's expressive and receptive vocabulary? We expect that children in the intervention group are expected to demonstrate a larger expressive vocabulary, more rich language target words, and larger conceptual vocabularies in Spanish and English than the control group at the end of the intervention. We expect the effects to be maintained at 6- and 12-month follow ups as measured by standard scores on the BESA.

Research Question 2: Does *EMT en Español* have an impact on caregiver use and teaching of naturalistic language? We expect that caregivers who receive training will use more naturalistic language teaching strategies and more rich linguistic input than caregivers in the control group, measured after intervention and at the 6 and 12-month follow up. We also expect that child expressive vocabulary at the 6 and 12-month follow up will be mediated by caregiver use of language support strategies.

Research Question 3 (Exploratory): What are the the long-term effects of the intervention on children's school readiness skills? Children in the intervention group are expected to have more growth in Spanish and English conceptual vocabulary than children in the control group and better language skills across English and Spanish (Standard scores on the BESA) than children in the control group at the 12-month follow up. Children in the intervention group are expected to have more expressive conceptual vocabulary across English and Spanish than children in the control group at the 12-month follow up. Children in the intervention group are expected to have more growth in executive functioning skills than children in the control group.

The proposed intervention has the potential to lead to an effective, accessible, and evidence-based early language intervention for Spanish-speaking children with identified language delays. Such support as a critical step toward improving language and school readiness in English language for young Spanish speaking children from low socio-economic status backgrounds.