

An Experimental Study Evaluating a State Funded Pre-Kindergarten Program:
Bringing Together Subsidized Childcare, Public School, and Head Start

Susan H. Landry, Ph.D.

Paul R. Swank, Ph.D.

Jason Anthony, Ph.D.

Michael A. Assel, Ph.D.

Susan Gunnewig, M.A.

Lilla McManis, Ph.D.

Affiliation: University of Texas Health Science Center at Houston, Children's Learning Institute.

Address correspondence to Susan Landry, The University of Texas Health Science Center,
Department of Pediatrics, Children's Learning Institute, 7000 Fannin, Ste. 2300, Houston, TX
77030 (phone: 713/500-3710, fax: 713/500-3705, e-mail: susan.landry@uth.tmc.edu).

Note: This manuscript has been submitted for peer review.



Author Biographies

Susan H. Landry, Ph.D. is a developmental psychologist and the Michael Matthew Knight Professor in the Department of Pediatrics at the Children's Learning Institute. Dr. Landry has been the Principal Investigator on multiple, large-scale grants funded by the National Institute of Health, National Institute of Child Health and Human Development, Institute of Educational Sciences, and the Texas Education Agency. Dr. Landry's research interests have focused on the impact of the caregiving environment in both the home and school settings. More than 90 peer-reviewed publications and chapters describe the findings of these studies.

Paul R. Swank, Ph.D. is the Director of Research at the Children's Learning Institute. He has 30 years experience in research and teaching. He specializes in general linear mixed models, structural equation modeling, and psychometrics. He has published more than 150 scientific papers.

Jason Anthony, Ph.D. is an Assistant Professor at the Children's Learning Institute and The University of Texas Medical School at Houston. He specializes in child psychopathology, developmental disabilities, interventions, assessment of children, learning disabilities, literacy acquisition, and family-and school-based interventions. He is a member of the American Psychology Association, the American Psychology Society, the National Association of School Psychologists and the Society for the Scientific Study of Reading.

Michael Assel, Ph.D. is a licensed psychologist and researcher at the Children's Learning Institute. He has published in the area of curriculum evaluation, assessment, early mathematical development, and influences on the mother-child relationship. Dr. Assel coordinates assessments for many initiatives in the Children's Learning Institute. He is an Assistant Professor at The University of Texas Medical School at Houston.

Susan B. Gunnewig, M.Ed. is a program director at the Children's Learning Institute. She coordinates many of the initiatives undertaken by the Center for Improving the Readiness of Children for Learning and Education (CIRCLE). Mrs. Gunnewig maintains affiliations in the Houston Association for Education of Young Children, Texas Association for Education of Young Children, and National Association for Education of Young Children and the International Reading Association. Ms. Gunnewig has presented at a number of conferences and conventions across the nation, including the Department of Education Early Educator Academies, the Teacher-to Teacher Initiative and the Even Start Academies.

Lilla Dale McManis, Ph.D. is the Research Coordinator for the Texas School Readiness Certification System at the Texas State Center for Early Childhood Development at the Children's Learning Institute. She has also worked as an evaluator and project manager for the Massachusetts Departments of Education and Public Health. Dr. McManis spent several years as an instructor in a teacher preparation capacity.

Executive Summary

Overview and Key Findings from “An Experimental Study Evaluating a State Funded Pre-Kindergarten Program: Bringing Together Subsidized Childcare, Public School, and Head Start”

Background and Significance. This paper describes the development and evaluation of an evidenced-based early childhood classroom program that was mandated with state legislative actions. The findings and recommendations from this experimentally tested program revolve around a strong focus on accountability through integration of educational services and the use of resources demonstrated to promote learning in literacy, language, math, and social functioning. The impetus for this program was the recognition from state legislators of the importance of a quality early childhood educational experience for better assuring school success for children from poverty (Bowman, Donovan, & Burns, 2001). Understanding how to provide young children with an early foundation in school readiness skills is becoming a primary goal of many states in order to decrease the high incidence of school failure and drop-out particularly by children from low income homes (NAEP, 2003).

The TEEM Approach. Through Senate Bill 76 (2003) communities were invited to submit proposals of interest to the State Center for Early Childhood Development that included a partnership among Head Start, public school, and childcare settings. An aspect of the legislative action was to integrate early childhood education delivery programs into a seamless approach that allowed parents a choice for their child’s preschool education. These integrated partnerships were expected to be cost effective as school districts were encouraged to partner with childcare and Head Start facilities to serve children who met criteria for state prekindergarten (i.e., free and reduced lunch and/or English Language Learners) rather than build new facilities to house these

programs. The focus of the TEEM classroom intervention was to increase children's school readiness through the three research tested components of research based curriculum, technology-driven progress monitoring, and teacher on-line professional development with facilitation and classroom mentoring. The Texas Early Education Model, TEEM SCHOOL READINESS, was designed to be equally appropriate and effective for childcare, Head Start, and public school prekindergarten classrooms. The model maximized resources and focused on school readiness by including both cognitive and social skills.

Findings. Through integration and appropriate resources, the results demonstrate communities can bring early childhood education funding streams together with the support of local leadership, identify key personnel to implement a model of integration that works in their community, increase teachers' use of best practices, and achieve substantial gains for children in the areas that predict success in school, particularly literacy and language skills. The results of an 11 community randomized test of TEEM SCHOOL READINESS across 2 years demonstrates how it enhances teachers' instructional practices ($n = 215$ per year) and supports children's entry into Kindergarten ready to succeed ($n = 7740$ across 2 years; $n = 3,086$ assessed).

Key Findings

- With just 4 months of the program, TEEM teachers were observed to show greater gains in their use of language building activities including the quality of their book reading, general conversations with children, and the use of small group oral language activities to build these skills.
- More positive and strong gains also were found in emergent literacy instructional practices including phonological processing and print knowledge activities.

- The differences in school readiness instructional practices before and after TEEM training were striking. Not only did teachers show improvement in almost all areas of teaching based on changes across the year on the observation rating scale but the differences were dramatic.
- The different groups of children in these teachers' classrooms across the two years also showed differences in their language and emergent literacy gains across the school year.
- The two aspects of emergent literacy that have been found to be unique predictors of reading from the recently released National Institute for Literacy report (2007), also were at higher levels and showed greater increases if children's teachers were in their second year of TEEM.

Future Work. There are limitations to this experimental evaluation of a state-mandated and funded, pre-K program. The level of funding determined the number of classrooms that could participate in each of the 11 communities and this was a relatively small sample at each site. With a larger classroom sample, stronger findings may have been found for the child outcomes. However, in spite of these limitations strong differences were found in teachers' instructional practices as a result of TEEM participation and small to moderate differences in children's outcomes. A future objective for this program will be to examine the longer term effects of the TEEM program as children move into formal schooling.

An Experimental Study Evaluating a State Funded Pre-Kindergarten Program:
Bringing Together Subsidized Childcare, Public School, and Head Start

This report details the key findings and recommendations for promoting school readiness among 3 and 4-year old children in a large state early childhood education program. At the current time, states estimate that as many as half of their children, particularly those from low socioeconomic (SES) backgrounds and/or learning English as a second language (ESL), are entering kindergarten programs without the basic cognitive foundational skills necessary for them to succeed (NAEP, 2003). Discrepancies between early skills for children from low SES versus more advantaged families are known to persist through formal schooling (Snow, Burns, & Griffin, 1998; National Center for Education Statistics Report Card on Mathematics, 2001, & Reading, 2001). The findings and recommendations from this experimentally tested program revolve around a strong focus on accountability through integration of educational services and the use of resources demonstrated to promote learning in literacy, language, math, and social functioning. Through integration and appropriate resources, the results demonstrate communities can bring early childhood education funding streams together with the support of local leadership, identify key personnel to implement a model of integration that works in their community, increase teachers' use of best practices, and achieve substantial gains for children in the areas that predict success in school, particularly literacy and language skills.

The impetus for this program was the recognition from state legislators of the importance of a quality early childhood educational experience for better assuring school success for children from poverty (Bowman, Donovan, & Burns, 2001). Understanding how to provide young children with an early foundation in school readiness skills is becoming a primary goal of

many states in order to decrease the high incidence of school failure and drop-out particularly by children from low income homes (NAEP, 2003). Texas, like other large states in the country, has a rapidly growing child population, particularly children from Hispanic backgrounds. There is greater than 25% of children under the age of 5 years living in poverty based on federal poverty standards and greater than 50% based on state poverty criteria for free and reduced lunch. It is estimated that by 2040 in Texas alone the school enrollment will double and as a large number of these children will come from disadvantaged backgrounds, there is a critical need to take advantage of the benefit of assuring a quality education experience in the early years for promoting academic success.

Legislators across the country are becoming aware of the critical nature of this problem and are looking for solutions to improve the situation as it can have a grave impact on the economic future of a state and the country. Recent evidence from longitudinal intervention studies demonstrates that there is a long lasting positive influence of quality prekindergarten education (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002; Reynolds, Ou, & Topitzes, 2004; Schweinhart, Barnes, & Weikart, 1993). This research further supports that a child's experience during their early years influences the way the brain is developing that, in turn, establishes a trajectory for future learning (e.g., Dawson, Klinger, Panagiotides, Hill, & Spiker, 1992; DiPetro, 2000). Thus, the solution many states are seeking is how to provide children from low income backgrounds with a quality early education.

For young children, a quality education includes teachers being skilled in the use of instructional approaches that are sensitive to the child's developmental needs and expose them to experiences with language, emergent literacy, and math within a responsive environment that supports social-emotional development (Landry, 2005). Recent results suggest that teacher

attention to these key areas of cognitive development is important for later school success. With data from six longitudinal data sets, the estimated links between three key elements of school readiness (i.e., school-entry academic, attention, social-emotional) and later reading and math achievement across 8 to 14 years of age were examined (Duncan et al., 2007). All six studies demonstrated the strongest predictors to be the early academic skills followed by attention skills. Surprisingly, social-emotional behaviors were generally found to be insignificant predictors of later academic achievement. Further support of the importance of early cognitive skills for reading success comes from a newly released National Report (National Institute for Literacy, 2007). This large meta-analysis demonstrates that young children's language skills, including vocabulary and complex language, as well as early literacy abilities, specifically phonological awareness and letter knowledge, are the most important and unique predictors of reading. Thus, in finding solutions to better preparing children for school, attention needs to be given to training teachers in instructional practices that support children's learning of these cognitive skills.

Accumulating evidence now shows that professional development can be designed in ways that facilitate teachers learning effective instructional practices to promote school readiness skills. In a recent study, we report the efficacy of a facilitated, on-line professional development approach in promoting gains in teachers' use of practices that expose children to rich learning experiences (Landry, Anthony, Swank, Gunnewig, & Monseque-Bailey. 2007). This experimental study carried out in four states incorporated key elements for adult learning, including presentation of content knowledge and related theory, opportunities for demonstration and hands-on learning and feedback, and prompt feedback as teachers engage in new practices. Through this study, it was determined that technology-driven progress monitoring and classroom mentoring are important components to a comprehensive professional development approach,

not only in facilitating teacher change but also for enhancing children's language and early literacy skills. Thus, the TEEM approach incorporated all three components (Figure 1). Of importance to a state-wide program, this study documented that the comprehensive approach was effective for teachers across the different settings where prekindergarten age children are found (i.e., Head Start, public school, child care). The technology components of the professional development and progress monitoring approaches also helped establish the feasibility of this approach for bringing a program to a large scale.

The three research tested components (i.e., professional development, progress monitoring with immediate feedback, research based curricula) were incorporated into the TEEM SCHOOL READINESS program in order to carry out the legislative mandate that a high quality program be implemented in all three types of early childhood programs and tested for its effectiveness (Senate Bill 76, 2003). Communities were invited to submit proposals of interests to the State Center for Early Childhood Development that included a partnership among Head Start, public school, and childcare settings, as the second aspect of the legislative action was to integrate early childhood education delivery programs into a seamless approach that allowed parents a choice for their child's preschool education. These integrated partnerships were expected to be cost effective as school districts were encouraged to partner with childcare and Head Start facilities to serve children who met criteria for state prekindergarten (i.e., free and reduced lunch and/or English Language Learners) rather than build new facilities to house these programs. An incentive to school districts for partnering with other programs was that they could draw down state dollars to fund a certified preschool teacher who would teach state eligible children in childcare or Head Start classrooms. Incentives for Head Start and childcare

programs included state funding for the components of the TEEM program and decreased likelihood of losing their 3 and 4-year old children to public schools.

The evaluation of the TEEM SCHOOL READINESS program was based on a random assignment study of 215 classrooms across 11 communities that geographically represented the different regions of the state. The following hypotheses were tested:

Year 1. This hypothesis tests for differences between control versus randomly selected TEEM teachers in Year 1. It was hypothesized that TEEM teachers would show greater gains across the 4-mo period as compared to the control teachers on a range of instructional practices including best practices, language building activities, and literacy. The focus was on examining teacher, rather than change in child skills, due to the relatively short time period for program implementation.

Year 1 vs. 2. This hypothesis tests for whether the same teachers with and without TEEM training across the 2-year period and their children showed differences. The design allowed for comparison of the same set of teachers who were controls in Year 1 and TEEM teachers in Year 2. Thus, we hypothesized that these teachers would show greater gains in teaching practices after the TEEM program compared to their behaviors without the program. In addition, the children of these teachers in Year 1 vs. Year 2 also were compared on end of the year language and literacy skills.

Year 2. This hypothesis tests whether an extended period of TEEM training resulted in better effects for both teachers and children. TEEM teachers receiving the second year of the program were expected to show greater gains in effective teaching behaviors as compared to those in their first year of TEEM. In addition, children with Year 2 TEEM teachers were

expected to show greater gains in language and literacy skills than those with Year 1 TEEM teachers.

Methods

Research Design

A Texas Education Agency (TEA) requirement was that by the end of Year 2 all teachers involved in the program would have received the TEEM program. Due to the cycle of state funding, the following occurred in Year 1 (2003) during the Fall; communities and classrooms were selected, staff hired, initial training of leadership and mentors occurred by the end of 2003. In Year 1, classrooms within each community were randomized to either a control “business as usual” vs. TEEM approach with stratification across the three types of classrooms to ensure a balance. Given this timeline, program implementation occurred across a 4-mo period in Year 1 (Jan – April, 2003). In Year 2, teachers from Year 1 control classrooms received the TEEM program training and those in the TEEM classrooms received a second year of the program. This approach allowed for examination of dosage effects for teacher and children (e.g., change with 1 vs. 2 years of program intervention) and within group change for teachers serving as controls in Year 1 compared to their change after participating in TEEM in Year 2.

Assessment of change in teaching behaviors and child language and literacy skills were used to examine for program effectiveness. For teachers, classroom observations occurred by trained research staff blind to classroom condition using the CIRCLE Teacher Behavior Rating Scale (TBRS). To evaluate change in child language and literacy skills, of all consented children within a classroom, eight were randomly selected to receive pre and post assessments. Children identified with a home language of Spanish were evaluated in Spanish.

Participants

A request for applications was opened in September 2003 for Texas communities interested in participating in the TEEM SCHOOL READINESS program. All applicants had to meet the following criteria: 1) bring together a leadership committee that crossed three early childhood programs, Head Start, childcare, and school district into a partnership to identify common school readiness goals (e.g., all agreed to use the same curriculum), 2) identify a lead agency to coordinate offices for program coordinators and mentors, and 3) agree to random assignment of 20 classrooms within the partnership to “business as usual” vs. TEEM approach with stratification across the three types of classrooms. In addition, the community partnership had to agree to use: 1) a research-based language and literacy curriculum from the TEA approved list, 2) the TEEM approach to professional development model including the progress monitoring system, on-line course, and mentoring, 3) participate in training for multiple levels of partners within the community (i.e., leadership, mentor, teacher), and 4) participate in meetings throughout the year to ensure effective implementation.

Of the 17 communities that applied, 11 met the above criteria and were accepted into the first year of the program. Table 1 provides a summary of the TEEM communities and location of classrooms within each partnership. Each year, the 11 sites had 215 classrooms that included 7740 children across the two year period, being served within an integrated model in the following settings: 1) 92, Independent School, 2) 64, childcare center, and 3) 59, Head Start. In general, a balance was found with respect to location of communities across the state, the agency within the partnership to serve as the lead agency, and in the location of classrooms across the partnership.

In addition, an Advisory Panel, mandated by the state legislation, was comprised of the key state agencies involved with young children (e.g., the Head Start collaborative office, Texas

Department of Family and Protective Services) assisted with program oversight. The State Center also developed a resource panel comprised of national early childhood experts to inform and advise the project.

Children. Across the 2-year study, 3,086 children who ranged in age from 3 to 5 years ($M = 4.6$ years, middle of school year, $SD = 0.5$ years) were assessed in the study. The sample was composed of a large proportion of children from minority backgrounds; 67% Hispanic American, 19% African American, 12% Caucasian, 1% Asian American, 1% other ethnicity. Forty-nine percent were female. The target and control children had almost identical demographic characteristics.

Procedures

Online professional development program. The genesis of the online professional development program was the face-to-face training workshops developed by the Center for Improving the Readiness of Children for Learning and Education (CIRCLE) (Landry, Swank, Smith, Assel, & Gunnewig, 2006). The eight program courses cover all language and early literacy instructional areas as well as classroom management, responsive teaching practices, and early math (see Table 2 for list of course titles). Research has indicated that adults will learn most effectively when: 1) intellectually engaged in the subject matter through opportunities to understand the theory and rationale for new instructional practices, 2) the learning is situated in authentic contexts (i.e., demonstrating techniques with teachers in classroom settings, 3) there are opportunities to do collaborative problem solving and practice specific skills, and 4) learning experiences are extended over time (e.g., Bransford, Brown, & Cocking, 2000; Elmore, 2002; Putman & Borko, 2000). Thus, the online course included (a) small-group interactive learning facilitated by a trainer with opportunity for independent review of all course contents, (b) each

course content included extensive videotaped modeling and expert commentaries, (c) active engagement of learning with online assessments of knowledge, (d) opportunities for practicing specific skills within the small group coursework (e.g., role playing, development of lesson plans), and (e) teachers' posting of experience with specific instructional activities in their own classroom with trainer review and feedback.

Based on current research, professional development for early childhood educators has moved from a predominate focus on child-centered approaches to one in which children have opportunities for both self-directed discovery, and times when they are presented with explicit information about vocabulary, number concepts, and letters in a more teacher-directed approach (e.g., Bereiter, 1972). Fears regarding the extent to which teacher-directed approaches compromise children's social-emotional development can be somewhat alleviated with recent evidence from the Preschool Curriculum Evaluation Research (PCER) Consortium demonstrating that social competence was at least comparable across classrooms providing enhanced literacy or math instruction versus those that did not (PCER Consortium, 2007). However, current models often do not provide this balance or the level of specification needed to effectively present and sequence activities integrating these two approaches. The on-line program was developed to provide teachers with the appropriate balance between implementing developmentally appropriate activities that are teacher-directed and designed to foster development of specific skills, and activities that are child-directed and designed to allow children to enhance mastery and breadth of skills through active exploration. What distinguishes the pedagogy of the online professional development model in this study is the goal of providing a balance between implementing teaching strategies based on research regarding cognitive readiness and what developmental research indicates about how children learn most effectively.

In general teachers learned a set of five key elements: 1) consistent use of a responsive interaction style to support learning, 2) content that builds cognitive and social skills, 3) to plan and sequence input and learning activities so that children build concepts, 4) a balance of teaching strategies between teacher vs. child directed, and 5) flexible groupings where instruction occurs in small and large group activities (Landry, 2005).

Because teachers had to attend the on-line course after hours, each was provided a \$750 stipend once the course was completed for that year. Paraprofessionals (e.g., aides, teacher assistants) that attended the course received \$250. Other incentives for teachers and staff included coordination with teacher training colleges to allow for college credit for the professional development program.

In-classroom teacher mentoring. Mentoring is thought to provide teachers with opportunities to try new approaches with guided support and a knowledge resource without concerns regarding the mentor having a supervisory role (Eisenhower National Clearinghouse for Mathematics and Science Education, 1998). In the TEEM approach, mentoring included planning for 3 hours of daily cognitive readiness activities in planful, purposeful, but playful ways, classroom demonstration of how to implement activities effectively, and side by side coaching. The goal was to provide individualized coaching support that met the learner's needs which may be important for early childhood teachers who vary in education and training.

Progress monitoring by teachers. The progress monitoring system was implemented with the use of Personal Digital Assistant (PDA) technology to assist the teacher in receiving systematic guidelines in the assessment procedures. The system included evaluation of children's vocabulary and letter knowledge using a 60 second fluency method. Using a flip chart booklet, children were shown pictures of objects and actions and asked to name them. This same

approach was used with pictures of letters, upper and lower-case. The PDA cued teachers to move forward with the next item after a certain number of seconds when the child had not answered. The system also included individual child assessment of phonological awareness by asking the child to demonstrate knowledge of rhyming words, words in sentence segmentation, and onset rhyme. For each of the three skill areas, the teacher was cued to input the child's response as either correct or incorrect. The PDA also allowed the teacher to make observations of a child's social and early writing skills as well as a checklist of the classroom environment.

An advantage to the technology approach is that the teacher received immediate feedback about an individual child's growth in each skill, how to group children for more effective learning, and specific activities to use with different groups of children. Grouping of children according to learning needs is known to maximize instructional impact (e.g., Bowman et al., 2001; Leeper & Witherspoon, 1984). Progress monitoring measurements are sensitive to change within and across children, and assist teachers in focusing on learning outcomes as they are shown to correlate with standardized measures of comparable child skills and have good inter-rater reliability (Swank, Assel, Anthony, King, Gunnewig & Landry, 2006).

State approved language and literacy curricula and classroom materials. At the time of program implementation, the State had an approved list of prekindergarten curricula selected by a panel of experts for state adoption. This included seven language and literacy curricula from which TEEM participants could choose. The majority of the classrooms chose to use Building Language and Literacy (Scholastic Inc., 2003), Let's Begin with the Letter People (Abrams & Co., 2003), or DLM Childhood Express (SRA/ McGraw-Hill, 2003). Other curricula used in a smaller number of classrooms included Doors to Discovery (Wright Group/McGraw, 2002), Pebble Soup (Rigby/Harcourt, 2002), and We Can! (Sopris West, 2003). In addition to the

curriculum, each classroom was provided with a CIRCLE Positive Beginnings kit (i.e., classroom management charts and directions on how to use within the classroom), and a Texas School Readiness kit (i.e., series of small containers filled with literacy rich manipulatives and books).

Child assessment. Assessors were trained during a four-day workshop by a Ph.D. level trainer that included didactic training and practice after which assessors participated in a graded certification process. Standardized certification procedures evaluated general administration procedures including following verbal and behavioral scripts detailed in administration manuals, administering practice items, establishing basal and ceiling items, recording children's responses, and managing children's behavior. Following obtainment of full certification, assessors were evaluated again during the initial stages of testing while they worked with children enrolled in the project. Specifically, project coordinators sat next to an examiner and observed administration of each subtest. If any difficulties were noted, then follow-up training/supervision was provided. Assessors were also blind to the treatment condition within each classroom.

Assessors were trained to spend time talking with each child in a playful manner to help them become comfortable before initiating the assessment process. Children took breaks for toileting, snacks, and/or to allow movement as needed on a per child basis. Consequently, testing sessions ranged from 10 to 30 minutes in length, and multiple testing sessions were permitted as needed. Testing of a given child was usually completed in a single day. Children were evaluated in the language of their instruction, if there was a primary language of instruction. For classrooms employing bilingual instruction, the teacher was interviewed using a systematic set of questions for each of the children selected for testing. From this information, a determination was made as to whether to assess individual children in Spanish or English.

Measures

Teaching behaviors. The CIRCLE-Teacher Behavior Rating Scale (TBRS) was used (Landry, Crawford, Gunnewig, & Swank, 2000) to evaluate for change in teaching behaviors. The TBRS contains multiple subscales with a total of 50 items that captured both quantity and quality of specific teaching behaviors within one subscale score. Inter-rater reliability using generalizability coefficients was high, ranging from .80 to .98 (Mitchell, 1979). Internal consistency also was high, .96. Although significant correlations between subscales are found, these were not so high that the information was redundant (Assel, Landry, & Swank, 2007). The TBRS includes the following subscales: 1) best practices, 2) centers, 3) lesson plans, 4) oral language, 5) book reading, 6) print & letter knowledge, 7) written expression, 8) phonological awareness, and 9) math. A total score that combined the subscale scores also was calculated.

Child vocabulary. The Expressive One-Word Picture Vocabulary Test (EOWPVT) (Brownell, 2000) was used to measure children's oral language skills. The EOWPVT measures children's ability to correctly label an action or concept depicted for individuals 2 to 18 years of age and has English and Spanish versions. Examinees are presented with stimulus pages containing an individual color picture and asked to correctly label each picture. Internal consistency values for 2- to 5-year-olds range from .96 to .98 for split-half values (corrected) and from .93 to .95 for Cronbach's alpha values. Test-retest reliabilities over a 20-day interval are .88 and .89 for 2- to 4-year-olds and 4- to 7-year-olds, respectively. A number of studies show concurrent correlations ranging from .64 to .87 with other language measures and from .67 to .90 with other specific measures of vocabulary (Brownell, 2003).

Child composite language. The English and Spanish versions of the PreSchool Language Scale – 4th Ed. (PLS-4) (Zimmerman, Steiner, & Pond, 2002) were used to assess complex

receptive language development. This measure has been highly sensitive to demonstrating change in young children's language development in relation to teacher enhancement projects (Landry et al., 2006). Test-retest reliability (mean, 6 days) for the Auditory Comprehension is .87 and .95. Internal consistency ranges from .91 to .93. Validity for the PLS-4 also has been established through correlating with other measures of language and accurately identifying children with differences in language development (Zimmerman et al., 2002).

Child phonological awareness. The Developing Skills Checklist (DSC) evaluates a range of skills typically developed from pre-kindergarten through kindergarten (CTB/McGraw Hill, 1990). For the present study, the Auditory Analysis subtest was used to examine phonological awareness development. Split-half reliabilities range from .84 to .92 and standard errors of measurement range from 1.87 to 2.27 (CTB/McGraw Hill, 1990).

Child letter knowledge & print awareness. The Preschool Comprehensive Test of Phonological and Print Processing (Pre-CTOPPP) (Lonigan, Wagner, Torgesen, & Rashotte, 2003) was designed as a downward extension of the Comprehensive Test of Phonological Processing (Wagner, Torgesen, & Rashotte, 1999). Like the version for the older children, the Pre-CTOPPP provides assessment of phonological processing and print knowledge, the latter of which was included in the present study. The Print Awareness subtest assesses children's knowledge of print concepts, letter discrimination, word discrimination, letter-name knowledge and letter-sound knowledge. Internal consistency for the Print Awareness subtest is moderate to high for 3 to 5-year-old children (i.e., alphas .89 to .95, respectively) as is test-retest reliabilities (.50 to .90), and validity coefficients (> .43) (Lonigan et al., 2003).

Results

Description of the Program Delivery Integration Process

Across the 11 communities there was clear evidence of the beginning of integrating service delivery models as evidenced by the number of participating agencies (see Appendix A). The level of integration varied from across TEEM partnerships where small to moderate numbers of state funded teachers were placed in childcare and Head Start settings. Barriers to accomplishing this aspect of an integrated partnership involved funding issues. For example, there was a difference in eligibility criteria for children funded by state preK dollars versus those enrolled in child care. Another aspect of integration achieved by some communities was an acceptance of a standard curriculum across all types of classrooms. This was often coordinated with what the independent school district was using. An ongoing aspect of many TEEM partnerships was efforts for the leaders of the participating agencies to continue to meet in order to set new goals and problem solve over current challenges.

Quality of implementation. To assure fidelity of the TEEM implementation, the following procedures were put in place. An initial five day training for TEEM mentors covered all aspects of the program (e.g., ordering materials, teacher mentoring, weekly teacher observation, teacher training, progress monitoring, and external observations and child testing). At the beginning of the year, a Classroom Environmental checklist was completed on every target classroom and was discussed on follow up visits. Monthly conference calls were conducted with focused agendas between State Center management staff and mentors. The eleven TEEM Mentors submitted monthly reports of success and challenges in the key program components. The mentors also sent “Glows and Grows” reports of their visit with each TEEM teacher plus a mentoring log where the activity in the classroom was coded. For instance, a TEEM Mentor would code what was completed during the classroom visit and State Center staff reviewed these closely to determine mentor effectiveness. In addition, two monitoring visits occurred across Year 1 and

three across Year 2 at each of the eleven sites by the TEEM State Center Manager after which reports were submitted to the TEEM Project Director for review and feedback. If a mentor was perceived as less than effective, an additional visit was made to the site. A monitoring visit report was completed by the Project Manager and sent to the leadership of the community and the coordinator. An end of year survey also was completed by the mentors and used to inform Year 2 implementation. Finally, the TEEM Mentors and TEEM partnership directors participated in a 2-day meeting at the State Center three times during the year for additional training and problem solving.

Data Analyses: Examination of Missing Data.

As across the 2-years of the study there was some loss of children from pre to post-testing, *t*-tests were used to examine if there were differences in pretest scores between children with posttest data and children without posttest data. Two-sample (Welch) *t*-tests are reported for tests in which the two groups had unequal variances in pretest scores, and pooled *t*-tests are reported for tests in which the groups had equal variances in pretest scores. For the first year of the project, children who supplied posttest data had higher Pre-CTOPPP Print Awareness scores, $t(294) = 5.72, p < .0001$, higher EOWPVT scores, $t(1421) = 3.96, p < .0001$, and higher PLS scores, $t(254) = 3.18, p < .01$, than children who did not supply posttest data. For the second year of the project, children with posttest data and children without posttest data demonstrated equivalent abilities on all pretest measures except Pre-CTOPPP Print Awareness, for which children with posttest data demonstrated higher scores, $t(385) = 2.32, p < .05$. The nonrandom pattern of missing posttest data precluded imputation of missing data. This was not an issue for observation of teaching behaviors.

Data Analyses for Testing Hypotheses

Teacher behaviors. The TBRS was completed on a randomly selected sample of teachers in each year by trained research assistants (who were blind to the treatment status of the teacher). For Hypothesis 1, differences between groups using Year one data were compared for control vs. TEEM teachers ($n = 83$). As there was a small number of teachers who were randomly selected in Year 1 for measurement with the TBRS as control teachers and then again in Year 2 as TEEM teachers, we made a comparison for these teachers, Hypothesis 2 ($n = 14$). Those teachers who dropped out after Year one or were added in Year two were not considered. Thus, this analysis focuses on just those teachers with complete data in years one and two and who were controls in Year one. To address Hypothesis 3, examining the extent to which a greater “dosage” of TEEM training made a difference in teaching behaviors, in Year 2, we compared teachers in their first year of TEEM to those in their second year, Hypothesis 3 ($n = 83$).

Child skills. Within each participating classroom, eight children were randomly selected for assessment. While the same teachers were being compared, the children in each year were different. Thus, the student observations were independent across years and nested within classrooms. For Hypothesis 1 and 3, analyses involved an analysis of covariance (ANCOVA) with the pretest used as a covariate along with the time between assessments. Treatment condition (TEEM vs. control) was the independent variable. For Hypothesis 2, because the child pretest data was collected at different times for each year, the analysis was conducted for the posttest only. In addition to the treatment group, language of testing (English vs. Spanish) and child’s age at posttest were included in the model. Interactions of age by the grouping variables also were included in order to test the assumption of homogeneity of regression slopes. If the interactions were not significant, then they were dropped from the model. Any variable or

interaction that was nested within a significant interaction was retained in the model. Only the final models are presented.

Significance of the TEEM program effects. To evaluate the significance of the TEEM program results, effects sizes are reported as Cohen's d (Cohen, 1988). This statistic is determined by obtaining the differences between groups divided by the pooled standard deviations. This has the advantage of not depending on the sample size for the model being tested (Raudenbush & Liu, 2001). The practical significance for effect sizes are: small, $d = .20$; moderate, $.50$, and large, $.80$ (Cohen, 1988).

Hypothesis 1: Effect of TEEM Program on Teaching Behaviors –TEEM Year 1 vs. Control Classrooms

Significant differences were found in favor of the TEEM as compared to control teachers for most of the TBRS subscales. The results are summarized in Table 3 and illustrated in Figure 2. With just 4 months of the program, TEEM teachers were observed to show greater gains in their use of language building activities including the quality of their book reading, general conversations with children, and the use of small group oral language activities to build these skills, with moderate effect sizes. More positive gains also were found in emergent literacy instructional practices including phonological processing and print knowledge activities with large effect sizes. In addition, teachers who received the TEEM program showed better responsive teaching practices, organization of their centers, and the use of lesson plans as well as early math instruction. Again the program effects were moderate to large. Although only a trend for significance was found for written expression activities, a moderate effect size was evident.

Hypothesis 2: Effect of TEEM Program on Teaching Behaviors and Child Skills – Comparison of the Same Teachers across 2-Years and Different Classrooms of Children

Because of the research design, a comparison of the same set of teachers could be made when they were untrained (control, Year 1) versus when they were TEEM trained (TEEM 1, Year 2). Across the two years, these teachers had two sets of children that could be compared. Differences were compared on post-test as pre-test scores were obtained at different times between the two years.

Comparison of teaching behaviors. The comparison of teaching behaviors for the same teachers as control vs. TEEM teachers showed similar, but stronger effects than the teaching results for Hypothesis 1, for most of the TBRS subscales (Table 3, Figure 3). Again, general responsive teaching, or best practices, was stronger for these teachers after participating in the TEEM program with a very large effect size. Very large effect sizes also were found for language building and emergent literacy activities as well as the quantity/quality of book reading. Again, while the written expression subscale showed a trend for differences, the effect size was large.

Comparison of child vocabulary (Figure 4). The final model for the Expressive One Word Picture Vocabulary (EOWPVT) test indicated that the scores for the children who were taught by teachers after they participated in the TEEM program were significantly higher than the children under the control condition, $F(1, 904) = 17.90; p < .0001$, and that this depended upon the age of the child, $F(1,904) = 5.63; p < .02$, effect size = .26. The greatest differences between the groups were found for older children. The relation of test language to the scores on the EOWPVT also depended on the age of the child, $F(1, 904) = 4.92; p < .03$ with the greatest difference found for children tested in English as compared to Spanish, but only for older children.

Comparison of child letter knowledge and print awareness. The final model for this aspect of early literacy included the child's age, $F(1, 918) = 89.07$; $p < .0001$, and TEEM vs. control years, $F(1, 918) = 4.93$; $p < .03$, effect size .11, Figure 4. The results indicated that the children tested while their teachers were in the control condition were significantly lower than those when the teacher was in the TEEM program. A similar model resulted when only the letter sounds score was analyzed, $F(1, 918) = 4.06$; $p < .05$; effect size = .10. Again, the children had higher scores when their teachers had TEEM versus when they were controls. The effects were larger for naming letters, $F(1, 916) = 14.31$; $p = .0002$; effect size = .20.

Hypothesis 3: Effect of TEEM Program on Teaching Behaviors and Child Skills – TEEM 2 vs. TEEM 1

In Year 2, teachers who were in the control condition during year one moved into the TEEM program (TEEM 1) while teachers who were in TEEM during year one continued to receive more training (TEEM 2). Thus, this comparison of results for teachers reflected a difference in the amount of program participation rather than TEEM versus no TEEM. A similar comparison could be made for children with teachers in their second versus first year of the program.

Comparison of teaching behaviors. These results revealed no differences between the teachers on the TBRS. That is, no differences on the TBRS subscales were observed between teachers with two years of TEEM exposure as compared to one year of TEEM exposure.

Child vocabulary. The final model for children's vocabulary skills revealed a significant effect that depended upon age at pretest, $F(1, 1061) = 4.73$; $p < .03$, effect size = .16. In addition, the program effect was dependent upon the child's language of testing, $F(1, 1061) = 4.29$; $p < .04$; effect size = .35. Children of teachers in their second TEEM year were higher on vocabulary at

the post test and this was especially true for those who were younger at the pretest. In addition, children tested in Spanish whose teachers were in their second TEEM year had higher posttest vocabulary scores (Figure 5).

Comparison of child letter knowledge and print awareness. Significant differences also were found for the print knowledge total score but this was dependent on their pretest score, $F(1, 1118) = 9.29, p < .003$, effect size = .34 (Figure 5). This included differences on knowledge of letter sounds, letter names, and print discrimination. The finding indicated that the posttest scores were significantly higher for children with teachers in their second year of TEEM, but this was particularly true for those who showed lower scores at the pretest. Thus, the effect of the second year of training seemed to be particularly important for children with lower print knowledge skills at the beginning of the year.

Child phonological awareness. On the Developing Skills Checklist phonological awareness subtest there was a significant group by age by language of testing interaction, $F(1, 1116) = 6.13; p < .02$ (Figure 6). Children tested in Spanish, particularly those who were older at the beginning of the year, had higher posttest scores if their teacher had two years of training, effect size = .50. Conversely, children of second year teachers who were tested in English seemed to do better if they were younger at the beginning of the year, effect size = .26.

Child complex language. A significant TEEM program effect was found for children's complex language, $F(1, 1107) = 14.44, p = .0002$ (Figure 7). However, this depended on the pretest score and age at pretest, $F(1, 1107) = 19.49; p < .0001$, as well as the language of testing, $F(1, 1107) = 11.41, p = .0008$. Children tested in English had high post-test scores regardless of the amount of teacher training but those tested in Spanish had higher posttest scores if their teachers were in the second year of training, effect size = .34. In addition, the TEEM program

effect for a second year of teacher training was greater for younger children when they started out with higher scores at pretest scores, effect size = .24, but greater for older children when they started out at lower scores, effect size = .20.

Discussion

The need to find effective solutions for providing quality early childhood programs for children from low income backgrounds is great. The challenge of implementing effective programs to meet this need is even greater. This study attempted to achieve two major goals as identified by a state legislative action. The first was to bring three types of early childhood service delivery programs (i.e., school district, Head Start, child care) together into integrated partnerships. This goal was particularly challenging as it was not a common practice in communities across the state and many barriers, perceived and real, existed that needed to be overcome. Achieving the goal of an integrated service delivery model was expected to be more cost-effective and to offer choices to parents based on their need for different types of services. Results showed that communities that had not previously been implementing an integrated model were able to bring the three types of programs together into a partnership, share resources, and establish common goals to a varying degree. It is important to note that in this initial phase of what is now a much larger and sustainable program, a great deal of oversight and support needed to be provided these partnerships from the state center.

The second goal was to design, implement, and evaluate a set of educational components that could be effective across types of programs, thereby ensuring that parents have access to high quality programs to prepare their children for school irrespective of program type. Based on the results of a recently completed, federally-funded, scale up study across communities in four states, an educational model was adopted that included three key components (Landry et al.,

2007). In this previous study, professional development using an on-line facilitated, intensive set of pre-K courses was found to support strong changes in pre-K teachers' instructional practices, particularly when it was paired with a PDA progress monitoring system that provided immediate feedback of children's progress in key language and literacy skills and classroom mentoring. Although in this previous study, curriculum could not be a controlled aspect of the design, a research based language and literacy curriculum was included as a key component in the TEEM program. Support for the decision to mandate the use of a state approved research based curriculum came from a recent experimental study where curriculum was a design feature and found to be an important factor in teacher and child outcomes (Assel, Landry, Swank, & Gunnewig, 2006).

Hypothesis 1: Comparison of Year 1 Effects for TEEM versus Control Teachers

There is strong evidence that the educational components are effective in promoting greater change in the TEEM teachers' instructional practices when compared to the control teachers. Greater gains with moderate to large effect sizes were found for the TEEM teachers in the initial 4-month training period across most of the subscales of the TBRS. Evidence of the program's effectiveness was found in the quality of classroom practices such as responsive teaching techniques, organizing the classroom into learning centers and in the development of lesson plans to include key language and literacy activities that showed an understanding of scope and sequence. Some of the greatest gains were found in school readiness instructional activities. For example, TEEM teachers were observed to implement more activities that supported children's development of early literacy skills such as print awareness and letter knowledge. Another key predictor of early reading success, oral language development, also showed differences where TEEM teachers outperformed control teachers. Strong differences also

were seen in TEEM teachers' use of math building activities and book reading practices.

Language building activities included conversations in large and small groups about the children's experiences both at home and across the school day as well as those that occurred during read-alouds that were expected to specifically target the development of new vocabulary.

Hypothesis 2: Effect of TEEM Program on Teaching Behaviors and Child Skills – Comparison of the Same Teachers across 2-Years and Different Classrooms of Children

The design of this experimental evaluation allowed for comparison of a small group of teachers who had been randomly selected for evaluation in year 1 as control teachers and again in year 2 as TEEM teachers. The differences in school readiness instructional practices before and after TEEM training were striking. Not only did they show improvement in almost all areas of teaching based on changes across the year on the observation rating scale but the differences were dramatic. The different groups of children in these teachers' classrooms across the two years also showed differences in their language and emergent literacy gains across the school year. For example, vocabulary development was greater for children whose teachers had TEEM compared to children's skills when these teachers were controls. Children who were older at the beginning of this pre-k school year and their teachers had TEEM showed the biggest advantage. The benefit of teachers having TEEM for the children's emergent literacy skills also was seen. Gains in naming letters were greater for those children who were in classrooms when the teachers had TEEM. Again, we see an advantage for the children who were older. It may be that the older children within 3 and 4 year old classrooms are ready to benefit from exposure to quality cognitive instructional activities. However, this does not appear to be the case for children with more experienced teachers. As the benefit of a second year of TEEM often

showed effects particularly for children who were younger, it may be the age effects seen for hypothesis 2 are related to teachers being in their first year of TEEM training.

Hypothesis 3: Effect of TEEM Program on Teaching Behaviors and Child Skills – TEEM 2 vs. TEEM 1

Change in teaching behaviors. Although dosage differences were expected, results for teachers did not support this hypothesis. As dosage effects were seen for the children's outcomes, it may be that the version of the TBRS used in this study was not sensitive enough to capture teachers' maturing in the quality of their practices. The TBRS used in this study attempted to capture both quantity and quality of teaching instruction. A more recent version discriminates these two important aspects of teaching and results of a recent study document differences across the two aspects. For example, differences were sometimes found across groups of teachers' behaviors for quantity but not quality (Landry et al., 2007). It might be expected that second year TEEM teachers were similar in the amount of activities used in the different skill areas compared to those in their first year of training. However, the manner in which activities were implemented was at a different level of quality. This would help explain why some differences were found in the children's outcomes related to the amount of program participation the children's teachers had received.

Change in child skills. Amount of TEEM teachers' training was apparent when examining the children's development of language and early literacy skills. While a positive effect of additional teacher participation was seen for all skills evaluated, at times these were dependent upon the child's age and language of assessment. For example, there were stronger language skills, both for vocabulary and complex language, for children whose teachers were in their second year of the TEEM program. However, these were strongest for children who were

younger at the beginning of the school year. Language skill differences also were stronger for those children evaluated in Spanish. As children tested in Spanish would be learning English as a second language and had a limited amount of English at the beginning of the school year, they might be considered as children who needed the most support from teachers to develop language skills. This could be expected to be true for younger children. Thus, the results suggest that the teachers who had more mentoring and more exposure to the on-line facilitated courses were better prepared to assist those children who typically require more specialized support. Specifically, teachers' training in language building activities and ongoing progress monitoring activities appeared to be beneficial for these teachers and students.

The two aspects of emergent literacy that have been found to be unique predictors of reading from the recently released National Institute for Literacy report (2007), also were at higher levels and showed greater increases if children's teachers were in their second year of TEEM. For letter sound correspondence this finding was strongest for children younger at the beginning of the school year while print discrimination skills were strongest for children learning English as a second language (ESL). The effect of TEEM participation for ESL children also was seen for phonological awareness skills. However, unlike the other language and literacy outcomes, teachers more experienced with the TEEM program appeared to be most effective in this area of emergent literacy for children who were older at the pre-test. This may occur because of the complexity of phonological awareness, such that a more experienced teacher is better able to implement the type of activities needed to support children's learning of this skill and, older children are more likely to be ready to take advantage of this instruction.

Can Child Results Be Sustained?

More recent information has been obtained on the Kindergarten reading and social readiness of children in TEEM classrooms (Texas State Center for Early Childhood Development, 2007). A second stage of the state model was to develop a method for identifying the classrooms that were adequately preparing children for Kindergarten. This method is based on the quality of implementation of practices in the preK classroom in combination with reading and social scores in early Kindergarten on screening measures that show the child is at expected skill levels. When children from well implemented TEEM classrooms were followed into Kindergarten and compared with a separate cohort of middle and upper-middle income children from non-TEEM classrooms, reading scores were found to be comparable and social development was significantly better.

Study Limitations

There are limitations to this experimental evaluation of a state-mandated and funded, pre-K program. For example, the flow of funding allowed for only 4 months, rather than the full school year for the evaluation of the Year 1 program. Thus, while there were strong teacher findings in year 1, we were not able to detect significant differences in children's early academic competencies during the first year of implementation. Additionally, like most studies evaluating preschool children's early academic skills, measurement issues, in areas such as phonological awareness were apparent. This is a problem that has historically plagued studies evaluating young children's cognitive skills. This is especially true in relation to appropriate measures of early academic readiness for ESL students. It must also be noted that this study may not generalize to other pre-K populations secondary to the high proportion of Spanish speaking children enrolled. A future objective for this program will be to examine the longer term effects of the TEEM program as children move into formal schooling. The results of this study clearly

indicate that an integrated service delivery model can be effective in improving the quality of preschool instruction, a fact that surely has important implications for educators and policy makers. Finally, this study demonstrates that comprehensive professional development, mentoring, progress monitoring, and collaborative relationships between educators in the public and private domains can result in benefits for at-risk preschool-aged children.

References

- Abrams & Co., Pub. (2003). *Let's begin with the letter people*. Waterbury, CT.
- Assel, M.A., Landry, S.H., & Swank, P.R. (2007). Are early childhood classrooms preparing children to be school ready? The CIRCLE Teacher Behavior Rating Scale. In L. Justice & C. Vukelich (Eds.), *Achieving excellence in preschool literacy instruction*, (pp. 120-135). NY: The Guilford Press.
- Assel, M. A., Landry, S. H., Swank, P. R., & Gunnewig, S. (2006). An evaluation of curriculum, setting, and mentoring on the performance of children enrolled in prekindergarten. *Reading and Writing: An Interdisciplinary Journal*, 20, 463-494.
- Bereiter, C. (1972). An academic preschool for disadvantaged children: Conclusions from evaluation studies. In J.S. Stanley (Ed.), *Preschool programs for the disadvantaged: Five experimental approaches to early childhood education* (pp. 1-21). Baltimore, MD: Johns Hopkins University Press.
- Bowman, B. T., Donovan, M. S. & Burns, M. S. (Eds.). (2001). *Eager to learn: Educating our preschoolers*. Washington, DC: National Academy Press.
- Bransford, J., Brown, A., & Cocking, R. R. (Eds.). (2000). *How people learn: Brain, mind, experience, and school*. Committee on Developments in the Science of Learning, National Research Council. Washington, DC: National Academic Press.
- Brownell, R (2000). *Expressive One-Word Picture Vocabulary Test*. Novato, CA: Academic Therapy.
- CTB/McGraw-Hill. (1990). *Developing Skills Checklist*. Monterey, CA: CTB/McGraw-Hill.
- Campbell, F.A., Ramey, C., Pungello, E.P., Sparling, J.J., & Miller-Johnson, S. (2002).

- Early childhood education: Young adult outcomes from the Abecedarian project. *Applied Developmental Science*, 6, 42-57.
- Cohen, J. (1988). *Statistical power analysis for behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Dawson, G., Klinger, L. F., Panagiotides, H., Hill, D., & Spieker, S. (1992). Frontal lobe activity and affective behavior of infants of mothers with depressive symptoms. *Child Development*, 63, 725-737.
- DiPietro, J. A. (2000). Baby and the brain: Advances in child development. *Annual Review Public Health*, 21, 455-471.
- Duncan, G.J., Dowsett, C.J., Claessens, A., Magnuson, K., Huston, A.C., Klebanov, P., et al. (2007). School readiness and later achievement. *Development Psychology*, 43, 1428-1446
- Eisenhower National Clearinghouse for Mathematics and Science Education (1998). *Ideas that work science professional development*. Columbus, OH: The Ohio State University.
- Elmore, R. R. (2002). Bridging the gap between standards and achievement. *The imperative for professional development in education*. The Albert Shanker Institute.
- Landry, S.H. (2005). *Effective early childhood programs: Turning knowledge into action*. Monograph produced by the University of Texas Houston Health Science Center and Texas Program for Society & Health, Rice University.
- Landry, S.H., Anthony, J.A., Swank, P.R., Gunnewig, S., & Monseque-Bailey, P. (2007) Effectiveness of comprehensive professional development for teachers of at-risk

preschoolers. Manuscript submitted for publication.

- Landry, S. H., Crawford, A., Gunnewig, S., & Swank, P. R. (2000). *The CIRCLE-Teacher Behavior Rating Scale*. Unpublished research instrument.
- Landry, S. H., Swank, P. R., Smith, K. E., Assel, M. A., & Gunnewig, S. (2006). Enhancing early literacy skills for pre-school children: Bringing a professional development model to scale. *Journal of Learning Disabilities*, 39, 306-324.
- Leeper, S. H., & Witherspoon, D. B. D. (1984). *Good schemes for young children*, 5th ed. NY: MacMillan.
- Lonigan, C. J., Wagner, R. K., Torgesen, J. K., & Rashotte, C. A. (2003). *Preschool Comprehensive Test of Phonological and Print Processing*. Austin, TX: PROED.
- Mitchell, F. (1979). Interobserver agreement, reliability, and generalizability of data collected in observational studies. *Psychological Bulletin*, 86, 366-370.
- National Assessment for Educational Progress. (2003). Highlighting NAEP 2003. National Assessment for Educational Progress. Retrieved July 17, 2007, from http://www.ode.state.or.us/initiatives/naep/naepnews_vol01num01.pdf
- National Center for Education Statistics. (2001). *The nation's report card: Fourth-grade reading 2000*. Retrieved April 6, 2001, from <http://nces.ed.gov/nationsreportcard/reading/results>
- National Center for Education Statistics. (2001). *The nation's report card: Mathematics 2000* (Rep. No. NCES 2001-517).
- National Institute for Literacy. (2007). *[Early literacy predictors of later reading outcomes]*. Unpublished raw data from the National Early Literacy Panel. Louisville, KY: National Center for Family Literacy.

- Preschool Curriculum Evaluation Research Consortium. (2007). *Effects of preschool curriculum programs on school readiness*. National Center for Education Research, Institute of Education Sciences, U.S. Department of Education. Washington, DC: U.S. Government Printing Office.
- Putnam, R. T., & Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning? *Educational Researcher*, 29, 4-15.
- Raudenbush, S., & Liu, X. (2001). Effects of study duration, frequency of observation, and sample size on power in studies of group differences in polynomial change. *Psychological Methods*, 6, 387-401.
- Reynolds, A., Ou, S., & Topitzes, D. (2004). Paths of effects of early childhood intervention on educational attainment and delinquency: A confirmatory analysis of the Chicago Child-Parent Centers. *Child Development*, 75, 1299-1328.
- Rigby/Harcourt (2002). *Pebble soup*. Orlando, FL.
- Scholastic, Inc. (2003). *Building language and literacy*. NY: New York.
- Schweinhart, L.J., Barnes, H.V., & Weikart, D.P. (1993). Significant benefits: The High/Scope Perry Preschool study through age 27. *Monographs of the High / Scope Educational Research Foundation 10*. Ypsilanti, MI: High / Scope Press.
- Senate Bill 76 (2003). Relating to the provision of subsidized childcare services: Establishment of new PreKindergarten program. Retrieved Sept 1, 2003, from <http://www.capitol.state.tx.us/tlodocs/78R/billtext/doc/SB00076F.doc>
- Snow, C. E., Burns, M. S., & Griffin, P. (Eds.). (1998). *Preventing reading difficulties in young children*. Washington, D.C.: National Academy Press.
- Sopris West (2003). *We can!* Longmont, CO.

SRA/McGraw-Hill (2003). *The DLM childhood express*. Columbus, OH.

Swank, P. R., Assel, M. A., Anthony, J. L., King, T., Gunnewig, S., & Landry, S. H.

(2006). Psychometric analyses of English m:Class data. Presentation at the annual meeting of the Society of the Scientific Study of Reading.

Texas State Center for Early Childhood Development (2007). *The Texas Legislature Senate Bill 23 Report on Texas Early Education Model (TEEM School Readiness): Certifying higher levels of school readiness in cost effective ways*.

Wagner, R. K., Torgesen, J. K., & Rashotte, C. A. (1999). *Comprehensive Test of Phonological Processing*. Austin, TX: PRO-ED.

Wright Group/McGraw (2002). *Doors to discovery*. Bothell, WA.

Zimmerman, I. L., Steiner, V. G. & Pond, R. E. (2002). *Preschool Language Scale*. (4th ed). San Antonio, TX: The Psychological Corporation.

Table 1. TEEM SCHOOL READINESS – Community partnerships

Community Partnership	Independent School District <i>n</i> = 92	Head Start <i>n</i> = 65	Child Care <i>n</i> = 64
Amarillo	14	2	4
Austin	11	3	6
Brownsville	10	5	5
Dallas	4	3	13
El Paso	6	6	8
Fort Worth	8	8	4
Houston	7	8	5
Laredo	8	7	5
Raymondville	9	6	3
San Antonio	6	8	4
Wichita Falls	9	3	7

Table 2. On-line Professional Development Course List

- Classroom Management
- Setting the Stage for Children's Talk
- Reading Aloud
- Phonological Awareness
- Letter Knowledge
- Mathematics
- Written Expression
- Language Development

Table 3. Summary of Teacher Behavior Change for Hypotheses 1 & 2.

	Hypothesis 1				Hypothesis 2 ¹		
	d.f.	<i>F</i>	<i>p</i>	Effect size	<i>F</i>	<i>p</i>	Effect size
Total teaching behaviors	1, 82	19.74	.0001	.84	32.60	.0001	1.71
Language							
Book reading	1, 79	9.27	.003	.57	39.56	.0001	2.27
Oral language	1, 82	5.89	.017	.40	57.61	.0001	2.04
Emergent Literacy							
Phonological awareness	1,82	9.10	.003	.66	27.98	.0001	2.45
Print use	1,82	25.16	.0001	1.03	25.50	.0002	1.98
Written expression	1, 81	3.36	.071	.39	3.61	.0793	.55
Math	1, 81	8.63	.004	.65	ns		
Best Practices	1, 82	9.78	.002	.56	40.32	.0001	2.21
Classroom Organization							
Centers	1, 81	8.48	.005	.63	19.18	.0007	1.22
Lesson plans	1, 79	6.15	.015	.59	19.36	.0007	1.45

¹All d.f. = 1, 13

Figure 1. TEEM SCHOOL READINESS Components



Figure 2. Differences in Teachers' Instructional Practices as a Result of TEEM:

Control (Dotted Line) versus TEEM (Solid) – Year 1

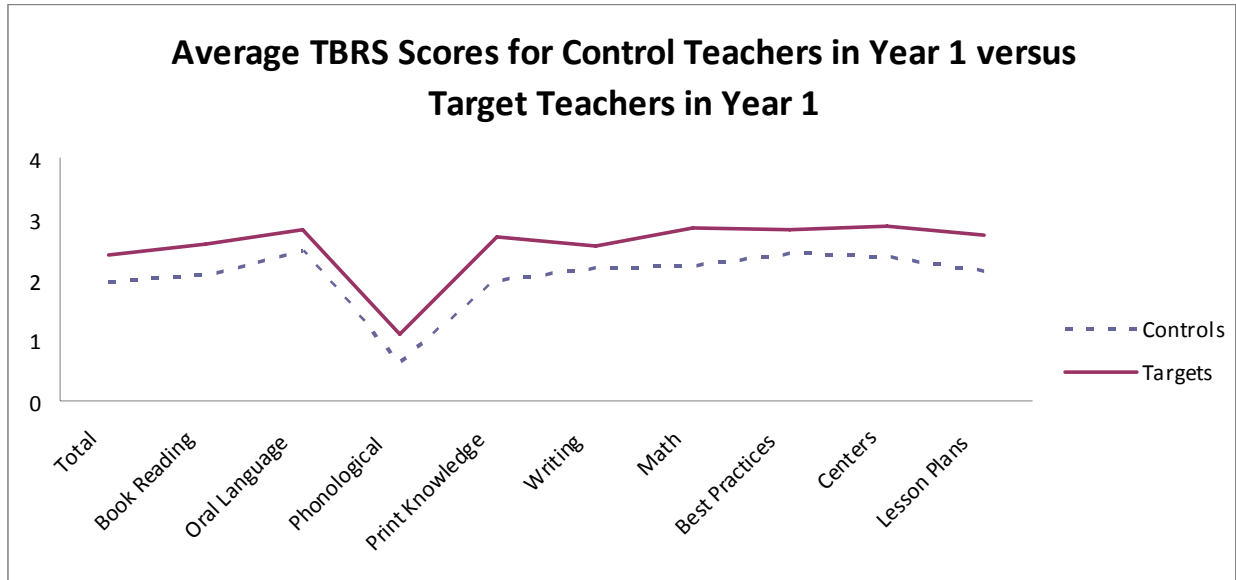


Figure 3. Differences in Teachers' Instructional Practices

The Same Teachers as Controls versus TEEM across Years 1 and 2.

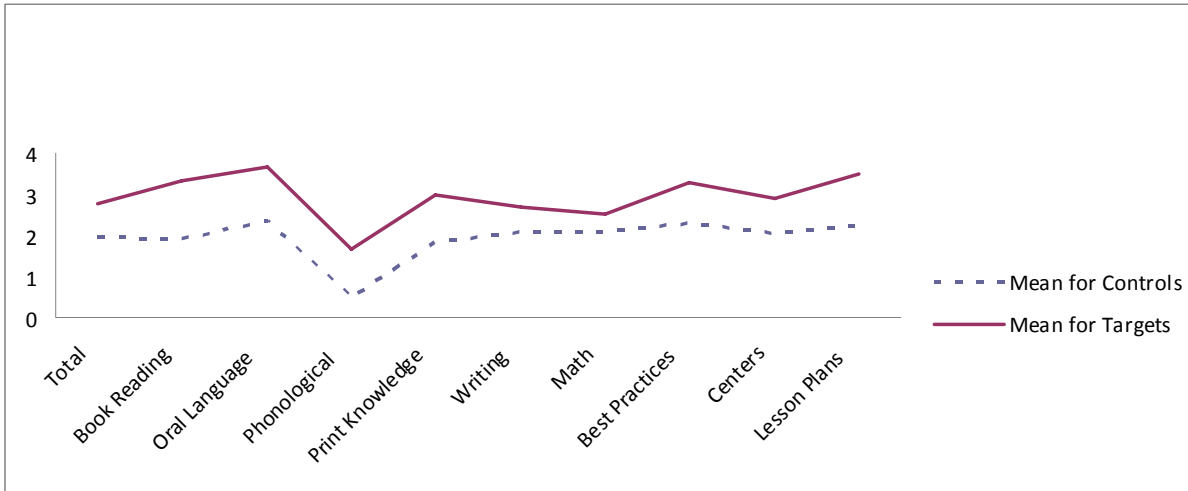


Figure 4. TEEM Effects on Child Vocabulary and Letter Knowledge for Children whose Teachers were Controls in Year 1 and TEEM in Year 2.

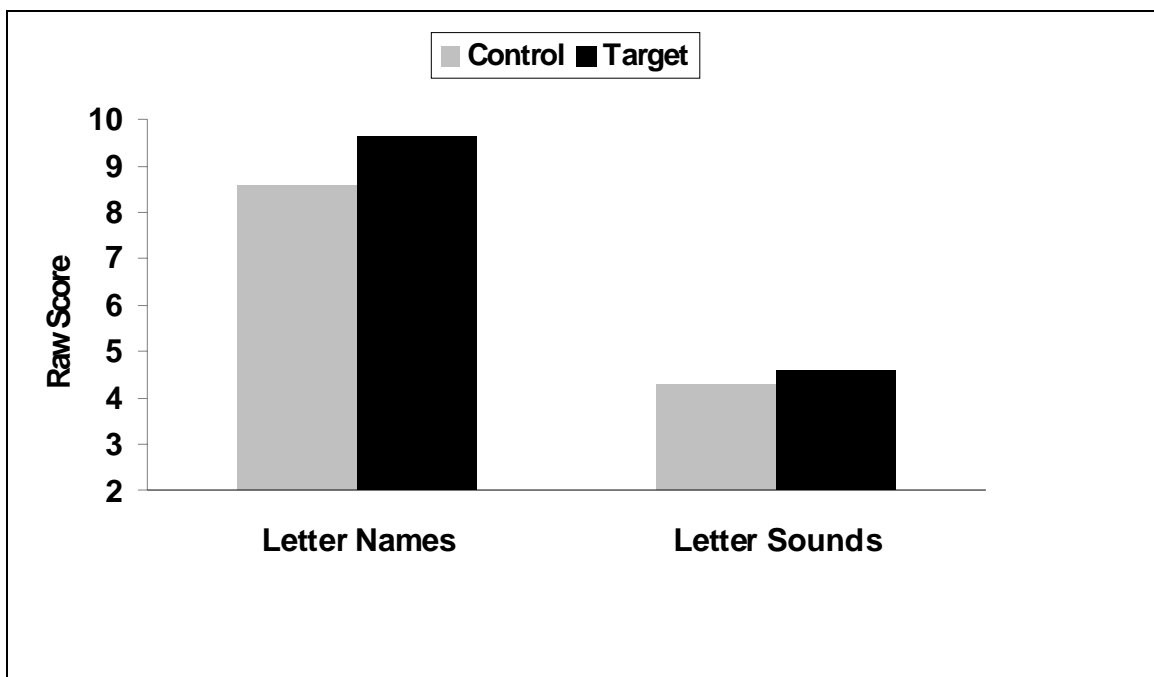
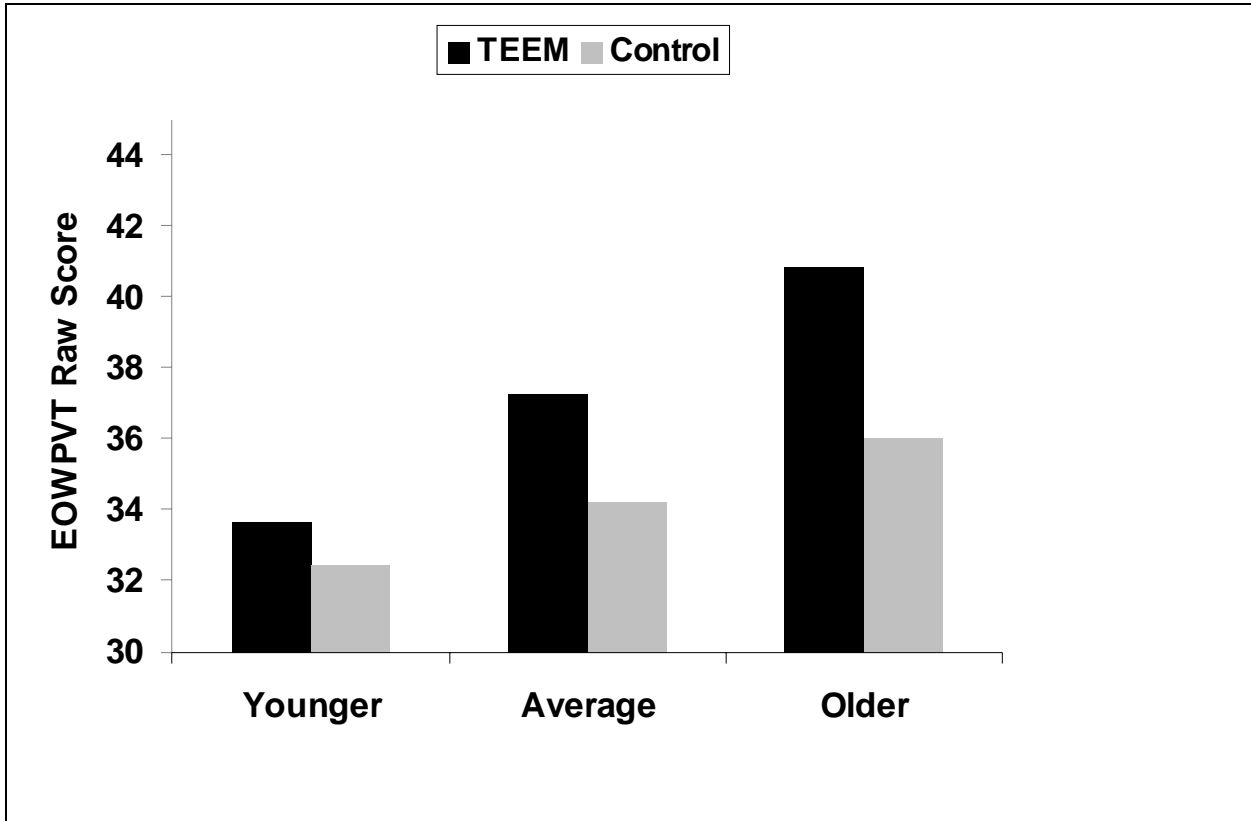


Figure 5. TEEM Effects on Child Vocabulary and Letter Knowledge

Based on the Amount of TEEM Teachers Received:

Differences by Language of Testing and Age of Child

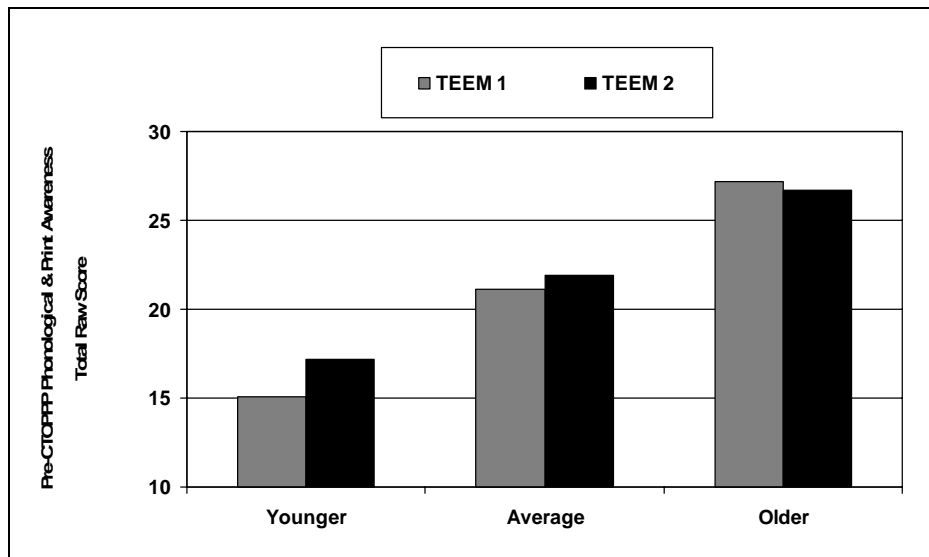
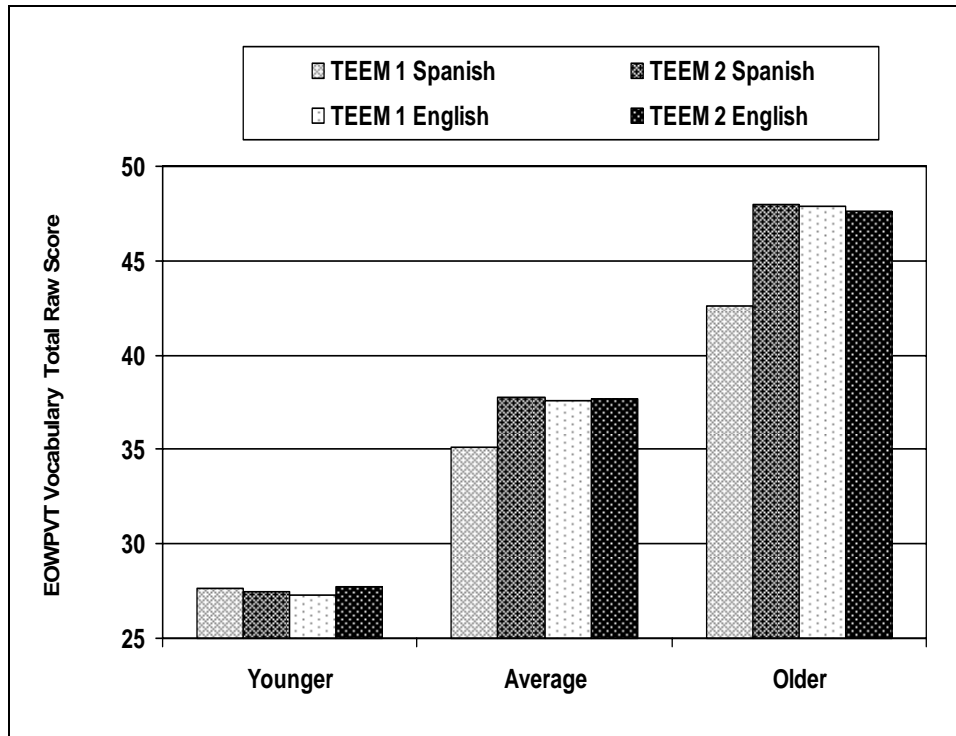


Figure 6. TEEM Effects on Child Phonological Awareness

Based on the Amount of TEEM Teachers Received:

Differences by Language of Testing and Age of Child

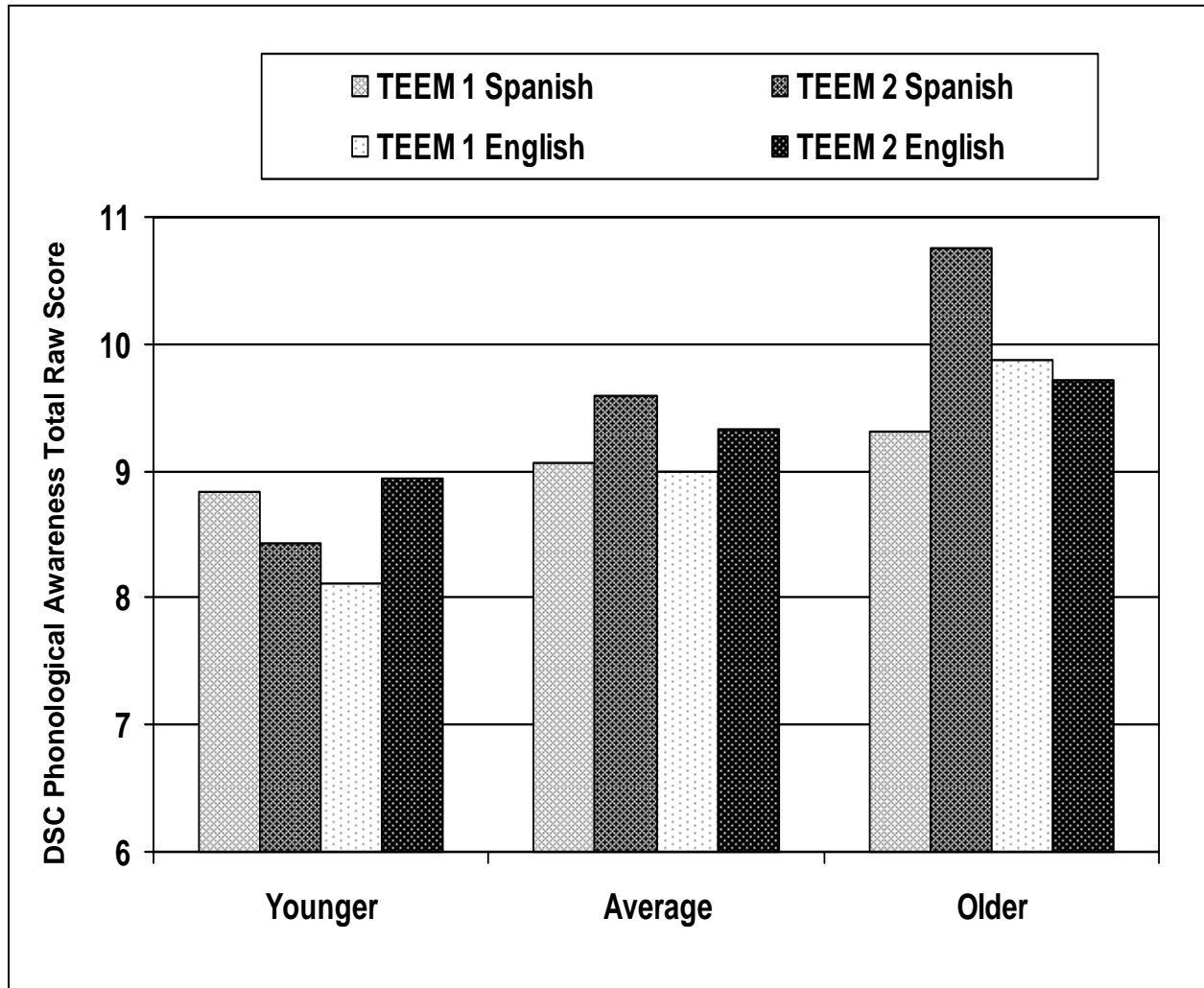
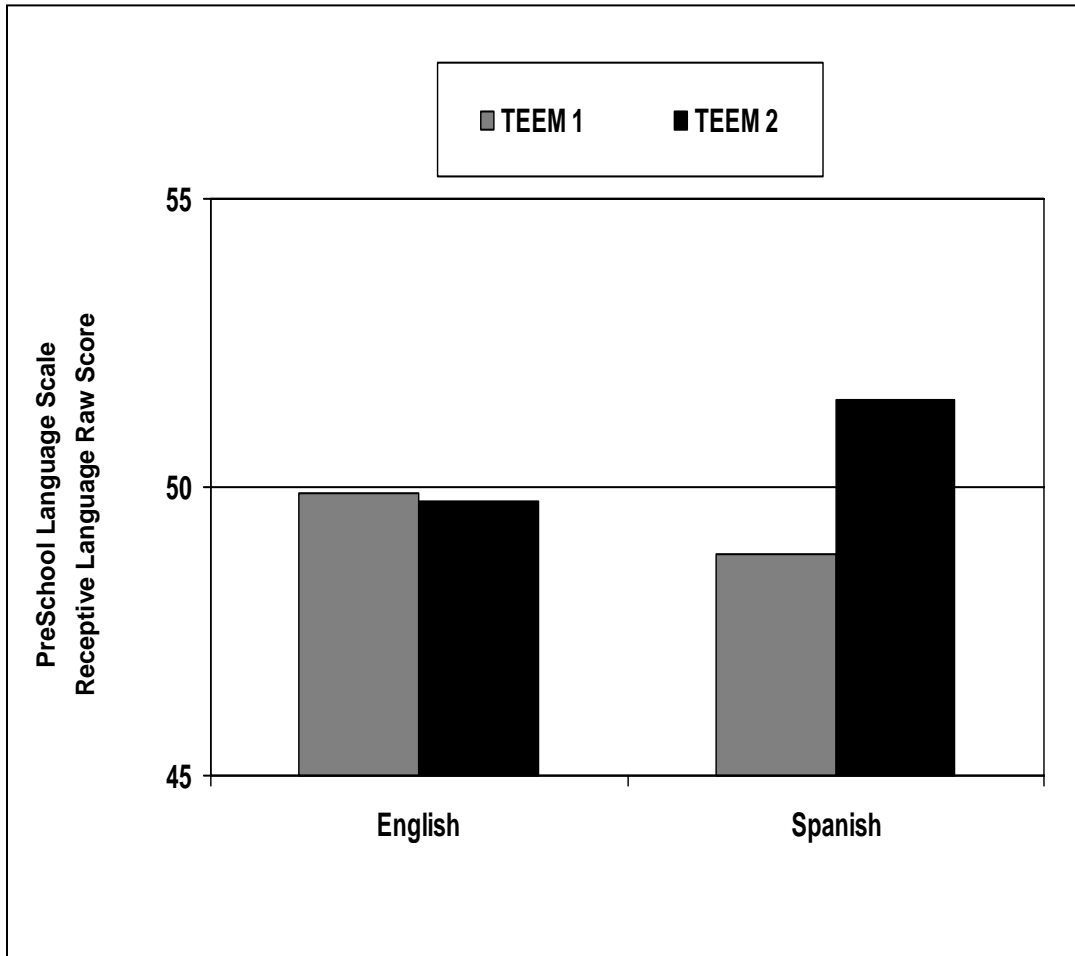


Figure 7. TEEM Effects on Child Complex Language

Based on the Amount of TEEM Teachers Received:

Differences by Language of Testing



Appendix A. Partner Agencies for the Eleven Communities

Community	Lead Agency	Partnering Agencies
Amarillo	Amarillo ISD	Amarillo College Lab School Family Support Services - Center City Child Care Opportunity School Region 16 Head Start Wesley Community Center
Austin	Child, Inc. (Head Start)	Austin ISD Capital City Creative School Ebenezer Child Development Center Family day homes (Independently operated/registered) Little Folks Bilingual Nursery and Day Care Main Spring School Manor ISD Pflugerville ISD True Light Child Development Center Work Source –Greater Austin Area Workforce Board
Brownsville	Brownsville ISD	Bizzy Tots Cameron Works, Inc. Kiddie Junction Day Care Kids First Learning Center

		<p>Kid's World</p> <p>Little Mermaid Day Care</p> <p>NINOS (Neighbors in Need of Services) Head Start Program</p> <p>Reach Out and Read</p> <p>Success by 6-United Way of Southern Cameron County</p> <p>Southwest Key Program, Inc.</p> <p>Young Scholar's Academy</p>
Dallas	Educational First Steps	<p>Angel's Playland Kiddie Kare</p> <p>Betty Lin Child Care Avance Dallas</p> <p>Dallas ISD Head Start of Greater Dallas</p> <p>Day Schools, Inc. (Glen Oaks School) Salvation Army Irving</p> <p>Irving YWCA Mi Escuelita</p> <p>Open Door Preschool Widner YWCA</p> <p>Park South YMCA</p> <p>SMU/LEAP Child Care Group</p>
El Paso	YWCA El Paso Del Norte Region/ Region 19 Head Start	<p>Robert F. Kennedy Pre-K Center</p> <p>Ysleta ISD Project Vida</p>
Ft. Worth	Child Care Assoc	Ft. Worth ISD

	(Head Start)	YWCA
Houston	Collaborative for Children (Advocacy Grp)	Aldine ISD (Head Start Delegate Agency) Amigos Por Vida Avance Head Start Choo Choo Train Academy Gulf Coast Community Services Association head Start Harris County Department of Education, Head Start Houston ISD KinderCare Neighborhood Centers Inc. Head Start Spring Branch ISD Teeter Totter Village, YMCA Young Learners Young Scholars
Laredo	Texas Migrant Council (Head Start)	Bright Beginnings Kristi Lin's Academy La Joya ISD Laredo ISD Our Lady of Guadalupe Catholic School St. Peter's Memorial Catholic School The Education Center Webb County Head Start
Raymondville	Raymondville	Lasara ISD

	ISD	<p>Lyford ISD</p> <p>NINOS (Neighbors in Need of Services) Head Start</p> <p>San Perlita Independent School District</p> <p>St. Paul Lutheran Child Care</p> <p>Texas Migrant Council, Inc.</p>
San Antonio	Family Service Association / San Antonio ISD	<p>Carmelite Learning Center</p> <p>Healy Murphy Center</p> <p>Madonna Neighborhood Center</p> <p>Parent Child, Inc., Head Start</p>
Wichita Falls	Wichita Falls ISD	<p>Brightest and Best Learning Center</p> <p>First Christian Church Children Come First</p> <p>First United Methodist Church Children's Center</p> <p>University Academy</p> <p>The Kids Place</p> <p>Wichita Falls ISD/Head Start Program</p> <p>YMCA Bill Bartley Branch</p> <p>YMCA Youth Center</p>