Supporting Cognitive Development in Early Childhood

Today I will describe how researchers and educational training staff from the Center for Improving the Readiness of Children for Learning and Education (CIRCLE), University of Texas-Houston Health Science Center, have been involved in the implementation and evaluation of a model of professional development for Head Start teachers. CIRCLE's research and training efforts have been supported with over 15 years of federal, state, and private funding on issues related to understanding the factors that are most important for supporting young children's cognitive and social development.

The problem. There is consistent documentation of a lack of school readiness for children with social, economic and physical risk factors. In a recent publication, 50% of kindergartners in the United States are from families with one or more risk factors for school failure. More than 33% of these children with only one risk factor will have reading scores in the bottom 25th percentile. Lack of school readiness for children from disadvantaged backgrounds due to social, physical, or economic factors is related to inadequate language and literacy experiences in early childhood. Therefore, a major question is whether greater attention to language and early literacy in early childhood programs can better prepare children for school success.

What educational research tells us. Research tells us that if language, literacy, and other cognitive factors are attended to through quality programming in early childhood settings, children's school readiness is optimized. Research describes three key components of quality programs for reading and academic success. These include a strong foundation in: 1) language development, 2) early literacy (i.e., phonological awareness, letter knowledge, written expression, book and print awareness, motivation to read, and 3) early math (e.g., number and operations).

What developmental research tells us. Research also tells us how young children learn most effectively through interactions with others. Based on developmental theories that emphasize the role of learning in social contexts, we know that caregivers and teachers are a critical source of stimulation for young children. The way in which more competent others are able to support young children's learning has been described as "scaffolding" and includes a broad range of interactive styles that are consistently reported to enhance children's ability to learn because they provide support for the young child's less mature attention, cognitive, and language skills. Scaffolding occurs in everyday situations when caregivers or teachers notice a child's interest in a toy or book and help him/her hold the object and talk about how it works and what it is called.

In our own research there are six key essentials for optimal support of young children's cognitive development. We have found that these include 1) providing rich language environments through labeling, explanations about children's interests, and frequent book reading on different topics, 2) responding to children's requests and signals promptly and sensitively, 3) maintaining and expanding on children's interests in specific learning activities, 4) avoiding negative and highly restrictive behaviors, 5) providing opportunities for choice by the toddler/preschool periods when children are more capable of beginning to direct their own learning, and 6) monitoring children's behavior. When this interactive style is apparent, 1) children are willing to signal their needs and interests, 2) caregivers and teachers respond to these in a sensitive and prompt manner, and 3) children receive a supportive consequence and more effective learning occurs.

In our research, after identifying the key interactive behaviors that are important for early learning, we addressed whether early childhood was a critical period for children to experience these supportive and stimulative interactive styles. We were specifically

interested in whether the period from infancy through entry into kindergarten played a unique role in children's development of cognitive and social skills because this was a time when children were more receptive to supportive learning environments. This question was motivated by research demonstrating that the young brain is highly susceptible to different types of stimulation as it is in the active process of developing networks of associations from learning experiences.

We evaluated the question of a critical period for 360 families and their young children by observing mother and child interactions in home visits when children were 6, 12, and 24 months of age, and again when they were 3, 4, 6, and 8 years of age. They were observed interacting in everyday activities such as having lunch together, bathing and dressing, as well as in toy play and book reading activities. To address the role of these key stimulation behaviors across this time period, we constructed average ratings of mothers' behaviors for the infancy period (6, 12, 24 months of age) and the preschool period (3, 4 years of age). We also collected measures of mothers' behaviors at 6 and 8 years of age. We were interested in whether mothers' differed in their ability to show responsive stimulation behaviors across infancy and early childhood. Through cluster analysis we found four evenly distributed groups of mothers: 1) one that was consistently and highly responsive throughout early childhood, 2) two of whom were responsive in either infancy or preschool period but not both, and 3) one that was consistently low in their responsiveness across this age period.

Examination of how these four patterns of parenting predicted children's cognitive/language abilities as well as their social skills showed that the children whose mothers were consistently the highest in responsiveness had the fastest rates of cognitive/ language development. This group of children had cognitive skills at average levels by kindergarten. The inconsistent and low responsiveness groups showed slower rates of development with children being considerably behind in their cognitive skills by 5 years of age. When we considered this question through 8 years of age and took into consideration mothers' 6 and 8 year parenting, we continued to find that the quality of parenting in early childhood was the strongest predictor and that parenting at these two later ages did not predict additional variance in the children's outcomes. Thus, this demonstrates support for a unique role of quality stimulation in early childhood for cognitive/language development. Although there is not time to illustrate how these patterns predict social development, similar results were found. This research led us to develop parent programs that were tested in random assignment studies for their effectiveness in facilitating parents' interactive behaviors. We are finding that parents from all socioeconomic levels usually want to learn more about how to enhance their children's development. Our research is demonstrating that with information about effective parenting practices and a facilitator helping them practice specific responsive strategies, caregivers show dramatic increases in their use of these strategies. This, in turn, resulted in their young children showing large gains in cognitive and social skills.

An innovative professional development model. With the guidance of the early literacy research and our own research on the importance of quality interactions, the next step for CIRCLE was to develop and help implement a model of professional development for early childhood teachers. In this model, teachers were seen as a critical source of stimulation for young children's cognitive, language, and social/emotional development. The goals of the model included assisting teachers in including classroom experiences that placed a strong focus on teaching a broad range of early literacy skills, including a strong foundation of language. In developing this program we identified, through interviews with teachers and program coordinators, a number of obstacles for achieving this goal. These included a tradition in professional development practices for using large, one dose training formats with no in-classroom support, the lack of focus on a specific set of skills, didactic formats without opportunities to practice, and limited attempts for "buy in" from all levels of agency staff. Most importantly, professional development rarely included strong evaluation

components. In order to address these obstacles, the state legislators allocated funding for a 2-year grant program and have since approved this as a yearly budget item for the next biennium. The development of state prekindergarten guidelines also assisted with this goal. Before scaling this program to serve large numbers of teachers it was piloted in both a small and moderate program and results showed strong increases in children's language and literacy skills across the year.

The project scope then increased to include 20 Head Start programs with 500 target teachers who participated in the professional development model, and 210 comparison teachers who received the "typical" training and support. Approximately 8,000 children were in target teacher classrooms. Fifty-five percent of the programs are in free standing Head Start agencies while 45% are programs within public school districts. The programs are located throughout Texas with 60% located in urban areas and 40% in rural settings. Target and comparison teachers were similar in that they represent a broad range of ethnicities (approximately 35% Hispanic, 30% African American, 25% Caucasian, 2% other) and level of teacher training (5% high school diploma, 40% child development associate certification, 15% 2-year college associate degree, 35% bachelor degree, and 5% master's degree). The language of instruction for the majority of the classrooms (80%) was English. Children in target and control classrooms also represented diverse ethnicities; 60% Hispanic, 20% African American, 18% Caucasian, and 2% other. This second year of a 2 year project, an additional 300 teachers have received training in the program.

We began the training program with a 3-day workshop to inform and problem-solve with program administrators, coordinators, and mentor teachers. As a key component of our model is ongoing, weekly in-classroom coaching for targeted teachers, this workshop focused on the training of side by side coaching skills and effective ways to give feedback to teachers regarding how to implement change in specific teaching skills. To assist mentors and classroom teachers in identifying targeted areas for change, we developed a teacher observation checklist that was used to guide mentoring and provided information for the evaluation of our model.

Teachers were trained in 4-day, small group, interactive workshops on specific ways to teach early literacy skills including language. They received in-depth information on separate literacy and language domains, including practice in developing and integrating literacy activities such as story extenders, literacy in all centers, "make it/take it" activities, phonological awareness games, and practice in conducting effective read alouds. Teachers also spent time developing lesson plans with literacy objectives and role playing activities related to these lesson plans. The content of these workshops included 2-hour sessions on the following: 1) the six key essential responsive teaching practices, 2) language enrichment (i.e., "scaffolding" throughout the day, encouraging children to use their language), 3) doing effective read alouds, 4) print & book awareness, 5) motivation to read, 6) phonological awareness, 7) letter knowledge & early word recognition, and 8) written expression. Some examples of activities the teachers were involved with included working in small groups with selected books and picture cards to develop open-ended questions that would encourage more complex language usage from the children. They also learned and role played a broad range of phonological activities including rhyming games, alliteration, and sound blending activities. The training also assists teachers in learning the importance of building new cognitive concepts for children by integrating these learning goals across a variety of exciting and engaging activities. As children experience repeated experiences with a new concept (i.e., new vocabulary words) in a variety of planful learning activities they learn more effectively.

Once the initial training workshops were completed prior to the start of the school year, all targeted teachers received, weekly, 1-hour in-class coaching with follow-up "grows & glows"

meetings concerning their progress. Classroom mentors and program coordinators attended monthly full day training meetings across September through May conducted by CIRCLE training staff. At these monthly training programs, mentors received in-depth training on how to coach early literacy areas and problem solving regarding how to implement change with all types of teachers. Reliability checks were conducted on the teacher observation checklist through the use of coaching videos of classroom situations. Additionally, site visits were conducted by CIRCLE staff twice per year. Let's watch a brief video showing how this training looked and how teachers who received this training carried out these activities in their prekindergarten classrooms.

Our model evaluation included pre and post testing for a random sample of 3500 children in target and comparison classrooms. The teacher behavior checklist included the following areas: use of literacy related activities, environment and portfolios of literacy skills, responsive teaching practices, team teaching, effective book reading, and oral language use. This was collected on a monthly basis and used to measure teacher change in target and comparison classrooms. The following tests were administered to the children in early fall and late spring: Peabody Picture Vocabulary Test, Expressive Vocabulary Test, Preschool Language Scale, Developing Skills Checklist subtests for print concepts, letter knowledge, and phonological awareness.

When we looked at results from our large program, we found target teachers made significantly greater gains than comparison teachers in all areas with average gains of about .75 on a five point scale on oral language, literacy activities, team teaching, and best practice subscales. Conducting effective book reads showed the most dramatic change of about 1.5 points.

A comparison of the first year pre test results for the large program of target and comparison children's skills revealed similar levels in language and literacy domains. Across both groups of children, early literacy skills, on average were in the 20% range. Children's one-word language skills were, overall, in the low average range and in the high 70's for more complex language understanding and use. Thus, the pre test results clearly demonstrated the need for quality programs to better assure school readiness.

Midpoint in this demonstration project we find that approximately 65% of the programs are showing positive gains in the language and/or literacy areas. Seven programs showed the strongest gains with both language and literacy areas improving to a greater extent in the target vs. control children. Six additional programs showed moderate gains for target vs. control children in language and literacy areas. A strength of this project is the opportunity to work with the teachers in the programs for 2 full years. At the end of this first year, we are able to learn more about why some programs are showing stronger gains than others. This will be used to help guide our training and support for the programs that are having more difficulty in demonstrating strong gains in children's cognitive skills.

We plan to carefully examine a large number of factors that may moderate or mediate changes in our programs. However at this point, there are a number of factors that do not appear to strongly explain variability in outcomes across the 20 programs. Whether programs are in public school systems or not, urban vs. rural setting, large vs. small programs, and the child's home language do not appear strongly related to programs' outcomes. Factors that seem to be potentially important include the rigor with which the program was implemented, including assuring that mentors had adequate time to work with teachers on a weekly basis and had the expertise to carry out this complex set of skills. The use of a specific language and literacy curriculum also predicted better success. This program has now been incorporated in Head Start programs in Maryland, Ohio, and California and will be in used in a trainer of trainers model with over 2,500 Head Start

literacy trainers this summer across the United States.

Implementation of this program has helped us understand that side by side coaching is a critically important component for professional development. Also, while teachers need to be encouraged to be creative, training needs to be step by step and include many "how to's". While it involves additional time investment, it is critical to work with all levels of program staff to achieve "buy in" and facilitate change. Our results demonstrate that with a systematic approach, teachers can be supported to teach young children cognitive skills and that this can occur for large numbers of programs that vary greatly in teacher and child characteristics. Most importantly, children's cognitive development can be supported in ways that are responsive to a broad range of other abilities including reasoning skills, social competence, and emotional health.

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Last Updated, August 1, 2001 (pik)