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**Research to Improve the Social and Academic Achievement of Children and Youth in an  
Urban, Poverty Neighborhood: A Personal Perspective**

Pathways to Literacy Achievement for High Poverty Children: Ready to Learn Group

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### *Introduction*

My program of research has been primarily problem driven by a strong focus on improving the social and academic achievements of children and youth in an urban, poverty community of Kansas City, KS. This work has been guided by the mission of the Juniper Gardens Children's Project (JGCP), a 43-year collaboration between faculty of the University of Kansas and residents of the Northeast Kansas City, KS neighborhoods<sup>1</sup>. The JGCP is one of twelve centers in the Kansas University Schiefelbusch Institute for Life Span Studies. The project has operated uninterrupted since 1964, and my work there began in the winter of 1978 when I accepted a position as a young Research Associate. I am currently the director of the JGCP, and with my 13 faculty colleagues, we operate collaborative research projects funded by the USDE, NIH, and ACYF that seek to intervene to promote the language, literacy, and social-emotional proficiency of area children and youth. This focus is broad ranging from early childhood, to middle childhood, to adolescence and young adult. The work has been interdisciplinary targeting the risks and effects of poverty intersected with disability including learning disabilities, mental retardation, and social-emotional behavior disorders (SBD) among other disability conditions embraced by the fields of early intervention, special education, general education, human development, and child psychology (Greenwood, 1999).

Since the beginning, the work has taken an empirical, experimental approach to testing potential solutions to the social-behavioral and academic achievement problems of area youth in local child care, preschools, and public schools. The JGCP effort has always been about development and evaluation of the efficacy/effectiveness of interventions intended for implementation by teachers, parents, and peers in classrooms and homes – in the natural conditions of the community. Thus, interventions are designed that are intended to be mediated

by local persons (teachers, peers, parents, etc.) supported by manuals and training; and over time, by addition of computer technology and media including software, multimedia, websites, and educational media/TV.

Complementary goals at JGCP have been: (a) to develop practical but rigorous forms of measurement for examining environmental risk conditions, fidelity of intervention implementation, and monitoring of individual child progress over time; (b) to disseminate and scale up the use of effective intervention practice; and (c) to provide a context for the mentoring doctoral and post-doctoral researchers and their research agendas. In pursuit of these goals, the research has developed and validated new measurement approaches, used them to examine the affects of problem conditions (i.e., risk) and their effects, and developed and refined evidence-based intervention practices (see Figure 1) (Greenwood, 2003).<sup>1</sup>

Insert Figure 1 About Here

The common thread running through this work has been the integration of descriptive and experimental research at the level of concept and empirical data such that the focus of intervention development has been on changing alterable variables as potential solutions with clinical and social significance (Greenwood, Hart, Walker, & Risley, 1994). The theoretical perspective reflected in this work has been ecological-interaction-developmental wherein one's proficiency in reading, for example, is shaped by one's personal contexts of family, school, and friends; and one's learning contexts are mutually influenced by one's increasingly proficient or deficient reading skills (i.e., social-behavioral and/or academic) in school over time. In this framework, interventions are contextual factors designed to influence skill development in socially desired ways. The purpose of this paper is to provide a brief synthesis of this work given space limitations. In undertaking this task, it was clear that my research spanning the domains in

Figure was been integrative, hypothesis generating, hypothesis testing, and programmatic in nature. To be empirical required that measurement instruments be developed that were sensitive to ecological-interactional constructs and variables associated with risks and problem conditions (i.e., poverty), and that these measures also could be shown sensitive to intervention effects. An additional requirement of the validity of instruments was that the constructs and variables be measured reliably reflecting what persons (e.g., children, students, teachers, and parents) actually did in natural settings and not what they reported they did. Thus, instrument development focused on quantifying what participants were doing through direct observation, testing, and/or the analysis of products of their behavior. To be ecological-interactional, these instruments needed to include objective indices of the actual features of children's environments (e.g., ecological contexts) to address research questions about the structure of real situations as well as their function, that is, the child/student responding in these situations. Examples of research validating such measures are briefly presented below, followed next by findings from key studies using these measures to examine problem conditions and their effects both with and without interventions. In the final section, findings from these areas are pulled together and implications discussed.

### ***Ecological-Interaction Measurement Research***

Two specific examples of a range of measures developed and validated for use in my program of research and that of close colleagues are presented. One reflects research on language learning in the homes of very young children, birth to 36 months of age, and one reflects research on instruction and student learning in early elementary school classrooms. While clearly different in content assessed, both measures were similar in ecological-interaction theory and method (objective, direct observation).

*Measuring the Home Language Learning Environment (Hart & Risley Code)*. The Hart & Risley Code was designed to measure individual children's growth in learning to talk as well as the child's language environment consisting of parents, siblings, and friends talk (a) heard by the child in the home and (b) addressed directly to the child (Hart & Risley, 1989). Using 1980's state of art technology, monthly 1-hour long audio tape recordings were made of each language learner and the talk addressed to them in the home (Hart & Risley, 1995). In addition to the audio recording, an observation coding scheme was implemented during the hour in which the audio recording was made. The audio recordings were transcribed, entered for computer analysis, and coded linguistically. Additionally, the coded ecological variable information was entered in temporal relationship with the home language data so that descriptive information about the child's language environment, parent language, and child talk were available, as well as conditional analyses of the data (e.g., number of initiations, turns, and contingencies between child and parent talk, etc). Because the data were collected by trained observers and transcribers, measures of interobserver agreement and score reliability were conducted and reported (see Hart & Risley, 1995).

The number of indicators available from this instrument were extensive (Hart & Risley, 1999, Appendix B, pg 269). A selected few included: For the child – (words, babble, nonverbal behaviors), For the parent (words, pick-up/put down child, etc), For parent and child –linguistic codes for what they said (noun, verb, clauses, tenses, functions, etc.), and For the home language environment (the speaker [parent, child other child, etc.], routine care, games and books, unstructured activities, etc). The technical validity features of the code included indices of interobserver agreement, construct validity, and predictive validity (Hart & Risley, 1992, 1995;

Walker, Greenwood, Hart, & Carta, 1994). The Hart & Risley Code was subsequently adapted for use on notebook computers (see Table 1).

Insert Table 1 About Here

*Measuring the classroom instructional environment (CISSAR Code and variations).* A similar direct observation measures was developed for study of students response to instruction in elementary school classrooms (Greenwood & Delquadri, 1988; Greenwood, Schulte, Dinwiddie, Kohler, & Carta, 1986)<sup>3</sup>. The Code for Instructional Structure and Student Academic Response (CISSAR) was designed to measure theoretical features of the classroom environment (e.g., subject matter, task, grouping, etc.; teacher behavior relative the child being observed (e.g., teaching, no response, etc.); and student behavior, including active academic responding (e.g., reading aloud, silent reading, writing, etc.), passive attending (looking at the teacher, raising hand), and problem behavior (e.g., inappropriate locale, disrupting, etc.). CISSAR was subsequently adapted specifically for the quantification of instruction in special education settings (Kamps, Greenwood, & Leonard, 1991), in preschool settings (Carta, Greenwood, & Robinson, 1987), and in program settings serving English Language Learners (ELL) (Arreaga-Mayer, Carta, & Tapia, 1994).

With all of these instruments, observers collected data relative to a single focal student using sequential momentary sampling paced by brief time intervals (Greenwood, Carta, & Dawson, 2000). Single students, rather than the groups of students were observed to generate hypotheses regarding the experiences provided individuals and their response to them. At the end of the first 10 second interval, classroom ecology was recorded; at the end of the second interval, teacher behavior was recorded; and at the end of the 3<sup>rd</sup> interval, the student's behavior was recorded. This sequence was repeated continuing systematically over the entire period of

observation that varied in duration based on study design and purpose of the research (e.g., Greenwood, 1991a; Greenwood, Abbott, & Tapia, 2003) (see Table 1). The technical adequacy of all of the CISSAR (and its spin-offs) include controlling software for notebook computers; and interobserver agreement, score reliability; and construct, criterion, and predictive validity (Greenwood, Horton, & Utley, 2002).

### ***Risk and Problem Conditions***

How poverty affects the personal environments in which children grow in their learning of language and early literacy skills is of keen interest to researchers interesting in improving the social and academic outcomes of young children (e.g., Whitehurst, 1996). Two areas of investigation are of particular interest. The first in terms of school readiness, and latter in terms of instructional effectiveness in elementary school.

*How differences in home poverty contexts affected children's early language learning and subsequent achievement in elementary school.* Results of Hart & Risley's longitudinal investigation of 42 young children starting at 7 months of age, learning to talk at home produced ground breaking results.

*"A University of Kansas study in the early 1980s reached the breathtaking conclusion that 3-year olds with professional parents use more advanced vocabularies than mothers on welfare--to say nothing of the 3-year-olds of those mothers. These children lack the kind of environment we just presume most kids will be exposed to, says Isabel V. Sawhill, Senior Fellow at the Brookings Institution" (Business Week, August 26, 2002, an article "The Importance of Teaching Tots"*

Children and families in three different family SES groups (i.e., welfare, vs. blue collar, vs. professional) were studied longitudinally using the Hart & Risley Code to record monthly, 1

hour observations in the home for 2.5 years, Hart & Risley (1995) reported that low-SES, welfare parents talked to their child less than did blue collar parents who talked less than their child than did professional parents. These differences included talk heard by the child, as well as talk addressed directly to the child by their parents. In the case of language addressed to the children, parents in poverty talked to their child 2.5 times less per hour per day than children in professional parent families (197 [welfare parents] vs. 482 words per hour [professional parents]). In cumulative terms over a 2.5 years time span, welfare parents addressed on the order of 9 million words to their children compared to 35 million by professional parents. Many more meaningful differences favoring the children in professional families were documented including number of interactions, questions asked, instances of direct teaching, familiarity with unusual words, standard pronunciation, complex syntax, and fewer prohibitions.

Stunning were the large differences in the cumulative amount of talk parents addressed to their child. And, equally stunning were the large differences in the children's spoken vocabulary development. Children whose parents addressed more language to them by 36 months of age had acquired and used significantly more vocabulary in their talk by 36 months of age. And, their monthly vocabulary growth trajectories accelerated faster and steeper. Follow-along investigation of these children as they experienced the first few grades of elementary school produced direct implications of spoken vocabulary proficiency, IQ, school readiness, and achievement in basic academic skills in kindergarten and the early elementary grades (Greenwood, Hart et al., 1994). Children from low-SES families at 36 months were lower in receptive vocabulary on the PPTV, and not ready for school by kindergarten; and significantly lower performing in basic academic skills by the end of 1<sup>st</sup> grade.



In summary, this work identified potentially alterable problem conditions in the earliest learning environments of low-SES children with respect to spoken vocabulary growth and language development. Spoken vocabulary is precursor to early literacy, school readiness at kindergarten, and a proxy for verbal IQ (Whitehurst & Lonigan, 2001). The work suggests potentially alterable mechanisms by which parent interventions focused on talking more frequently and differently may lead to accelerated outcomes for children reared in low-SES and under-educated families.

*How poverty related differences in classroom instruction affected students' engagement in active, academic responding and achievement.* Results of similar longitudinal descriptive research on the instruction received by low- vs. high-SES students in the elementary grades also produced intriguing large differences in how students were taught basic academic skills in reading, language, and arithmetic and students' time spent engaged in active academic responding. Like Hart & Risley, differences also suggested alterable variables that might lead to more accelerated growth in achievement for low-SES students. Our initial search for meaningful differences in how low-SES students were taught in school and responded to instruction was based on informal observations in inner-city elementary classrooms. For example, we reported that reading instruction was often not held for the entire time it was scheduled, that teacher's lectured predominately with students expected to sit and listen, that the lowest group in reading often met for less rather than more time supervised instruction, and that students' typical response to teacher-led instruction was passive attention with infrequent examples of academic responding (Greenwood, Carta, Hart, Thurston, & Hall, 1989; Greenwood, Delquadri, & Hall, 1984).

Subsequent research using the CISSAR observation system to sought to compare

classroom instruction and student response in low- versus high SES schools tended to confirm these anecdotal observations. From an initial study comparing schools divergent in SES (title 1 vs. nontitle 1 schools) at the 4<sup>th</sup> grade, we reported finding statistically significant differences in students' performance in standardized tests of basic skills. While this difference in mean achievement was expected, more intriguing were similar differences in how students were taught and students' engagement in academic responding. Fourth graders in low-SES schools were more frequently taught by teachers who lectured using the chalkboard or overhead projector, whereas teachers in high-SES schools combined lectures with more small group and independent seat work activities with students assigned to complete work (Stanley & Greenwood, 1983). Students in low-SES classrooms response to instruction was significantly less engagement in active academic responding, or 12 minutes less per day than did their counterparts in higher-SES schools (Non-Title 1). These findings were based on CISSAR observations that spanned all subject matter instruction over an entire school day (Greenwood, Delquadri, & Hall, 1984).

These findings of both instructional and student response differences were replicated in a second study of students in low vs. high SES schools. By October of first grade, students in low-SES schools were 0.3 grade levels lower than their high-SES peers. This gap grew to 3.5 grade levels by the end of 6<sup>th</sup> grade. And as in the earlier 4<sup>th</sup> grade study, a gap also existed in students' engagement in active academic responding. Low-SES students engaged in academic responding an average of 6 minutes per day less than did high-SES peers. Cumulatively over all of elementary schooling (grades K-5), this grows to 364 hours less - based on the 6-minute daily gap, reflecting substantially different functional histories of using and displaying academic behavior in response to instruction in elementary school (Greenwood, Hart et al., 1994).

Like the Hart & Risley work in the home, this work on classroom instruction and students

response to it in low-SES schools revealed meaningful differences in both instruction and students' response relative to high-SES schools (Greenwood, Hart et al., 1994) that included an ever widening gap in achievement by end of 6<sup>th</sup> grade. Collectively, these findings seemed to reveal poverty induced mechanisms in terms of what parents and teachers know (vocabulary and instructional practice) and how they interacted with children and students in ways different from those in non-poverty home and school environments. These differences parenting and teaching differences put low-SES children on a trajectory of lower language proficiency from birth to 3 years of age associated with lower IQ and lower receptive language skill, and lower achievement beginning 1<sup>st</sup> grade through 6<sup>th</sup> grade gap widening to more than 3 grade levels by end of 6<sup>th</sup> grade and 364 hours less cumulative engagement in academic responding.

These findings in more recent years have been at the national forefront in the effort to improve the home language and early literacy environments to alter rates of growth and proficiency in advance of school entry in kindergarten and early preschool and elementary school environments (Shonkoff & Phillips, 2000; Shore, 1997; Thompson, 1995). In particular, initiatives to influence parents reading to their young children at home (e.g., Parents as Teachers), and to employ educational television to teach the precursors of reading including "Between the Lions", and innovative research efforts to employ TV to boost home literacy in at risk, low-SES families have been framed around this earlier work. It also has lead to personal efforts to employ the primary messages from the Hart & Risley work in advice to parents, which was "you need to talk more and longer to your language learning child" (Raspberry, 2003, August, 2003, November). To date, replications of Hart & Risley's work have been hampered because of tremendous costs associated with transcription of language samples and to code them. Future innovations, for example, using advanced speech recognition software tools for this

purpose are needed. These findings also lead to the hypothesis that elementary school instruction that systematically improved low-SES schools daily engagement in active academic responding, and that also were acceptable and sustainable by teachers, might accelerate students' subject matter learning.

### ***Research on Instructional Intervention and Prevention Techniques***

*Together We Can!: ClassWide Peer Tutoring for Basic Academic Skills (CWPT)* was developed to test this hypothesis (Greenwood, Delquadri, & Hall, 1989; Greenwood, Terry, Utley, Montagna, & Walker, 1993). A peer tutoring instructional strategy for testing this hypothesis experimentally was first suggested by informal observations that even 1<sup>st</sup>-3<sup>rd</sup> grade students who had failed to respond to teacher-led classroom instruction, were able to make rapid and sustained progress learning to read when taught one-on-one by a highly qualified tutor outside of the classroom (Delquadri, 1978). It also was obvious that students who were tutored responded favorably to one-on-one teaching by interacting and responding to the tutor's prompts and corrections. The development of CWPT became a search for a cheap but effective, sustainable, and acceptable approach to providing such instruction for students in low-SES schools (Greenwood, Maheady, & Delquadri, 2002b).

Work focused on how peer tutoring might be used classwide for a daily portion of subject matter instruction in reading including spelling and math. These key principles guided its design: (a) application in the general education classroom with all students participating (Class-wide), (b) explicit strategies for including English Language Learners (ELL) and students with disabilities (instructional strategies), (c) maximum adaptability to local curricula to promote acceptability (integration with existing curricula and policies), and therefore, its scalability and sustainability, and eventually (d) use of computer software to support continuous progress

monitoring and teacher implementation.

CWPT has subsequently become known as a Peer Assisted Learning Strategy (PALS). The *core reading process* involves daily 35-45 minute sessions wherein half the students in a classroom tutor and supervise the reading of the other half. After 15 minutes of tutoring, the teacher signals the tutor and tutee dyads (one triad if unequal number of students) to stop and trade roles. In the next 15 minutes, the tutors become tutees, and vice versa for a second tutoring round on the same material. Because the primary goal of CWPT is to accelerate intensity (i.e., engagement and volume of responding of all students in the material), its immediate effects on reading are in terms of accuracy, fluency, and comprehension of the material.

In Reading CWPT, daily sessions typically occur three or more times per week in coordination with teacher-led instruction in which background knowledge is activated, new material introduced, and students read to the teacher as determined by the adopted curriculum, with formative evaluation of progress. Teacher planning and design decisions shape the core process that include flexible methods of peer pairing, curriculum, and peer teaching strategies. Tutor and tutee pairs change weekly or with every new unit of reading material to avoid the negative effects such as boredom and the stigma of always being the one tutored and never the tutor. Partners are assigned by the teacher, typically paired from among members of the same or adjacent reading groups. To include the lowest performing students, teachers pair higher with lower functioning students. Some additional strategies include having the high performing student read first as a model for the lower performing student. These and other decisions are all made privately by the teacher as part of his/her weekly planning.

CWPT is adaptable with respect to integration with local curricula making it readily scalable. At the elementary level, CWPT is integrated to create a comprehensive reading

program for grades 1-5, focused on science-based beginning reading skills, fluency, and reading comprehension. Combined with teacher-led instruction and aligned peer-teaching materials, CWPT may be used to scaffold phonemic activities, word, vocabulary, spelling, passage reading accuracy/fluency, and retell reading comprehension as appropriate before and after third grade. CWPT also is used for literature-based activities when peer tutors are guided by teacher-developed study guides (Greenwood, Hou-Reynolds, Abbott, & Tapia, in press; Greenwood & Hou, 2001).

For example, *when applied to phonemes or letter names*, CWPT tutees say the sounds or letter name associated with the flashcard item presented by the tutor. The Beginning Reading - CWPT curricula and teacher support software is comprised of 16 science-based skill modules that can be selected and flexibly used by teachers for initial instruction and reused for review and refresher sessions<sup>4</sup>. Each of the modules is supported by computer software for creating visual/picture flashcards specific to each module for use in the peer tutoring sessions.

The flashcards are planned by the teacher and supplied by the Beginning Reading CWPT software (Terry & Greenwood, 2004). The tutor provides correction and tallies the tutee's responding using points. *When applied to word and passage reading*, tutees read brief passages from the curriculum to their tutor. The tutor provides points for correctly read sentences and error correction. Teachers assess the fluency of the students' reading using oral reading rate measures. *When applied to comprehension*, the tutee responds to who, what, when, where, and why questions (and/or other comprehension promoting tasks) concerning the passage, provided by the tutor. They may also respond to prediction and other questions. The tutor corrects responses and provides feedback using materials and their own knowledge. *When applied to*

*advanced subject matter* (e.g., literature, science, etc.), peer teaching is guided by study guides (Greenwood & Hou, 2001).

Adaptations of the curricula can be made to include individual students with disabilities or ELL, including variations in content, tasks and materials, and behavioral supports inclusion of paraprofessionals in the tutoring process as translators or for assistance. For example, in CWPT program in integrated classrooms, students with autism and behavioral disabilities also earned points for appropriate social interactions such as offering help and sharing information (Kamps, Leonard, Potucek, & Garrison-Harrell, 1995). For example, a child with a hearing impairment and his/her paraprofessional participate in CWPT with a nondisabled peer tutor, wherein the paraprofessional provides sign language translation. A somewhat similar translation strategy applies with ELL.

For example, the teacher of ELL may use another student in the classroom to help introduce the spelling or vocabulary to all students to the entire class in the second language, in addition to having the items presented in writing and/or in combination with pictures. For passage reading, a non-English or limited English speaker can be paired with a more fluent bilingual speaker to assist with pronunciation and comprehension of text (Arreaga-Mayer, 1998b).

### ***Effectiveness of CWPT***

Initial work developing CWPT used single-subject research designs to demonstrate efficacy and to examine some essential components (see Greenwood, 1996 for a review). The effectiveness of CWPT was established in a randomized trial and follow-along study of 12 years duration. In this experimental study, teachers were the implementers of the CWPT in beginning in 1<sup>st</sup> grade. In subsequent grades, up grade teachers implemented CWPT so that students

received a prospective exposure beginning in grade 1 continuing through their 4<sup>th</sup> grade year. Follow-along measures were obtained for students in middle- and high-school (Greenwood, Maheady, & Delquadri, 2002a). Contrasted in the design were the following: Instruction (CWPT integrated into the teacher-led curriculum versus teacher-led instruction as usual without CWPT) and School SES (low SES [Title 1] vs. upper SES (non-Title 1). Low- SES, Title 1 schools were randomly assigned to (a) use CWPT in daily reading, spelling and math instruction for 90 minutes per day (30 minutes per session daily, four days per week) or to (b) continue convention instruction without peer tutoring components. Upper SES schools (Non-Title 1) schools in the same inner-city school district served as another non-treatment comparison group by using the same curricula and conventional teacher-led instruction according to district policies.

Results indicated that CWPT used progressively over grades 1-4 in low-SES schools significantly (a) improved students' classroom engagement during instruction and reduced socially inappropriate classroom behavior; and (b) accelerated reading, language, and mathematics performance on standardized tests compared to both the low-and mid-high SES comparison groups (Greenwood, 1991a, 1991b; Greenwood, Delquadri et al., 1989). We also reported that low-SES CWPT students at 4<sup>th</sup> grade were not significantly different in achievement adjusted for initial ability (1<sup>st</sup> grade pretest and IQ) and achievement from the mid-high SES comparison group students. It appeared that the CWPT group had closed the achievement gap existing between groups at 1<sup>st</sup> grade by the end of 4<sup>th</sup> grade.

These accelerated effects *in elementary school* for low-SES CWPT group students compared to mid-high-SES controls were (a) associated with higher achievement outcomes in reading, language, math, social studies, and science, and (b) lower use of special services *in middle school* (Greenwood et al., 1993). *In high school*, the low-SES CWPT, group was



significantly less likely compared to the low-SES control group to drop out of school (Greenwood, 1996a; Greenwood & Delquadri, 1995).

Effect sizes between low-SES CWPT versus the low-SES no-treatment group averaged .72, ranging from .37 (Math), to .57 (Reading), to -.83 (a reduction in Inappropriate Behavior), to 1.41 (Academic Engagement) in the original elementary school study. Using Cohen's (1988) criteria these effects are moderate to large in educational significance. At the middle school follow-up, the average effect size was .44 (a moderate effect), ranging from .35 (Language), to .39 (Reading), to .57 (Math) on achievement test measures. The effect size for reduction in special education services between groups was .54; the proportion of students served in less restrictive services compared to controls was .73. The effect size for reduction in the number of students who were high school dropouts was .66. To my knowledge, these studies are the only ones in the literature reporting later life outcomes of PALS interventions.

To date, PALs interventions based largely on CWPT procedures have been evaluated across a range of subject matter including reading, students, and elementary classroom settings. In a recent synthesis ( $N = 90$  group comparative studies in elementary school), Rohrbeck et al. (2003) reported that: The average effect size for PAL was .59, a moderate effect size overall (59% of PAL group students exceeded the achievement of non-PAL group students). Students in urban, low income, and minority status experienced larger gains than students from suburban, middle to high income backgrounds. Younger students experienced larger gains in achievement than older students. Greater academic effects were produced by programs wherein students controlled more of the PAL procedures including: goal setting, students prepared to use guiding tutoring roles, monitoring of progress, evaluating performance, reward selection, and reward administration. PAL programs that included *individualized* compared to *group* evaluation

procedures were associated with larger outcomes. PAL programs wherein *interdependent* reward contingencies, rather than *individualized* or *group* contingencies produced greater achievement. Thus, strong evidence exists that it is possible to accelerate the learning of students' poverty schools including preventing the number of children needing special education services for reading problems when students are taught to play the roles of both teacher and learner, progress is monitored frequently, and contingencies of reinforcement for performance are used.

How this knowledge of the risk mechanisms and interventions capable of accelerating the language and literacy of children in poverty has taken a number of other directions since this early work including educational TV, science-base reading curricular, and school-wide 3 tiered models of reading and behavior prevention.

### ***Educational TV and Early Literacy***

*Between the Lions (BTL)*. TV offers a powerful way to serve the literacy needs of children in poverty whose personal educational resources are limited in terms of parent education and books and literature in the home, for example. TV holds promise because of the quality of instruction that can be produced. And, even in the presence of few literacy resources in poverty homes, 99% of all U.S. homes have a television set (Mielke, 1994; Statistical Abstracts, 2000, p. 126) making it possible to delivery instruction to children at scale. Building on their success teaching preschoolers school readiness via television (i.e., *Sesame Street*), producers in collaboration with leading reading experts created a new television program for young children, *Between the Lions (BTL)*, that incorporates science-based early literacy skills (Strickland & Rath, 2000, August). *BTL* presents children with an environment and experiences known to foster emergent literacy.

This series was created with the intent of teaching young children important emergent literacy skills (Whitehurst & Lonigan, 1998, p. 894). These experiences focus on both holistic processes (e.g., understanding different reading/writing contexts, prior knowledge, motivation) as well as direct instruction comprised of visual and auditory stimuli (e.g., print on screen with changing initial/final consonants) that have been specifically designed to teach concepts of print, the alphabetic principle, phonemic awareness, and letter-sound correspondences.

In a test of the effectiveness of *BTL* in a randomized trial, 17 one-half hour episodes from the first season of the new series were used (Linebarger, 2000, June; Linebarger, Kosanic, Greenwood, & Doku, 2003)<sup>3</sup>. Participants in this first randomized trial were 164 Kindergarten and 1<sup>st</sup> grade students. These children were recruited from classrooms in 3 elementary schools in the greater Kansas City metropolitan area. Eighty-one percent of the children were European American, 7% were Hispanic, 6% were African American, and 6% were from other backgrounds. Thirty-six percent of the families reported incomes below \$30,000; 28% reported incomes between \$30,000 and \$45,000; and 36% reported incomes above \$45,000. Eight percent of the children had an identified disability.

Randomized experimental viewing groups of Kindergarten and 1<sup>st</sup> grade children watched one *BTL* episode each day. The viewing group watched the program in their classrooms in the afternoon during their computer free time from the end of February through the beginning of April with days off for spring break and district-scheduled vacation days. Children in the control group continued their usual instruction and schedule during the viewing phase.

Analyses controlled for the effects of initial differences at pretest, family SES, and home literacy experiences. The most prominent finding was improvement in the emergent literacy skills for kindergarten children who watched *BTL*. These improvements were moderated by the

child's reading risk status. Significantly higher word recognition and *Test of Early Reading Ability* scores were achieved for *BTL* viewers compared to non-viewers (Cohen's *d* effect sizes ranged from .46 to .91, averaging .70). Additionally, higher means and accelerated slopes for *BTL* viewers were noted for phonemic awareness and letter-sound tasks (accounting for 58% and 47% of the variance in the intercept and 36% and 0% of the variance in the slope, respectively). Children who were most at-risk for reading failure improved on concepts of print tasks (first graders) and word recognition tasks (both K and 1<sup>st</sup> graders). Given that television represents universally available technology for reaching all children, having children view a program like *BTL* should help a significant portion of students by extending early literacy instruction, reinforcing, and motivating children within the home and in the classroom.

With confirmation of the ability of the program by itself to support children's acquisition of early literacy skills, the creators of the program decided to develop instructional materials to accompany the program's curriculum and involve educators in the learning process. A demonstration project was funded to evaluate whether or not these instructional materials in combination with viewing the program could further support children's literacy skill development. The Mississippi Literacy Initiative was created and delivered in preschool kindergarten, and first grade classrooms in two different contexts: the Choctaw Indian Reservation and the Delta region of the state. Teachers showed the students two half-hour *Between the Lions* episodes each week and received training in how to use a set of related children's books and resources along with the series to help teach reading. In a school-year-long evaluation, researchers reported improvements in basic early literacy skills for both populations (Prince, Grace, Linebarger Atkinson, & Huffman, 2002). *BTL* replication and effectiveness trials are in progress (Annenberg School for Communication of the University of Pennsylvania, 2001),

most notably one involving an American Indian Head Start Initiative involving 12 different tribes in the southwestern USA with both home and Head Start components.

### ***Science-based Reading Curricula and School-Wide 3-Tier Prevention Models***

Continuing to examine problem conditions in poverty schools, a recent line of work examined features of the reading curriculum associated with students' progress learning to read. Science-based reading curricula offer advantages to the early reading instruction of students in poverty schools because what, when, and how it is taught is based on study designs capable of generating causal results that are rigorous and believable. However, whether or not students in real poverty schools actually make differential progress learning to read in curricula with or without science-based curricula is not clear. To investigate this issue locally in Kansas City Metro schools, we were able to examine and compare students' growth in early literacy skills in 5 poverty elementary schools serving similar student populations using curricula that varied in scientific basis (Kamps et al., 2003). Beginning in grades K, 1, and 2, students' with parental permission in these 5 schools were tracked Fall, Winter, and Spring using the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) over the next 3 years. The curricula used in this schools were: (a) literature based (Schools 1, 2, and 5), (b) Success for All (School 4), and (c) Reading Mastery (School 3). Compared to the literature-based curricula, both Success for All and Reading Mastery included a greater number of science-based components including the skills taught (e.g., phonemic awareness) with explicit rather an implicit instruction strategies. Teaching science-based reading skills ensures students are proficient with the precursors needed to be successful readers. Instruction becomes intensive and explicit, wherein when all steps are taught directly (Mathes, Torgesen, Allen, & Howard Allor, 2002), as compared to implicit instruction wherein many students simply don't learn the skills that teachers do not teach.

Results indicated that students' growth in DIBELS (i.e., lettering naming fluency, nonsense word fluency, and oral reading fluency) was differentially influenced by the school's reading curriculum. In fact, students in the same grades in the Reading Mastery and Success for All made significantly greater progress learning to read (i.e., rate of growth over time and endpoint scores) as indicated by all three measures (i.e., letters, nonsense word, and oral reading fluencies) than did the literature-based curricula. And, Reading Mastery out-performed Success for All (Kamps et al., 2003). These findings for Reading Mastery were consistent with findings previously reported (Foorman, Francis, Fletcher, & Schatschneider, 1998). We also reported that students in the study with one or more risk factors at start (academic and/or behavioral risk) also made greater progress over time in the Reading Mastery curricula compared to the other two.

These findings based on students' response to the reading curriculum as indicated by progress monitoring using DIBELS led to current work testing the effectiveness of a school-wide, 3 tiered model of Reading and Behavior Prevention as an effective and sustainable means of improving the environment and outcomes of students attending schools in poverty (Kamps & Greenwood, 2006, February). Based on universal and frequent screening and progress monitoring, the 3 tiers are used to individualize and intensify instructional interventions in support of key skills. The 3 tiers are primary, secondary, and tertiary. All students receive the primary level. In this case in reading, science-based reading curriculum is used for all children attending, including struggling readers and students with disabilities. These procedures were supported by experimental studies of effective reading instruction (e.g., Foorman et al., 1998) and that of our own just reviewed.

What we know is that schools choosing not to employ a science-based reading curricula will be faced year to year with increasing numbers of children struggling to learn to reading and

qualifying for special education services to learn to read compared to schools using science-based curricula. Without appropriate change in reading instruction, struggling readers do not make progress on their own (Chard & Kameenui, 2000; Juel, 1988; Kamps et al., 1989). From a prevention perspective, use of a science-based reading curriculum as “primary or universal intervention” is a first step in improving the instructional environment of children in poverty schools, improving student outcomes, and reducing the subpopulation of struggling readers and students with reading disabilities (Kamps & Greenwood, 2005, September 29 & 30). Gauging students’ response to the reading curricula using DIBELS assessed Fall, Winter, and Spring of the school year for all students K-3 is another component of the 3 tiered model seeking to identifying unresponsive students and individualize their instruction in terms of adding secondary-level or tertiary-level instruction to the primary instruction they already receive (Kamps & Greenwood, 2005). Instruction at the secondary level is comprised of small groups and peer-tutoring experiences added to primary level instruction using and supporting the science-based curriculum. Instruction at the tertiary level is comprised of one-on-one instruction combined with highly explicit methods of instruction more frequently progress monitoring. This work is currently in progress (Kamps & Greenwood, 2005) but initially results appear favorable.

### ***Discussion***

The purpose of this paper was to provide a brief synthesis of my program of research and that of colleagues concerning lessons learned about the poverty mechanisms impacting children’s social and academic achievement, in including evidence-based intervention practices that have emerged. Reviewed were findings from multiple descriptive and experimental studies, some longitudinal - spanning 10 or more years. Embracing an empirical approach from the beginning, the work validated direct observation measures based on an ecological-interaction

conceptual framework for use in the homes and classrooms of children in a poverty community. The measures were then used to provide descriptive data on these environmental contexts and the behaviors of parents and teachers in these settings, and students' response thereto. By describing and comparing these parameters in both low- and high-SES settings, it proved possible to identify meaningful differences in the situations and in the parenting and teaching interactions revealing ways that reduced, limited, slowed, failed to expand, and at times prohibited -- desired child response (e.g., talk to parent, or engagement in active academic responding). Overall, children and students' "opportunities to respond" and their actual production of desired behavior were reduced in poverty environments in terms of both daily and cumulative estimates. On average, these limitations in experiences in early life led to lower developmental trajectories over time that continued in terms of lower vocabulary, IQ, school readiness, and basic skills achievement in early elementary school years later. For these children, the absence of effective early interventions to change their learning environments to increase child responding in language and academic behavior, the intellectual and academic achievement gaps did not close; and in fact, grew larger. This view of poverty early learning mechanisms proved extendable to educational television, evidence-based reading curricula, and school-wide models of prevention in poverty homes and schools by examining students' trajectories of growth in key skills monitored frequently over time in the presence of these environmental interventions.

This work contributed uniquely to theories of developmental retardation (Baumeister, Kupstas, & Klindworth, 1990; McDermott & Altekruise, 1994; Shonkoff & Phillips, 2000), the most prevalent form of retardation linked to environmental causes such as depriving and non-stimulating environments. This work expanded knowledge of how it was that momentary interactions parent and teacher over time actually functioned to produce lower levels of



responding and learning over time. While it was no news that poverty environments are under-resourced physically and intellectually including under-educated parents or over-extended and often under-qualified teachers (Guin, 2004, August 16), how it is that these environments functioned to produce poor child outcomes and what might be done about it was of critically importance.

These findings pointed to alterable variables with potential for change using interventions to changes the details of these interactions in meaningful ways. The findings also supported the ecological-interaction-developmental theoretical framework and the integration of descriptive and experimental data in early intervention and educational research.

These descriptive data informed new interventions and related concepts such as the “opportunity to respond”, that could be assessed and altered in experimental studies by changing the way parents and teachers interacted with the children. Results of these studies in schools resulted in a number of important interventions (e.g., CWPT and PALS), and provided additional evidence in support of the causal interaction mechanisms that are either risk or protective factors in the development of language and early literacy of children living in poverty.

Themes in our most current work and future plans are several. One is developing measures and research seeking to identify the language and early literacy precursors in preschool and earlier in the lives of infants and toddlers (Greenwood, Carta, Walker, Hughes, & Weathers, 2006; Greenwood, Walker, Carta, & Higgins, in press; McConnell, McEvoy, & Priest, 2002). We seek the means of intervening earlier in homes and in child-care to remove risk by improving learning environments and thus, the developmental and academic outcomes of children in poverty. Another is improving early language and literacy intervention in the local community via an Early Reading First Project, using evidence-based practices and intensive progress

monitoring techniques to inform decisions about individualizing instruction. In the context of a growth number of new measures capable of progress monitoring in children birth to age 5, we are seeking to examine the extent to which 3-tier prevention model components can be conceptualize and applied to early childhood, in preschool, child care, and home-based services for young children with developmental delays.

## References

- Annenberg School for Communication of the University of Pennsylvania. (2001). NEWS: Deborah Linebarger to assess effectiveness of American Indian Literacy Initiative in New Mexico. from <http://www.asc.upenn.edu/asc/Application/NewsDetails.asp?ID=111>
- Arreaga-Mayer, C. (1998b). Language sensitive peer-mediated instruction for culturally and linguistically diverse learners the intermediate elementary grades. In R. M. Gersten & R. T. Jimenez (Eds.), *Promoting learning for culturally and linguistically diverse students* (pp. 73-90). Belmont, CA: Wadsworth.
- Arreaga-Mayer, C., Carta, J. J., & Tapia, Y. (1992). *ESCRIBE: Ecobehavioral system for the contextual recording of interactional bilingual environments*. Kansas City, KS: Juniper Gardens Children's Project, University of Kansas.
- Arreaga-Mayer, C., Carta, J. J., & Tapia, Y. (1994). Ecobehavioral assessment of bilingual special education settings: The opportunity to respond revisited. In R. Gardner, D. Sainato, J. Cooper, T. Heron, W. Heward, J. Eskleman & T. Grossi (Eds.), *Behavior analysis in education: Focus on measurably superior instruction* (pp. 225-240): Brooks/Cole.
- Atwater, J. B., Montagna, D., Creighton, M., Williams, R., & Hou, L. S. (1993). *Code for interactive recording of caregiving and learning environments (CIRCLE)*. Kansas City, KS: Juniper Gardens Children's Project, University of Kansas.
- Baumeister, A. A., Kupstas, F., & Klindworth, L. M. (1990). New morbidity: Implications for prevention and children's disabilities. *Exceptionality, 1*, 1-16.
- Carta, J. J., Greenwood, C. R., & Atwater, J. B. (1985). *Ecobehavioral system for complex assessments of preschool environments: ESCAPE*. Kansas City, KS: Juniper Gardens Children's Project, University of Kansas.

Carta, J. J., Greenwood, C. R., Luze, G. J., Cline, G., & Kuntz, S. (2004). Developing a general outcome measure of growth in social skills for infants and toddlers. *Journal of Early Intervention, 26*(2), 91-114.

Carta, J. J., Greenwood, C. R., & Robinson, S. (1987). Application of an eco-behavioral approach to the evaluation of early intervention programs. In R. Prinz (Ed.), *Advances in the behavioral assessment of children and families* (Vol. 3, pp. 123-155). Greenwich, CT: JAI.

Carta, J. J., Greenwood, C. R., Schulte, D., Arreaga-Mayer, C., & Terry, B. (1988). *Code for instructional structure and student academic response: Mainstream version (MS-CISSAR)*. Kansas City, KS: Juniper Gardens Children's Project, Bureau of Child Research, University of Kansas.

Chard, D. J., & Kameenui, E. J. (2000). Struggling first-grade readers: The frequency and progress of their reading. *Journal of Special Education, 34*(1), 28-38.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Delquadri, J. C. (1978). *An analysis of the generalization effects of four tutoring procedures on oral reading responses of eight learning disability children*. Unpublished Doctoral Dissertation, University of Kansas, Lawrence, KS.

Foorman, B. R., Francis, D. J., Fletcher, J. M., & Schatschneider, C. (1998). The role of instruction in learning to read: Preventing reading failure in at-risk children. *Journal of Educational Psychology, 90*(1), 37-55.

Greenwood, C. R. (1991a). Longitudinal analysis of time engagement and academic achievement in at-risk and non-risk students. *Exceptional Children, 57*, 521-535.

Greenwood, C. R. (1991b). Classwide peer tutoring: Longitudinal effects on the reading language and mathematics achievement of at-risk students. *Reading Writing and Learning Disabilities International, 7*, 105-124.

- Greenwood, C. R. (1996). Research on the practices and behavior of effective teachers at the Juniper Gardens Children's Project: Implications for the education of diverse learners. In D. Speece & B. K. Keogh (Eds.), *Research on classroom ecologies: Implications for inclusion of children with learning disabilities*. (pp. 39-67). Hillsdale, NJ: Lawrence Erlbaum.
- Greenwood, C. R. (1996a). Research on the practices and behavior of effective teachers at the Juniper Gardens Children's Project: Implications for the education of diverse learners. In D. Speece & B. K. Keogh (Eds.), *Research on classroom ecologies: Implications for inclusion of children with learning disabilities* (pp. 39-67). Hillsdale, NJ: Lawrence Erlbaum.
- Greenwood, C. R. (1999). Reflections on a research career: Perspective on 35 years of research at the Juniper Gardens Children's Project. *Exceptional Children*, 66(1), 7-21.
- Greenwood, C. R. (2003). Commentary: Building community laboratories for experimental studies. *School Psychology Review*, 32(4), 515-519.
- Greenwood, C. R., Abbott, M., & Tapia, Y. (2003). Ecobehavioral strategies: Observing, measuring, and analyzing behavior and reading interventions. In S. Vaughn & K. L. Briggs (Eds.), *Reading in the classroom: Systems for observing teaching and learning*. (pp. 53-82). Baltimore: Brookes.
- Greenwood, C. R., Carta, J. J., & Dawson, H. (2000). Observational methods for educational settings. In T. Thompson, D. Felce & F. J. Symons (Eds.), *Behavior observation: Technology and applications in developmental disabilities* (pp. 229-252). Baltimore, MD: Brookes.
- Greenwood, C. R., Carta, J. J., Hart, B., Thurston, L., & Hall, R. V. (1989). A behavioral approach to research on psychosocial retardation. *Education and Treatment of Children*, 12, 330-346.

- Greenwood, C. R., Carta, J. J., Kamps, D., Terry, B., & Delquadri, J. (1994). Development and validation of standard classroom observation systems for school practitioners: Ecobehavioral assessment systems software EBASS. *Exceptional Children, 61*, 197-210.
- Greenwood, C. R., Carta, J. J., & Walker, D. (2005). Individual growth and development indicators (IGDIs): Tools for assessing intervention results for infants and toddlers. In B. Heward & et al. (Eds.), *Focus on Behavior Analysis in Education: Achievements, Challenges, and Opportunities (Chapter 6)* (pp. 103-124). Columbus, OH: Pearson/Prentice-Hall.
- Greenwood, C. R., Carta, J. J., Walker, D., Hughes, K., & Weathers, M. (2006). Preliminary investigations of the application of the Early Communication Indicator (ECI) for infants and toddlers. *Journal of Early Intervention, 28*(3), 178-196.
- Greenwood, C. R., & Delquadri, J. (1988). Code for instructional structure and student academic response: CISSAR. In M. Hersen & A. S. Bellack (Eds.), *Dictionary of behavioral assessment techniques* (pp. 120-122). New York: Pergamon.
- Greenwood, C. R., & Delquadri, J. (1995). ClassWide Peer Tutoring and the prevention of school failure. *Preventing School Failure, 39*(4), 21-25.
- Greenwood, C. R., Delquadri, J., & Hall, R. V. (1984). Opportunity to respond and student academic performance. In W. Heward, T. Heron, D. Hill & J. Trap-Porter (Eds.), *Behavior analysis in education* (pp. 58-88). Columbus, OH: Merrill.
- Greenwood, C. R., Delquadri, J., & Hall, R. V. (1989). Longitudinal effects of classwide peer tutoring. *Journal of Educational Psychology, 81*, 371-383.
- Greenwood, C. R., Delquadri, J., Stanley, S. O., Terry, B., & Hall, R. V. (1985). Assessment of eco-behavioral interaction in school settings. *Behavioral Assessment, 7*, 331-347.
- Greenwood, C. R., Hart, B., Walker, D., & Risley, T. R. (1994). The opportunity to respond revisited: A behavioral theory of developmental retardation and its prevention. In R. Gardner, D. M. Sainato, J. O. Cooper, T. E. Heron, W. L. Heward, J. W. Eshleman & T.

- A. Grossi (Eds.), *Behavior analysis in education: Focus on measurably superior instruction* (pp. 213-223). Pacific Grove, CA: Brooks/Cole.
- Greenwood, C. R., Horton, B. T., & Utley, C. A. (2002). Academic engagement: Current perspectives on research and practice. *School Psychology Review, 31*(3), 328-349.
- Greenwood, C. R., Hou-Reynolds, S., Abbott, M., & Tapia, Y. (in press). *Together we can: ClassWide Peer Tutoring Learning Management System (CWPT-LMS)*. Longmont, CO: Sopris West.
- Greenwood, C. R., & Hou, L. S. (1995). *Ecobehavioral Assessment Systems Software (EBASS) - Version 3.0: Technical manual*. Kansas City, KS: The Juniper Gardens Children's Project, University of Kansas. .
- Greenwood, C. R., & Hou, S. (2001). *The Classwide Peer Tutoring Learning Management System (CWPT-LMS): Manual for Teachers*. Kansas City, KS: Juniper Gardens Children's Project, University of Kansas.
- Greenwood, C. R., Luze, G. J., Cline, G., Kuntz, S., & Leitschuh, C. (2002). Developing a general outcome measure of growth in movement for infants and toddlers. *Topics in Early Childhood Special Education, 22*(3), 143-157.
- Greenwood, C. R., Maheady, L., & Delquadri, J. (2002a). ClassWide Peer Tutoring. In M. R. Shinn, H. M. Walker & G. Stoner (Eds.), *Interventions for achievement and behavior problems* (2nd ed., pp. 611-649). Washington, DC: National Association for School Psychologists (NASP).
- Greenwood, C. R., Maheady, L., & Delquadri, J. (2002b). ClassWide Peer Tutoring. In G. Stoner (Ed.), *Interventions for achievement and behavior problems*. (2 ed., pp. 611-649). Washington, DC: National Association for School Psychologists (NASP).
- Greenwood, C. R., Schulte, D., Dinwiddie, G., Kohler, F., & Carta, J. J. (1986). Assessment and analysis of eco-behavioral interaction. In R. Prinz (Ed.), *Advances in behavioral assessment of children and families*. (Vol. 2, pp. 69-98). Greenwich, CT: JAI Press.

Greenwood, C. R., Terry, B., Utley, C. A., Montagna, D., & Walker, D. (1993). Achievement placement and services: Middle school benefits of ClassWide Peer Tutoring used at the elementary school. *School Psychology Review*, 22(3), 497-516.

Greenwood, C. R., Walker, D., Carta, J. J., & Higgins, S. (in press). Developing a general outcome measure of growth in the cognitive abilities of children 1 to 4 years old: The Early Problem Solving Indicator (EPSI). *School Psychology Review*.

Guin, K. (2004, August 16). Chronic teacher turnover in urban elementary schools (retrieved August 24, 2006 from <http://epaa.asu.edu/epaa/v1n43/>). *Education Policy Analysis Archives*, 12(42).

Hart, B., & Risley, T. R. (1989). The longitudinal study of interaction systems. *Education and Treatment of Children*, 12, 347-358.

Hart, B., & Risley, T. R. (1992). American parenting of language-learning children: Persisting differences in family-child interactions observed in natural home environments. *Developmental Psychology*, 28, 1096-1105.

Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore: Brookes.

Hart, B., & Risley, T. R. (1999). *The social world of children learning to talk*. Baltimore, MD: Brookes.

Juel, C. (1988). Learning to read and write: A longitudinal study of 54 children from first through fourth grades. *Journal of Educational Psychology*, 80, 437-447.

Kamps, D., Carta, J., Delquadri, J., Arreaga-Mayer, C., Terry, B., & Greenwood, C. R. (1989). School-based research and intervention. *Education and Treatment of Children*, 12, 359-390.

Kamps, D., & Greenwood, C. R. (2005). Formulating secondary-level reading interventions. *Journal of Learning Disabilities*, 38(6), 500-509.



- Kamps, D., & Greenwood, C. R. (2005, September 29 & 30). *Session III: Database Presentation III and Q & A*: Paper presented at the Topical Forum I: Applying RTI to SLD Determination Decisions, Kansas City, MO.
- Kamps, D., & Greenwood, C. R. (2006, February). *Strength of treatment as a Mediator of three tiered reading intervention effects*. Washington, D.C.: Office of Special Education Programs, USDE.
- Kamps, D., Greenwood, C. R., & Leonard, B. (1991). Ecobehavioral assessment in classrooms serving children with autism and developmental disabilities. In R. J. Prinz (Ed.), *Advances in behavioral assessment of children and families*. (pp. 203-237). New York: Jessica Kingsley.
- Kamps, D., Leonard, B., Potucek, J., & Garrison-Harrell. (1995). Cooperative learning groups in reading: An integration strategy for students with autism and general classroom peers. *Behavior Disorders, 21*(1), 89-109.
- Kamps, D., Wills, H. P., Greenwood, C. R., Thorne, S., Lazo, J. F., Crockett, J. L., et al. (2003). A descriptive study of curriculum influences on the early reading fluency of students with academic and behavioral risks. *Journal of Emotional and Behavioral Disorders, 11*(4), 211-224.
- Linebarger, D. (2000, June). *Summative evaluation of Between the Lions*. Kansas City, KS: University of Kansas: Unpublished report prepared for the WGBH Educational Foundation.
- Linebarger, D., Kosanic, A. Z., Greenwood, C. R., & Doku, N. S. (2003). Effects of viewing the television program 'Between the Lions' on the emergent literacy skills of young children. *Journal of Educational Psychology, 96*(2), 297-308.
- Luze, G. J., Greenwood, C. R., Carta, J. J., Cline, G., & Kuntz, S. (2002). *Developing a general outcome measure of growth in social skills for infants and toddlers*. Kansas City, KS: Early Childhood Research Institute for Measuring Growth and Development, Juniper Gardens Children's Project, University of Kansas.

- Mathes, P. G., Torgesen, J. K., Allen, S. H., & Howard Allor, J. K. (2002). *First grade PALS (Peer-Assisted Literacy Strategies)*. Longmont, CO: Sopris West.
- McConnell, S. R., McEvoy, M. A., & Priest, J. S. (2002). Growing measures for monitoring progress in early childhood education: A research and development process for Individual Growth and Development Indicators. *Assessment for Effective Intervention*, 27(4), 3-14.
- McDermott, S. W., & Altekruze, J. M. (1994). Dynamic Model for Preventing Mental Retardation in the Population: The Importance of Poverty and Deprivation. *Research in Developmental Disabilities*, 15(1), 49-65.
- Mielke, K. (1994). Sesame Street and children in poverty. *Media Studies Journal*, 8, 125-134.
- Raspberry, W. (2003, August). For toddlers: Literally, words to the wiser. *Washington Post*.
- Raspberry, W. (2003, November). Baby Steps. *Washington Post*.
- Rohrbeck, C. A., Ginsberg-Block, M. D., Fantuzzo, J. W., & Miller, T. R. (2003). Peer-assisted learning interventions with elementary school students: A meta-analytic review. *Journal of Educational Psychology*, 95(2), 240-257.
- Shonkoff, J. P., & Phillips, D. A. (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Academy Press.
- Shore, R. (1997). *Rethinking the brain: New insights into early development*. New York: Families and Work Institute.
- Stanley, S. O., & Greenwood, C. R. (1983). Assessing opportunity to respond in classroom environments through direct observation: How much opportunity to respond does the minority disadvantaged student receive in school? *Exceptional Children*, 49, 370-373.
- Statistical Abstracts. (2000). Washington DC: Government Publishing Office.
- Strickland, D. S., & Rath, L. K. (2000, August). Between the Lions: Public television promotes early literacy. *Reading Online*, 4, Available at

[http://www.readingonline.org/articles/art\\_index.asp?HREF=/articles/strickland/index.html](http://www.readingonline.org/articles/art_index.asp?HREF=/articles/strickland/index.html).

- Terry, B., & Greenwood, C. R. (2004). *ClassWide Peer Tutoring infused into the beginning reading curriculum of young children*. Kansas City, KS: Juniper Gardens Children's Project, University of Kansas.
- Thompson, T. (1995). Children have more need of models than critics: Early language experience and brain development. *Journal of Early Intervention, 19*(3), 264-272.
- Walker, D., Greenwood, C. R., Hart, B., & Carta, J. J. (1994). Improving the prediction of early school academic outcomes using socioeconomic status and early language production. *Child Development, 65*, 606-621.
- Whitehurst, G. J. (1996). Language processes context: Language learning of children reared in poverty. In L. B. Adamson & M. A. Ronski (Eds.), *Research on communication and language disorders: Contribution to theories of language development*. Baltimore, MD: Brookes.
- Whitehurst, G. J., & Lonigan, C. J. (1998). Child development and emergent literacy. *Child Development, 69*, 848-872.
- Whitehurst, G. J., & Lonigan, C. J. (2001). Emergent literacy: Development from prereaders to readers. In S. B. Neuman & D. K. Dickinson (Eds.), *Handbook of early literacy research* (pp. 11- 29). New York: Guilford Press.

*Footnotes*

Footnote 1. Home page of the Juniper Gardens Children's Project, online at

<http://www.jgcp.ku.edu>

Footnote 2. Online description of the mission of the Juniper Gardens Children's Project

([http://www.jgcp.ku.edu/About\\_JG/Mission.htm](http://www.jgcp.ku.edu/About_JG/Mission.htm))

Footnote 3. Online description of the EBASS software for implementing CISSAR, MSCISSAR and ESCAPE observation instruments

[http://www.jgcp.ku.edu/EBASS/ebass\\_descrp.htm](http://www.jgcp.ku.edu/EBASS/ebass_descrp.htm)

Footnote 4. Report on the efficacy of "Between the Lions" Online at

<http://www.pbs.org/readytolearn/research/btlkansassum.pdf>

Footnote 5. School-wide, 3 Tier Reading and Behavior Prevention/Intervention Model

<http://www.lsi.ku.edu/jgprojects/r&b/Index.htm> or <http://www.wcer.wisc.edu/cce/kansas.html>

Table 1. *Measurement Instruments/Tools*

1. *Hart and Risley Language-Interaction Code* enables computerized analyses of the development of spoken language in terms of interaction and ecological contexts within the home (Hart & Risley, 1989; Hart & Risley, 1995).
2. *Parent-Infant Computerized Code for the Observation of Language Interactions: PICCOLI* is a computerized version of the earlier Hart and Risley code using a notebook computer with digital audio recording capabilities. This upgrade made data recording more accurate and efficient to transcribe and prepare for statistical analysis (Walker, Hart, & Greenwood, 1994).
3. *Code for Instructional Structure and Student Academic Response: CISSAR* provides observational measurement of student/teacher behavior in classroom settings. Its purpose is to quantify students' academic behavior within the context of specific instructional variables, practices, and teacher behavior (Greenwood, Delquadri, Stanley, Terry, & Hall, 1985).
4. *Code for Instructional Structure and Student Academic Response- MainStream Version: MS-CISSAR* performs measurements similar to the CISSAR, but is designed for use in regular and special education classrooms and is adaptable to environments and behaviors of students with mental retardation and special needs (Carta, Greenwood, Schulte, Arreaga-Mayer, & Terry, 1988).
5. *Ecobehavioral System for the Complex Assessment of Preschool Environments: ESCAPE* is an observation system for evaluating the instructional effectiveness of preschool programs and interventions. Like the CISSAR and MS-CISSAR, it measures ecological, teacher, and student variables in close temporal relation and provides indices of student engagement, talk, and inappropriate behavior overall or conditionally by specific ecological dimensions (Carta, Greenwood, & Atwater, 1985).
6. *Ecobehavioral Assessment Systems Software: EBASS* is a software system integrating the CISSAR, MS-CISSAR, and ESCAPE for use on notebook computers (Greenwood, Carta, Kamps, Terry, & Delquadri, 1994; Greenwood & Hou, 1995).
7. *Ecobehavioral System for the Contextual Recording of Interactional Bilingual Environments: ESCRIBE* supports direct observational measurement of ecological,

teacher, and student behaviors in culturally and linguistically diverse classrooms (e.g., English as a Second Language, etc.) (Arreaga-Mayer, Carta, & Tapia, 1992).

8. *Code for Interactive Recording of Caregiving and Learning Environments: CIRCLE 1-2* is a hand-held computer observation system used with children four to 36 months old and their caregivers in the home and childcare center. CIRCLE 1 is designed for use with infants (Atwater, Montagna, Creighton, Williams, & Hou, 1993).
9. *Individual Growth and Development Indicators for Infants and Toddlers* are designed of early interventionist interested in tracking the monthly or quarter growth and development of young children (Greenwood, Carta, & Walker, 2005). Data are collected using paper and pencil recording sheets and processed using a website (on line at <http://www.igdi.ku.edu> )
  - a. *Early Communication Indicator (ECI)* (Greenwood et al., 2006; Luze, Greenwood, Carta, Cline, & Kuntz, 2002)
  - b. *Early Problem Solving Indicator (EPSI)* (Greenwood, Walker et al., in press)
  - c. *Early Social Indicator (ESI)* (Carta, Greenwood, Luze, Cline, & Kuntz, 2004)
  - d. *Early Movement Indicator (EMI)* (Greenwood, Luze, Cline, Kuntz, & Leitschuh, 2002)

Table 2. *Beginning Reading - CWPT Modules and Skills Taught*

1. Word Discrimination (hear a sentence, identify beginning, middle, and end words, and then hear a series of words, repeat the words to make a sentence)
2. Letter-Sound Association (hear a sound, repeat it, say its letter name; hear a sound, write its letter)
3. Letter-Symbol Identification (see a letter, say its name; hear a letter, write it)
4. Beginning Sounds (hear a word, say the beginning sound)
5. Ending Sounds (hear a word, say the ending sound)
6. 2-Letter Sound Blends (hear a word; say the 2-letter sound blend)
7. Sound Identification (hear a word, say all sounds in the word)
8. Sound Blending (hear a sequence of sounds, say the word)
9. Matching Sounds (hear a word and a sound, say if the sound is present in the word)
10. Common Sounds (hear two words, say the sound that is common in both words)
11. Subtracting Sounds (hear a word, take out a sound, say the word/sound(s) that are left)
12. Switching Sounds (hear a word, switch one sound for another, and say the new word)
13. Working with Syllables (hear a series of syllable sounds, say them fast to say the word; hear a word and say the syllable sounds)
14. Sight Word Vocabulary (using the Dolch sight words, see a word and say it; hear the word and write it)
15. CWPT Oral Reading (see grade level sentences, paragraphs, passages, and read orally at an 85% accuracy level)
16. CWPT Comprehension (read grade level material, answer related comprehension questions orally and written, including vocabulary, factual, recall, sequential, and inferential information)

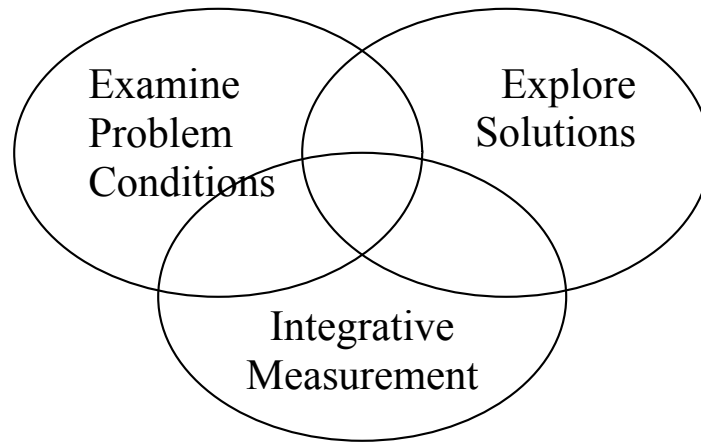


Figure 1. *Integration of key research areas.*