

Chapter 6

MY MAGIC STORY CAR:

Video-Based Play Intervention to Strengthen

Emergent Literacy of At-risk Preschoolers ¹

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Elisha and Max are in their make-believe library in their daycare center pretending to read a book about building castles. Elisha counts the blocks as she hands them to Max who repeats the numbers as he places each block in the structure. Max is growing impatient, however, and says that he will be the castle's "big green dragon." Elisha responds, "Okay, I will be the princess with a purple dress, but let's finish making the castle." Juan joins them and wants to play. Max agrees, and offers Juan a role as the prince. But Juan wants to be the green dragon. Much negotiating takes place. Finally, Juan agrees to assume this role, but he insists on wearing a gold crown.

Through their make-believe play, these four-year-olds are developing basic cognitive and social skills. They count, name colors, pretend to read, use vocabulary, expressive language and socialized speech, and practice cooperation and sharing. They are also practicing eye-hand coordination, and learning about spatial relationships. They are improvising a simple "script" about a prince, princess, and dragon based on a mixture of fairy tales that were read to

them and a library game they had played in the *My Magic Story Car* program described in this chapter. Learning happens as they improvise their pretend game.

As Joan Almon, the coordinator of the Alliance for Childhood's branch in the United States says, "Creative play is like a spring that bubbles up from deep within a child. It is refreshing and enlivening. It is a *natural part of the makeup of every healthy child*. The child's love of learning is intimately linked with a zest for play" (Almon, 2003, p. 18).

This chapter focuses on *My Magic Story Car*, a video-based program that strengthens emergent literacy skills of at-risk preschool children from low-income families, through one of the most effective available modalities – make-believe play. Research documents how

make-believe play, a natural feature of early childhood development peaking at ages three-to-five, is an intrinsically motivating modality for engaging preschoolers in activities to enhance a plethora of cognitive, socio-emotional, and motor skills (Segal, 2004; Simms, 2003; Singer & Singer, 1990, 2005). Through play, children practice vocabulary and new ways to express themselves. They verbalize plot sequences with increasingly complex situations that often evoke correcting responses from adults or peers. The narrative sequences of imaginative play can also enhance socio-emotional skills such as cause-and-effect thinking, empathy, cooperation, patience, civility and self-regulation. (See Berk et al, Chapter in this volume; Bowman, 2003; Howes & Wishard, 2003; Singer & Singer 1990, 2003, 2005).

Numerous studies, summarized by J. L. Singer (1996) support the value of training parents and other caregivers to use imaginative play to strengthen preschoolers' cognitive skills through simple activities such as playing games, reading, story-telling, explaining things in ways that strengthen a child's ability to find verbal labels for their milieu, providing basic toys that lend themselves to varied "plot lines" (e.g., puppets and blocks), and singing

rhymes that help a child notice similar sounds. Inter-generational play is also mutually reinforcing for parents and other caregivers, and is an effective means of engaging adults as full partners in children's development.

Singer and Singer (2001) developed a comprehensive set of learning games to strengthen these skills among 3-5-year-olds. The games require no previous training, and use inexpensive, common household objects such as bags, boxes, and sox. Several of these games were adapted into a new video-based program, *My Magic Story Car*, that uses play to address a crucial national priority – strengthening the emergent literacy of preschool children from poor families who are increased risk of starting school lacking the skills they need to learn to read.

Emergent Literacy and Socioeconomic Risk Factors

Reading is a uniquely empowering skill, and is a prerequisite survival skill for a full and productive life in twenty-first century America. The crucial foundations for reading, “emergent literacy,” are developed in the early childhood years before school entry. However, research starting with a pivotal 1996 report by Carnegie Task Force on Learning in the Primary Grades has shown that a significant number of children in the USA, particularly children from poor families, start school lacking skills necessary for learning to read (Carnegie, 1996). Their academic achievement gap widens in the elementary school years, their prospects for high school graduation diminish, and their likelihood for later success plummet. In fact, reading scores in tenth grade can be predicted with accuracy on the basis of a child's knowledge of the alphabet in kindergarten (Whitehurst, 2001).

Socioeconomic status (SES) of children's families is one of the strongest predictors of performance differences in children entering school (Whitehurst, 2001). A significant

number of young children are vulnerable to this economic risk factor: nearly twenty percent (19.8%) of children under age six in the USA (4.7 million children) live in poverty (childstats.gov, 2005), and 42% (9.6 million children) live in low-income families (National Center for Children in Poverty, 2005). Over half (52.9%) of preschool children in female-householder families with no husband present live in poverty –over five times the rate of their counterparts in married-couple families (9.6%) (Census, 2004a, 2004b).

In a major study of the impact of family socioeconomic status (SES) on children's early academic achievement, The National Center for Education Statistics (NCES) Early Childhood Longitudinal Study, *Kindergarten Class of 1998-99*, has followed 22,000 children from kindergarten through fifth grade. In nearly every measure NCES assessed – kindergartners' reading and mathematics scores, general knowledge, social skills, approaches to learning, and preschool educational opportunities in the home – consistently lower scores were found for kindergartners with risk factors associated with low SES: (a) household income below the poverty level, (b) single-mother household, (c) low maternal education, and (d) non-English primary home language (NCES, 2002, 2004).

Fifty-two percent of kindergarteners whose mothers did not graduate from high school scored in the lowest quartile on reading tests, as did 49% of children whose families had received public assistance, and 36% of children in single-mother households. When children in the NCES longitudinal study completed third grade, the higher the number of their family risk factors, the smaller the gains children experienced in both reading and mathematics. In fact, the reading and mathematics achievement gaps of children with multiple risk factors increased from the start of kindergarten to the end of third grade (NCES, 2004).

Additional factors place preschool children from poor families at risk of difficulties learning to read when they start school:

- Children who do not engage in rich language interactions with their parents will have low levels of vocabulary and conceptual development, and this will affect their later reading and academic achievement (Whitehurst, 2001). The *Meaningful Differences* study by Hart and Risley (1995) recorded naturally occurring conversations in the homes of professional, working class, and welfare families with young children for two and a half years. They found that professional parents exchanged nearly 300 more spoken words per hour with their children than did welfare parents. As a result, by age three, professional family children had larger recorded vocabularies than the welfare family parents. By first grade, linguistically advantaged children are likely to have vocabularies four times the size of their linguistically disadvantaged peers, and these differences widen in elementary school (Whitehurst, 2001).
- Reading aloud daily to preschoolers promotes language acquisition and correlates with literacy development and later success in school. Preschoolers who are read to at least three times a week are almost twice as likely to score in the top 25 percent in reading in kindergarten and first grade than children read to less than three times a week. In 2001, only 48% of preschoolers in families living below the poverty line were read aloud to every day, compared with 61% of children in families at or above the poverty line (NCES, 2002).
- An additional risk factor is the quality of childcare for many poor preschoolers. Their primary arrangements are more likely to be parental (45%), relative care (26%) or non-relative home care (10%) with caregivers who are less likely to have been trained in

child development (childstats.gov, 2005). And the 27% of poor preschoolers in center-based programs often have teachers who do not know how to provide children with the emergent literacy opportunities and experiences that can compensate for the lack of language stimulation at home (Whitehurst, 2001).

In summary, children from low-SES families enter kindergarten at increased risk of lacking the emergent literacy skills needed to learn how to read; but recent research offers strategies for reliable interventions.

Strategies for Enhancing Preschoolers' Emergent Literacy

A vast outpouring of studies ranging from brain science to early childhood pedagogy indicates a strong consensus of findings about developmentally appropriate interventions for preventing reading difficulties among children from low-SES families (McKey, 2003; National Association for the Education of Young Children, 2003; National Center for Education Statistics 2000, 2002, 2004; National Research Council, 1998, 2000; RAND Reading Study Group, 2002; Thompson, 2004). These and other studies clearly indicate that the precursors to literacy, emergent literacy, start well before school entry, in the first years of life.

Grover J. Whitehurst, Director of the U.S. Department of Education Institute of Education Sciences, has identified two categories of essential emergent literacy skills (Whitehurst, 2001):

- (1) *Inside-out Domain*: children's knowledge of the rules for translating written text into spoken words including: (a) Phonological awareness, the ability to detect and manipulate the sound structure of oral language – letters, sounds, the links between letters and sounds, and how letters in written language correspond to speech sounds at the level of phonemes;

- (b) Print knowledge – how to use a book, understanding that English text runs from top to bottom and left to right across a page, and the ability to name letters of the alphabet; and
- (c) Emergent writing – pretending to write, learning to write one's name, and using crayons and other writing instruments to draw, and (later) to write letters.

(2) *Outside-In Domain*: children's understanding of information outside of the printed words they are trying to read, such as: (a) Meanings of words (vocabulary), (b) Comprehension based on knowledge about the world, and (c) Understanding narrative and story structure.

These emergent literacy skills occur across a developmental continuum with strong windows of opportunity at various ages from birth to five years (Whitehurst, 2001). In a child's first three years, parent-child bonding through exploring and playing with books and listening to stories are especially important. Effective techniques for 2-3-year-olds include dialogic reading in which the adult does not simply read a story while the child listens; instead the child is encouraged to talk about the book, and the adult serves as a conversational partner, asking questions and expanding on the child's answers. Skills training for 4-5-year-olds include print knowledge, phonological awareness, letter-sound correspondence and emergent writing. Whitehurst (2001) prioritizes teaching children phonological awareness, print knowledge, alphabet letter recognition, and emergent writing before they start school. Conceptual and vocabulary skills become important later, once children have mastered the alphabetic code.

A longitudinal study of African American Head Start students by Whitehurst (2002) demonstrated the equally significant role of home literacy environments in fostering children's emergent literacy and subsequent reading achievement. The findings highlight the importance of factors such as the frequency of shared book reading and trips to a library, the

number of age-appropriate books in the home, and parental expectations for their child's learning to read and write. Therefore, providing parents/caregivers easy and effective ways to enhance children's emergent literacy is another key component of a comprehensive strategy for preventing reading difficulties among at-risk children.

As outlined above, a wealth of evidence-based research highlights the components of effective strategies for strengthening preschoolers' emergent literacy and other school-readiness skills. The question remains of finding effective modalities for delivering these curricula to large numbers of preschool children; and television and video/DVD media have shown very promising results.

Applying TV and Video/DVD Media to Strengthen Preschoolers Ready-to-Learn Skills

A report to Congress, *A Role for Television in the Enhancement of Children's Readiness to Learn*, prepared for the Corporation for Public Broadcasting by Singer and Singer (1993), laid the foundations for much of today's ready-to-learn television programming for preschoolers; and the subsequent developments have proven quite beneficial.

A national evaluation of the PBS series, *Barney & Friends* demonstrated gains by preschool children of all socio-economic strata and ethnicities when examples of cognitive and social skills in the television programs were reinforced by play with adult caregivers (Singer & Singer, 1998). Teenagers who regularly watched programs such as *Sesame Street* and *Mr. Rogers' Neighborhood* before starting school scored higher in English, math and science than their peers who had rarely viewed these educational programs (Huston et al, 2001). Early childhood education television programming continues to expand through additional outlets such as the Nickelodeon cable channel's *Noggin* commercial free company (Umstead, 2003).

However, it is clear that many at-risk preschoolers are not exposed to these programs. Therefore, under United States Department of Education grants, Bellin, Singer and Singer developed a series of video/DVD programs of playful learning games to deliver cognitive and socio/emotional skills training directly to at-risk preschoolers in any childcare setting – parent and relative care, non-relative home care, nursery schools, prekindergartens, day care and Head Start centers. The first two programs were:

- *Learning through Play for School Readiness*. A video program and facilitator's manual for training parents and other caregivers to engage preschool children from low SES families in playing make-believe games that resulted in measurable gains in children's cognitive and socio-emotional skills (Bellin, Singer & Singer, 1999).
- *Circle of Make-Believe*. A video program of playful learning games for 3-5-year-olds from low SES families and an instructions/material booklet for adults, which requires no training sessions for parents or other caregivers. The program is designed for use anytime, anyplace in any childcare setting to strengthen children's cognitive and social-emotional skills (Bellin, Singer & Singer, 2001).

Both programs were extensively tested in representative childcare settings for underprivileged preschoolers. *Learning through Play for School Readiness* was tested with 463 preschoolers in the care of 310 parents and teachers in low-SES communities in California, Connecticut and Georgia. *Circle of Make-Believe* was tested with 546 preschoolers in the care of 260 parents, teachers and home care providers in low-SES urban and rural communities in Alabama, California, Connecticut, Maryland, Minnesota, Ohio, Wisconsin and Wyoming. The results of these five years of testing indicated (Bellin, Singer & Singer, 1999, 2001):

- Video-based programs are an effective medium for empowering parents, teachers and other caregivers of children from poor families with reliable, easily replicated interventions for use in any childcare setting.
- Developmentally-appropriate video-based programs of make-believe play, a natural feature of early childhood development, can be effective, intrinsically-motivating modalities to engage preschoolers from low-SES families in playing games designed to strengthen specific school-readiness skills.
- When preschoolers from low-SES families played the programs' learning games for just two weeks, they showed measurable gains in targeted cognitive skills, such as enhanced vocabulary and counting, and socio-emotional skills such as politeness and emotional literacy.
- After the testing period, children continued to use skills modeled in the learning games on their own without adult intervention – i.e., they appear to have gained ownership of these skills.

My Magic Story Car: Program Design

The preceding findings – the efficacy of learning through make-believe play, the consensus of research on the requisite skills of emergent literacy, and the use of video-based media to deliver easily replicable interventions to any childcare setting – were incorporated into a new video-based program to strengthen emergent literacy skills of at-risk 4-5-year-olds from poor families, *My Magic Story Car* (Bellin, Singer & Singer, 2005).

The program's title, *My Magic Story Car*, is derived from the findings of the researchers' previous video-based programs that indicated preschool children's fascination with driving make-believe vehicles. In this program, adults help children assemble their own Magic Story

Cars (chairs, cushions, or cardboard boxes decorated with alphabet letters) with a ‘license plate’ on which children are assisted in writing their name or initials. Children in the video and young viewers drive their Magic Story Cars to play five learning games with make-believe narratives designed to strengthen specific emergent literacy skills as well as socio-emotional skills.

The five *My Magic Story Car* games and their targeted emergent skills are:

- (1) *Rhyme Store Game*. Children practice rhyming then use rhymes to buy toy animals at a discount in the Rhyme Store. *Targeted Skills*: Phonological awareness: rhymes (words that end with the same sound); and enhanced vocabulary.
- (2) *Lost Puppy Game*. Children ‘drive’ to a library, get library cards and borrow a book that tells how to help a sad lost puppy go home – they must guess the first letter, then the name of the puppy’s owner. The child playing the puppy barks positive or negative feedback to the children’s choice of letters. *Targeted Skills*: Print knowledge: naming alphabet letters; using a library; emergent writing (writing one’s name on a library card); enhanced emergent literacy vocabulary; and dialogic reading.
- (3) *Octopus Treasure Game*. To raise funds for a neighborhood playground, children transform their cars into submarines to retrieve a treasure in a sunken ship. A giant octopus guarding the ship requires them to answer several compound-word riddles to win the treasure. *Targeted Skills*: Phonological awareness: compound words (words composed of two other words); enhanced vocabulary; and knowledge of the world (undersea nature).
- (4) *Birthday Presents Game*. Children match pictures of birthday presents that start with the same first letter and sound. At the party, they give the birthday person these sets of presents

as well as the special present of learning alphabet letters. *Targeted Skills*: Phonological awareness: alliteration (words that start with the same sound); print knowledge: naming alphabet letters; and emergent writing (drawing with crayons).

(5) *Trip to Mars Game*. In response to a make-believe inquiry from children on Mars, an adult helps children make their own book about their life on earth. Children change their cars into spaceships, fly the book to Mars, and teach Martian children (who have never seen books) how to use the book. *Targeted Skills*: Print knowledge: parts of a book and direction in which text is read; emergent literacy vocabulary (e.g., “author” and “title”); and general knowledge (planets, space travel).

My Magic Story Car: Program Components

The *My Magic Story Car* program presents the five learning games in two components:

- (a) *Printed Manuals for Parents/Caregivers* with comprehensive instructions in user-friendly text that is clear to low-SES adults, including those with limited literacy skills or for whom English is a second language; materials needed for playing each game, so that no purchases are necessary; tips on helping preschoolers prepare to become good readers and resource lists.
- (b) *Video/DVD Program for Preschool Children* with engaging depictions of playing the five learning games that interweave live-action, playful animations and interactive challenges to preschoolers. Viewers stop the program after watching each game, and then play that game using guidelines and materials in the printed manuals. The video component incorporates several approaches that proved effective in the researchers’

previous programs, *Learning through Play for School Readiness* and *Circle of Make-Believe*:

- *Video Production with 'Real People.* The video/DVD features children playing the five games with their parents or teachers. Testing indicated that seeing 'real people' (not actors) with whom they can identify having fun engaging in the learning games, motivates and empowers child and adult viewers with confidence that the activities are easy to do, required no special training, and can be done by anyone, anytime, anyplace – “If they can do it, I can do it.”
- *Computer-Generated Animation.* The live-action sequences are punctuated with playful, age-appropriate computer-generated animations. The animations provide entertainment value, reinforce the program's playful learning environment and help children visualize imaginative story elements such as the giant octopus that guards a submerged treasure in the Octopus Treasure Game and the make-believe Martian children encountered in the Trip to Mars Game.
- *Real Time Interactivity.* A key feature of the video/DVD program is engaging young viewers in the learning games as active participants, rather than passive observers. The program's youthful narrator punctuates each game with tips and real-time interactive challenges in which young viewers are invited to answer questions that reinforce skills modeled in the program. For example, in the Rhyme Store Game children make rhymes to buy toy animals at discount prices. Children in the video take turns identifying pictures of an animal (e.g., *cat*) and two other items that rhyme with that animal (e.g., *bat, hat*). They must then say a fourth word that rhymes with all three pictures. The narrator challenges young viewers to say the fourth rhyming

word before children in the video respond: “Can you say another word that rhymes with *cat*, *bat* and *hat*?” Also, children in the video have to say aloud the first letter of a key word in each game to start their Magic Story Car engines and play that game (e.g., *Puppy*, *Mars*). In each case, the narrator challenges young viewers to say that first letter before children in the video respond.

- *Original Musical Score*. The upbeat, lively, very contemporary *My Magic Story Car* theme song and musical score helps to engage young viewers and maintain their attention. The program also invites young viewers to join children in the video in singing familiar songs such as the *ABC Song* and *Happy Birthday to You*.
- *DVD and Videocassette Versions*. The program was developed in both videocassette and DVD formats. The DVD format with its menus and buttons provides easy, user-directed, nonlinear access to each game anytime children want to see it. It is a considerably better interface than linear videocassettes, in which it is often difficult to locate the exact starting point of a particular game. The rapid adaptation of inexpensive DVD players in low-income communities is a very positive trend for this program’s potential efficacy and long-term viability (see below, Testing: Participants’ Use of Information Technologies).

Testing *My Magic Story Car*: Research Questions

To assess the program’s efficacy in enhancing emergent literacy of 4-5-year-olds from poor families, *My Magic Story Car* was tested in low-SES communities in six states with a representative sample of 434 preschoolers in the care of 259 parents, teachers and home care providers. The program was tested in two phases:

(a) Year One Local Testing (New Haven, CT) in representative parent, teacher and home care settings.

(b) Year Two National Testing in five geographically- and demographically-diverse additional states (California, Illinois, New York, Ohio and South Carolina).

Each phase of the testing addressed the following research questions:

- Can representative parents, home care providers and teachers of 4-5-year-olds from low-SES families use the video-based program in their respective childcare settings without any prior training; and do they find it effective?
- Does the program engage preschoolers and motivate them to play the learning games?
- After playing the program's games for just two weeks, do preschoolers demonstrate measurable gains in targeted emergent literacy knowledge and skills embedded in the learning games?
- After playing the program's games for just two weeks, do adults show gains in their own skills for enhancing the emergent literacy of children in their care?
- After the two-week test period, do preschoolers continue to play the games on their own without adult intervention, engage other children in playing the games, and/or incorporate skills demonstrated in the games into their daily activities?

Testing *My Magic Story Car*: Participants

Participants in Year One (Local) Testing. Following the positive outcomes of testing a prototype program, in the first year of the study the program was tested in representative inner city childcare settings in New Haven, CT using random assignment, before and after measures, and statistical controls. Testing was conducted with 267 participants, 179

preschool children in the care of 91 adults – 33 parents, 35 teachers, and 23 home care providers.

The Mean age of the 179 participating children was 4.07 years (SD=0.40). Each parent tested the program with one child. Teachers tested it with a Mean of 2.74 preschoolers, and home care providers tested it with a Mean of 2.04 preschoolers.

Demographic features of participating parents reflected those of the program's targeted communities – nearly all were mothers (92%), and over half (56%) were unmarried. Eighteen percent spoke Spanish as their first language; and some parents presented the program to their child in a mixture of English and Spanish. Participating teachers and home care providers reflected the greatly varied levels of educational attainment and teaching experience among these professions in low-income communities.

For ethical reasons, participants were not asked to identify their race/ethnicity or that of children in their care. However, in order to test the program in settings representative of targeted end-users, participants were recruited from predominantly African-American and Hispanic preschools.

Participants in Year Two (National) Testing. The second year of the study focused on the extent that positive outcomes from Year One testing in Connecticut (see below) could be replicated in representative low-income childcare settings in five other states. Through the cooperation of other universities, participants were recruited in Los Angeles, CA, Chicago, IL, New York City, Cleveland, OH, and Greenville, SC. Testing was conducted with 303 participants, 180 preschool children in the care of 123 adults – 44 parents, 45 teachers, and 34 home care providers.

Demographic features of the national testing participants were similar to those of the participants in Year One local testing. The Mean age of the 180 participating children was 4.00 years. Eleven percent of children spoke a first language other than English. Ninety-one percent of participating parents were mothers. Once again, for ethical reasons, participants were not asked to identify their race/ethnicity or that of children in their care; however, participants were recruited from predominantly African-American and Hispanic preschools and communities in order to test the program in settings representative of targeted end-users.

Participants' Use of Information Technologies. Data gathered on adult participants' access to information technologies, reflected positive national trends of increasing computer access in low-SES communities (National Telecommunications & Information Administration, 2002). Among Year One (local testing) participants, 62% percent of parents, 83% of teachers and 78% of home care providers had some access to computers. One year later, participants in national testing reflected even stronger gains in access to computers. Eighty-nine percent of adult participants – 89% of parents, 87% of teachers, and 91% of home care providers – had some access to computers. Around half of participants in both years (56%, 44%) used computers at home, around a fourth (21%, 29%) accessed computers at work, around 15% (13%, 17%) in public libraries, and the remainder (10%, 8%) in other settings.

Participants' use of DVD players reflected the accelerated adaptation of this technology in all segments of the US population. In 2002 only 2% of adult participants (1 out of 50) had requested a DVD copy of the program's prototype version; 98% had requested videocassettes. By 2004, the first year of the full study, nearly a third (32%) of adult

participants requested the program in DVD rather than videocassette format. In 2005, the second year of the full study, 60% of participants in national testing requested the program in DVD format. As noted above, low-income communities' rapid adaptation of inexpensive DVD technology is a positive trend for enhanced use of *My Magic Story Car*. The DVD format with its menus and buttons provides easy, user-directed, nonlinear access to each game anytime children want to see it; and is a considerably better interface than linear videocassettes.

Testing *My Magic Story Car*: Methodology

In both years of the study, adult participants and parents of preschoolers in the care of participating teachers and home care providers signed Informed Consent forms; and all participants were assigned code numbers to preserve their anonymity.

Testing in the first year of the study was conducted in representative inner city childcare settings in New Haven, CT using random assignment, before and after measures, and statistical controls.

A written instrument and telephone interviews were employed to assess children's pre-intervention emergent literacy skills, including: the number of alphabet letters the child can name; print knowledge (e.g., parts of a book, direction in which English text is read, the meaning of terms such as *author* and *title*); phonological awareness (e.g., child's ability to make rhymes), and emergent writing (e.g., child's ability to write his or her name). Adults' current practices to foster emergent literacy (e.g., frequency of taking children to a library) were also assessed prior to intervention.

Participants were randomly assigned to an Experimental Group (n=136, 45 adults and 91 children) that used the program with children in their care for two weeks, and a Control Group (n=131, 46 adults and 85 children) that did not receive this intervention. The two groups were evenly matched in terms of demographic features and children's pre-intervention scores on the multiple emergent literacy measures.

The video/DVD for children and printed manuals for adults were distributed to parents, teachers and home care providers in the Experimental Group. In order to simulate how the final version of *My Magic Story Car* would be used in childcare settings, participants no prior training in how to use the program. Participants were simply asked to present the program to children in their care and play its emergent literacy learning games for two weeks. After the two-week test period, Experimental Group outcomes were recorded on three instruments:

- Children's Post-intervention Emergent Literacy Skills: Children's scores for the same skills previously scored on the pre-intervention instrument and telephone interviews (e.g., the number of letters the child can name).
- Record of Play Form: A log of the frequency (times/week) and amount of time spent playing the games, which games were played most often and were "favorite games," and the extent to which children continued to play games on their own without adult intervention.
- Feedback Form: Participating adults rated the program's usefulness on a 5-point scale, and provided qualitative comments on any enhancements in children's emergent literacy and/or their own practices for fostering emergent literacy after using the program.

Experimental Group adults also attended one of several 90-minute focus groups to provide additional qualitative feedback on their experiences using the program with children in their care and to offer suggestions for any refinements needed.

For ethical reasons, to increase the number of participants testing the program, and to examine whether their experiences would replicate the outcomes of the Experimental Group, the same intervention was then provided for the Control Group (n=46 childcare settings) subsequent to testing the program with the Experimental Group. Testing procedures were the same as those conducted with the Experimental Group, including asking adults to present the program to children for two weeks with no prior training in the program's use.

Quantitative and qualitative data were compiled and analyzed to determine if: (a) as a result of using the program for two weeks, Experimental Group children showed measurable gains in targeted emergent literacy skills when compared with the Control Group, and (b) whether the combined pre/post scores of all participants (Experimental and former Controls) showed significant gains after the intervention.

Year Two national testing in five additional states (California, Illinois, Ohio, New York, and South Carolina) was conducted with similar protocols of assessing children's targeted emergent literacy skills prior to intervention, asking parents, teachers and home care providers to present the program to children in their care for two weeks with no prior training in the program's use, assessing children's targeted emergent literacy skills after the intervention, and conducting focus groups to compile adults' qualitative feedback. However, due to logistical considerations, national testing participants were not divided into Experimental and Control Groups. Instead, all national testing participants received the same intervention at the same time.

Testing *My Magic Story Car*: Findings

Assessments of Program Efficacy and Use. The data indicated that participating low-SES parents, teachers and home care providers were able to use the program with no prior training.

Participants also had no difficulties in providing children some form of the Magic Story Cars needed for playing the learning games. The majority reported they had used cushions, pillows, chairs or decorated cardboard boxes. Some participants evolved rather creative solutions such as giving children laundry baskets, mop buckets, diaper boxes, carpet squares or large stuffed animals to drive as their Magic Story Cars.

Adult participants were asked to rate the usefulness of the *My Magic Story Car*, and gave it very high scores. They rated the video/DVD and printed manuals on a 5-point scale, in which 1=Not Useful, 2=Somewhat Useful, 3=Fairly Useful, 4= Very Useful, and 5= Extremely Useful. In Year One, 85% of participants scored both the video/DVD and the printed manuals '4' (Very Useful) or '5' (Extremely Useful) on the 5-point scale. Among Year Two national testing participants, 85% rated the video/DVD and 82% rated the printed manuals scores of 4' (Very Useful) or '5' (Extremely Useful).

As one measure of the extent to which the program engaged and motivated children, participants recorded how much time children spent playing the emergent literacy games during the two-week test period. Their responses indicated, that despite the adults' hectic schedules, participants devoted considerable time engaging in the games. In Year One (local) testing, children in home care played the games for 9.5 hours (means), children played the games with parents 7.7 hours (means), and those with teachers played 4.4 hours (means). Teachers attributed their lower number of hours playing the games to their more limited opportunities within the highly structured school schedule.

Year Two testing employed slightly different measures, which also indicated that the 303 national testing participants devoted considerable time to playing the games. On average,

participants played the games four and a half times per week, with 95% of the sessions lasting 20 minutes or more and over half of the session (53%) lasting 30 minutes or more.

Outcomes for Children: In Year One (Connecticut) testing, enhancements to children's emergent literacy were assessed in two ways: (a) Comparisons of Experimental Group post-intervention scores with Control Group pre-intervention scores; and (b) Comparison of all participants' (Experimental Group and former Control Group) cumulative post-intervention scores with their cumulative pre-intervention scores. In Year Two national testing, pre- and post-intervention scores were recorded for all participants without dividing them into Experimental and Control Groups. The following summaries the outcomes.

Print Knowledge: Naming Alphabet Letters. The video presentations of the Lost Puppy Game, Birthday Presents Game, and to some extent all the games in the program, show young children naming alphabet letters to solve challenges in the games' make-believe narratives. The video also provides young viewers many interactive challenges for practicing this important skill. Pre/Post testing indicated significant gains in children's ability to name alphabet letters after they played the program's emergent literacy games for just two weeks.

Year One (Local Testing) Results: After exposure to the program for two weeks, Experimental Group children's Mean post-intervention score of knowing 16.79 letters ($P < .01$) was more than a 1/3rd higher than Control Group children's Mean pre-intervention score of knowing 12.32 alphabet letters. The most significant difference was among children in home care settings, where the Experimental Group's post-intervention Mean score of knowing 16.35 letters ($P < .01$) was more than 2/3rds higher than the Control Group's pre-intervention Mean score of knowing 9.73 letters.

After the Control Group also used the program and played its games for two weeks, their pre/post scores were combined with those of Experimental Group children. Again, there were significant gains when comparing pre/post scores for all participants (Experimental and former Controls) – a post intervention gain from a Mean of knowing 12.35 letters to a Mean of knowing 17.51 letters ($p < .01$). The largest pre/post gain was among home care children, who increased their ability to name alphabet letters by more than 50%, from a Mean of identifying 10.93 letters to a Mean of identifying 16.57 letters ($p < .01$).

Year Two (National Testing) Results: It is important to note that Year Two national testing occurred later in the academic year (April-May) than Year One local testing (November-December). This resulted in many children's having higher pre-intervention scores and somewhat lower rates of gain than Year One participants for skills such as the identifying alphabet letters. Nonetheless, after children participating in Year Two national testing played the games for just weeks, they showed a statistically-significant post-intervention gain from a Mean of knowing 14.21 letters to a Mean of being able to identify 17.19 letters ($p = 0.00$).

Print Knowledge: Literacy-related Words (author, title, library, borrow). The Trip to Mars Game and the Lost Puppy Game incorporate definitions and narrative examples of the words *author, title, library* and *borrow* (as in *borrowing* library books). Pre/Post test scores indicated significant gains in children's understanding and use of these four words.

Year One (Local Testing) Results: Experimental Group children's post-intervention Mean score, correctly identifying 2.98 of the four literacy-related word ($p < .01$), was more than 2/3rds higher than Control Group children's pre-intervention Mean score (correctly identifying 1.76 of the four words). Experimental Group children in home care settings showed particularly

strong gains; their post-intervention Mean score of knowing 3.35 words of the four words ($P < .01$) was more than double the home care Control Group's score of knowing only 1.57 of the four words.

After the Control Group also used the program and their pre/post outcomes were combined with those of Experimental children, even stronger gains were evident when comparing pre/post scores for all participants (Experimental and former Controls) – a post intervention score of knowing 3.08 words of the four words ($p = 0.00$), which nearly doubled their pre-intervention score of knowing only 1.58 of the four words.

Year Two (National Testing) Results: Preschoolers who participated in national testing in five additional states also demonstrated statistically-significant gains in their understanding of the literacy-related words, *author*, *title*, *library* and *borrow*. Their post-intervention score of knowing 2.48 of the four words ($p = 0.00$) was more than 3/4ths higher than their pre-intervention score of identifying only 1.37 of the four words.

Print Knowledge: Book Use. The Trip to Mars Game, and to some extent the Lost Puppy Game, demonstrate and provide young viewers interactive challenges to practice how to use books and identify the parts of books.

Year One (Local Testing) Results: In Year One preschoolers were scored for their understanding of three elements of print knowledge: (a) identifying a book's front cover; (b) identifying a book's back cover; and (c) indicating the direction in which we read English text (top-to-bottom, left-to-right).

Children also showed gains in this skill after exposure to the program. Experimental Group children's post-intervention Mean score, correctly answering 2.80 of the three book use questions ($p < .01$), contrasted with Control Group children's Mean score of 2.16 correct

answers to the three questions. After the Control Group also played the program's games for two weeks, and their pre/post scores were combined with outcomes of the Experimental Group, the mean post-intervention score for all participants (Experimental and former Controls) increased from a Mean of 2.25 correct answers to a Mean of 2.76 correct answers to the three book use questions ($p < .01$).

Year Two (National Testing) Results: As noted above, because national testing was conducted later in the school year than Year One local testing, children began with higher pre-intervention scores and therefore showed smaller resultant gains for this measure. On average, children participating in national testing demonstrated a modest gain in their correct answers to four book knowledge questions: (a) identifying a book's front cover; (b) identifying a book's back cover; (c) identifying which elements of a printed page are "words," and (d) indicating the direction in which we read English text. Their pre-intervention Mean score, correctly answering 3.37 of the four questions, rose to a post-intervention Mean score of 3.69 correct answers to the four book use questions ($p=0.00$) after playing the program's games.

Phonological Awareness: Rhyming. The Rhyme Store Game demonstrates rhyming and gives young viewers many interactive challenges to practice rhyming. Pre/Post testing indicated statistically significant gains in children's abilities to rhyme after exposure to the program for just two weeks.

Year One (Local Testing) Results: Experimental Group children's post-intervention score, a Mean of 77.8% who could make rhymes, was 16.7% higher than Control Group children's pre-intervention Mean score of 61.1% who could rhyme. After the Control Group also used the program for two weeks and their pre/post scores were combined with those of the Experimental Group children, the Mean post-intervention score for all participants

(Experimental and former Controls) increased by 27.84% from a Mean of 56.5% to a Mean of 84.4% of children who could make rhymes.

Year Two (National Testing) Results: Children who played the program's gains in five additional states showed an even stronger 33% Mean gain, an increase from 43% to 76% of children who could make rhymes after exposure to the program for two weeks.

Phonological Awareness: Compound Words. The primary learning objective of the Octopus Treasure Game is demonstrating and providing young viewers interactive challenges to practice recognizing and manipulating compound words such as *cowboy*, *sunshine* and *popcorn*.

Children's abilities to recognize and manipulate compound words were not fully assessed until Year Two national testing. The Year Two national testing instrument included a set of eight questions to score children's understanding of compound words before and after intervention (e.g., "What two words do you hear when I say the word *doorbell*? What word is left when I take the word *door* away from the word *doorbell*?").

Understanding compound words is the program's most challenging emergent literacy skill, because it pushes the envelope of preschoolers' developmental levels. Several participants noted children experienced difficulties on their first attempts with compound words; however, the vast majority experienced gains in this skill after playing the game again. Before exposure to the program, children had a Mean score of correctly answering less than half, only 3.73, of the eight compound word questions. After playing the games for two weeks, children's Mean score rose by over 50% to a Mean of correctly answering 5.57 of the eight compound word questions ($p=0.00$).

Participants' qualitative feedback reinforced these findings. For example, one teacher noted: "I have seen a change in the children's vocabulary. They are using words from the games. They loved compound words. They broke up words by syllable. They also tried to put two words together, like *dollhouse*, *doghouse*, *classroom*, *basketball*, *bathtub*, *bathroom*, and *boxcar*. I was amazed and excited about their progress."

Phonological Awareness: Letter Sounds. The primary emergent literacy objective of the Birthday Presents Game is demonstrating and providing young viewers interactive challenges to practice alliterations – words that begin with the same sound (and letter). Children in the video and young viewers are asked to match sets of make-believe birthday presents that begin with the same sound and letter, such as *ball*, *bat*, *balloon* and *book*. At the same time they practice naming alphabet letters.

Children's abilities to recognize and manipulate letter sounds were not fully assessed until Year Two national testing. In three questions on the national testing instruments, two words that start with the same sound, (e.g. *dog* and *doll*) were read aloud to a child, and the child asked the child to say those two words aloud and then say another word that begins with the same sound. After playing the program's games for two weeks, participating children showed a statistically significant gain in this skill, going from a pre-intervention Mean of correctly answering 1.33 of the three letter sound questions, to a post-intervention Mean of correctly answering 1.99 of the three letter sound questions ($p=0.00$).

Emergent Writing: Child Can Write His or Her Name. The program provides children opportunities to practice emergent writing when playing the Lost Puppy Game (writing their names on library cards), the Trip to Mars Game (writing their name as the 'author' of a book

for children on Mars), and when writing their names on 'license plates' for their Magic Story Cars.

Writing is complex skill involving cognitive as well as motor skills that develop over a longer time frame than other emergent literacy variables such as learning the meanings of the book-related words *title*, *author*, *library* and *borrow*. Nonetheless, in both years of testing children showed statistically significant gains in emergent writing after using the program for just two weeks.

Year One (Local Testing) Results: The percentage of Experimental Group children who could write their names after playing the games (74.2%) was 13.6% higher than the percentage of Controls who could write their names before using the program (60.6%). After the Control Group also used the program, and their pre/post scores were combined with those of the Experimental Group children, the Mean post-intervention score for all participants (Experimental and former Controls) increased by 12.3%, from a pre-intervention Mean of 59.6% to a post-intervention Mean of 71.9% of children who could write their names.

Year Two (National Testing) Results: Children who participated in national testing showed a comparable 15% post-intervention gain. After exposure to the program, their Mean score increased from 43% to 58% of children who could write their names.

Gains in Children's Knowledge of and Interest in Libraries. One objective of the Lost Puppy Game is to motivate children to want to use libraries and to obtain their own library cards. Participants' feedback indicated strong increases in children's (and parents') interest in libraries and books after playing the program's games, as illustrated in these representative examples:

- We have a library with Spanish and English books and a writing area. These areas of the classroom were not popular, but now the children compete to have a turn there. (Teacher)
- They set up chairs to play library on their own. (Home care provider)
- I invited the parents of the children to come and watch it (the video). And one of the parents right away, that afternoon, when they were leaving, took their child to a library. (Teacher)
- I have heard kids asking their moms if they can go to the library after school. (Teacher)
- More than anything I try to make more time to go to the library. She (daughter) keeps saying “mom, come on, let’s go to the library, come on!” (Parent)

On-going Outcomes of Playing the Games. An important measure of the product’s efficacy is the extent to which, after playing the games for two weeks with adults, children continued playing the games on their own without adult intervention, engaged other children in playing the games, and/or incorporated skills they learning in the games into their daily activities.

Year One (Local Testing) Results: Adult participants (n=91) rated the extent to which children (n=176) continued playing the games on their own on a five-point scale, in which 1= Not At All, 3= Sometimes, and 5= Many Times. Sixty-five percent of all adult participants (73% of home care providers, 70% of parents, and 54% of teachers) reported children continued to play the games on their own, i.e., they gave scores of ‘3’ (Sometimes) to ‘5’ (Many Times) for this measure.

Year Two (National Testing) Results: Adults participating in national testing (n=123) reported somewhat higher scores for this measure. Sixty-eight percent of participants (84% of home care providers, 82% of parents, and 49% of teachers) reported that children

continued to play the games on their own without adult intervention after the two-week test period. In both years teachers attributed their lower scores for this measure to children's more limited free time during the highly structured hours they spend with teachers.

Participants' qualitative feedback from both years included these comments:

- They play the games by themselves and with each other. They imitate me as a teacher, they teach letters and sounds to the other kids. (Teacher)
- The big surprise was taking the children to a real library. They told the librarian where the front and back covers of the book were (Home care provider).
- My son was afraid to say the alphabet when he was in school. Now he spells words that he sees wherever we go. When we were at a store he spelled the word E-X-I-T. (Parent). “
- He taught the rhyme game and the lost puppy to his friends in Sunday School (Parent).

Outcomes for Adults. Qualitative feedback from written instruments and focus groups indicated that many parents, teachers and home care providers made meaningful gains in their own skills for fostering emergent literacy after using the program for just two weeks.

For example, a teacher noted: “Participating in the project made me more aware of teaching children about reading left to right. Before, I just assumed that everyone would know that. Now I am more aware of the sounds of letters. It was great to watch the children become authors, to write their own words and to see the sense of pride and accomplishment that followed.”

Another teacher commented: “Before, I actually didn't know how to do a lot of activities with alphabets because we weren't suppose to teach that to the children – like you're suppose to teach them in kindergarten or in elementary school. So we didn't know how to be more

creative with letters or reading, but now we just do it at all, all the time.” And a parent reported: “I realized that a lot of things that I did not think she was ready for or things I did not think she even thought about, she knew. When she shows interest that makes me show more interest.”

A home care provider offered this insight: “I think I’d kind of lost touch with some of the real simple things that you can do with children. I had watched one of my grandchildren one Christmas tear the wrappings off, throw the present out and hop in the box. Well this (program) brought all of that back. Because children do like simple things and I think that’s why they enjoyed it. Because they could decorate their box. They could get in it. That was their own little space. Each one knew which one was theirs even the sixteen-month-old. And the little group couldn’t wait to see who was going to be the puppy and show the others ones, you know, how you read the book and which way you went to read it, you know, and who it was written by, and they enjoyed that... I think the best way they can learn is through play.”

One of the best summaries of the program’s ultimate purpose was provided by a mother from Puerto Rico at the end of a focus group session. She offered her thanks for being included in the testing, which gave her new skills for helping her young son learn. She sadly recalled that when she was a child her parents were not involved in her education, and she didn’t want to do that to her children. Now, even when she comes home from work exhausted, she reads books to her children every night. She concluded: “I know how much it means to them, how good it is for them, and how good it is for me too.”

Conclusions

A significant number of children in the USA, particularly children from poor families, start kindergarten lacking the skills needed to learn reading. *My Magic Story Car* is a video-

based program that untrained parents and other caregivers can use in any childcare setting to engage 4-5-year-olds from low-income families in make-believe games that strengthen their emergent literacy skills. The program addresses its objective by interweaving three elements: (a) make-believe play as an intrinsically motivating modality for engaging preschoolers in learning activities; (b) empirical studies of the requisite skills of emergent literacy; and (c) video-based programs as an effective medium for empowering parents/caregivers of poor children with easily replicated, reliable interventions for implementation any childcare setting.

In just two weeks, children in the study showed significant pre/post gains in key emergent literacy skills embedded in the game's make-believe narratives, such as phonological awareness and print knowledge. Children also showed increased knowledge of and interest in books and libraries; and adults reported that using the program led to gains in their own skills for fostering children's emergent literacy. After the two-week test period, the vast majority of children (66%-68%) continued to play the games on their own without adult intervention, to incorporate skills modeled in the games into their daily activities, and teach the games to other children.

Reading is prerequisite survival skill for a full and productive life in twenty-first century America. Providing parents, teachers and other caregivers of disadvantaged preschoolers an engaging, empirically-tested, easily replicated, no-prior-training-required program for strengthening emergent literacy can help to kindle a spark in young children, a spark of each child's vast potential that can brighten when he or she enters school and continue glowing through a lifetime of learning. *My Magic Story Car* demonstrates that one of the most

effective ways of kindling this spark is also among the most natural, entertaining, amusing, rewarding and exhilarating of all human experiences – make-believe play.

Few activities surpass the intrinsic power and pure enjoyment of play – for adults as well as young children. We can be transformed by “playing” an instrument, experiencing a “play” at the theater, participating in or observing the “plays” of competitive sports, or “playing” a hand of cards. Many of our most rigorous intellectual disciplines, such as the protocols of experimental sciences and the “what if” scenarios of economics, politics and war games are, in reality, simply highly structured forms of play. To the extent that we are wise enough to leverage the natural potency of play in our pedagogy and other practices, the more effective we can become in all species of human endeavors.

Perhaps, it is little wonder that the approaches at the heart of the program outlined in this chapter has proven effective in democratizing and leveling the emergent literacy playing field for at-risk, disadvantaged preschoolers. As Shakespeare’s Hamlet said: “The play’s the thing” (*Hamlet*, II:2).

¹ Endnote

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