

ABSTRACT

Title of Document: CHILDREN'S PUBLIC LIBRARY USE AND
KINDERGARTEN LITERACY READINESS IN THE
STATE OF MARYLAND

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In the last fifteen years dramatic changes have occurred in early childhood education, particularly in early literacy. Responding to the research, public libraries have transformed their services to young children and caregivers. In 2004, the Public Library Association launched *Every Child Ready to Read*. Maryland librarians were on the forefront of this effort, which developed in tandem with their *It's Never Too Early* campaign. At the same time, libraries have been trying to develop outcome measures to assess their impact on users. The current study uses data from a kindergarten readiness assessment in literacy and finds a positive correlation with children's library use as shown by circulation and attendance at children's programs in Maryland. This paper examines the implications of such research on policies and practices and makes recommendations for future study.

CHILDREN'S PUBLIC LIBRARY USE AND KINDERGARTEN LITERACY
READINESS IN THE STATE OF MARYLAND

by

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Introduction

Public libraries in the United States have long contended that they serve an important role in early childhood literacy and school readiness. In addition to offering collections of books, CDs, magazines, videos, and educational software and kits for children, most public libraries also offer targeted programs for preschoolers and their caregivers. Libraries' programs and services for children often focus on literacy and other educational skills and nationally distributed models are infused with the latest findings in neuroscience, developmental research, and educational research (ALSC/PLA, 2011; Diamant-Cohen, 2004; Nespeca, 2013).

In 2000, the Public Library Association (PLA) began an Early Literacy Project. This involved not only sharing the results of literacy research widely to libraries throughout the nation, but also developing model public library programs using the research. PLA hired two scholars in early literacy, Dr. Grover Whitehurst and Dr. Christopher Lonigan, to review current library offerings and develop the new research-based programming. While early childhood programming was deemed worthwhile, Whitehurst and Lonigan encouraged librarians to add a component aimed at parents and caregivers. By modeling language-enrichment games and activities, librarians could also inform adults about how they could be a child's first literacy teacher. To help that happen, the researchers developed a curriculum of written lessons for librarians to present to parents and caregivers of three target age groups: pre-talkers, talkers, and pre-readers. Pre-talkers are infants and toddlers under 24 months; talkers are two- and three-year-olds; and pre-readers are four- and five-year-olds (Meyers & Henderson, 2005; Minkel, 2002). The model for caregivers focuses on how they can help prepare children

for learning to read, while the model for preschool children shows ways to improve vocabulary development and awareness of sound and print structure (Reif, 2000). After piloting and evaluating this new literacy approach, PLA disseminated it to public libraries throughout the nation under the moniker *Every Child Ready to Read* (ECRR) in 2004 (Meyers & Henderson, 2005). As ECRR co-chairs Elaine Meyers and Harriet Henderson assert, “The intent of these partnerships and programs is to firmly establish public libraries as a partner in the educational continuum, and to validate our contributions by linking our activities to relevant research and evaluation” (2005, para. 7). Recognizing public library efforts in the literacy domain, in June 2001 First Lady Laura Bush invited libraries to speak at a White House summit on early childhood cognitive development, *Ready to Read, Ready to Learn* (Shauck, 2002). Since then, the public library community, spurred by government grants from the Institute of Museum and Library Services (IMLS) and state libraries, has continued to evaluate and modify ECRR and related early literacy initiatives.

Public libraries in Maryland, perhaps more than any other state, have been on the forefront of early childhood literacy education, even helping to develop ECRR. The push began in 1998, when Maryland’s state library, the Division of Library Development and Services (DLDS), created a Youth Services Consultant position. Simultaneously, the person who became the ECRR co-chair, Harriet Henderson, was both the Director of Montgomery County Department of Libraries in Maryland and president-elect of PLA. As part of the Maryland Association of Public Library Administrators (MAPLA), she and Kathleen Reif, Director of Wicomico County Free Library, launched and co-chaired a new Birth-to-Five Task Force in 1998. In May 1999, DLDS, MAPLA, and the Ready at

Five Partnership of the Maryland Business Roundtable collaborated on a historic symposium called “Maryland Public Libraries: Creating Connections to Help All Children Start School Ready to Learn to Read!” Twenty-two of the 28 public library directors in the state attended. As a result of the symposium, the libraries created a document that defined how Maryland public libraries were serving the birth to five community titled *First Edition: Public Libraries Help Young Children Start School Ready to Learn to Read* (Reif, 2000; Shauck, 2002).

DLDS fostered adoption of these ideas among Maryland libraries by offering two kinds of grants. Twenty-five systems received a \$1,000 “Greenhouse Grant” to incubate new library services sprouting from the seeds of knowledge planted at the symposium. In addition, in fiscal years 2000 and 2001, DLDS encouraged libraries to apply for Library Services and Technology Act (LSTA) grants in order to support projects that focused on children birth to five and their caregivers (Shauck, 2002).

As on the national level, 2001 and 2002 were years of burgeoning early childhood initiatives in Maryland. Frances Glendening, First Lady of Maryland, approached public libraries to help with her Fifteen for the Future Literacy Initiative. Her goal was to encourage parents to read with their children as a way to develop a love of reading. As part of the initiative, libraries contributed literacy tips for 40,000 calendars that were distributed throughout the state. Also in 2001, DLDS contracted with Elaine Czarnecki and Gilda Martinez, reading specialists with the Johns Hopkins University, Center for Reading Excellence, to conduct a literature search of how public libraries used their knowledge of research-based pre-reading skills to support children entering school. Like Lonigan and Whitehurst on the national level, Czarnecki and Martinez simultaneously

researched and prepared model programs for Maryland. In 2001, they developed storytime training sessions for every children's librarian in the state that incorporated the latest findings in child development and reading theory (Shauck, 2002). Librarians also received training in the state's new kindergarten assessment and learned ideas for activities that adults could use to strengthen children's listening, speaking, pre-reading, and writing skills (Minkel, 2002).

In 2001, Maryland libraries bundled their efforts under the umbrella of a public awareness campaign called *It's Never Too Early* to publicize that libraries were actively providing storytimes, assisting families in finding books of interest, providing tips on choosing age-appropriate books, and connecting families to literacy resources (Shauck, 2002). Over the course of a few years, several types of trainings were offered in the following areas: early literacy (tied to the PLA initiative and linked to Maryland education standards); childcare certification workshops for caregivers; workshops for the Spanish community; and support for children and families with special needs (Shauck, 2004). As a result, children's programs in Maryland public libraries have become infused with research-based literacy practices for a wide variety of populations.

The *It's Never Too Early* campaign did leave some room for improvement, however. The high-quality trainings did not always transfer into practice, so in 2006 DLDS piloted an Emergent Literacy Peer Coaching project in Carroll County as a way to target prospective lead coaches who would ensure continued use of emergent literacy and best practices in storytimes. This quick, non-evaluative coaching process was packaged with an overview of emergent literacy and offered in workshops statewide in fall 2008. Organizers drew on research that found that only 10% of staff apply what they learn in a

workshop; however, when a coaching component is added to the training, 90% of learners will transfer the new skills into practice (Stoltz, Czarnecki, Wilson, & Martinez, 2010). A representative sample of the kinds of children's outreach programs and services being offered in Maryland in 2008 is described in a multiple case study done by Martinez. As the initiative matured, she found that librarians had expanded their reach to churches, community centers, malls, pediatrician's offices, childcare centers, hospitals and beyond (Martinez, 2008). This decade of coordinated efforts primed Maryland public libraries to be an integral part of the state's learning infrastructure in early childhood education, both inside and outside the libraries' walls.

The current study of Maryland was inspired by an article by Lance and Marks entitled "The Link Between Public Libraries and Early Reading Success" (2008). By analyzing data published in 2007 by the National Center for Education Statistics (NCES), Lance and Marks found that the correlation between the number of children's materials circulated and the reading scores on the National Assessment of Educational Progress (NEAP) for 4th grade was .514 with a high statistical significance ($p < .01$). The correlation between the reading scores and attendance at children's programs was .288 and was also statistically significant ($p < .05$). These significant positive relationships show that as juvenile circulation and program attendance rise in a given state, so do standardized test scores in elementary schools in that state.

Over a decade earlier, Stephen Krashen did a similar analysis in an article entitled "School Libraries, Public Libraries, and the NEAP Reading Scores" (1995). He found that public library average circulation per capita numbers correlated positively with 4th grade scores on the 1992 NEAP Reading Comprehension test in 41 states (1995). He

reported a statistically significant positive correlation of .2928 ($p < .01$). Though this effect size is small to medium, Krashen showed that such an examination was worthy of a researcher's time as future datasets became available.

Though neither of these studies focused on kindergarten readiness, their analyses offer a window into how statistical analysis of surrogates can help demonstrate outcomes. The current study follows their lead, but focuses on the state of Maryland, the first state in the nation to institute mandatory kindergarten testing. The Maryland State Department of Education (MSDE) launched the Maryland Model for School Readiness (MMSR) assessment in 2001, making it possible to narrow the research focus to juvenile library use and kindergarten readiness in the literacy domain using the counties as the unit of analysis. The targeted approach in the current study offers support for the widespread belief that Maryland libraries' decade-long focus on early literacy has led to children being better prepared to learn to read in kindergarten.

The current study is an exploratory look at data collected in the state of Maryland as it pertains to children's library use and kindergarten test scores. More specifically, it considers the circulation of children's materials, children's program attendance (in general), program attendance at preschool programs (in particular), and MMSR test scores in language and literacy in 2010. A Pearson's r correlation coefficient test was run using the counties as the unit of analysis to see if MMSR scores went up as circulation and/or program attendance went up. The results indicate that in the state, there is a much larger positive relationship between juvenile library use and literacy in Maryland than previously discovered, particularly in the realm of preschool programming.

Research Questions

- In the state of Maryland is there a relationship between library circulation of juvenile materials and kindergarten literacy skills?
- In the state of Maryland is there a relationship between attendance at public library programs designed for children in general, or preschoolers in particular, and kindergarten literacy skills?

Hypotheses

- In the state of Maryland a relationship exists between library circulation of juvenile materials and kindergarten literacy skills.
- In the state of Maryland a relationship exists between attendance at public library programs designed for children and kindergarten literacy skills.
- In the state of Maryland a relationship exists between attendance at public library programs designed for preschoolers and kindergarten literacy skills.

Literature Review

The Rise of School Readiness and Emergent Literacy Theory

Though preparing children for school has been a concern since at least the beginning of the Head Start program in 1965, school readiness moved to the forefront of public discussion in 1989, when President Bush and the National Governors' Association declared that by the year 2000 "all children in America will start school ready to learn" (Andrews & Slate, 2001, para. 4). Part of the research initiated by the bipartisan National Education Goals Panel launched by federal and state officials in 1990 included the Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K). This study

followed a national sample of children from kindergarten through fifth grade, assessing their physical, academic, and social development. At the insistence of Maryland librarians from MAPLA's Birth-to-Five Task Force, questions on public library use were also included on the ECLS-K (Reif, 2000). The study found that family risk factors in kindergarteners were associated with lower proficiency in academic skills, and that high quality early childhood education was a promising solution (Joyner & Theodore, 2012). Bush's No Child Left Behind legislation, the increase in accountability of schools, and the growth of "high stakes" testing combined to force schools and governments to devise strategies to improve school readiness (Garber, Timko, Bunkley, Lumpkins, & Duckens, 2007).

In addition, new developmental research has transformed the way people think about early learning and literacy. Advances in research in brain science have shown that babies are born hardwired to learn (Shonkoff & Phillips, 2000), and that early experiences can create or diminish readiness gaps among different groups of children that can lead to achievement gaps later in school (Santa Clara County Partnership for School Readiness & Applied Survey Research, 2008). Such research has had a profound effect on the conception of literacy. As early as 1966, Mary Clay's dissertation *Emergent Reading Behavior* introduced the idea that the precursors for reading begin well before any formal instruction. William Teale and Elizabeth Sulzby coined the term *emergent literacy* in 1986 with their book *Emergent Literacy: Writing and Reading* (Dixon & Johnston, n.d.). Birckmayer defines emergent literacy as "the constellation of skills accumulated in unique ways by each child, beginning in infancy and continuing throughout the preschool years" (2000/2001, p.25). Cross-fertilizing with the brain

research going on simultaneously, the emergent literacy concept has continued to evolve into an “interactive, holistic approach to literacy development emphasizing the natural reading and writing behaviors exhibited by preschoolers before formal instruction begins” (Celano & Neuman, 2001, p. 3).

The majority of the studies on early literacy have been synthesized by two meta-analyses: the report of the National Reading Panel, *Teaching Children to Read* (2000), and the report from the National Early Literacy Panel, *Developing Early Literacy* (2008). In 1997 Congress called upon the National Institute of Child Health and Human Development (NICHD) to create a National Reading Panel to identify research-based information on how children learn to read. The National Reading Panel’s report, *Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and Its Implications for Reading Instruction*, was released in April 2000. The panel examined the effectiveness of various types of reading instruction for children from preschool to grade 12. It screened approximately 100,000 research reports for methodological rigor and did meta-analyses of effect sizes when possible. The panel found that instruction in phonemic awareness (the smallest components of spoken language) was a highly effective technique to improve reading and spelling. It also found that systematic phonics instruction helped children learn to read and spell much more effectively than instruction that teaches little or no phonics. Guided oral reading has a significant and positive effect on word recognition, fluency, and comprehension. The panel also discovered seven types of instruction that improve text comprehension, many of which are inherent in the technique of dialogic reading, which encourages back-and-forth conversation between adult and child during reading (NICHD, 2000). This was the

report that PLA disseminated widely to libraries and used as the basis for its Early Literacy Project that ultimately led to ECRR.

The National Reading Panel necessarily had to limit its focus and left many questions unanswered, particularly in the area of preschool literacy. As a result, the National Early Literacy Panel released a follow-up report focused on the implications of literacy practices on children from birth to age five in 2008. Out of the 8,000 articles located by the panel, only about 500 had the methodological rigor to be used in meta-analysis. Compiling the research, the panel advised which conventional literacy and early literacy skills correlated with later literacy development. Of particular interest to libraries, it also reported on the instructional practices that enhance early literacy skills. Among these are shared reading programs as well as parent and home programs, which are areas of focus for library services. The report also found that the types of instruction that are effective in kindergarten can also be used for preschoolers, so the findings from the National Reading Panel on which PLA's Early Literacy Project, ECRR, and Maryland's *It's Never Too Early* programs were based, continued to be appropriate and relevant. What the National Early Literacy Panel did emphasize, however, is that too few studies had the rigor to show definitive outcomes in later literacy attainment. Therefore, the panel recommended future research using a wider range of outcome measures combined with longitudinal studies of more complex interventions that report data separately for children in different demographic categories (Lonigan & Shanahan, 2008).

A more recent meta-analysis takes a slightly different angle on the published research. In the 2010 report entitled *Children's Access to Print Material and Education-Related Outcomes*, Lindsay orients away from the pedagogical focus of the reports from

the two aforementioned national panels. He focuses instead on the effect the availability of reading materials has on educational outcomes as described in 11,616 research reports. Lindsay analyzes the effect sizes in 108 of those reports and is able to determine that children's access is positively related to seven types of outcomes in literacy as well as overall general academic achievement. A causal relationship is established for attitudes towards reading, reading behavior, emergent literacy skills, and reading performance (Lindsay, 2010). In other words, simply by providing access through free circulation of print materials, public libraries are having an impact on key indicators of literacy and broader educational attainment.

An excellent literature review of the critical dimensions of language and literacy in early childhood can be found on the ECRR website, www.everychildreadytoread.org, under "Literature Review" (PLA, 2010b). It bears noting that one of the most influential articles comes from Whitehurst, Lonigan, and their colleagues' landmark experiment using a shared reading method called "dialogic reading," which demonstrated causal links between aspects of shared picture book reading and two-year-old children's oral language development (1998). PLA subsequently hired Whitehurst and Lonigan to evaluate library services and create a model program for caregivers and parents, which ultimately became ECRR.

The National Reading Panel's report and Whitehurst and Lonigan's research triggered a response that fundamentally changed the way public libraries structured services for young children and their caregivers. After examining the literature about early literacy that informs and influences public library programs and services to

children, this researcher turned to the literature specifically on libraries to examine how libraries have applied this new knowledge.

Impact on Libraries

Awareness of school readiness needs, especially emergent literacy, has caused a huge transition in public library services (Celano & Neuman, 2001). Now that literacy has been redefined to include pre-literacy skills that even the youngest children can learn (Diamant-Cohen, 2007), the process of becoming literate can begin at birth “in the context of family life and community settings” like libraries (Birckmayer, 2000/2001, p. 24). Researchers Bruder and Dunst of the Everyday Child Learning Opportunities Institute identify the public library as one of the community’s “natural learning environments” that offers both serendipitous learning opportunities because of its wealth of welcoming spaces and children’s materials, as well as planned learning opportunities, such as storytimes and other structured children’s programs (1999/2000, p.34). Bruder and Dunst call libraries “activity settings,” and differentiate them from other places because they are “social and physical places” where “children participate in activities that encourage learning about the people and things in the world” (1999/2000, p. 35). Birckmayer points out that having “available, knowledgeable and willing adults” to provide literacy rich experiences for the children is a key part of emergent literacy. As a result, “[h]ooking the parent on books and libraries has become one of the primary goals of programs originally planned for children only” (Birckmayer, 2000/2001, pp. 25-26).

Outcomes for Library Users

Libraries expected that these research-based transformations of their services would prepare children for school success. Diamant-Cohen, in her article “First Day of

Class: The Public Library's Role in 'School Readiness'," gives an overview of the research on school readiness, emphasizing that the library can cultivate pro-social readiness skills such as social interaction, self-regulation, enthusiasm, curiosity, and the ability to follow directions. Not only do libraries have a variety of books and magazines for all ages and levels, but also non-print resources such as audiobooks and videos. Computers and games available at libraries can also help promote readiness skills such as "promoting social interaction, encouraging problem solving, stimulating imagination, and enhancing the development of an attention span" (Diamant-Cohen, 2007, para. 13). Programs can help children interact in socially acceptable ways in public places, while preparing them for structured learning spaces like school. Diamant-Cohen believes that repeated attendance can have an impact, albeit smaller than the influence of daily settings such as home or daycare (2007).

Knowing that libraries provide services that have the potential to change the behavior, knowledge, and skills of children and caregivers, libraries now are tasked with showing that they indeed cause these changes, that library usage results in positive outcomes. As Campana and Dresang pointed out during the ASIST 2011 conference, libraries often measure early literacy program success through output numbers such as attendance, circulation, library card registrations, and library use (2011). Then libraries use these numbers to benchmark against other similar institutions to see how busy they are relative to their populations. Since 1993, the federal government, including IMLS, has required that grantees go beyond these output measures of what the library *does* and start to measure outcomes, or *what difference* the library makes in the lives of users. By 2003, IMLS began offering a free on-line course, "Shaping Outcomes" (available at

<http://www.shapingoutcomes.org/course/index.htm>) to encourage librarians to incorporate these measures.

Library researchers Dresang, Gross, and Holt published a book called *Dynamic Youth Services through Outcome-Based Planning and Evaluation* to encourage the incorporation of better metrics from the very start of project planning (2006). They developed a library-specific outcome-based planning and evaluation model, which they unveiled in a 2003 article in *Library & Information Science Research*. In the article, they give an overview of outcome models developed by the United Way, the W. K. Kellogg Foundation, and various scholars. Their book expands on this to provide a history of assessment in public library youth services, beginning with input measures in the 1970's, output measures in the 1980's, and outcome measures in the 1990's. They note that when they proposed a project using outcome measures in 2000, "no public library program for youth that had employed an outcome-based evaluation process and reported results publicly could be found" (2006, p. 12). In 2011 at the ASIST conference, Dresang pointed out that even now, outcome measures that examine the impact of the interventions on children's literacy are few and far between (Campana & Dresang, 2011).

PLA's Early Literacy Initiative did measure outcomes, at least as they affected the adults involved. Their research project examined early literacy practices in 14 public library systems—two of which were in Maryland—and found that they showed enough promise to be developed into ECRR for nationwide dissemination to libraries (Czarnecki, Stoltz, & Wilson, 2008; Meyers & Henderson, 2007). This Early Literacy Initiative used pre- and post-workshop interviews of parents and caregivers and determined that they

“significantly increased their literacy behaviors” as a result of participation in the programs (Meyers & Henderson, 2003, p. 2). In 2008, a joint ALA/PLA Task Force determined that the resulting ECRR program successfully educated caregivers because of focus group and survey responses they received from the providers--library directors and children’s librarians, participants-in-training, state librarians, graduate library programs, as well as those who had decided *not* to use the materials (PLA, 2010a). However, though they evaluated outcomes on adults, they did not measure the impact the program had on end users: the children. The ECRR toolkit, 2nd edition (2011), still does not contain any assessment tools that librarians can use to measure if the program is having the intended effect on children. It assumes that if the parents increase their pro-literacy behaviors, the children will acquire emergent literacy skills.

Like PLA, other researchers have examined library storytime programs with adult outcomes in mind. Many studies indicate that library storytimes do increase caregivers’ skills and behaviors as literacy coaches to young children (Cahill, 2004; Czarnecki, Stoltz, & Wilson, 2008; Diamant-Cohen, 2007; Dresang, Campana, & Kotrla, 2011; Meyers & Henderson, 2005; Prendergast & Lazar, 2010).

Similarly, a number of studies assert that baby book packet give-away programs containing both children’s books and suggestions on how to read to children have positive outcomes on caregivers. Pittsburgh’s Beginning with Books and the United Kingdom’s Bookstart resulted in better literacy coaching by parents (Bean, Southworth, Koebler, & Fotta, 1990; Collins, Svensson, & Mahoney, 2005). The Better Beginnings Family Literacy Program in Australia, which uses both a book kit as well as storytimes and other parenting programs, also achieved increases in parental skills and behaviors

that foster literacy (Allen, 2010). In an overview of book distribution programs based in libraries around the world, Dickinson, Griffith, Golinkoff, and Hirsh-Pasek (2012) note that Finnish parents were more likely to engage in literacy building behaviors as a result of participating in that country's Bookbabies program.

Outcomes on Children.

Though public library impacts on adults have been shown, impacts on children are not well-documented. ECRR, book giveaways, and similar early literacy interventions have been taking place in public libraries all across the country for over a decade, but experimental research on the outcomes of early literacy practices in libraries on children is largely non-existent. In an article for *Library Journal*, Walter Minkel discussed the promising start of Maryland's *It's Never Too Early* campaign by pointing out the work that was left undone: "What's missing, of course, is proof that Maryland's ambitious program helps kids succeed once they reach kindergarten" (2002, para. 15). According to Stephanie Shauck, the youth services consultant for DLDS at the time, the magnitude of a study to examine the outcomes of *It's Never Too Early* was prohibitively expensive and difficult (Minkel, 2002). According to an article by Shauck (2002), DLDS intended to offer small grants to libraries to help create an assessment model with the intention of releasing results in spring 2002. However, the evaluation was never completed.

A literature review reveals only two experimental research projects undertaken by public libraries in the area of early literacy for preschoolers. One was the Emergent Literacy Training Assessment Project (ELTAP) in Carroll County Public Libraries, Maryland, by Czarnecki, Stoltz, and Wilson in 2005 to 2006 (Czarnecki et al., 2008). The research team randomly selected 40 home childcare providers serving three and four-

year-olds and gave them an ECRR training enhanced by the incorporation of state school readiness standards, hands-on materials, and continued support beyond the initial training. In addition to finding that the caregivers improved their understanding and application of early literacy concepts, researchers also reported that children improved in three of four key literacy areas as shown on a standardized test. This is the only published evidence that suggests that Maryland's *It's Never Too Early* initiative had an impact.

The second experimental study reporting outcomes on preschool children took place in the Pierce County Library System, Washington, in 2010 to 2011 (Campana & Dresang, 2011). Modeled on Carroll County's project, Campana and Dresang studied a public library-initiated early literacy training for in-home childcare workers using a pretest-posttest experimental design. They found that the variety and number of activities related to literacy principles increased as a result of the childcare providers' new knowledge. Likewise, children's competence grew in three of the four early literacy skills as measured on standardized tests.

Aside from the two experiments described above, no library studies have used the kind of methodological rigor demanded by the National Reading Panel, the National Early Literacy Panel, or Lindsay to measure public library literacy outcomes on preschoolers. One reason is because establishing a control group and using random selection takes a lot of time and effort. However, even once those hurdles are cleared, the measurement tools available to librarians are limited. The cost to use and analyze results of standardized tests like those used by Czarnecki and Campana's teams can be one factor. Furthermore, librarians may resist having libraries join schools in the testing realm, especially since library services are often focused on spontaneous, informal

learning directed by the users themselves. McKechnie offers advice for librarians who wish to conduct observations of babies and toddlers, based on her own naturalistic participation study of library storytimes (2006); meanwhile, the University of Washington (led by Dresang) was granted funding from IMLS in 2011 to investigate and test new ways to measure effectiveness of early literacy programs in public libraries. According to Nelson and Campana's presentation at the PLA Conference in 2014, an observational checklist developed at University of Washington may be available as early as June 2014. Surveys have been the most popular option for libraries; several studies share the surveys they piloted, which could be adapted for use in further studies (Barratt-Pugh, 2009; Chelton, 1987; Czarnecki et al., 2008; Leach, 2010).

Considering the time and effort necessary to conduct large scale experiments on human subjects and the dearth of good measurement instruments, using readily available data to examine correlations is a reasonable first step. The data used in the current study are all readily available because they do not infringe on the privacy of individuals since they are aggregated by county. The only cost involved was the SPSS software used to run the statistical tests and the time of the researcher. Though correlations do not prove causality, they are a good first step in establishing a relationship that can be further explored through later research. In this case, correlations can offer a window into the statewide impact of the *It's Never Too Early* initiative on children's school readiness skills in reading.

Statistical Correlation Research in Maryland

Although Maryland is a small state, its libraries are diverse. It contains large metropolitan systems, running along the I-95 corridor and around the Washington, D.C., beltway, which are quite different from the rural ones, some of which are further isolated by mountains and the large bay that bisects the state. However, the state eases the disparities by funding regional library resource centers in eastern, southern, and western Maryland. As a result the state has 23 county systems, one city system, and three regional libraries. All are given technical assistance and direction from the Public Libraries and State Networking Branch within DLDS. Furthermore, all are part of the state network of over 400 libraries that provides residents with access to information not available on the local library level.

Maryland's public libraries are considered to be among the best in the nation, according to top rankings in key measures of library effectiveness. Not only did Maryland libraries circulate more items per capita than the national average in 2010, but also 60% of residents have library cards (MSDE DLDS, 2013). Marylanders are eligible for free registration at all the libraries in the state, allowing them to use multiple systems to meet their needs. Pre-professional librarians are legally mandated to earn 90 hours of continuing education credit to be certified to work in the libraries, and both pre-professionals and professional librarians must earn continuing education credits throughout their careers to maintain their certifications (MSDE DLDS, 2013). As a result, the libraries are staffed by well-trained and certified professionals.

Maryland's public library system began a systematic overhaul of its early childhood resources as early as 1999. According to Shauck (2002), after the *Maryland*

Public Libraries: Creating Connections to Help All Children Start School Ready to Learn to Read! symposium in May 1999, the state offered \$25,000 in grants to help 25 libraries enhance their existing initiatives as well as develop new ones based on the knowledge shared at the symposium. Some of these projects included purchasing extra copies of board books so each child-adult pair could have its own book during storytimes; adding musical resources, oversized books, puppets, and stuffed animals to traditional storytimes; expanded services to younger children; adding resource kits on additional topics; purchasing magnets in English and Spanish; updating the parenting collection with videos containing the new information on brain research; and a series of open houses to attract new library patrons. Some libraries used their grants to form new partnerships to share library resources with users of other organizations. These included creating packets for parents of newborns; creating staff development opportunities that were offered jointly with other county agencies; having library resources added to in-home visits by other organizations; and purchasing over-the-shoulder baby carriers for newborns and taking photographs of each baby's first library visit (Shauck, 2002). These grants were just the start of Maryland libraries' determination to make themselves into key agents in early education.

The state library, DLDS, also prioritized birth-to-five initiatives during its 2000 and 2001 LSTA grant cycles as part of the state's *It's Never Too Early* Initiative. As Shauck outlines (2002), the counties' libraries responded with a variety of new and expanded projects for young children and their caregivers. Cecil County created a *Rx for Reading* program in collaboration with pediatricians. Garrett County purchased storytime resources to encourage adults to continue reading to children outside the library. Queen

Anne's County launched a storytime on wheels program using retired teachers and other volunteers to offer storytimes outside the library walls. Carroll County developed a Library Discovery Zone to support at-risk children identified through partnerships with local agencies; their multipronged approach included incentives for families, adding developmental toys to the collection, and revamping attractive child-friendly play spaces in the buildings. Baltimore County created *Baby Boosters*, whose multifaceted approach included staff development, parent workshops, childcare provider education, additional resources for programming, "Booster Kits" for circulation, and a companion website (Shauck, 2002).

Meanwhile, Enoch Pratt Free Library in Baltimore City was growing and sharing its Mother Goose on the Loose programs. Begun in 1998, these musical lapsit programs for children under age three incorporated brain research and were shared statewide via a Maryland Library Association Workshop on Baby Programs. By 2003 bimonthly parent-training sessions were added at Pratt to share the theory and value behind the Mother Goose programs (Diamant-Cohen, 2004). In 2006, Betsy Diamant-Cohen published a manual on Mother Goose on the Loose for librarians and educators, allowing the program to reach a national audience.

Libraries were also considered in the state's educational initiatives in preschool education. Beginning in 2001, the state established Judith P. Hoyer Early Child Care and Family Education Centers (Judy Centers) to provide children and families with comprehensive, integrated, full-day, full-year services that promote school readiness for children birth through age five. The 25 Judy Centers throughout the state were encouraged to include public library services in their array of programs for families

(Fontaine, Torre, & Grafwallner, 2006; LoCasale-Crouch, Rudasill, Sweeney, et al., 2012). Because of Maryland's Judy Centers, its statewide definition of school readiness, and its universal kindergarten readiness system, the state was ranked number one in the nation for four years in a row by *Education Week's* "Quality Counts" report for its preschool to kindergarten transition and alignment efforts (LoCasale-Crouch et al., 2012). Libraries are part of this success.

Data Sources

Maryland Model for School Readiness (MMSR)

The Maryland State Department of Education (MSDE) was the first in the U.S. to create a tool for assessing children's school readiness statewide. Launched in 2001, the Maryland Model for School Readiness (MMSR) evaluates what each public school kindergartener knows in seven domains of learning: social and personal development; language and literacy; mathematical thinking; scientific thinking; social studies; the arts; and physical development.

Within the first eight weeks of the school year, teachers evaluate children in the seven domains using a Work Sampling System® (WSS), a portfolio-based assessment system through on-going observations of everyday classroom activities over a several-week period. Teachers give each child a score of one to three on 30 indicators of skills, behaviors, and knowledge. These numbers are then summed and used to assign one of three levels-- *full readiness, approaching readiness, or developing readiness*--for each domain.

This system has both strengths and weaknesses. According to an analysis in 2007 by Garber and her associates, WSS® aligns with eight of 10 best practices regarding

assessment of school readiness. It is age-appropriate, uses naturalistic observations, is culturally appropriate, uses data collected from multiple caregivers, measures multiple domains, is matched with the curriculum to guide instruction, and is conducted on an ongoing basis. Out of the 38 other kindergarten readiness instruments evaluated, no other met as many best practices as WSS® (Garber et al., 2007). WSS® is a criterion-referenced assessment, however, meaning that it measures a child's level of skill and knowledge versus a norm group, as opposed to a formal, standardized assessment. Though it is considered to be a valid and reliable instrument, by its very nature it is less valid and reliable than a formal, standardized instrument. This needs to be considered when using its results with statistical analysis, as there is no raw numerical data publically reported.

Though libraries have traditionally emphasized language and literacy skills more than the other six domains of the MMSR, this focus is a helpful one. According to MSDE, "There is a direct correlation between increases in children's Language & Literacy skills and improvements in their MMSR composite scores. [...] Of the seven Domains of Learning, Language & Literacy is the most closely linked to overall school readiness" (2012, p. 5).¹ Similarly, the report of the National Reading Panel affirms that reading comprehension is essential to learning in all the academic subject areas as well as to lifelong learning (NICHD, 2000). The traditional library role and the correlation between literacy and all other domains may explain why library research so far has measured its impact on literacy skills to the exclusion of all other domains.

¹ The researcher confirmed this correlation using counties as the unit of analysis and comparing language and literacy full readiness scores with composite full readiness scores on the 2010 MMSR. There was a statistically significant positive relationship with a large effect size, $r(24)=.928$, $p<.01$. See Appendix A for tables.

Two research articles were located that mention the MMSR. One is a 2007 study by Martinez, in which she evaluates how a statewide training for Maryland librarians on the literacy section of the MMSR affected their storytime planning. She does not discuss other domains of the MMSR, nor does she examine the outcomes for the children or caregivers ultimately affected. The second is a study by Fontaine, Torre, and Grafwallner (2007), in which the 2002-2003 MMSR scores were used to determine that students who received Judy Center services showed little difference in MMSR scores from those who did not. Further analysis suggested benefits to children in high-risk categories, such as those receiving special education. No analysis of how library services are related to MMSR scores have been found in the professional literature.

Other Data Sources

In addition to the MMSR data from MSDE, research for the current study is drawn from the U.S. Census Bureau and DLDS. The analysis uses the 2010 population data from the decennial census count. Library data is from FY2010 (July 1, 2009 to June 30, 2010), and school test data is from fall 2010 (which is part of SY2011). The assumption is that the library use for a year prior to kindergarten entry is the most related to readiness.

Maryland schools and libraries use 24 jurisdictions: 23 counties and the city of Baltimore. Baltimore is treated on par with the counties in all three data sources: census, DLDS, and MSDE. This analysis scrutinizes the relation between three independent variables—juvenile circulation, total children’s program attendance, and preschool program attendance—with one dependent variable, the proportion of kindergarteners who score full readiness in the language and literacy domain of the MMSR.

Data gleaned for this study include several types. DLDS collects annual circulation of juvenile materials, which includes books, audiobooks, videos, periodicals, and “other,” which varies by library system holdings but encompasses materials such as educational software and games, as well as literacy or science kits that include multiple types of items grouped together. Juvenile materials are designated for elementary school students, up through age 11, and exclude those for “young adults,” or middle and high schoolers. Considering that many videos, audiobooks, and kits found in the children’s section of the library promote reading skills, the researcher opted to use the total count rather than limiting the analysis strictly to print materials.

DLDS also collects children’s program attendance figures in three categories as described in *FY 2010 Maryland Public Library Survey General Instructions and Definitions*. Section 8.8b defines children’s program attendance as the “count of the audience at all programs for which the primary audience is children 11 and under. Include[s] adults who attend the programs intended primarily for children.” In addition, in 8.8c, counties provide “total program attendance for preschool program attendance using a typical week sampling method for the month of October.”² DLDS then adds these two totals together and reports total children’s program attendance in section 8.8d. Though this does mean that the preschool sample may be counted twice in 8.8d (confirmed via personal communication with Susan Paznekas at DLDS, October 16, 2013), in practice most counties do not double count the preschool data. The researcher discovered this in conversations with the data analyst at Frederick County Public

² According to Susan Paznekas, the Public Library Consultant at DLDS, DLDS did not define the age group for preschool programs prior to FY 2013. Beginning in 2013, DLDS defined this group as “under 5” (personal communication, March 17, 2014).

Libraries, Emily Gamertsfelder (personal communication, November 11, 2013), as well as by examining the totals. In FY2010, in 18 of the 24 jurisdictions, the counts for preschool attendance (8.8c) were greater than the counts for children's programs as defined in 8.8b, implying that the count of children's programs did not already include the preschool programs. (See Appendix B). Therefore, the researcher decided to use the preschool number (8.8c) and the total children's program attendance (8.8d) for analysis. Because DLDS did not define the ages for the preschool programs until FY2013, the researcher chose to use Frederick County's definition of preschool programs as those for children aged zero to five.

School data comes from the annual reports on kindergarten readiness available on MSDE's website. For each county, the number and proportion of students are reported in a number of categories, including those who have achieved full readiness in the language and literacy domain.

Data Preparation and Analysis

Data preparation for the analysis included several steps. First, census data were gathered from table "QT-PA: Single Years of Age and Sex" by county, and the total number of zero-to-11-year-olds was tabulated. These numbers were used to create per capita proportions for the circulation of juvenile materials and the total children's program attendance. Then the total number of zero-to-five-year-olds was tabulated, and those numbers were used to create a per capita proportion for the attendance at preschool programs in each county.

For the preschool attendance analysis, the researcher omitted one anomalous county, Allegany, which reported zero for preschool attendance. Joni Reed, Marketing

and Outreach officer for the county, confirmed that zero was not an accurate reflection of their attendance, but rather a lack of capacity to separate their counts with the software they used (personal communication, January 27, 2014). In light of this information, all further data preparation and analysis on preschool attendance uses a sample size of 23 and omits Allegany County.

In order to use Pearson product-moment correlation coefficient r to analyze the data, several assumptions had to be met: independence, normality, and linearity. Independence was met because the numbers that are used have no influence on the other numbers. That is to say that the circulation or attendance in one county does not have an impact on the circulation or attendance in another. The same is true of the MMSR test scores: scores in one county are independent from those in other counties.

For normality, the researcher looked at skewness and kurtosis statistics to ensure that the data fell along a normal curve. In the social sciences, the rule of thumb is that skewness and kurtosis values between -2 and 2 represent a normal distribution. For the variable of total children's program attendance in 2010, one county had per capita attendance that was so much higher than the others that it spiked the kurtosis statistic to 4.44. When this outlier was excluded, the kurtosis statistic became -0.860 and the skewness statistic was 0.784, putting it in a relatively normal curve. Therefore, the children's program attendance analysis uses a sample size of 23, with the outlier removed. Preschool attendance data had a skewness statistic of 0.973 and a kurtosis statistic of 0.557, landing it within the realm of a normal distribution. Circulation data had a skewness statistic of 1.263 and a kurtosis statistic of 1.581, which is also considered normally distributed. Though there was an outlier, whose score of 65.63

circulations per child was above the 75th quartile, two other counties had circulations similar enough (52.7 and 49.25) to make the outlier seem less extreme. Considering the kurtosis and skewness statistics, the researcher chose not to omit this outlier from the analysis. Finally, the proportion of children achieving full readiness in the language and literacy domain also fell in the normal range, with a skewness statistic of 0.211 and a kurtosis statistic of 0.287.

To examine the data for linearity, the researcher ran two kinds of scatterplots. One represented each of the independent variables in relation to the dependent variable and then overlaid them with Lowess lines. The researcher was fairly confident that the assumption of linearity was reasonable. However, residual plots were run as an additional check. Once the outliers were removed as described above, the residuals also appeared to show linearity.

A Pearson correlation coefficient was computed. The test was conducted using an alpha of .05. The null hypothesis was that the relationship would be 0.

Results

All three independent variables had a statistically significant positive correlation with literacy scores, showing a medium effect size of between .2 and .8, as defined by Cohen (1998). The effect size for preschool program attendance was the largest of the three, perhaps because of Maryland librarians' training in ECRR and MMSR. The second variable, children's program attendance, showed a moderate relationship with kindergarten readiness and one that was larger than that found by Lance and Marks in their analysis using 4th grade scores. The effect size of the third independent variable,

circulation, in relation to kindergarten test scores landed between the two effect sizes reported by Krashen ($r=.2928$) and Lance and Marks ($r=.514$) for 4th grade scores.

The strongest relationship appeared between preschool program attendance and full readiness in the language and literacy domain, $r_{(23)}=.648$, $p<.01$. (See Tables 1 & 2). Per capita preschool attendance in all jurisdictions ranged from .46 to 5.57 annual attendances per zero-to-5-year-old child ($M=2.02$, $SD=1.47$). This means that as the number of preschool program attendances rose, so did kindergarten readiness test scores in language and literacy. With 0 denoting no relationship and 1 denoting a perfect positive correlation, .648 shows a moderately strong effect. The r^2 of .42 indicates that 42% of the variance in MMSR language scores can be predicted by preschool library program attendance rates in the county. The result is also highly statistically significant, with a p value of .001, which means that this result has only a 1 out of 1000 likelihood of occurring by chance.

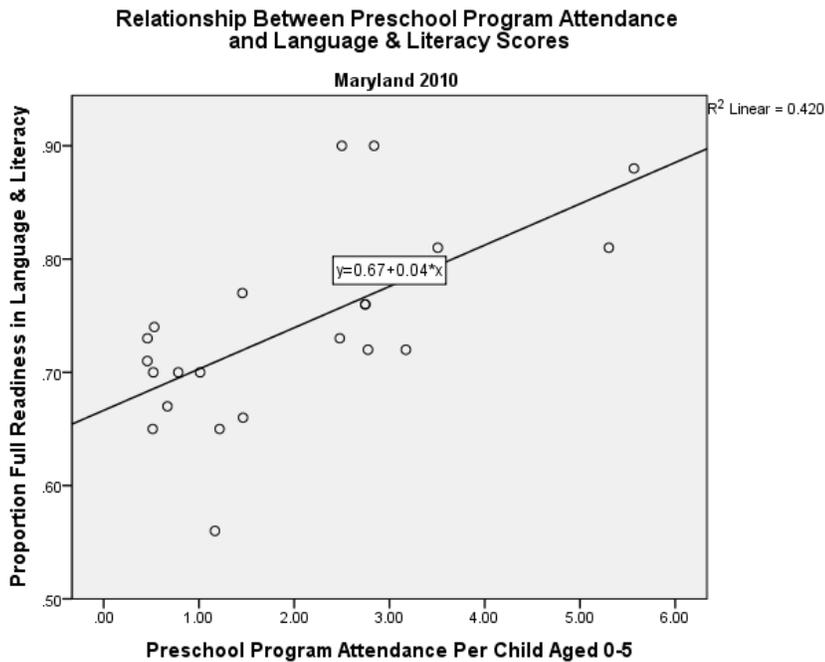


Table 1: Scatterplot of Preschool Attendance & MMSR, Maryland

Correlations

		Preschool Program Attendance	MD Percent Full Lang Lit 2010
Preschool Program Attendance	Pearson Correlation	1	.648**
	Sig. (2-tailed)		.001
	N	23	23
MD Percent Full Lang Lit 2010	Pearson Correlation	.648**	1
	Sig. (2-tailed)	.001	
	N	23	23

** . Correlation is significant at the 0.01 level (2-tailed).

Table 2: Correlation of Preschool Attendance & MMSR, Maryland

Taking a slightly broader look at total children’s program attendance also revealed a positive relationship with kindergarten language scores. Though the narrow focus solely on programs designed for preschoolers was fruitful, the researcher recognized that the preschool numbers were not actual counts, but rather samples based on a single week in October. Also understood was that preschool aged children sometimes attend other children’s programs designed for a range of ages, either because they attend with siblings of a different age or because the program does not focus exclusively on preschoolers. Therefore, the researcher included an analysis of total children’s program attendance, as well. When the outlier was omitted and linearity and a normal distribution were achieved for total children’s program attendance, a moderate positive relationship was evident with literacy scores, $r_{(23)}=.422, p<.05$. (See Tables 3 & 4). Per capita attendance by children from birth through age 11 ranged from 0.07 to 1.85 attendances per child in FY2010 ($M= 0.7, SD=.03$). This result showed a closer relationship than Lance and Marks discovered nationwide between children’s program attendance and 4th grade NEAP scores ($r=.288$) (2008), perhaps because of Maryland’s *It’s Never Too Early* initiative.

**Relationship Between Children's Program Attendance
and Language & Literacy Scores**

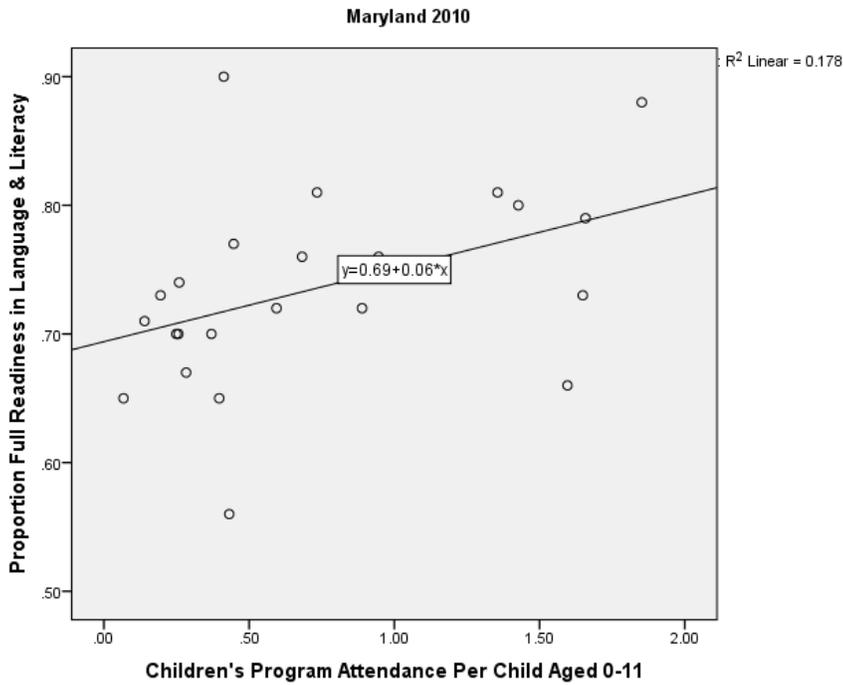


Table 3: Scatterplot of Program Attendance & MMSR, Maryland

		Children's Program Attendance	MD Percent Full Lang Lit 2010
Children's Program Attendance	Pearson Correlation	1	.422
	Sig. (2-tailed)		.045
	N	23	23
MD Percent Full Lang Lit 2010	Pearson Correlation	.422	1
	Sig. (2-tailed)	.045	
	N	23	23

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4: Correlation of Program Attendance & MMSR, Maryland

The third independent variable examined, circulation of children's materials, also had a moderate and statistically significant positive relationship to literacy scores, $r_{(24)} = .448, p < .05$. (See Tables 5 & 6). Circulation ranged from 3.68 to 65.63 materials per

child in FY2010 ($M=24$, $SD=15$). With a p value of .028, this result would be expected to happen by chance less than three times out of a hundred. The relationship between circulation and 4th grade scores was less related in Krashen's analysis ($r=.2928$), perhaps because he looked at total circulation per capita instead of focusing on juvenile circulation per child (1995). The inclusion of materials for teens and adults would understandably weaken the relationship with 4th grade test scores. Lance and Marks did focus exclusively on children's materials and found a higher correlation with 4th grade scores ($r=.514$) than the current analysis did with kindergarten scores. One reason for this may be because the bulk of children's materials are used by elementary school-age children, rather than babies and preschoolers, who must rely on their parents to select and check-out materials.

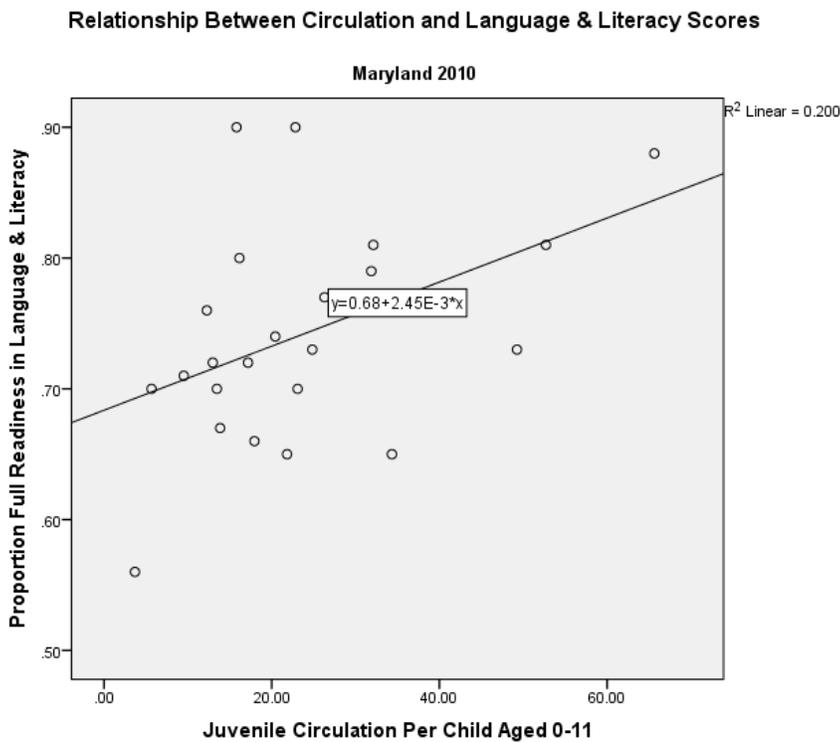


Table 5: Scatterplot of Circulation & MMSR, Maryland

Correlations

		Juvenile Circulation	MD Percent Full Lang Lit 2010
Juvenile Circulation	Pearson Correlation	1	.448
	Sig. (2-tailed)		.028
	N	24	24
MD Percent Full Lang Lit 2010	Pearson Correlation	.448*	1
	Sig. (2-tailed)	.028	
	N	24	24

*. Correlation is significant at the 0.05 level (2-tailed).

Table 6: Correlation of Circulation & MMSR, Maryland

Limitations

It bears noting that one limitation of using the MMSR data is that it only accounts for children entering public schools. Children who attend private schools or are homeschooled are excluded from the data set. Maryland homeschoolers account for 2.4% of the state’s student age population, according to one estimate (Giampaolo, 2011, para. 12). According to MSDE, 8,616 kindergarteners were enrolled in non-public schools in September 2010 (Maryland State Department of Education Division of Accountability and Assessment, 2011, p. 2). As such, roughly 14% of kindergarteners are excluded from this study.

Another limitation is the DLDS data. It includes the number of adults who attended programs designed for children, which makes the precise count of the number of children per capita who attended impossible to figure. It is also evident that not all counties chose to report the data the way DLDS requested, resulting in some counties double counting children at preschool programs, while others did not. Furthermore, DLDS did not define “preschool” precisely during the year analyzed, so different counties may have interpreted and counted differently from one another. Finally, in considering the circulation of juvenile materials, the researcher assumed that all

children's materials were used by children. That is not necessarily the case, as teens and adults with lower literacy levels may use children's books as a way to gather information or improve their reading.

Implications

Maryland public libraries spent years of staff time and funding on the *It's Never Too Early* initiative and inspired subsequent projects to foster emergent literacy and educate caregivers on the importance and techniques of early learning. However, no published research on the initiative as a whole had been conducted prior to the current study. The research by Czarnecki, Stoltz, and Wilson in 2005 to 2006 offers the only glimpse into the venture, though through the narrow window of Carroll County exclusively. Considering that the *It's Never Too Early* began in 2001, the only way to reflect back to gauge impact is by using published data. The current study is the only one that demonstrates that a significant positive relationship is evident statewide between children's public library use and kindergarten literacy readiness. This is the first evidence that as the *It's Never Too Early* initiative matured, it may have created a significant impact on children by 2010.

Future Research

The current study is only a cursory beginning to many additional directions of research in library use and kindergarten readiness in literacy. An obvious next step would be to run the correlations controlling for potentially confounding variables, such as poverty, language, or preschool attendance. Of particular interest to public libraries are the children who have no formal schooling before entering kindergarten. Only 59% of these children achieve full readiness in language and literacy, the lowest of all the groups

analyzed by their prior care. These children lag 26% points behind the children who attend non-public nursery schools (MSDE, 2011). Krashen (1995) and Lance and Marks (2008) both did partial correlations to control for poverty, but that analysis was beyond the scope of the current study and would be valuable for future researchers to examine.

Having established that a significant positive relationship exists between library use and kindergarten readiness in language and literacy, a natural next step would be to design an experiment to see if the library use causes the early literacy skills. ELTAP in Carroll County Public Libraries showed that as a result of the training the library gave childcare workers, children in their care improved in three of four key literacy areas as shown on a standardized test: comprehension, phonological awareness, concepts about print (Czarnecki et al., 2008). However, it did not use MMSR's Work Sampling System. An experiment that used an observational checklist of the MMSR's exemplars in language and literacy at programs, combined with reports of library circulation, could be an effective method of discovering whether the library use causes kindergarten readiness. A statewide sample would also be necessary to see if the effects are similar in other counties as well.

An additional variable to consider is the effect of children's museum-style play spaces in libraries on school readiness. According to ECRR's 2010 Literature Review, "there is clear and abundant evidence that certain physical design features in environments support young children's literacy engagement and subsequent achievement. Physical design features, uses of space, and resources, may help to focus and sustain children's literacy activity, providing greater opportunity to engage in language and literacy behaviors" (PLA, 2010b, para. 30). Public libraries have taken note and are

constructing special play spaces at a steady clip. The cover story of *School Library Journal* in August 2013 documents this phenomenon (Bayliss, 2013), which is well underway in Carroll, Baltimore, Frederick, and other counties. An analysis of the impact of these spaces on kindergarten readiness skills would be an important contribution to the field.

Another fresher angle would take into effect the increasing awareness of the importance of non-academic domains. Though early childhood education professionals do not universally agree on what constitutes school readiness, more recent definitions promote a holistic view that takes into account more than simply what children know and do (Garber et al., 2007). The National Education Goals Panel adopted five dimensions that represent a range of a child's capabilities. These include health and physical development; emotional well-being and social competence; approaches to learning; communication skills; and cognition and general knowledge (National Education Goals Panel, 1997). Likewise, the MMSR measures "social and personal development" by using indicators and objectives such as "follows classroom rules and routines," "take[s] turns when working in groups," "share[s] materials and equipment," "participates in the group life of the class," and "listen[s] to directions from peers" (MSDE, 2007, pp. 9, 16, 17). As Diamant-Cohen pointed out (2007), these socio-emotional skills are fostered by public library storytimes, which allow preschoolers to practice following directions , taking turns, and interacting positively with peers in a group setting. Though the language skill "be able to communicate needs, wants, and thoughts verbally" is rated as essential by 84% of teachers in a national survey on kindergarten readiness, the next most valuable quality is socio-emotional: "be enthusiastic and curious in approaching new activities"

(National Center for Education Statistics, 1993, para. 3) In fact, all of the other skills rated as significant by more than 50% of the teachers are also in this domain: the ability to follow directions, not being disruptive in class, being sensitive to other children's feelings, and the ability to take turns and share (National Center for Education Statistics, 1993, para. 4). The relationship between attendance at preschool programs and the kindergarten readiness in this socio-emotional domain would be an interesting expansion of the current analysis.

Finally, on the national level, the National Center for Education Statistics has released a new data sets on Early Childhood Longitudinal Study, Kindergarten Class 2010-11, and Early Childhood Longitudinal Study, Birth Cohort, which followed children from birth in 2001 to kindergarten. However, the researcher could find no published examination of the correlation between library use and reading scores using these huge, freely available datasets. These could be a rich resource for future library researchers to mine now that libraries have instituted *Every Child Ready to Read* and other early literacy intervention programs.

One more consideration about future research and available data involves how DLDS collects data. For preschool statistics to be of more use in the future, DLDS might consider changing some definitions and methods. Presumably, the agency requested an estimate based on a sample from a week in October as a way to lessen the burden on program providers, but the numbers show that programmers noticed the double counting of the preschool statistics in the total children's program attendance, and most counties chose not to record them in the way DLDS suggested. Fortunately, DLDS has already tweaked its definitions of key terms, such as to define preschool programs as those for

children under age five, beginning in FY2013. It is also aware of other challenges and has demonstrated by virtue of the first statewide Stats Summit held in fall 2013 that it is interested in making statistics use more valuable for Maryland libraries.

Recommendations

The time is ripe for the expansion of research using Maryland's early childhood assessment tool. In fall 2014, the state is building on the success of the MMSR with a new baseline test called Ready for Kindergarten (RK4): Maryland's Early Childhood Comprehensive System. RK4 was developed using Maryland's federal Race To The Top—Early Learning Challenge Grant and includes an early learning assessment for children from ages three to six in addition to the kindergarten assessment (Reinhard, 2014). As a result, now there is a new measurement tool available for librarians to adapt and use for even younger children. Research beginning now with this new baseline will allow for a longitudinal perspective over subsequent years.

Maryland's universal use of the MMSR/RK4 offers its libraries a special opportunity to be partners in school readiness. Through collaborative work with schools and Judy Centers, librarians in the state have access to training and information that both clarifies what kindergarteners need to be successful in school and benchmarks developmental and learning expectations for children as young as age three. Publically available MMSR exemplars of what constitutes full readiness in each indicator, objective, and domain gives librarians guidelines for the behaviors and skills they can cultivate in their storytimes. The exemplars offer guideposts for creating preschool programs that align libraries with the education infrastructure. In addition, they also offer librarians

metrics for school success, so that librarians, in theory, could use the exemplars as the basis for creating their own outcome measurement tools.

In addition, Maryland's strong history in the early literacy arena is a huge benefit that needs to be capitalized upon. At the time of writing this paper, Maryland librarians Kathleen Reif and Dorothy Stoltz are still active in the field and are in a position to mentor a new generation of children's librarians. Both librarians were instrumental in creating and assessing the effectiveness of ECRR, both are currently on the PLA ECRR committee, and both are still advocates to keep Maryland libraries engaged in political and educational conversations that can result in increased exposure, influence, and funding for children's library services. A designated Youth Services Coordinator position at DLDS is still in place to ensure collaboration, resource sharing, and research capacity that can keep Maryland libraries meeting the changing needs and diverse populations inherent in the state.

Public libraries should also continue to cultivate partnerships with the prekindergarten through 12th grade education sector. DLDS is located within MSDE and should be able to capitalize on that proximity for advocacy, inclusion, and influence. Fortunately, Maryland is one of nine states that is including libraries in its Race to the Top, Early Childhood federal grant. For their part, libraries are creating Library Family Councils and Family Information Centers that will be instituted in all public library systems by 2017. These councils aim to engage families in Title I school districts to participate in library activities (MSDE DLDS, 2013). As such, librarians are already part of early childhood education committees in each county, allowing them to network with other early childhood education providers in their area. This kind of networking can

result in collaborative training and information sharing, as well as the promotion of libraries as a key early education resource.

Furthermore, when schools share aggregated MMSR/R4K data with libraries, they can help libraries evaluate their impact in specific areas without violating the privacy of individual students. They could even collect data on library use on kindergarten registration forms so that individual students could be the unit of measurement. Combined with other data on the form, such as first language and preschool experience, this information could help libraries determine whether individual students who use the library are more likely to be school ready. However, first libraries need to establish trusting, collaborative relationships to ensure that the data they encourage schools to collect and analyze is used in ways that help instead of undermine library credibility, public support, and funding. Together, schools and libraries can use the test data and information collection to evaluate and improve services that will ultimately improve student outcomes in their counties and throughout the state.

Conclusion

Kathleen Reif succinctly captured the conundrum of using statistical data to determine library outcomes. Referring to PLA's Early Literacy Initiative, in 2000 she wrote:

There is a possibility that these partnerships and initiatives might turn us into teachers, with our fates determined by a three-year-old's performance on an assessment tool. However, if public librarians do not establish a role for our libraries in the continuum of services that help children start school ready to learn, one of two things will surely happen: (1) public libraries will continue to be

excluded from discussion and funding; or (2) someone else will define our role for us. (Reif, 2000, p. 268)

Librarians need to position themselves wisely to continue being part of the conversation about early childhood education. Fighting the schools' need to test will hurt libraries' ability to engage and collaborate with the education establishment. Instead, showing schools how libraries are poised to support them in achieving the educational outcomes they need for funding and success is a better strategy. Ultimately, it's also the one that helps the children and families who need to meet those educational benchmarks, as well. By actively engaging the schools, libraries can define themselves both within the educational status quo, while also shaping a role for themselves as "other." They can prepare children for the tests, but they can also offer an unstructured, informal, exploration space. They can help families meet educational and developmental benchmarks using structured storytimes and flexible, play-based, non-compulsory methods. The strength of libraries lies in the array of services and programs that offer choices for learning. Libraries are the ultimate universally useable classroom for everyone in the community.

The use of publically available data to identify correlations between what libraries do in early childhood education and how this impacts users is one way to lend support to the argument that what libraries do has an effect. In the case of Maryland, a relationship between children's use of the library and reading readiness scores shines a light on the state's decade of devotion to early childhood education. As libraries and schools continue to collaborate and align on the county and state level, children and caregivers who

discover the rich resources of the library are likely to reap benefits not only in kindergarten but also in the lifetime beyond school.

Appendix A: Correlation Between Literacy and Composite Scores

According to MSDE, “There is a direct correlation between increases in children’s Language & Literacy skills and improvements in their MMSR composite scores.” (2012, p. 5). The researcher confirmed this using counties as the unit of analysis relating language and literacy full readiness with composite full readiness on the 2010 MMSR. There was a significant positive relationship with a large effect size, $r(24)=.928$, $p<.001$.

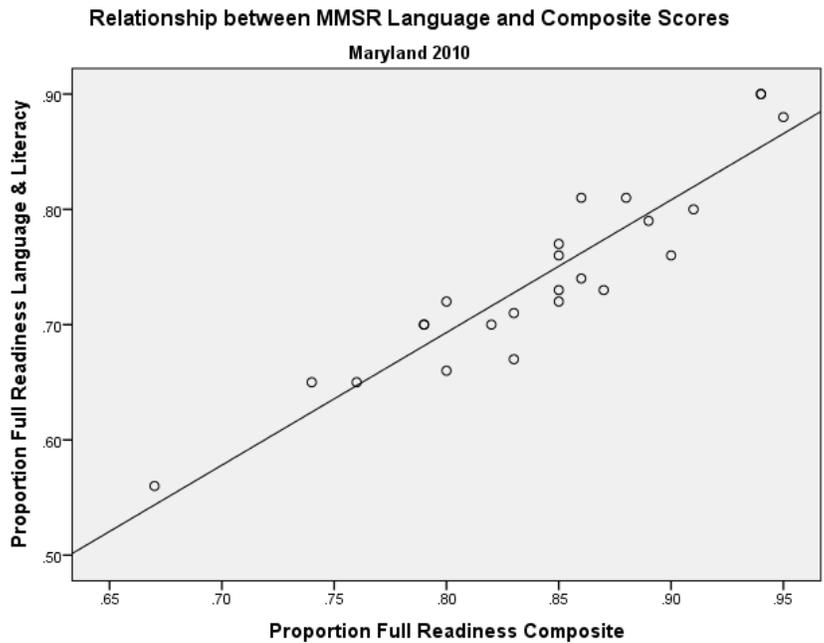


Table 7: Scatterplot of MMSR Composite and Literacy Scores, Maryland

Correlations		Proportion Full Lang Lit 2010	Proportion Full Composite
Proportion Full Lang Lit 2010	Pearson Correlation	1	.928**
	Sig. (2-tailed)		.000
Proportion Full Composite	N	24	24
	Pearson Correlation	.928**	1
	Sig. (2-tailed)	.000	
	N	24	24

** . Correlation is significant at the 0.01 level (2-tailed).

Table 8: Correlation of MMSR Composite and Literacy Scores, Maryland

Appendix B: DLDS Program Attendance Data

According to *FY 2010 Maryland Public Library Survey General Instructions and*

Definitions:

- 8.8b: defines children’s program attendance as the “count of the audience at all programs for which the primary audience is children 11 and under.”
- 8.8c: “total program attendance for preschool program attendance using a typical week sampling method for the month of October.”
- 8.8d: total children’s program attendance by adding 8.8b and 8.8c.

In FY2010, in 18 of the 24 counties, the preschool attendance estimate (8.8c) was greater than children’s programs count (8.8b), implying that 8.8b did not already include 8.8c. (See Table 9). Therefore, 8.8d is likely the most accurate indicator of children’s program attendance in most cases, while 8.8b likely underreports total children’s program attendance in most cases. This also means that the five counties that do follow the DLDS guidelines may have inflated 8.8d counts.

Children’s Program Attendance

County	2010		
	8.8b	8.8c	8.8d
Allegany	12,393	0	12,393
Anne Arundel	21,536	21,963	43,499
Enoch Pratt	39,209	56,684	95,893
Baltimore	51,440	83,876	135,316
Calvert	23,369	15,503	38,872
Caroline	19,679	7,876	27,555
Carroll	47,113	62,433	109,546
Cecil	26,066	11,353	37,419
Charles	3,381	5,204	8,585
Dorchester	1,725	1,247	2,972
Frederick	27,859	95,507	123,366
Garrett	1,670	4,781	6,451
Harford	63,535	44,871	108,406

Howard	63,223	74,400	137,623
Kent	2,098	3,343	5,441
Montgomery	10,371	39,390	49,761
Prince George's	33,650	54,499	88,149
Queen Anne's	2,059	2,220	4,279
St. Mary's	12,500	25,000	37,500
Somerset	2,794	4,174	6,968
Talbot	2,835	7,210	10,045
Washington	8,831	13,247	22,078
Wicomico	2,879	3,382	6,261
Worcester	1,524	2,811	4,335

Table 9: Children's Program Attendance, Maryland 2010

The scatterplot reveals that three of the counties that followed the DLDS guidelines (Calvert, Cecil, and Harford) may have inflated attendance scores that negatively affect the present correlation analysis. Dorchester's inflation does not figure prominently, and Caroline was already excluded from the analysis as an outlier.

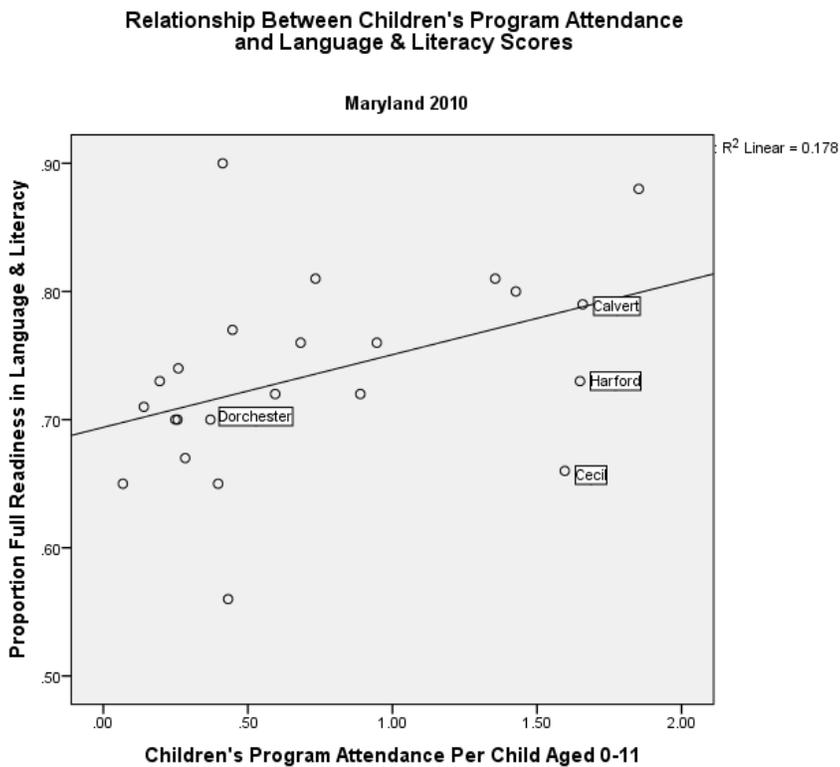


Table 10: Scatterplot Identifying Anomalous Counties

Appendix C: Frederick County, MD

The researcher, who is employed as a library associate in Frederick County Public Libraries, also looked at this local jurisdiction within Maryland as a way to examine disaggregated data. Though individual student data is difficult to obtain, school-level and library-branch level data can offer a granularity that lies between individuals and entire counties. The results of correlation studies from this mid-level can give a more complete picture of the relationships between the variables because of the variability inherent in data from the diverse parts of a county system. If the variables still rise and fall together regardless of other demographic factors, researchers can begin to zero in on the causes and effects.

Frederick is a fast-growing and increasingly diverse county in central Maryland. Bordering West Virginia, Virginia, and Pennsylvania, this rural county has a strong farming tradition, while being an hour's drive to either Baltimore or Washington D.C. The county grew 19% between 2000 and 2010, largely due to immigrants moving into the southern end of the county and into Frederick City. The county is geographically the largest in the state and includes both urban and rural environments, with a total of 233,385 residents in 2010 (Census 2010b; Stern, 2011).

Though the population is fairly homogeneous, the influx of young families seeking affordable living in the D.C. metro area has been changing the demographics. About 77% of the county's population is white/non-Hispanic, 9% are Black, 8% are Hispanic, and 4% are Asian. Thirty-nine percent of households have children under age 18 (compared to 34% nationwide), and 6% of the population is under age five. About 11% of the population is over age 65. About 9% are foreign born, and nearly 12% speak

a language other than English at home. Frederick County is relatively well-educated and solidly middle class. The median household income is \$81,686, with 5.7% of the population living in poverty. Among residents aged 25 or older, 91% graduate from high school, while 36% have a bachelors degree or higher (Census, 2010b; Eckstein, 2011; “Measuring poverty in Frederick County,” 2012; Stern, 2011).

Within this rural county, however, lies the third largest city in the state, Frederick City. Its population (65,239 residents) is young and increasingly diverse: 7.7% are under 5 (vs. 6.4% nationally), and 20% speak a language other than English at home. Just 63.9% of the city’s population identified themselves as white-only during the 2010 census; 18.6% are African-American (12,144 residents), 14.4% are Hispanic (9,402 residents), and 5.8% are Asian (3,800 residents). The Hispanic population in the city increased 271% between 2000 and 2010 (Census 2010a; Stern, 2011).

Serving the city and county is Frederick County Public Libraries (FCPL), considered a mid-sized library system in the U.S. Like the population that it serves, FCPL has rapidly expanded in the past 12 years using the model of a large headquarters in the city and two medium sized regional hubs—one in the north in Thurmont, and one in the south in Urbana. These large branches are supplemented by four other small branches in town centers, one rural outpost with limited hours, two bookmobiles, and a room in the Detention Center. Each location has its own personality and relationship with its customers, though they share resources to provide the same materials and content to people throughout the county. In FY2011, FCPL had 143,000 registered users and circulated 2,280,000 items a year. The annual operating budget was \$11,500,000.

FCPL considers itself a key component of the early childhood education system in the county. Nonpublic options include 16 nonpublic preschools (MSDE Division of Accountability and Assessment, 2011). Public options include 21 pre-kindergartens for students eligible for free and reduced lunch, 16 Head Start classes, and three Judy Centers (McCarthy & Anthony, 2013; “Pre-kindergarten,” 2014). Fourteen percent of kindergarteners in Frederick County had no preschool or daycare experience prior to entering school in 2011, pointing to the fact that parents need the skills to be their child’s first teacher (Maryland State Department of Education, 2012). Connecting these parents to the information they need to prepare their children for school is one of the library’s roles. FCPL offered 4115 free public programs for children in FY2011. At the core of this programming are weekly 30-minute storytimes for the following age groups: birth to two (babies), age two (toddlers), and ages three through five (preschoolers). Children’s librarians create themed storytime boxes that contain books, flannel boards, puppets, rhythm instruments, bean bags, and other learning toys, plus scripts for rhymes and songs and directions about how to run the program. These boxes rotate to each library branch, which results in more uniform quality than if each branch created its own each week. Librarians are trained to incorporate the six skills of emergent literacy, the seven learning domains in the MMSR, and the principles of ECRR into their early childhood programs.

The libraries support Frederick County’s 36 public schools that offered kindergarten to 2,938 children during the school year 2011-2012. Most of the schools serve unique and defined geographic districts. However, two are magnet schools that accept students from around the county (Monocacy Valley Montessori Charter School) or around the state (Maryland School for the Deaf). The Maryland School for the Deaf,

having an additional campus in another county, is distinctive from other Frederick schools, and the state reports its kindergarten readiness data separate from the county's. In addition, 30 nonpublic kindergartens exist in the county. According to a report that relies on the self-reporting of these schools, the 23 schools that completed the survey reported that they enrolled 204 non-public kindergarteners in 2010 (Maryland State Department of Education's Division of Accountability and Assessment, 2011).

Data Sources and Preparation

Research data on the county of Frederick was drawn from three sources: Frederick County Public Libraries' (FCPL) integrated library system software, Frederick County Public Schools (FCPS), and the U.S. Census Bureau. The FCPL data is for FY2011, which runs from July 1, 2010 to June 30, 2011. The FCPS data is for fall 2011, which is part of SY2012. The assumption is that the library usage in the year just prior to kindergarten entry is the most appropriate timeframe for this analysis.

FCPS provided the number of students who achieved full readiness in the language and literacy domain separated by elementary school, as well as the total number of test takers so that a proportion could be calculated. The charter school and the Maryland School for the Deaf, which draw students from many geographical areas, were omitted from the analysis.

FCPL provided the annual number of juvenile materials circulated and the number of children aged zero to five who attended programs in FY2011. Like the rest of the state, FCPL designates juvenile materials as those aimed at children under age 12, and each of its libraries designates an area to children's materials, as distinct from young adult materials, which are for middle-school-aged children. As for program attendance,

FCPL takes a count of all the children under age six who attend its programs rather than making an estimate based on a sample as requested by the state. Therefore, it was not necessary to consider the equivalent of the state’s “total children’s program attendance,” which included older children, in this analysis of kindergarten readiness. This allowed the researcher to narrow the focus to pre-kindergarten only.

The counts from FCPL were separated by branch. The researcher chose to collapse the numbers for the smallest rural library (Point-of-Rocks), which has very limited hours, programming, and collections, with the regional library that supports and supervises it (Urbana). The two bookmobiles, which serve the entire county (rather than a specific school region) were also omitted from the analysis. This resulted in seven geographical library regions. (See Table 11).



Table 11: Map of Geographic Library Regions, Frederick

The researcher then matched the remaining 34 schools geographically with the seven libraries, using guidelines created by FCPL. As such, each library is envisioned as serving children who will attend elementary schools located in its geographic area. This resulted in some disparities that made comparisons challenging. For example, it is not surprising that the largest library in the population-dense city of Frederick serves 12 schools. However, the southern regional library serves nine schools in a wide geographic area both to the south and east that are quickly growing. Meanwhile, the smallest municipality in the northern region serves only one elementary school with 36 kindergarteners in fall 2011.

Because estimates by single years of age are not available at the county level in Maryland in years other than in the decennial census year, the researcher estimated the population data in the following way. She totaled the number of kindergarteners who took the MMSR in fall 2011, added on the estimated 204 kindergartners likely to have been in nonpublic kindergarten, then multiplied this total by 12 to estimate the total number of zero-to-11-year-olds in Frederick County. Her estimated total was 37,584, which differed from the census reported total of 37,969 in 2010 by about 1%. This implied that the researcher's method of estimating population per library region using counts of the number of children taking the MMSR was reasonable.

To grapple with the large differences in population between library regions, the researcher created proportions. To estimate the total number of children aged zero-to-11 in each library region, the researcher totaled the number of kindergarten test takers in the schools associated with the library branch and multiplied it times 12. The juvenile circulation numbers for each branch were then divided by that estimated total number of

zero-to-11-year-olds. Likewise, to estimate the number of zero-to-five-year-olds, the researcher totaled the number of kindergarten test takers in the schools associated with the library region and multiplied it times six. Then the program attendance numbers were divided by the estimated number of children aged zero-to-five in that library's region.

Data Analysis

With such a small sample size ($n=7$ library regions), a statistical correlation would not be an appropriate analysis technique. However, the strength of the relationships could emerge through graphs. Scatterplots help show the linearity between the variables, and bar and line charts display the details inherent in the relationships. The small variability in each region's language and literacy scores, however, makes drawing conclusions difficult. The proportion of full readiness in this domain ranges from .77 to .89 of students, with a small standard deviation of .04. Skewness and kurtosis scores imply that the MMSR scores are normally distributed.

Results

Juvenile circulation numbers do not appear to have a large relationship with language and literacy scores in this sample. In fact, two of the regions that have the smallest proportions of circulations per child—the Urbana/Point-of-Rocks region (19.81) and the Walkersville region (21.76)—have some of the highest proportions of students who are fully ready in the language and literacy domain, .84 and .86, respectively. However, the library that has the highest circulation per child also has the highest proportion of students at full readiness; Emmitsburg Library has 56.28 circulations per child and .89 at full readiness. (See Tables 12 & 13).

Relationship Between Circulation and Language & Literacy Scores

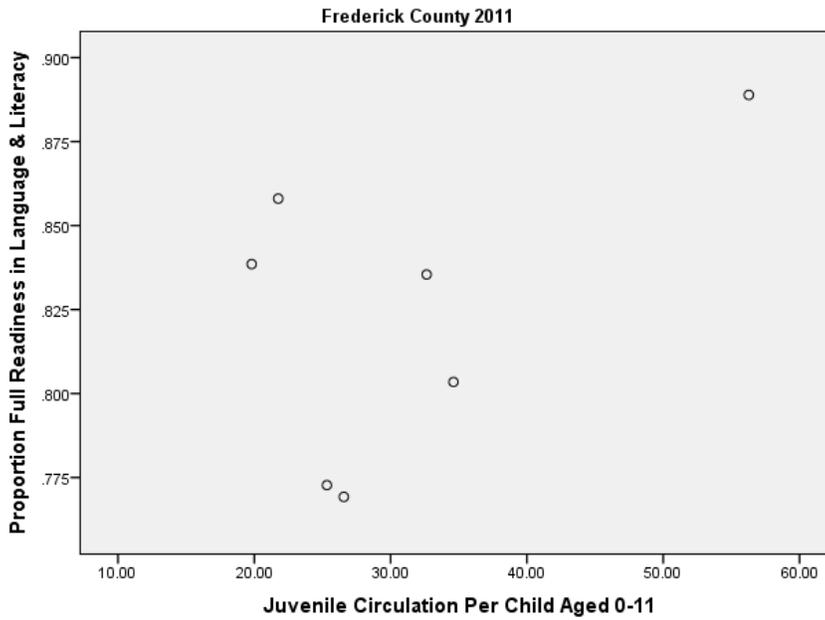


Table 12: Scatterplot of Circulation & MMSR, Frederick

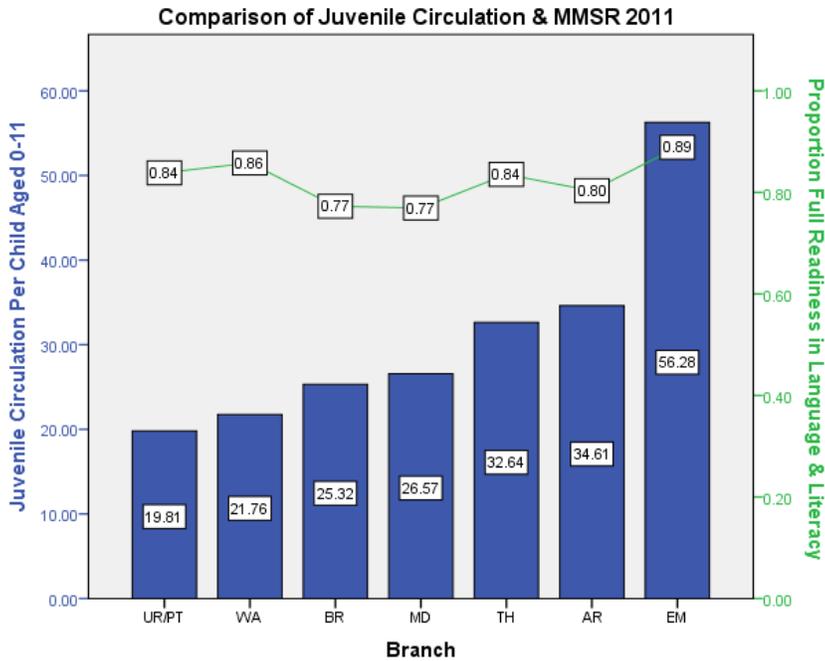


Table 13: Relationship Between Circulation & MMSR, Frederick

Similarly, program attendance by children aged zero-to-five did not appear to have a strong relationship with language readiness scores. The scatterplot does not show linearity. (See Table 14). Program attendance per child ranges from 1.44 in Middletown to 15.79 in Emmitsburg, with a standard deviation of 5.47. The skewness and kurtosis values fall within 2 and -2, so the proportions do fall on a normal curve, and the region is not an outlier in terms of program attendance. In fact, Thurmont, the library region that borders Emmitsburg and serves it as a regional hub, also has a similar program attendance proportion of 13.02. This implies that the northern region of the county as a whole has a high proportion of prekindergarten children attending library programs. (See Table 15).

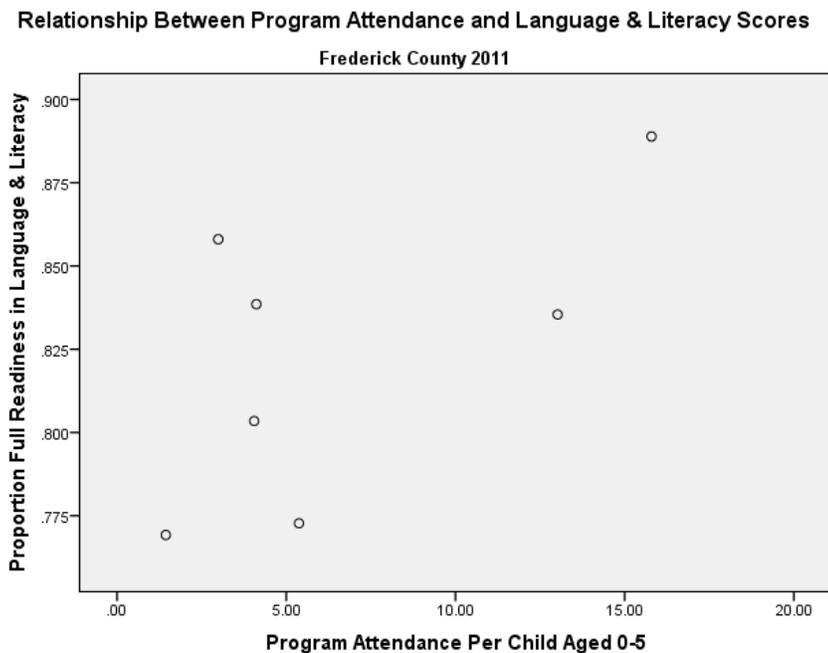


Table 14: Scatterplot Of Preschool Attendance & MMSR, Frederick

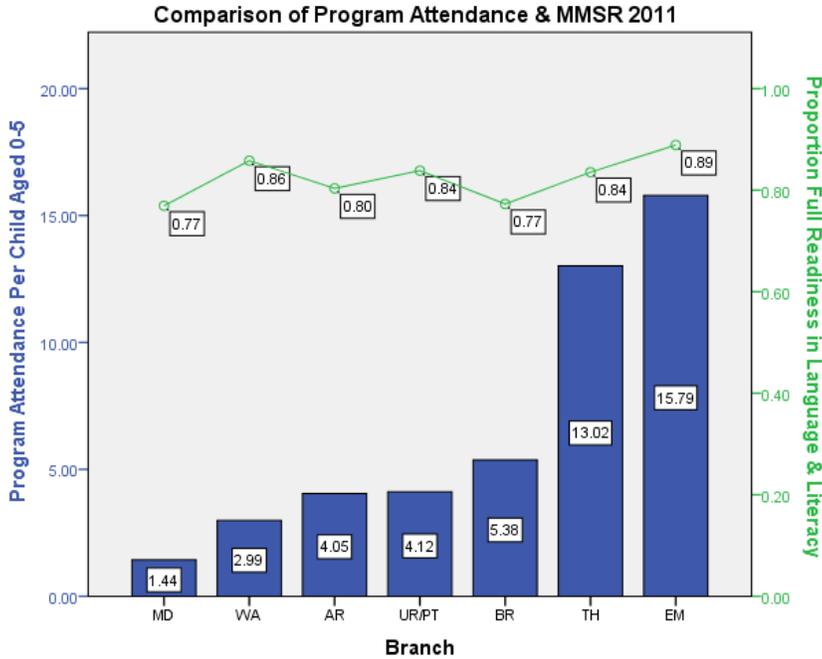


Table 15: Relationship Between Preschool Attendance & MMSR, Frederick

Limitations

A limitation to note is that Brunswick Library was in transition during FY2011. It was located in a temporary space for all of FY2011 until its grand reopening in a much larger, new building in April 2011. As a result, circulation and attendance were likely lower than average for eight months, then higher than average after the library’s grand reopening (between April and June).

Another limitation involves data that lack normality. An examination of the range of circulations shows that Emmitsburg’s uncharacteristically high circulations spike the kurtosis statistic to 3.2, meaning that the circulation data do not fall on a normal curve. They range from 19.81 to 56.28 with a standard deviation of 12.36. This may be due to the fact that the researcher estimated the population of children based on attendance at the

one public elementary school (36 students). However, this small, rural region has a well-regarded Catholic school whose population could potentially double the count of children in the area and invalidate the estimates the researcher used to calculate the circulation proportions.

Finally, this small sample size, with its rough estimates of population, is not a strong data set. If researchers had access to individual student data and could track how each child accesses library services and scores on his/her kindergarten entry test, the picture would emerge much more clearly.

Implications

Though no clear relationships between MMSR scores and either juvenile program attendance or circulation appear in this sample, further research could clarify the picture. FERPA legal regulations and FCPS policies prohibit the sharing of individual students' data with graduate researchers. In fact, teachers do not even report a child's MMSR scores to the parents unless the parent requests them. Likewise, FCPL does not track any individual's library usage over time in a way that it could be culled for this type of analysis. As such, only a research study dependent on the informed consent of parents and children could elicit the kind of library and school data needed to examine the relationship between the variables in Frederick County.

However, with more participating library branches in additional counties, a middle ground could be found between the fine granularity of the data of individuals and the large granularity of data by the county as a whole. A larger sample size of library geographical regions and their associated elementary schools would make a Pearson's correlation coefficient test possible. However, to make that possible, county library

systems would need to share their disaggregated data by branch, and school systems would need to share their disaggregated data by school. Such a study could protect the anonymity of individuals, while giving a closer look at how the variables relate to each other than the examination at the state level can.

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