

Evaluating the relationship between the *Imagination Library* early childhood literacy program and kindergarten readiness

Abstract

Research Findings: This study examines the association between participation in the *Imagination Library* early childhood literacy program and early language and math skills at kindergarten entry. The findings suggest participation in the program is positively and significantly associated with higher measures of early language and math development. This association remains after controlling for demographic and socioeconomic factors, pre-kindergarten educational experience, and family reading habits. *Practice or Policy:* These results offer support for policy interventions designed to advance kindergarten readiness by increasing young children's access to early literacy materials.

Evaluating the relationship between the *Imagination Library* early childhood literacy program and kindergarten readiness

Introduction

The first years of life are a period of rapid brain development and skills acquisition for young children (Shonkoff, 2010). Experiences in these early years establish the foundation for children's capacity to learn and thrive when they reach school (Cunha, Heckman, Lochner, & Masterov, 2006; Duncan et al., 2007; Entwisle, Alexander, & Olson, 2005). In turn, a child's readiness for school establishes a pathway to later academic achievement (Claessens, Duncan & Engel, 2009). Distal effects associated with early childhood development have been identified in adolescence and adulthood, including patterns of reliance on assistance in adulthood, engagement in risky health behaviors, and patterns of employment and homeownership (Barnett 2006; Campbell et al., 2008).

School readiness is a multi-faceted concept, and implies that a child has reached certain developmental milestones across a range of physical, emotional, behavioral, and cognitive domains (Andrews & Slate, 2001). This study focuses on a narrow bandwidth of readiness, including cognitive and language skills. Early reading and early math skills have been identified as foundational elements of future learning, and have been linked to both school readiness and future academic success (Duncan et al., 2007; Hindman, Skibbe, Miller, & Zimmerman, 2010).

Early Literacy Skills and School Readiness

Early childhood experiences shape language development and are associated with school readiness, early reading success, and effective grade progression (Duncan et al., 2007; Lee & Burkham, 2002; Sadowski, 2006; Willms, 2007). Early development of language and conceptual skills are vital to later development of increasingly complex literacy and numeracy skills, as well

as practical problem-solving skills (Duncan, et al., 2007; NICHD Early Child Care Research Network, 2005; Scarborough, 2001).

School readiness often reflects differences in early childhood experiences and developmental opportunities. Children raised in poverty, for example, are likely to reach kindergarten with lower measures of cognitive, language, social, and emotional development than their more affluent peers (Barnett 2006; Duncan, Morris, & Rodrigues, 2011; Isaacs & Magnuson, 2011; Lee & Burkam 2002). Moreover, national data indicate that children raised in poverty are exposed to far fewer words during their early years and are likely to reach school with smaller vocabularies than their peers from middle-income families (Hart & Risley, 1995; Lee & Burkam, 2002; Zimmerman et al., 2009).

Differences in early vocabulary development, subsequently, become school readiness gaps that are reflected in achievement gaps in later grades (Snow, Burns & Griffin, 1998; Willms, 2007). Children who demonstrate reading proficiency in grade school are likely to continue to read at grade level, whereas children identified with early reading deficits are more likely to experience difficulty throughout their academic careers (Scarborough, 1998). Children with early learning difficulties continue to require greater resources from school systems, including special education and remedial services, and are at greater risk for grade retention and dropout (Laosa, 2005).

However, developmental plasticity in early childhood also marks this period as particularly promising for intervention. High-quality early childhood interventions, particularly targeted at children at greatest risk, are associated with positive gains across a broad range of domains of early childhood development (Camilli, Vargas, Ryan, & Barnett, 2010; Isaacs 2007; Janus & Duku, 2007; Son & Morrison, 2010). Previous research indicates that greater parent-

child reading practices predict greater receptive vocabulary, understanding of story and print concepts, and pre-literacy skills among low-income children (Bracken & Fischel, 2008).

The *Imagination Library* Program

This study investigates the association between an early childhood literacy enrichment program and children's pre-literacy and pre-numeracy skills at the point of kindergarten entry in an urban school district. Specifically, this article reports on a recent evaluation of the Shelby County *Books from Birth* program, an affiliate of Dolly Parton's *Imagination Library*, which is designed to promote early childhood family reading habits and support literacy development.

The *Imagination Library (IL)* program mails a free, age-appropriate book directly to each enrolled child each month, until they reach age five. Every child younger than five, living in Shelby County, Tennessee, is eligible to participate in the program, regardless of family income.¹ The program is intended to support school readiness by encouraging families to read with young children, fostering an interest in reading among children, and encouraging positive, developmentally stimulating interactions between children and their families (Governor's Books from Birth Foundation, 2008; Shelby County Books from Birth, 2012). The books selected are intended to introduce children and their families to age-appropriate, developmental themes, language, phonics, and vocabulary, and exploration and stimulation of the senses (Dolly Parton's *Imagination Library*, 2012).

There are reasons to believe the *Imagination Library* program would support school readiness. Developing a capacity for reading is a foundational skill for success in both primary and secondary school (Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001). Early exposure to literacy experiences supports language development and emergent literacy (Bus, van Ijzendoorn & Pellegrini, 1995). Children introduced to literacy activities at a young age have an

advantage when they reach kindergarten, and this advantage extends through primary school (Mullis, Mullis, Cornille, Ritchson, & Sullender, 2004; Wade & Moore, 2000).

Previous Evaluations of the *Imagination Library* Program

A number of previous studies have evaluated the *IL* program. Several of these evaluations have queried parents about their family's experiences with the program. (Gordon, 2010; High/Scope Educational Research, 2003; Thomason, 2008). As a group, parents reported that their families engaged in stronger reading practices as a result of their participation in the program. They reported spending more time reading, and rising levels of comfort reading with their children. Additionally, parents reported that they were more aware of their children's amount of – and interest in – reading. While suggestive, these evaluations did not compare families in the program to similar families not in the program. Further, these studies relied on parents' self-reports of their impressions of the effectiveness of the program rather than independent measures that might be linked to program participation.

In a parallel research stream, several studies have asked early childhood educators to discuss differences between children who did and did not participate in the *IL* program (Governor's Books from Birth, 2008; Tennessee Board of Regents, 2008a, 2008b). Both pre-kindergarten and kindergarten teachers reported that, as a group, children who participated in *IL* reached the classroom better prepared. These teachers noted that *IL* participants had stronger early reading skills than non-participants (Governor's Books from Birth, 2008; Tennessee Board of Regents, 2008a, 2008b). Again, these results are suggestive, but limited by the study design. In this case, teachers had prior knowledge of which children had participated in the *IL* program, and were asked to compare this group to the cohort of children who did not participate in *IL*.

Several other studies have taken a different approach, and have considered the length of enrollment in the *IL* program to see if longer involvement (and receipt of more books) improves early reading and home literacy practices. For example, Thomason (2008) found a positive association between longer program participation and stronger home literacy environments. Similarly, a study conducted in Onondaga County, New York found an association between longer enrollment in the program and higher rates of parents reading books with their children (Ridzi, Sylvia, & Singh, 2011). Again, though, this design did not allow for comparisons with families outside the program, and relied on parents' self-report of outcomes they associated with program participation.

The design of one final study managed to avoid a number of these shortcomings. Conducted in Middleton, Ohio, the researchers compared early literacy measures for a cohort of new kindergartners who had access to the *IL* program to scores for their classmates who had not taken part in the *IL* program. The Middleton study identified a statistically significant advantage for *IL* participants on early literacy scores at the point of kindergarten entry (Gordon, 2010).

Taken together, these evaluations suggest that *IL* supports the early literacy development of young children. Would a more rigorous evaluation confirm these findings? Only one of the earlier studies included a comparison group. Most of the earlier evaluations were based on participating family's evaluations of the program's influence. A single study examined the influence of the program on a tangible kindergarten readiness outcome (pre-literacy skills). Moreover, none of the previous studies considered the importance of other key correlates of kindergarten readiness (including pre-kindergarten experience, and family socio-economic status).

The current study

The current project compared pre-literacy and pre-numeracy kindergarten readiness measures for a cohort of families and children who participated in the *IL* program, alongside the same measures for a comparable cohort of families and children who did not participate in the *IL* program. The study asked whether children who participated in the *IL* program entered kindergarten with stronger measures of kindergarten readiness, and whether those differences remained after controlling for other factors known to influence kindergarten readiness (including child's age in months at kindergarten entry, eligibility for free or reduced price lunch, race, gender, pre-kindergarten experience, and families' reported early reading practices).

Methods

Participants

This study is based on secondary data collected on 263 new kindergarten students enrolled in the fall of 2011 at five public elementary schools in Memphis, Tennessee.² This dataset allowed us to compare the kindergarten readiness scores of children who had participated in the *IL* program to the group of children who did not participate in the *IL* program. Roughly half (54%) of the children in this sample had participated in the *IL* program.³ This rate of participation is consistent with published rates of participation in the *IL* program in Shelby County (InSights 2013).

Comparing the groups of children who did and did not participate in the *IL* program in our sample, we identify no significant group differences in terms of age, gender, race, or economic status. However, statistically significant differences were identified between participants and non-participants in terms of two key dimensions: pre-kindergarten experience and family reading habits. Table 1 presents the complete demographics, pre-kindergarten

experiences, and measures of parent-reported family reading habits of both the group of families exposed to the IL program, and the group of families that did not participate.

Table 1
Descriptive characteristics of IL program participants and non-participants (N = 263)

	<i>IL Participant (n = 143)</i>	<i>IL Non-participant (n = 120)</i>	<i>df</i>	<i>t or χ^2</i>
Age (months)			261	0.59
<i>M</i>	65.9	66.3		
<i>S.D.</i>	3.7	4.1		
Gender			1	1.19
% Female	51.7	45.0		
% Male	48.3	55.0		
Race			1	1.02
% Black	69.2	63.3		
% Other	30.8	36.7		
Economic disadvantage^a			1	0.65
% Yes	77.6	81.7		
% No	22.4	18.3		
Pre-K Experience^b			3	13.79**
% District pre-kindergarten	31.5	42.5		
% Head Start	17.5	7.5		
% Child care center	34.3	22.5		
% Parent/relative care	16.8	27.5		
Reading Habits Scale Score			261	2.13*
<i>M</i>	3.64	3.44		
<i>S.D.</i>	0.65	0.78		

^aChildren were considered economically disadvantaged if they qualified for the federal free or reduced price lunch program, (i.e., family income \leq 185% of the federal poverty line).

^bParent report of where the child spent most of his/her weekday time in the year prior to entering kindergarten

* $p < .05$, ** $p < .01$

Procedures

During kindergarten registration in the fall of 2011, information was collected from parents of new kindergartners concerning aspects of home life that relate to kindergarten success, including family home reading habits, participation in the *IL* program, and each child's pre-kindergarten experience. A range of socio-demographic information also was collected on each

child. These data were then matched to measures of kindergarten readiness collected on each child's first day of kindergarten.

Measures

Background Variables. At kindergarten registration, the school district regularly collects information about students' age, gender, race, family economic status, and pre-kindergarten experience. Student age in months was calculated as of September 30, 2011, the state-defined threshold for kindergarten eligibility for that school year. Race was analyzed as Black / African American students as compared to all other reported races due to the high proportion of Black students within the study sample and the district. Family economic disadvantage was defined by eligibility for the federal National School Lunch Program (free/reduced price lunch program), further defined as family income \leq 185% of the federal poverty guidelines (United States Department of Agriculture, 2012).

The measure of students' pre-kindergarten experiences was built from parents' reports of where their children spent most of their weekday time in the year prior to entering kindergarten. Pre-kindergarten experience was coded as pre-kindergarten provided by the district, Head Start, other center-based child care, or parent/relative care. In the analysis, we focused on differences in outcomes observed between each form of structured care (district pre-kindergarten, Head Start, or center-based child care) when compared to parent/relative care.

Family Reading Habits Survey. A second set of information collected at kindergarten entry concerned early childhood family reading habits. This information was collected through a Family Reading Habits Survey. The survey was adapted from a previous measure used to evaluate the impact of the *IL* program on the family home reading environment (Thomason, 2008). Survey questions were modified to accommodate a fifth-grade reading level, and to

clarify issues raised during a focus group conducted with parents of young children. The resulting survey comprised 18 questions touching on five themes: family home reading environment, child's level of enthusiasm for reading, parental comfort with reading to children, and questions about a family's participation in the *IL* program. A Spanish language version of the questionnaire was available, but only those responses recorded on the English version of the survey are included in this analysis ($n = 263$). We noted several differences between the group of children whose families completed the reading habits survey in Spanish and the children from families that completed the survey in English. As a group, children from families that completed the survey in Spanish were likely to have lower Kindergarten Readiness scores. They were also more likely to be low-income, and less likely to have participated in the *IL* program. This sub-set of the data was excluded from the analysis to prevent confounding the results with limited English proficiency (The English version of the survey is included as Appendix A).

The quality of family home literacy activities in each child's home was then scaled. Individual items included the frequency of reading with a child, telling stories, and singing the alphabet, for example. Parent responses were scaled using a five point Likert scale ("Never," "1-2 times a month," "1-2 times a week," "Almost daily," and "Daily") for each question, and a mean scale score was derived for each participant. The resulting scale score was used to assess the home reading habits of these families. Cronbach's α measured .92 among the study sample, indicating high internal consistency of the family reading habits scale.

Kindergarten Readiness Indicator. The cognitive readiness of new kindergartners in Memphis City Schools is evaluated using an instrument known as the Kindergarten Readiness Indicator (KRI; Memphis City Schools [MCS], 2006). The KRI consists of language and mathematics scales and is used to rapidly assess the pre-reading and pre-numeracy skills of

kindergartners as they enter school. The pre-reading scale is comprised of 86 items addressing vocabulary, pre-literacy skills (e.g. rhyming, letter identification), and speaking/listening skills. The pre-mathematics scale is comprised of 27 items and includes number identification, pattern identification, sorting, shape identification, and counting.

An earlier study of the KRI (Sell, 2008) found high internal consistency (KRI Language Cronbach's $\alpha = .98$; KRI Math Cronbach's $\alpha = .95$) as well as high construct validity with the Developing Skills Checklist (DSC; CTB/McGraw-Hill, 1990), a nationally-normed assessment (KRI Language and DSC Language $r = .61, p < .01$; KRI Language and DSC Memory $r = .86, p < .01$; KRI Mathematics and DSC Mathematical Concepts & Operations $r = .76, p < .01$). Further, a canonical correlation, comparing the KRI and DSC, indicated a significant first canonical root ($R = .88, p < .001$). In the present study, Cronbach's α measured .98 for the language scale and .95 for the math scale among the study sample. These findings are consistent with the internal consistency values reported by Sell (2008).

Statistical Analyses

The current study asked if *IL* participation was associated with stronger measures of kindergarten readiness, after accounting for other important background characteristics. To address these questions, we performed mixed-model regression analyses. One model used the KRI language scale as the dependent variable. The second model used KRI math scores as the dependent variable. A type III regression model was utilized to control for the effects of all other variables in the models, following consideration of interaction effects. Each model also included key socioeconomic and demographic variables identified by the literature as related to kindergarten readiness. These variables included child's age in months at kindergarten entry, child's gender, child's race, and family economic disadvantage. Additionally, each model

included an indicator of *IL* participation status. Missing data were addressed using case-wise deletion, as data were determined to be missing completely at random via Little’s MCAR test (Little, 1988), $\chi^2 = 35.15$ (33, $N = 338$) $p = .367$, resulting in the removal of 75 cases.⁴ (For this, and subsequent, statistical analysis, SAS software, version 9.2, was used) (SAS Institute, Cary, NC).

Homogeneity of slopes for KRI reading scores was initially tested against the continuous age and reading habits variables to test for interaction effects. Slopes were pooled, as homogeneity was determined for the continuous variables of child’s age and family reading habits. Homogeneity of slopes was also determined for KRI math scores. KRI language: Differences in age slopes were not statistically significant, $b = 0.18$, $t(251) = 0.28$, $p = .78$, nor were differences in reading habits slopes, $b = 2.00$, $t(251) = 0.56$, $p = .57$. KRI math: Differences in age slopes were not statistically significant, $b = -0.0089$, $t(251) = -0.04$, $p = .97$, nor were differences in reading habits slopes, $b = 0.68$, $t(251) = 0.56$, $p = .58$. Model fit was determined for both KRI language, Omnibus $F(2, 251) = 0.20$, $p = .82$, and KRI math, Omnibus $F(2,251) = 0.16$, $p = .86$.

Results

***IL* participation is associated with higher kindergarten readiness scores**

Overall, our results suggest that a child’s participation in the *IL* program is associated with higher scores on the KRI language and KRI math scales. Descriptive comparisons are depicted in Table 2.

Table 2
Comparison of kindergarten readiness outcome measures (N = 263)

	<i>IL</i> Participant ($n = 143$)	<i>IL</i> Non- participant ($n = 120$)	<i>df</i>	<i>t</i>
KRI Language			261	-3.49**

<i>M</i>	64.52	54.88		
<i>S.D.</i>	21.71	22.95		
KRI Math			261	-2.19*
<i>M</i>	21.13	19.12		
<i>S.D.</i>	7.24	7.58		

* $p < .05$, ** $p < .01$

KRI language scores averaged 9.64 points higher (out of 86 possible) for program participants than for non-participants, 95% CI [4.20, 15.07]. KRI math scores averaged 2.01 points higher (out of 27 possible) for program participants, 95% CI [0.21, 3.81].

When we include other variables associated with kindergarten readiness, the association between *IL* participation and the KRI language scale remained statistically significant. Table 3 reports on the results of a mixed-model regression analysis of the relationship between each of the independent variables and the KRI language scale. Overall model significance was determined, $F(9, 262) = 9.75, p < .01$.

Table 3
Mixed-model regression parameter estimates and effect sizes for KRI language scores

Variable	<i>B</i>	<i>SEB</i>	<i>t</i> (253)	<i>F</i> (<i>df</i> , 253)	η^2
Constant	-53.58	22.85	-2.34*		
Age	1.35	0.32	4.18**	17.48(1)**	.051
Economic disadvantage	-12.34	3.32	-3.72**	13.83(1)**	.041
Gender	2.82	2.51	1.13	1.27(1)	.004
Pre-K Experience ⁵				7.71(3)**	.068
District pre-k	16.10	3.44	4.68**		
Head Start	7.48	4.59	1.63		
Child care	11.54	3.69	3.13**		
Race	-0.15	2.97	-0.05	0.00(1)	.000
Reading habits	5.14	1.78	2.89**	8.36(1)**	.025
<i>IL</i> status	8.02	2.56	3.13**	9.81(1)**	.029

Note. $R^2 = .26$

* $p < .05$, ** $p < .01$

As Table 3 suggests, age, economic disadvantage, pre-kindergarten experience, reading habits, and participation in the *IL* program are each significantly associated with KRI language scores.

The model explains 26% of the overall variance. When each independent variable is considered, participation in the *IL* program is associated with an 8 point higher score (9.3% of the scale) on the KRI language scale, 95% CI [2.98, 13.07].

Next, we turned to our second measure of kindergarten readiness, KRI math scores. As with the KRI reading scores, we find a positive, statistically significant association between participation in the *IL* program and the KRI math measure. This relationship remains after we account for each of the other variables of interest. Results of this regression model are presented in Table 4. Overall model significance was determined, $F(9, 262) = 6.69, p < .01$.

Table 4
Mixed-model regression parameter estimates and effect sizes for KRI math scores

Variable	<i>B</i>	<i>SEB</i>	<i>t</i> (253)	<i>F</i> (<i>df</i> , 253)	η^2
Constant	-17.91	7.71	-2.29*		
Age	0.47	7.81	4.23**	17.86(1)**	.057
Economic disadvantage	-2.78	1.13	-2.45*	6.00(1)*	.019
Gender	-0.06	0.86	-0.07	0.00(1)	.000
Pre-K Experience ⁶				4.49(3)**	.043
District pre-k	3.61	1.17	3.07**		
Head Start	-.13	1.57	-0.09		
Child care	2.30	1.26	1.83		
Race	-0.84	1.01	-0.83	0.69(1)	.002
Reading habits	1.99	0.61	3.27**	10.69(1)**	.034
<i>IL</i> status	1.84	0.88	2.11*	4.43(1)*	.014

Note. $R^2 = .19$

* $p < .05$, ** $p < .01$

As Table 4 indicates, age, economic disadvantage, pre-kindergarten experience, reading habits, and *IL* participation each prove to be significantly associated with KRI math scores. Overall, the model explains 19% of the variance in math scores. When each of these independent variables is considered, participation in the *IL* program is associated with a significant increase of 1.8 points (6.6% of the scale) in KRI math scale score, 95% CI [0.11, 3.57].

Discussion

This study has considered the association between participation in the *Imagination Library (IL)* program and measures of school readiness, building upon previous evaluations of the *IL* program. Extending earlier findings, we identify an association between participation in the *IL* program and higher pre-literacy and pre-math scores at kindergarten entry.

This study extends previous findings through a research design that allowed for consideration of the association between the *IL* program and kindergarten readiness scores while also controlling for the influence of demographic and socio-economic factors, family reading practices, and children's pre-kindergarten educational experiences. A rich research literature suggests that these factors are strongly related to kindergarten readiness. The models considered in this study allow us to account for the influence of each of these factors, and suggest that the association between participation in the *IL* program and higher pre-reading and pre-math scores remains statistically significant even after we account for these other factors.

Implications and Conclusions

Our study design allowed us to make use of an extraordinary data collection opportunity: the annual, nationwide project of kindergarten registration. With access to kindergarten intake data, we were able to consider a number of important covariates of kindergarten readiness alongside *IL* participation (these included demographic and socio-economic factors, patterns of early childhood family reading habits, and preschool experiences). This study demonstrates that there is an association between participation in the *IL* program and development of fundamental pre-reading and math skills. By design, the *IL* program is intended to support early childhood family literacy practices by providing developmentally appropriate reading materials. These materials are intended to foster early literacy and conceptual skills among children from birth to kindergarten entry, encourage strong family reading habits, and nurture positive early childhood

developmental experiences. The results of this study underscore the importance of accessible reading materials, as well as the importance of early exposure to reading, for families with young children.

These results have potential policy implications given the association between early childhood development, kindergarten readiness, future academic success, and stronger adult well-being and health. In policy terms, early childhood interventions offer far greater economic and social returns on investment when compared to interventions administered later in life (Isaacs 2007; Karoly, Kilburn, & Cannon, 2005).

Limitations

It is important to note several limitations to this study. First, these findings are correlational, not causal. Children and families in this study were not randomly assigned to exposure or control groups. Instead, families self-selected into the *IL* program, or chose not to participate. In this respect, our study remains silent on the factors that influence self-selection into the *IL* program. These same factors also may have an independent influence early childhood home environments, early childhood developmental patterns, and kindergarten readiness.

Moreover, while *IL* participation may support family reading habits and positive early childhood developmental experiences, this relationship is likely to be bidirectional. That is, stronger early childhood reading habits may both support kindergarten readiness and increase the likelihood that a family will enroll in the *IL* program.

Additionally, these analyses are based only those students whose parents completed the English version of the family reading habits questionnaire. These results, therefore, should not be generalized to non-native English speaking families. Further study is needed to evaluate the impact of *IL* on non-native English-speaking families.

Two additional limitations of the study concern our measure of school readiness. First, the KRI is not a nationally normed instrument. To some extent, this concern is obviated by evaluations that find that KRI results closely reflect national kindergarten readiness findings, suggesting that the instrument is comparable to other measures of readiness (Mulligan, Hastedt, & McCarroll, 2012). Second, the KRI offers a narrow focus on specific cognitive dimensions of school readiness: pre-reading and pre-math skills. To some extent, this concern is muted by findings from Greg Duncan and his colleagues (2007) that suggest reading and math skills at kindergarten entry offer a strong predictor of subsequent academic achievement. Nevertheless, further studies are needed to consider the influence of the *IL* program on other dimensions of kindergarten readiness, potentially including self-regulation skills.

In spite of these limitations, this study helps to further our understanding of the relationship between community interventions designed to promote a love of reading in young children and their subsequent readiness for kindergarten.

References

- Andrews, S.P., & Slate, J.R. (2001). Prekindergarten programs: A review of the literature. *Current Issues in Education, 4*(5). Retrieved from <http://cie.asu.edu/volume4/number5/index.html>
- Barnett, W.S., & Belfield, C.R. (2006). Early childhood development and social mobility. *Future Child, 16*(2), 73-98.
- Bracken, S.S., & Fischel, J.E. (2008). Family reading behavior and early literacy skills and preschool children from low-income backgrounds. *Early Education and Development, 19*(1), 45-67.
- Bus, A.G., van Ijzendoorn, M.H., & Pellegrini, A.D. (1995). Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmission of literacy. *Review of Educational Research, 65*(5), 1-21.
- Camilli, G., Vargas, S., Ryan, S., & Barnett, W.S. (2010). Meta-analysis of the effects of early education interventions on cognitive and social development. *Teachers College Record, 112*(3), 579-620.
- Campbell, F.A., Wasik, B.H., Pungello, E., Burchinal, M., Barbarin, O., Kainz, K., ... Ramey, C.T. (2008). Young adult outcomes of the Abecedarian and CARE early childhood educational interventions. *Early Childhood Research Quarterly, 23*(4), 452-466.
- Claessens, A., Duncan, G.J., & Engel, M. (2009). Kindergarten skills and fifth-grade achievement: Evidence from the ECLS-K. *Economics of Education Review, 28*, 415-427.
- CTB/McGraw-Hill. (1990). *Developing Skills Checklist*. Monterey, CA: McGraw-Hill.

Cunha, F., Heckman, J.J., Lochner, L.J., & Masterov, D.V. (2006). Interpreting the Evidence on Life Cycle Skill Formation. In E. Hanushek & F. Welch (Eds.), *Handbook of the Economics of Education* (pp.697-812). Amsterdam: North Holland.

Dolly Parton's Imagination Library (2012). Themes & Concepts. Retrieved from http://usa.imaginationlibrary.com/themes_concepts.php#.UPRqTPI1CS0

Duncan, G.J., Dowsett, C.J., Brooks-Gunn, J., Claessens, A., Duckworth, K., Engel, M., . . . Sexton, H. (2007). School readiness and later achievement. *Developmental Psychology*, 43(6), 1428-1446.

Duncan, G.J., Morris, P.A., & Rodrigues, C. (2011). Does money really matter? Estimating impacts of family income on young children's achievement with data from random-assignment experiments. *Developmental Psychology*, 47(5), 1263-1279.

Entwisle, D.R., Alexander, K.L., & Olson, L.S. (2005). First grade and educational attainment by age 22: A new story. *American Journal of Sociology*, 110, 1458-1502.

Gordon, T.D. (2010). Celebrating little dreamers: An analysis of the first 18 months of Dolly Parton's Imagination Library in Middletown, Ohio. Retrieved from <http://www.mcfoundation.org/report.pdf>

Governor's Books from Birth Foundation. (2008). Release – Results of Imagination Library Impact Study. Retrieved from <http://www.governorsfoundation.org/pdf/RELEASE%20-%20Results%20of%20Imagination%20Library%20Impact%20Study.pdf>

Hart, B., & Risley, R.T. (1995). *Meaningful Differences in the Everyday Experience of Young American Children*. Baltimore: Paul H. Brookes.

High/Scope Educational Research Foundation. (2003). *Literacy Outcomes and the Household Literacy Environment: An Evaluation of the Dolly Parton's Imagination Library*.

Ypsilanti, MI: Charles Smith.

Hindman, A.H., Skibbe, L.E., Miller, A., & Zimmerman, M. (2010). Ecological contexts and early learning: Contributions of child, family, and classroom factors during Head Start, to literacy and mathematics growth through first grade. *Early Childhood Research Quarterly, 25*, 235-250.

InRoads: The Newsletter of the GBBF. 2013. Nashville, TN: Governor's Books from Birth Foundation. Winter.

Isaacs, J.B. (2007). *Cost-Effective Investments in Children*. Washington, DC: The Brookings Institution.

Isaacs, J., & Magnuson, K. (2011). *Income and education as predictors of children's school readiness*. Washington, DC: The Brookings Institution.

Janus, M., & Duku, E. (2007). The school entry gap: Socioeconomic, family, and health factors associated with children's school readiness to learn. *Early Education and Development, 18*(3), 375-403.

Karoly, L.A., Kilburn, M.R., & Cannon, J.S. (2005). *Early Childhood Interventions: Proven Results, Future Promise*. Santa Monica, CA: RAND Corporation.

Laosa, L.M. (2005). NIEER Working Paper: Effects of Preschool on Educational Achievement. Retrieved from <http://www.plan4preschool.org/documents/effects-preschool.pdf>

Lee, V.E., & Burkam, D.T. (2002). *Inequality at the Starting Gate: Social Background Differences in Achievement at Children Begin School*. Washington, DC: Economic Policy Institute.

- Little, R.J.A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, 83, 1198-1202.
- Memphis City Schools. (2006). *Kindergarten Readiness Indicator*. Memphis, TN: Memphis City Schools.
- Mulligan, G.M., Hastedt, S., & McCarroll, J.C. (2012). *First time kindergarteners in 2010-11: First findings from the kindergarten rounds of the Early Childhood Longitudinal Study, kindergarten class of 2010-11 (ECLS-K:2011)* (NCES Report No. 2012-049). Retrieved from <http://www.eric.ed.gov/ERICWebPortal/detail?accno=ED533795>
- Mullis, R.L., Mullis, A.K., Cornille, T.A., Ritchson, A.D., & Sullender, M.S. (2004). *Early literacy outcomes and parent involvement*. Tallahassee, FL: Florida State University.
- NICHD Early Child Care Research Network. (2005). Pathways to reading: The role of oral language in the transition to reading. *Developmental Psychology*, 41(2), 428-442.
- Rayner, K., Foorman, B.R., Perfetti, C.A., Pesetsky, D., & Seidenberg, M.S. (2001). How psychological science informs the teaching of reading. *Psychological Science in the Public Interest*, 2, 31-74.
- Ridzi, F., Sylvia, M., & Singh, S. (2011). *Imagination Library: Do more books in hand mean more shared book reading?* Syracuse, NY: LeMoyne. Retrieved from http://www.lemoyne.edu/Portals/11/pdf_content/CURAR_IL_Final%20Do%20More%20Books%20in%20Hand%20-%20Paper%20July%205%202011.pdf
- Sadowski, M. (2006). The School Readiness Gap. *Harvard Education Letter*, 22(4). Retrieved from <http://www.hepg.org/hel/article/307>
- Scarborough, H.S. (1998). Early identification of children at risk for reading disabilities: Phonological awareness and some other promising predictors. In B.K. Shapiro, P.J.

- Accardo, & A.J. Capute (Eds.), *Specific reading disability: A view of the spectrum* (pp. 75-119). Timonium, MD: York Press.
- Scarborough, H.S. (2001). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In S. Neuman & D. Dickinson (Eds.), *Handbook for research in early literacy* (pp. 97-110). New York: Guilford.
- Sell, M. (2008). *Kindergarten Readiness Indicator: Instrument scoring and validation technical report*. Memphis, TN: Memphis City Schools.
- Shelby County Books from Birth. (2012). FAQ. Retrieved from <http://booksfrombirth.org/about-us/faq/>
- Shonkoff, J.P. (2010). Building a new biodevelopmental framework to guide the future of early childhood policy. *Child Development, 81*(1), 357-367.
- Son S., & Morrison F.J. (2010). The nature and impact of changes in home learning environment on development of language and academic skills in preschool children. *Developmental Psychology, 46*(5): 1103-1118.
- Snow, C.E., Burns, M.S., & Griffin, P. (1998). *Preventing Reading Difficulties in Young Children*. Washington, DC: National Academy Press.
- Tennessee Board of Regents. (2008a). Imagination Library Program Fall 2007 Survey of Pre-kindergarten Teachers Report of Findings. Retrieved from <http://www.governorsfoundation.org/pdf/PreKindergartenResultsFall07final.pdf>
- Tennessee Board of Regents. (2008b). Imagination Library Program Fall 2007 Survey of Kindergarten Teachers Report of Findings. Retrieved from <http://www.governorsfoundation.org/pdf/KindergartenResultsFall07final.pdf>

- Thomason, G.B. (2008). *The impact of the Ferst Foundation for Childhood Literacy on the home literacy environment*. (Unpublished doctoral dissertation). Liberty University, Lynchburg, VA.
- United States Department of Agriculture. (2012). National School Lunch Program. Retrieved from <http://www.fns.usda.gov/cnd/Lunch/AboutLunch/NSLPFactSheet.pdf>
- Wade, B., & Moore, M. (2000). A sure start with books. *Early Years*, 20(2), 39-46.
- Willms, D. (2007). *Wait to Fail*. Presentation to the Canadian Education Association.
- Zimmerman, F.J., Gilkerson, J., Richards, J.A., Christakis, D.A., Xu, D., Gray, S., & Yapanel, U. (2009). Teaching by listening: The importance of adult-child conversations to language development. *Pediatrics*, 124(1), 342-349.

Appendix A

Family home reading practices survey.



NEW KINDERGARTEN STUDENTS

_____ Elementary School

Child first and last name: _____ Child birth date ___/___/___

Child's Social Security #: _____ - _____ - _____ Today's date: ___/___/___

Your name & relationship to the child: _____

Please mark an X in the box the best fits for your family reading habits and your kindergarten student.

How often does someone in your home:	Never	1-2 times a month	1-2 times a week	Almost daily	Daily
1. Read a young children's book with your child?					
2. Talk about the pictures in a book with your child?					
3. Talk about a book after reading it with your child?					
4. Sing or say the ABC's with your child?					
5. Sing or say nursery rhymes with your child?					
6. Tell your child stories without using books?					
7. Go to the library with your child?					
8. Help your child draw pictures or color?					
How often does your child:					
9. Ask to be read to?					
10. Look at books by himself or herself?					
11. Play with games or toys for learning?					
12. See someone in your home reading for fun?					

13. How many young children's books do you have in your home? *(circle one)*

0 1-10 11-25 26-50 51+

14. How much does your child like being read to? *(circle one)* not at all a little a lot loves it

15. How comfortable are you reading to your child? *(circle one)* not at all a little a lot loves it

16. Did your child get a free book in the mail once a month (the Imagination Library Program)? ___yes ___no

17. How old was your child when he or she got the first book from Imagination Library?

_____ years _____ months



18. How many books has your child gotten in the mail from Imagination Library? *(circle one)*

0 1-15 16-30 31-45 46-60

Memphis City Schools does not discriminate in its programs or employment on the basis of race, color, religion, national origin, disability, sex, age or genetics. For more information, please contact the Office of Equity Compliance at (901) 416-6670.

¹ Strong statewide support for the Imagination Library program in Tennessee is due to the active support of two successive governors, working alongside the efforts of the Dollywood Foundation. In Shelby County, the program's strong foundation is supported by the advocacy of both county and municipal mayoral offices, along with the active commitment of the local foundation community, the state-wide Governor's Books from Birth Foundation, and corporate and nonprofit partners.

² Participant confidentiality was maintained throughout the study, and the school district de-identified all student-level data prior to our study analysis. This project was undertaken after review and full approval by the University of Memphis Institutional Review Board, and under the terms of a signed research agreement with the Memphis City Schools office of Research, Evaluation, Assessment, and Student Information. The study drew upon secondary data collected by Memphis City Schools at the point of Kindergarten registration, and through their standard process of kindergarten readiness assessment.

³ Based on parents' report, collected during kindergarten registration.

⁴ Case-wise deletion was performed based on missing data for respondent-reported pre-kindergarten experience ($n = 63$), respondent-reported *IL* status ($n = 7$), missing KRI score ($n = 4$), and missing reading habits response ($n = 1$). All remaining data were complete.

⁵ Post-hoc comparison of pre-kindergarten experience was performed using Tukey-Kramer adjustment. Post-hoc analyses determined significantly higher KRI language scale scores between children who attended district pre-kindergarten and those who were in parent/relative care, $b = 16.10$, $t(253) = 4.68$, adj. $p < .01$, and between children who attended child care centers compared with children who were in parent/relative care, $b = 11.54$, $t(253) = 3.13$, adj. $p = .01$.

⁶ Significantly higher KRI math scores were also noted between children who attended district pre-kindergarten compared with children who attended Head Start, $b = 3.74$, $t(253) = 2.69$, adj. $p = .04$, and between children who attended district pre-kindergarten compared with children who spent the previous year in parent/relative care, $b = 3.61$, $t(253) = 3.07$, adj. $p = .01$.