The Relation of Language and Literacy Outcomes to Family Literacy Practices for Children with Disabilities at Transition to Preschool and Kindergarten: A Multi-State Sample

Final Report

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Abstract

Through funding from the United States Department of Education's Office of Special Education, the National Early Childhood Transition Center (NECTC) began a series of studies to investigate the variables which influence transition during the early childhood years for young children with disabilities. Among others, factors studied include child characteristics, and parenting practices that interact to affect the child's adjustment, family's involvement, and the child's early performance in schools. Within this extant data set are a series of questions that reflect family literacy activities used by families to prepare their children for transition to preschool (at age 3) or kindergarten (at age 5). The ***goal*** of this study was to use parental reports of family literacy practices (contained in this dataset) to determine the association between the use of these family literacy practices and child outcomes in language and literacy. Study ***methods*** include a description of the ***recruitment of the sample*** which occurred in five states (Kentucky, Louisiana, Michigan, Oregon and Wisconsin); ***data collection*** accomplished by trained data collectors who used direct child assessments, family interviews and questionnaires, and teacher surveys to gather data for 235 children and their families at age three; and 355 children and their families at age five and ***measurement*** which included the Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Kaminski & Good, 1996); Individual Growth and Development indicators (IGDI; Alliteration, Picture-Naming, Rhyming subtests, ECRI-MGD, 2004), Peabody Picture Vocabulary Test (PPVT; Dunn & Dunn, 1997); and the Merrill –Palmer Revised Scale of Development (Expressive Language subtest; Roid & Sampers, 2004). A project-developed tool (the Early Literacy Measure; NECTC, 2004) adapted from the Head Start FACES (USDHHS, 2000) assessment also provided information about early literacy skills for these two groups of children. These data were used in ***data analysis*** to determine if family literacy activities are associated with child outcomes in language and literacy outcomes for young children with disabilities at entry to preschool and at exit from preschool. Study findings demonstrate the utility of family literacy activities in preparing young children with disabilities for transition to preschool and kindergarten and are congruent with the Collaborative Center for Literacy Development (CCLD) Family and Community Literacy Research Agenda. Furthermore, the use of a multi-state, multi-site, and multi-community data set has **implications** for the CCLD Family Literacy research questions which seek to more clearly determine if family literacy is differentially effective in Kentucky as compared to practices in other states. In addition, the samples provide sufficient variability to investigate the impact of demographic variables (i.e., adult educational attainment, race/ethnic membership, family structure) for family literacy practices.

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Introduction and Review of the Literature

Background and rationale for the study. There exists a long history of family literacy practices among world cultures; family members have been reading nighttime stories to their children, telling stories, sharing myths and legends and dancing and singing for many centuries; however there is a paucity of data to confirm the efficacy of these practices for later child outcomes in language and literacy (Lonigan, Escamilla & Strickland, 2008). Most early childhood educators view family literacy activities as a critical part of the early childhood experience; however a review by the National Early Literacy Panel (NELP) suggests that the effectiveness of these interventions varies greatly. The NELP reviewed 23 studies to examine the impacts of home and parent early literacy programs. The results of their analysis suggest that home and parent programs had statistically significant effects on measures of oral language and cognitive ability but that the effect sizes were small to moderate (respectively). They also report significant effects of family literacy practice on memory and writing (Jordan, Snow, & Porche, 2000). Results from the NELP meta-analysis of the impacts of family literacy practice on the literacy behaviors of young children suggest that these intervention efforts yield moderate to large effects for oral language and cognitive abilities (Baxendale & Hesketh, 2003). Furthermore, their analysis suggests that these effects appear to be sufficiently robust to variability in demographic variables such as child age and demographic characteristics of families. The NELP panel concluded that more research was needed to further reveal the impact of family literacy on language and literacy outcomes for young children and to determine which family literacy interventions can be linked to later child outcomes in language and literacy. Furthermore, the relation of these family literacy interventions to language and literacy outcomes for young children with disabilities is also unclear. The goal of this research was to increase knowledge and understanding of the utility of family

literacy practices for the improvement of child language and literacy outcomes. **Specific research questions** are included in Table 1. The results will address each of these questions specifically.

Table 1: Research Questions

1a. Do the assessed child factors have an impact on the level of family literacy practices for children at three years of age and their families;
1b. Do the assessed child factors have an impact on the level of family literacy practices for children at five years of age and their families;
2a. Do the assessed family factors have an impact on the level of family literacy practices for children at three years of age and their families;
2b. Do the assessed family factors have an impact on the level of family literacy practices children at five years of age and their families;
3a. Do the assessed community factors have an impact on the level of family literacy practices for children at three years of age and their families;
3b. Do the assessed community factors have an impact on the level of family literacy practices for children at five years of age and their families;
4a. Does state of residency impact the level of family literacy practices for children at age three and their families;
4b. Does state of residency impact the level of family literacy practices for children at age five and their families;
5a. What is the relation between family literacy practices and child outcomes for children at age three and their families when child, family and community variables are controlled;
5b. What is the relation between family literacy practices and child outcomes for children at age five and their families when child, family and community variables are controlled;
6. Is there a differential impact of family literacy practices on the child outcomes of children at age three and age five after controlling for child, family, and community variables?

Research Methods

Sampling. Five states (Kentucky, Louisiana, Michigan, Oregon, and Wisconsin) were purposively selected (Patton, 1990) to represent a diversity of region, size, population density, and minority membership. Recruitment efforts were launched by initial contact with state-level early intervention staff in each of the five states. More than 1000 (1030) programs and providers were contacted across the states

with participation from 359 (34.8%). From this sampling pool, programs were selected based urban/rural membership. Providers from these 359 programs recruited children and their families for the at-three sample (n = 235). Providers for the at-three sample served as recruitment sites/schools for the at-five sample. (n = 355). Children were recruited at both ages using race as a stratification variable.

Instrumentation. A number of standardized tools provide information for **child** variables and many are standardized norm-referenced tools which provide a high level of psychometric integrity and allow multiple comparisons across ages, children, and programs. For the at-three sample, the *Merrill-Palmer Scales of Development-Revised* battery (MP-R; Roid & Sampers, 2004) was administered and provides a comprehensive evaluation. Three additional assessments were administered, including (a) the *Peabody Picture Vocabulary Test, Third Edition* (PPVT-III; Dunn & Dunn, 1997); (b) *Merrill-Palmer Expressive Language* (Roid & Sampers, 2004); and (c) a project-developed literacy measure *(Emergent Literacy Measure)* adapted from the FACES battery (USDHHS, 2000). Two tools were added to the battery for the preschool sample (at kindergarten) to assess the more complex language, and literacy behaviors found at this age. These tools were the (a) *Individual Growth and Development Indicators* (IGDIs*;* ECRI - MGD, 2004); and (b) *Letter Naming Fluency subtest* of the *Dynamic Indicators of Basic Early Literacy Skills* (DIBELS; Kaminski & Good, 1996). In addition to these direct child assessment tools, family members and providers completed two rating scales to assess children's behavior and temperament: the *Behavior Assessment System for Children* (BASC) Teacher Rating Scale (TRS) and Parent Rating Scale (PRS) (Reynolds & Kamphaus, 1992); and the *Dimensions of Temperament – Revised* (DOTS-R; Windle & Lerner, 1999). Questions describing child behavior and attributes also were included in the family and teacher/provider interviews and surveys. An overview of this set of measures is included in Table 2. *Note: Outcomes from the behavior assessment measures are not included in this report.*

Table 2. Child Assessment Instruments

Instrument	[1]Location of Administration	Type of Administration	Ages
Behavior Assessment System for Children, Parent Report Scales (BASC - PRS; Reynolds & Kamphaus, 1992)	Home	Norm-referenced survey	Ages 3 & 5
Dimensions of Temperament-Revised (DOTS-R, Child; Windle & Lerner, 1999)	Home	Survey	Ages 3 & 5
Emergent Literacy Measure (ELM; NECTC, 2003, adapted from Print and Story Concepts, HHS, 2000)	Home or Center	Project- developed tool (adapted from FACES; HHS, 1998)	Ages 3 & 5
Individual Growth and Development Indicators (IGDIs; Early Childhood Research Institute on Measuring Development and Growth, 2004)	Home or Center	Performance measures	Age 5 only
Letter Naming Fluency subtest of the *Dynamic Indicators of Basic Early Literacy Skills* (DIBELS; Kaminski & Good, 1996)	Home or Center	Performance measures	Age 5 only
Merrill Palmer Scales of Development -Revised (MP-R; Roid & Sampers, 2004) Cognitive	Home or Center	Norm-referenced direct child assessment tool	Ages 3 & 5
Merrill Palmer Scales of Development –Revised (MP-R; Roid & Sampers, 2004) Self-Help	Home	Norm-referenced direct child assessment tool	Ages 3 & 5
Merrill Palmer Scales of Development -Revised (MP-R; Roid & Sampers, 2004) Expressive Language Evaluator Report	Home or Center	Norm-referenced observation by examiner	Ages 3 & 5
Merrill Palmer Scales of Development -Revised (MP-R; Roid & Sampers, 2004) Expressive Language Parent Form	Home	Norm-referenced survey	Ages 3 & 5
Merrill Palmer Scales of Development –Revised (MP-R; Roid & Sampers, 2004) Motor	Home or Center	Norm-referenced tool	Ages 3 & 5
Peabody Picture Vocabulary Test-Third Edition (PPVT-III; Dunn & Dunn, 1997)	Home or Center	Norm-referenced direct assessment tool	Ages 3 & 5

[1] Instruments administered at home unless parent indicated need or preference for other arrangements.

Family variables were measured using three tools commonly used in the disability and family literature (1) *Family Support Scale* (FSS; Dunst, Trivette, & Jenkins, 1988), (2) the *Family Empowerment Scale* (FES; Koren, Dechillo, & Friesen, 1992) and (3) the *Center for Epidemiological Studies – Depression Scale* (CES-D; Radloff, 1977). Results from these three scales were not included in the analysis for this

report because of the level of missing case data. A family interview (developed by project staff and researchers) completed with family members was the primary data collection instrument for family data. Family interviews also included items from measures used in early childhood large scale studies including the Early Childhood Longitudinal Study (ECLS Birth & Kindergarten Cohorts; USDOE, 1999); the Head Start Family and Child Experiences Survey (FACES; U.S. Dept of Health and Human Services, 2000); the National Early Childhood Development and Learning (NCEDL, 2001); the National Early Intervention Longitudinal Study (NEILS; SRI, 1997); and the Pre-Elementary Education Longitudinal Study (PEELS, NCSER, 2002). Extant documents (federal, state, and local) and census data were used to provide a contextual description of the **communities** in which participants lived. This information included population data for race, unemployment, poverty, and metropolitan status (rurality or urbanicity). *Note: Because of the poor quality of this data; data for community is not included in this report. However, the PI and staff will continue to seek to resolve the weaknesses of data set to provide information for this variable.* **Family literacy practices** were reported by family members in a comprehensive family interview. These items prompted family respondents to describe their daily interactions with their children which were literacy-based, the number of books and other print materials accessible in their homes and communities, and community literacy resources such as libraries, bookstores, or other facilities where literacy activities may occur.

Data collection. NECTC research coordinators recruited data collectors from each state. The training backgrounds of data collectors were most often from the disciplines of early childhood, early childhood special education, family studies, human development, school psychology, and speech and language pathology. Across five states, a total of 32 data collectors were trained; 28 collected data. Data collectors were trained at UK during a 2 ½ day training for the at-three sample and again for 1 ½ days for the at-five sample. Both training sessions included participation from instrument authors and researchers

familiar with the tools. To ensure that accurate standardized procedures were followed, data collectors submitted taped video administrations of the instruments (1) The *Peabody Picture Vocabulary Test-Third Edition* (PPVT-III; Dunn & Dunn, 1997), (2) *Merrill-Palmer-Revised* (MP-R; Roid & Sampers, 2004) *Cognitive and Motor*, and the (3) *Emergent Literacy Measure* (ELM; NECTC, 2003) for the at-three sample. For the at-five sample the video included the (1) PPVT-III (Dunn & Dunn, 1997); (*2)* ELM (NECTC, 2003), (3) *Individual Growth and Development Indicators* (IGDIs; Early Childhood Research Institute on Measuring Growth and Development, 2004); and (4) *Letter Naming Fluency* subtest of the *Dynamic Indicators of Basic Early Literacy Skills* (DIBELS; Kaminski & Good, 1996). Criterion for adequate initial and ongoing reliability was 90%. Standardization practices are vulnerable to a number of threats; thus, it was anticipated that data collector test administration could change over time. Data collectors might develop standardization procedures unique to their state (based on their interactions/answers to procedural questions) or sites, forget specific standardization procedures, or simply neglect to follow them. Some of these threats cannot be controlled; however, NECTC research staff developed and utilized multiple techniques to respond quickly to correct procedures back to standardization level. Children were directly assessed (typically in their homes for at-three and in preschool settings for the at-five sample. Families provided most information in a face-to-face interview and also completed the three checklists referenced above.

Data Analysis. All assessments were scored at UK (rather than distant sites) to facilitate reliability in scoring. Data were entered into the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL). For each of the standardized instruments (i.e., PPVT-III, MP-R), standard scores were calculated using published data entry programs. Those standard scores were then entered into SPSS. All other quantitative data were also entered into SPSS (i.e., demographics and literacy practice items). Following entry of all data, each variable was examined for skewness, kurtosis, and distribution. Outliers were identified as any variable that was greater than three standard deviations from the mean. Data that contained any outliers were checked to ensure data entry reliability and then removed from the data set prior to analysis.

Research Questions 1 and 1a were addressed using a multiple regression analysis with child factors (i.e., disability, race, gender) as the independent variables and use of family literacy practices as the dependent variable. For Research Questions 2 and 2a a similar approach was used with the family factors (i.e., structure, socio-economic status, education level, employment) as the dependent variable and use of family literacy practices as the independent variable. Research Questions 3, 3a, 4, and 4a follow the same schema for analysis. Questions 5 and 5a used a regression analysis with the child outcomes as the dependent variable with child, family and community variables entered first and family literacy practice measures entered second. This will segregate the impact of the demographic variables and then determine the impact of literacy activities. Finally for Research Question 6 a comparison of the outcomes of the two regression analyses for preschool and kindergarten was used to evaluate any differences in the strength of the associations between the independent variables and the dependent variable at the two age levels. By using the confidence intervals around the β weights, the outcomes could be compared. If the distributions overlap then that overlap would serve as a demonstration that there was not a significant difference between the two ages (3 & 5).

Findings

Description of the participants at age three (preschool) and their families. The majority of the 235 ***adult*** participant/respondents were biological mothers of the target children (N = 164; 68%) while 14 were adoptive mothers (6%) and 24 of the respondents were either adoptive or biological fathers (10%). Grandparents, foster parents and other adult relatives formed the remaining group of respondents (N = 33; 16%). Most were White (N = 161; 68%) with 41 (17%) African American respondents; 5 (2%) were Asian/Pacific Islanders and 4 Hispanic/Latino (2%). Seven (3%) respondents labeled themselves other or multiracial; 17 (7%) respondents did not answer this question. Their ages ranged from 17 years to 70 years with a mean age of 34.75 and S.D. of 9.56. The primary language of more than 85% of the families

was English while 5% spoke either Spanish or another language; 9% did not respond to this question. Most (69%) reported that they were married and most reported to be in good to excellent health (83%). The families were fairly well educated as reflected in the Table below.

Table 3: Respondent Education Level for Preschool Sample

Education Level	Frequency	Percent
Less than high school	23	9.5
HS Diploma/GED	83	34.4
Associate's	29	12.0
Bachelor's	50	20.7
Master's	26	10.8
Specialist	1	.4
Doctorate	2	.8
Professional	1	.4
Other	4	1.7
Total	219	90.9

Family income is fairly well distributed across four income levels as reflected in Table 4.

Table 4: Respondent Income Level for Preschool Sample

Reported Income	Frequency	Percent
$25,000 or less	63	26.1
More than $25,000, Less than $50,000	56	23.2
More than $50,000, Less than $75,000	42	17.4
More than $75,000	49	20.3
Total	210	87.1

More than half of the ***children*** in the sample were male (N= 140; 58%) while the remainder were female (N = 74; 31%). Their ages ranged from 29 months to 41 months with a mean age of 35 months. English was used in the child's home "all the time" for most of the children (85%); most were at home with family members (N = 146; 61%). More than 25% were premature (26%) and 11% were multiple births. A large number of children in the sample have a medical diagnosis which has an established pattern of risk while others had a diagnosis of development delay, or disability (80%); Other children in the sample have a

medical conditions with an established history of risk of delay or disability (20%). More than 36% of the sample have had frequent or repeated ear infections. Chronic otitis Media has a strong relation to delayed language development. About half of the children in the sample receive early intervention services at home (N = 119; 50%) while state early intervention services are provided to almost all (97%) of the respondents with service delivery occurring at home or in early care and education centers or treatment/therapy clinics. More than 30% of the children receive speech and language services (31%) while a large percentage (21%) also receive special education or developmental services.

Description of the participants at age five (kindergarten) and their families. More than 350 (N = 355) ***adults*** participated in the study when a target child in their care was age 5 or entering kindergarten. Of these, 290 (80%) were biological mothers with adoptive mothers numbering an additional 19 (5%) and 6 stepmothers (2%) and 3 foster mothers (1%). Fifteen fathers (4%) participated in the kindergarten study. The remaining participants were grandmothers and other adult relatives (N = 16; 4%). Similar to the preschool sample; most were White (N = 262; 72%) while 38 (10%) were African Americans and 11 were Asian/Pacific Islander (N = 11, 3%), and Hispanic/Latino (N = 8, 2%). The remaining participants were multiracial (1%) or did not identify an ethnicity (2%). The participating adults ranged in age between 22 and 66 years of age with a mean age of 36 years (S.D. = 7.86). Most participants were female (N = 330, 91%) and the majority spoke English as their primary language (N= 323; 89%) and were married (N = 248; 68%). Similar to the preschool sample, the majority of the adults in the kindergarten sample reported that they were in good or excellent health (N = 178, 49%; N = 106, 29% respectively). Their education and income levels are reflected in Tables 5 & 6 below.

Table 5: Respondent Education Level for Kindergarten Sample

Education Level	Frequency	Percentage
Less than high school		
HS Diploma/GED	140	38.5
Associate's	42	11.5
Bachelor's	77	21.2
Master's	26	7.1
Specialist	2	.5
Doctorate	6	1.6
Professional	1	.3
Other	6	1.6
Total	329	90.4

Respondent income is represented in Table 6 below.

Table 6: Respondent Income Level for Kindergarten Sample

Income Level	Frequency	Percentage
$25,000 or less	88	24.2
More than $25,000, Less than $50,000	79	21.7
More than $50,000, Less than $75,000	71	19.5
More than $75,000	332	91.2
Total		

Almost two-thirds of the ***children*** in the kindergarten sample were male (N = 228, 63%) and most of these children lived in homes where English was used "all the time" (N = 307; 85%). Like their peers in the preschool sample, most of the children (n = 231; 64%) were cared for at home rather than attending group or after-school programs and approximately 81% were identified as children with special needs. By age five the frequency of chronic or repeated ear infections had decreased with only 37% of adult respondents reporting that their child had frequent or repeated ear infections; but unlike the preschool sample 4% of the kindergarten sample wore hearing aids. There was also a difference in service delivery

and provider discipline with only 12% receiving services in their home. Furthermore, the service provider reported most frequently was the special educator rather than the speech and language pathologist for the sample existing preschool and entering kindergarten

Findings for Research Questions 1a & 1b and Questions 2a & 2b. Child and family variables were entered into a regression simultaneously. Therefore, the results are provided for both Research Questions 1a and 2a (at three) and for Research Questions 1b and 2b.

1a. Do the assessed child factors have an impact on the level of family literacy practices for children at three years of age and their families;
1b. Do the assessed child factors have an impact on the level of family literacy practices for children at five years of age and their families;
2a. Do the assessed family factors have an impact on the level of family literacy practices for children at three years of age and their families;
2b. Do the assessed family factors have an impact on the level of family literacy practices children at five years of age and their families;

Family literacy practices were measured using 39 items adapted from literacy measures including *The Pre-Elementary Education Longitudinal Study* (U.S. Department of Education. www.peels.org.), *National Early Intervention Longitudinal Study* (SRI, 1997; www.sri.com/neils/) and the *Early Childhood Longitudinal Study, Kindergarten Cohort* (Westat,1999; http//nces.ed/gov/ecls). Factor solutions were generated separately for the preschool (at-three) and kindergarten (at-five) samples since family literacy behaviors vary significantly as children age and become more proficient and literate in oral and written language and literacy (Dickenson & Tabors, 2001). A four factor solution emerged for the at-three or preschool sample while a 5-factor solution was evidenced for the at-five or kindergarten sample. A summary of the items are included in the Appendix. The items are grouped into these factors and summative scores were generated. The factors are included in Table 7.

Table 7: Factor Structure for Family Literacy Behaviors

Factors	Family Literacy Factors at 3 – years	Family Literacy Factors at 5 - years
1	Literacy activities which are ***developmental*** in focus and provide opportunities for families to read with children (reading together, environmental print, games, playing with toys, counting and writing)	Interactive literacy activities which actively ***involve children in literacy-based activities*** (reading together, writing, and visiting libraries & bookstores)
2	Literacy activities which are ***primarily family literacy*** (modeling reading - newspaper, magazines, books, letters, reading with children, using interactive/dialogic approaches such as asking the child about the story, pointing to pictures)	Literacy activities which are ***developmental in focus and focus on oral/language and story-telling, and interactive reading approaches*** (counting, reading package labels, telling stories, singing songs, saying alphabet, colors, uses dialogic approaches to reading)
3	Activities that relate to television and/or video games	Activities that relate to television and/or video games.
4	Child play video games and/or games that are educational in focus	Literacy behaviors that are modeled for children (newspaper, magazines, books) and those that are shared with children (reading comics, children's books)
5		Adult literacy behaviors that aren't easily/typically shared with children (reading letters, internet)

Using these factors; regression procedures were conducted to determine the association of child and family variables to the frequency and use of family literacy practices for each of the factors.

Influence of Child and Family Characteristics for Family Literacy Practices at 3 or Beginning Preschool. Statistical analyses revealed that for the preschool sample the delivery of intervention services at home was significantly related to the frequency of family literacy practices included in Factor 1. Factor 1 literacy behaviors can be characterized as practices that are generally considered developmental/readiness including literacy. For Factor 2 (primarily literacy) adult health and education were positively associated with the delivery of this group of practices. A significant positive association was revealed between

activities that relate primarily to television and/or video games (Factor) and adult working hours. No associations were significant for Factor 4.

Influence of Child and Family Characteristics for Family Literacy Practices at 5 or Beginning Kindergarten. Statistical analysis revealed that for the kindergarten sample two factors, the age of the child and adult education were significantly associated with Factor 1 (literacy behaviors). No associations were revealed for Factor 2 (literacy and developmental/readiness family behaviors). Three variables; child health, adult age, and adult education were significantly associated with Factor 3 (viewing television and/or video games) for the sample at entry to kindergarten. Race was differentially associated with family literacy behaviors for Factors 4 & 5. For Factor 4, Latino families differed in their use of family literacy practices when compared to families in all other groups. For Factor 5, African-American families differed in family literacy practices reflected in this factor. Adult education was also associated with the frequency of literacy behaviors in this group (reading/literacy behaviors that model literacy but are not typically interactive).

Research Question 3. The data for the community variable was not considered reliable at this time. The PI and other staff will continue to address this problem and bring this information to CCLD as it is determined reliable.

Findings for Research Questions 4a & 4b.

4a. Does state of residency impact the level of family literacy practices for children at age three and their families;
4b. Does state of residency impact the level of family literacy practices for children at age five and their families;

The analysis revealed no significant relation between state of residency and the implementation of family literacy practices at age three. However at age five two statistical differences were found for Factor 2 and Factor 3. Families in Wisconsin and Kentucky differed in their use of family literacy practices for Factor 2 while families in Louisiana and Kentucky differed in their use of family literacy practices for Factor 3.

Findings for Research Questions 5a & 5b

5a. What is the relation between family literacy practices and child outcomes for children at age three and their families when child, family and community variables are controlled;
5b. What is the relation between family literacy practices and child outcomes for children at age five and their families when child, family and community variables are controlled;

Results of the regression suggest that two factors (Factor 1 and Factor 2) are positively associated with child outcome as measured by the Merrill Palmer total score and the Peabody Picture Vocabulary Test – 3rd Edition (PPVT-3). Factors 1 and 2 include the traditional family literacy and readiness behaviors. The factors 3 & 4 (television and video games) were not associated with cognitive outcomes as measured by the Merrill Palmer or language outcomes as measured by the PPVT-3). For the kindergarten sample, Factors 1 & 3 were associated with the Merrill Palmer while only Factor 1 was positively associated with scores on the PPVT-3. However, although the associations are significant between the literacy behaviors included in Factor 3 (watching television) and child outcomes on the Merrill Palmer and the PPVT, these associations are negative (i.e., as television watching increases cognitive and language outcomes decrease).

The relation of family literacy and child literacy outcomes was also examined while accounting for the contribution of child and family variables. These analyses were applied only to the at-5 or kindergarten sample where more (compared to at-3 sample) literacy development would be expected. Specifically, for the at-five sample literacy outcomes for *Individual Growth and Development Indicators* (IGDIs; Early Childhood Research Institute on Measuring Growth and Development, 2004) for Picture Naming, Rhyming, and Alliteration were used to measure literacy behaviors. The *Letter Naming Fluency* subtest of the *Dynamic Indicators of Basic Early Literacy Skills* (DIBELS; Kaminski & Good, 1996) was also used. The inclusion of Factors 1 and 4 demonstrated a significant change in the regression model for three of the four

measures (only Rhyming was not associated with any of the family literacy practices). Income and race were significant contributors to the regression model for the *Rhyming* subtest of the IGDIs literacy tasks. Income also contributed significantly to the model for the *Alliteration* subtest as did child health status. However, the addition of Factor 1 (adult-facilitated literacy-based activities in interaction with the target child) improved the model significantly. Child outcomes for the *Picture Naming* subtest was also associated with income with Factor 1 providing a significant change when entered in the model. Factors 1 (adult-child literacy-based activities and 4 (adult modeling literacy behaviors) influenced the regression model for child outcome as measured by the DIBELS Letter Naming subtest. Again income and race also were significant contributors to the model. Interestingly, math skills were also positively influenced by adult-literacy behaviors.

Findings for Research Question 6.

> **6. Is there a differential impact of family literacy practices on the child outcomes of children at age three and age five after controlling for child, family, and community variables?**

The evaluation of Research Question 6 used a comparison of the outcomes of the two regression analyses to evaluate any differences in the strength of the associations between the independent variables and the dependent variable at the two age levels, the three year olds and the five year olds. Using the 95% confidence intervals around the β weights, the outcomes could be compared. If the distributions overlap then that would serve as a demonstration that there was not a significant difference between the two ages (3 & 5).

In order to answer this question; the factor solutions for age 3 and age 5 were re-structured to produce the same 5-factor structure used for age 5. After controlling for the contribution of the demographic variables in the first step of the analysis, the contribution of the family literacy factors could be

evaluated. The analyses revealed that family literacy practices were differentially influential on child outcomes for children ages 3 and 5. For age 3, Factor 2 (developmental/readiness activities & reading activities) and Factor 5 (adult literacy behaviors modeled for children) were influential for cognitive and child outcomes as measured by the Merrill Palmer Cognitive Scale (MP-R; Roid & Sampers, 2004). But at age 5, two different factors (Factor 1 – interactive literacy activities) and Factor 3 (activities related to television and video games) were associated with cognitive child outcomes. However, family literacy factors contribute only 16.2% of the variance at age 3 and only 10.8% of the variance in child cognitive outcomes at age 5.

Similarly, Factor 2 and Factor 5 are significantly associated with child language outcome scores on the Peabody Picture Vocabulary Test (PPVT-III; Dunn & Dunn, 1997) for age 3, but only Factor 1 is significantly associated with outcomes on the PPVT for age 5. However the contribution is larger at both ages for family literacy practices. The family literacy factors interpret 26.3 % of the variance of child outcome scores on the PPVT at age 3, but can only explain 18.0 % of the variance in child outcome scores as measured by the PPVT at age 5.

Conclusion and Implications

Potential implications for policy and practice. There are a number of implications for policy and practice when a relation is found between family literacy practices and school outcomes for children with disabilities at age three and age five. First, these ages are pivotal and transitional times for young children and their families. There is currently a groundswell of interest in "school readiness". If family involvement through family literacy can impact child outcomes then schools may call on these willing and competent allies to help to support the "readiness" of young children for school and schooling. Second, family literacy activities also promote positive family interactions – when children and their families read, tell stories, and engage in literacy-based interactions child and family mental health and social adjustment is promoted.

Finally, family literacy is embedded within a cultural and community context with significant variability in the ways in which families and their children interact with language and literacy. A more thorough understanding of the influence of family literacy on child outcomes may provide stakeholders and policy makers with a sufficient rationale to garner funding and support for family literacy initiatives at the local, state, and national levels.

Connection to the CCLD research agenda priority topic of ***Family and Community Literacy.*** Data for Kentucky and comparison states will provide information about the use of family literacy in Kentucky and its relation to child outcomes. In addition, an investigation of the relation to community factors (rurality or urbanicity, region, wealth) to family literacy practices will provide information for policy decisions at community and state levels.

Description of how the research questions align with the CCLD research agenda. Three research questions guide the CCLD Family and Community Literacy research Agenda. The first CCLD research question addresses variability within the Commonwealth and among regions of the state in regard to the use of family and community literacy practices and supports. At this time, the report does not provide sufficient and reliable information to address this question; however, further investigation may generate better and more valid data to address this question. However, some of the demographic questions included in this CCLD research question were addressed in this study (i.e., influence of factors such as race, unemployment, & poverty) on family literacy practice. The second research question which seeks to determine the impact of certain community literacy supports (i.e., children's hour at the public library) and interaction effects between these services and community characteristics was addressed in the analysis of literacy practices (Research Question #5). Finally, the third CCLD research question for Family and Community Literacy seeks to identify specific family and community practices which impact literacy achievement. This question were answered through an analysis of the family literacy practices families report and their relation to child outcomes.

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Appendix: Family Literacy Items

A. Environmental print in the home n = 6

8.69.1. Newspaper – Adult reads
8.69.2. Magazines – Adult reads
8.69.3. Books – Adult reads
8.69.4. Letters, notes, emails– Adult reads
8.69.5. Internet or WebPages– Adult reads
8.70. Approximately how many children's books do you have in your home (including library books)?

B. Reading with the child n = 2

8.71. Do you have a typical time(s) during the day when you read to your child?
8.72. When you read to your child, how long do you typically read?

C. Reading and Developmental Activities with the child : n = 24

8.73a. Read or look at books
8.73b. Read or look at children's magazines
8.73c. Read or look at catalogues
8.73d. Read or look at newspapers
8.73e. Read funnies or comics
8.73f. Read food packages or signs (e.g., cereal box, stop sign)
8.73g. Tell stories (e.g., fairy tales, family stories)
8.73h. Sing songs (e.g., nursery rhymes, sing along to radio/tape)
8.73i. Listen to books-on-tape
8.73j. Practice saying letters of alphabet (could include ABC song)
8.73k. Practice counting (1-10)
8.73l. Play games that include pictures, letters, or words (e.g., Memory)
8.73m. Color
8.73n. Complete arts and crafts activities (e.g., painting, making things with clay or dough)
8.73o. Play with toys (e.g., blocks, cars, dolls)
8.73p. Play make-believe or dress-up
8.73q. Complete activity pages (e.g., dot-to-dot, mazes)
8.73r. Writing letters of the alphabet
8.73s. Writing child's name
8.73t. Writing words (other than child's name)
8.73u. Review letters, letter sounds, or words
8.73v. Ask child to point to pictures or objects
8.73w. Talk to child about book or story
8.73x. Ask child questions about book or story

D. Child activities: watches TV and plays videogames/tapes n = 5

8.76a. Watch TV, videotapes, or DVDs
8.76b. Watch children's shows on TV (e.g., Sesame Street, Disney Channel, Nickelodeon)
8.76c. Watch children's videos or DVDs (e.g., Disney, cartoon)
8.76d. Play video games (e.g., Nintendo, Playstation)
8.76e. Play educational games on computer

E. Adult takes the child n = 2

8.77a. Public library
8.77b. Bookstore

	Appendix 1	Factor 2	Structure for 3	Sample Age 3 4
NewsPaper	0.022	0.263	-0.076	0.11
Magazines	0.175	0.424	0.089	0.17
Books	0.261	0.382	-0.006	0.038
Letters	-0.08	0.565	0.013	0.024
Internet	-0.101	0.555	0.031	0.109
BooksAtHome	-0.053	0.535	-0.021	-0.079
ReadingTimes	0.002	0.506	-0.151	0.023
ReadingTime	-0.04	0.401	-0.037	0.11
RLBooks	0.839	0.179	0.014	-0.067
RLMagazines	0.561	0.1	-0.002	0.282
RLCatalogues	0.456	0.045	0.031	0.084
RLNews	0.528	-0.114	0.011	0.129
RLComics	0.356	0.027	0.005	0.186
RLPackage	0.603	0.18	0.095	-0.126
TellStories	0.699	0.201	0.161	-0.104
Songs	0.878	0.029	0.05	-0.137
BooksTape	0.599	0.062	0.067	0.15
Alphabet	0.796	0.01	0.089	-0.207
Counting	0.819	0.008	0.052	-0.184
Games	0.661	0.163	-0.104	0.115
Color	0.772	0.123	-0.01	-0.027
ArtsActivities	0.654	0.227	-0.054	0.131
Toys	0.876	-0.074	0.055	-0.112
PlayMBDU	0.605	0.083	0.022	-0.07
PageActivities	0.595	0.06	-0.048	0.359
WritingLetters	0.576	-0.022	-0.213	0.122
WritingNames	0.577	-0.021	-0.145	0.06
WritingWords	0.674	-0.084	-0.186	0.094
ReviewLetters	0.625	0.182	0.009	-0.093
PointPictures	0.238	0.679	0.122	-0.159
TalkAboutStory	0.128	0.752	0.063	-0.201
AskAboutStory	0.167	0.628	0.061	-0.096
WatchTV	-0.041	-0.034	0.862	0.126
WatchCHShow	0.058	-0.076	0.744	0.046
WatchCHVideos	-0.043	0.043	0.704	0.036
PlayVG	-0.007	0.053	0.119	0.602
PlayEdGames	0.02	0.252	0.069	0.607
PublicLibrary	0.101	0.409	0.057	0.137
Bookstore	0.156	0.413	-0.085	0.167

	Appendix: Factor Structure for Sample at Age 5				
	1	2	3	4	5
NewsPaper	-.076	.054	-.025	.460	.210
Magazines	.083	.123	-.029	.380	.217
Books	-.021	.196	-.084	.212	.208
Letters	.017	.123	.035	.103	.686
Internet	.076	.017	.026	.097	.789
BooksAtHome	.100	.189	-.372	.099	.229
ReadingTime	.237	.190	-.162	.094	.035
RLBooks	.211	.300	-.346	.174	.267
RLMagazines	.147	.083	-.099	.479	-.017
RLCatalogues	.060	.089	.058	.268	.084
RLNews	.039	.073	.019	.627	-.019
RLComics	.181	.064	.031	.532	-.031
RLPackage	.166	.457	-.069	.243	.066
TellStories	.222	.382	-.238	.259	.045
Songs	.001	.533	-.016	.037	.176
Alphabet	.197	.642	.055	-.035	.070
Counting	.169	.643	.106	.006	.001
Games	.381	.244	-.064	.253	-.024
Color	.396	.369	-.011	.158	-.088
ArtsActivities	.401	.157	-.129	.352	-.096
Toys	.020	.446	.042	.116	.083
PlayMBDU	.146	.468	.039	.098	.003
PageActivities	.580	.107	-.026	.216	.020
WritingLetters	.782	.134	.073	-.052	.085
WritingNames	.763	.058	.045	.014	.031
WritingWords	.693	-.003	-.035	.070	-.003
ReviewLetters	.425	.308	-.072	.011	.143
PointPictures	-.057	.495	.021	.054	-.110
TalkAboutStory	.068	.545	-.111	.140	.061
AskAboutStory	-.086	.220	-.082	.072	.066
WatchTV	-.065	-.013	.779	.037	.078
WatchCHShow	-.065	.114	.729	.113	.129
WatchCHVideos	-.001	.160	.675	-.031	.076
PlayVG	.071	-.060	.151	-.015	-.106
PlayEdGames	.321	-.095	.080	.056	.202
PublicLibrary	.236	.045	-.194	.136	.151
Bookstore	.206	.127	-.160	.157	.132
Bookmobile	.141	-.009	-.053	.019	-.063