

Minnesota School Readiness Study



Developmental Assessment at
Kindergarten Entrance

Fall 2009
Technical Report

Minnesota
Department
of Education 

Acknowledgements

Minnesota School Readiness Study: Developmental Assessment at Kindergarten Entrance

The Minnesota School Readiness Study: Developmental Assessment at Kindergarten Entrance Fall 2009 was planned, implemented, and the report prepared by the Minnesota Department of Education (MDE).

Special thanks to the 105 elementary schools involved in the study, their principals, kindergarten teachers, support staff and the superintendents of the school districts. The observation and collection of developmental information by these kindergarten teachers on kindergarten children in their classrooms was essential to the study and is much appreciated.

For more information, contact Avisia Whiteman at Avisia.Whiteman@state.mn.us or 651-582-8329.

Date of Report: April 2010

Background

Minnesota School Readiness Study: Developmental Assessment at Kindergarten Entrance - Fall 2009

Research has shown, and continues to show that there is a critical relationship between early childhood experiences, school success, and positive life-long outcomes. This research has been a focal point for many states as they strive to reduce the growing achievement gap between less advantaged students and their same-aged peers in the educational system.

With no systematic process in place to assess children's school readiness, the Minnesota Department of Education in 2002 initiated a series of three yearly studies focused on obtaining a picture of the school readiness of a representative sample of Minnesota kindergartners as they enter school in the fall, and to evaluate changes in the percentage of children fully prepared for school at kindergarten entrance. The studies were well-received by the public, and during the 2006 Minnesota state legislative session, Governor Tim Pawlenty proposed and the Legislature appropriated funding for the study to be continued on an annual basis.

This report describes findings from the assessment of school readiness using a random sample of children entering kindergarten in Minnesota in Fall 2009. The data provides a picture of the ratings of entering kindergartners for the state across five domains of child development. The study provides information on school readiness for parents; school teachers and administrators; early childhood education and care teachers, providers and administrators; policymakers; and the public.

Definition of School Readiness

For purposes of the study, "school readiness" is defined as the skills, knowledge, behaviors and accomplishments that children know and can do as they enter kindergarten in the following areas of child development: social and emotional development; approaches to learning; language and literacy development; creativity and the arts; cognition and general knowledge; and physical well being and motor development. This definition is consistent with school readiness definitions used by other states and the *Minnesota Early Childhood Indicators of Progress: Minnesota's Early Learning Standards (2005)*.



Assessing School Readiness

The study is designed to capture a picture of the readiness of Minnesota children as they enter kindergarten and track readiness trends over time. To ensure that results are reliable and can be generalized to the entire population of Minnesota kindergartners, the study

uses a 10 percent random sample of schools with entering kindergartners. This sample size generates data from approximately 6,000 kindergartners annually.

The study uses the Work Sampling System (WSS®), a developmentally appropriate, standards-based observational assessment that allows an individual child to demonstrate knowledge and skills in practices because of the complexities in assessing young children.



WSS® is aligned with the state’s early learning standards, Minnesota Early Childhood Indicators of Progress, and the K-12 Academic Standards and assesses all areas of child development including cognitive, social, emotional and physical development and approaches to learning. These areas are represented by the five domains of the Work Sampling System Checklist (MN-P4).

Each domain and developmental indicator within the WSS® Developmental Checklist includes expected behaviors for children at that age or grade level. For each indicator, teachers used the following guidelines to rate the child's performance as:

- o **Proficient** — indicating that the child can reliably and consistently demonstrate the skill, knowledge, behavior or accomplishment represented by the performance indicator.
- o **In Process** — indicating that the skill, knowledge, behavior or accomplishment represented by the indicator are intermittent or emergent, and are not demonstrated reliably or consistently.
- o **Not Yet** — indicating that the child cannot perform the indicator (i.e., the performance indicator represents a skill, knowledge, behavior or accomplishment not yet acquired).

Because children’s rate of development is variable, the study assesses children’s proficiency within and across the developmental domains. It does not establish whether an individual child is ready for school by giving a child a composite “ready” or “not ready” score.

Rubrics for each rating level were distributed to teachers at the start of the study. The rubrics, provided by the publisher and revised in 2009, provide additional detail for each indicator for a *Not Yet*, *In Process* or *Proficient* rating.

2009 Recruitment

Beginning mid-winter to build the sample for the coming fall, MDE contacts superintendents, principals and teachers. A list of all public schools with kindergartners as of October 1 the previous year is compiled. This list is divided into eight strata which accounts for proximity to population centers and population density and separates charter and magnet schools. A random sample of schools within each strata is invited to participate via a mailed invitation to the superintendent and principal of each site. Follow-up calls are made to each site to answer any questions that may arise. In 2009, 55 percent (501/910) of all schools were invited to participate.



Approximately 27 percent (134/501) of those invited responded positively to the initial invitation. In late spring, schools are randomly selected to be released from the cohort when student counts exceed the sample amount. In 2009, 20 schools were released in a way to maintain representation across the strata. By November, 11.5 percent of all elementary schools (105/910) submitted child-level data.

The following table shows the total kindergarten population compared to the sample population. The sample seeks to be representative of all public schools including charters and magnets across federally mandated demographic categories. (See Table A.)

Table A - Kindergarten Population Compared to the Sample

	State Kindergarten Enrollment	Study Sample	Ratio of Representation Sample to Population
American Indian	2.4%	2.9%	1.17
Asian	6.7%	5.1%	.75
Hispanic	8.3%	8.7%	1.05
Black	10.3%	9.7%	.94
White	72.3%	73.7%	1.02
Free Lunch	27.7%	32%	1.16
Reduced-Price Lunch	7.9%	9.3%	1.18
Limited English Proficiency	11.4%	11.5%	1.01
Special Education	9.8%	10.1%	1.04

2009 Results

A total of 6,392 kindergartners from 105 randomly selected elementary schools across the state were included in the Fall 2009 cohort. This reflects 11.2 percent of the entering kindergartners for the 2009-2010 school year.

The domain rankings by proficiency for the 2009 cohort are consistent with previous years of the study. Physical Development had the highest percentage of children assessed *Proficient* on average, followed in order by The Arts; Personal and Social Development; Mathematical Thinking; and Language and Literacy. Indicator rankings within each domain remain unchanged from 2008.

It is important to note that while there are trends towards increases in estimates of *In Process and Proficient* results, the trends are not outside the margin of error. Also, the existing data set does not allow for examination of potential reasons for shifts.

Table 1 - Results By Domain

Domain/Result	Not Yet	In Process	Proficient
Physical Development	3% SE .4%	32% SE 2.5 %	65% SE 2.7%
The Arts	6% SE .7%	42% SE 2.9%	53% SE 3.3%
Personal & Social Development	8% SE .8%	39% SE 1.9%	53% SE 2.4%
Language & Literacy	10% SE 1.0%	40% SE 2.2%	51% SE 2.7%
Mathematical Thinking	9% SE .9%	42% SE 2.0%	49% SE 2.5%

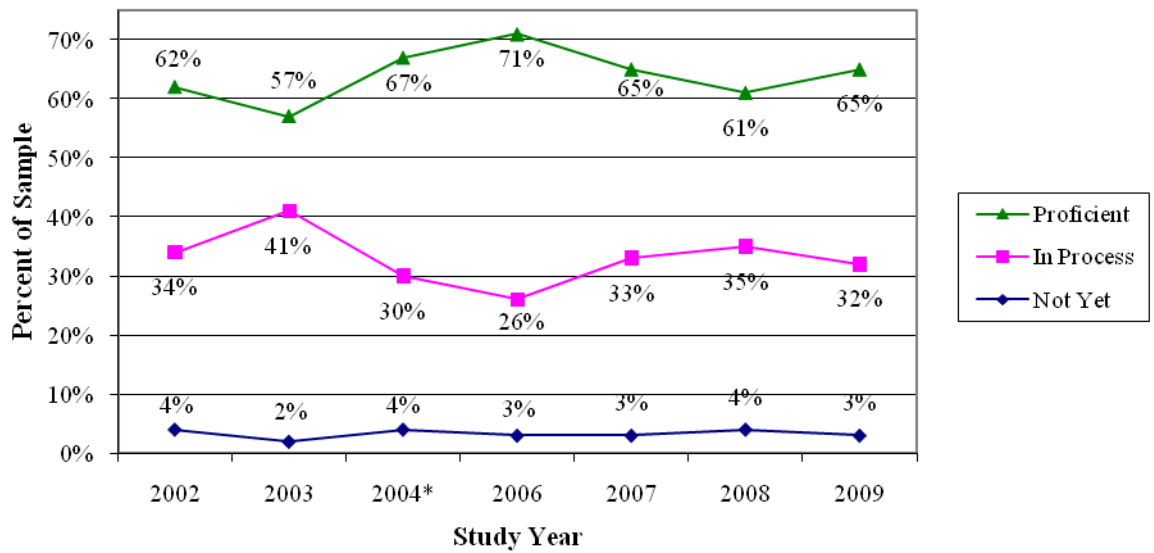
Note that categories may not add to 100% due to rounding and are adjusted for stratified cluster sampling.



Table 2 Results by Domain Indicators Ranked by Proficiency Rating						
	Not Yet		In Process		Proficient	
Physical Development	Percent	N	Percent	N	Percent	N
Physical Development Average Score Summary	3%		32%		65%	
Performs some self-care tasks independently.	2%	157	28%	1,785	69%	4,415
Coordinates movements to perform simple tasks.	2%	150	33%	2,069	65%	4,136
Uses eye-hand coordination to perform tasks.	4%	230	36%	2,270	61%	3,860
The Arts						
The Arts Domain Average Score Summary	6%		42%		53%	
Participates in group music experiences.	4%	279	40%	2,549	56%	3,533
Participates in creative movement, dance and drama.	6%	404	42%	2,666	52%	3,290
Uses a variety of art materials for tactile experience and exploration.	6%	356	44%	2,783	51%	3,203
Responds to artistic creations or events.	8%	513	46%	2,899	46%	2,939
Personal and Social Development						
Personal and Social Development Domain Average Score Summary	8%		39%		53%	
Interacts easily with familiar adults.	5%	333	36%	2,293	59%	3,757
Shows eagerness and curiosity as a learner.	7%	429	37%	2,331	57%	3,616
Interacts easily with one or more children.	6%	393	37%	2,378	57%	3,615
Shows empathy and caring for others.	7%	464	38%	2,418	55%	3,486
Follows simple classroom rules and routines.	7%	432	40%	2,562	53%	3,391
Manages transitions.	8%	530	39%	2,485	53%	3,364
Shows some self-direction.	8%	518	41%	2,639	51%	3,221
Seeks adult help when needed to resolve conflicts.	9%	569	43%	2,734	48%	3,062
Attends to tasks and seeks help when encountering a problem.	11%	726	42%	2,693	46%	2,964
Approaches tasks with flexibility and inventiveness.	14%	891	43%	2,715	43%	2,761

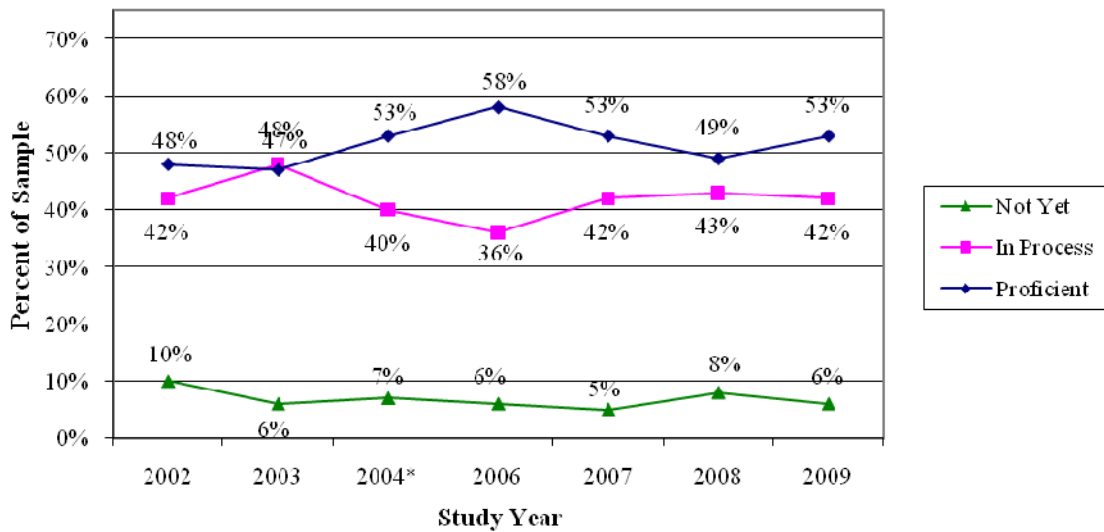
Table 2 Results by Domain Indicators Ranked by Proficiency Rating, continued						
	Not Yet		In Process		Proficient	
Language and Literacy						
Language and Literacy Domain Average Score Summary	10%		40%		51%	
Speaks clearly enough to be understood without contextual clues.	8%	533	34%	2,173	58%	3,672
Shows appreciation for books and reading.	5%	316	38%	2,394	57%	3,664
Gains meaning by listening.	6%	397	42%	2,695	52%	3,286
Comprehends and responds to stories read aloud.	8%	485	40%	2,549	52%	3,329
Shows beginning understanding of concepts about print.	8%	529	40%	2,560	52%	3,293
Begins to develop knowledge about letters.	8%	533	41%	2,612	51%	3,236
Follows two- or three-step directions.	13%	836	37%	2,382	50%	3,163
Represents ideas and stories through pictures, dictation and play.	10%	614	42%	2,702	48%	3,063
Uses expanded vocabulary and language arts for a variety of purposes.	15%	962	40%	2,552	45%	2,855
Uses letter-like shapes, symbols and letters to convey meaning.	13%	855	42%	2,645	45%	2,867
Demonstrates phonological awareness.	14%	917	44%	2,777	37%	2,672
Mathematical Thinking						
Mathematical Thinking Domain Average Score Summary	9%		42%		49%	
Begins to recognize and describe the attributes of shapes.	6%	387	42%	2,660	52%	3,332
Shows understanding of and uses several positional words.	9%	599	40%	2,564	50%	3,201
Shows beginning understanding of number and quantity.	8%	487	44%	2,781	49%	3,113
Begins to use simple strategies to solve mathematical problems.	12%	787	45%	2,871	42%	2,721

Chart 1 - Physical Development



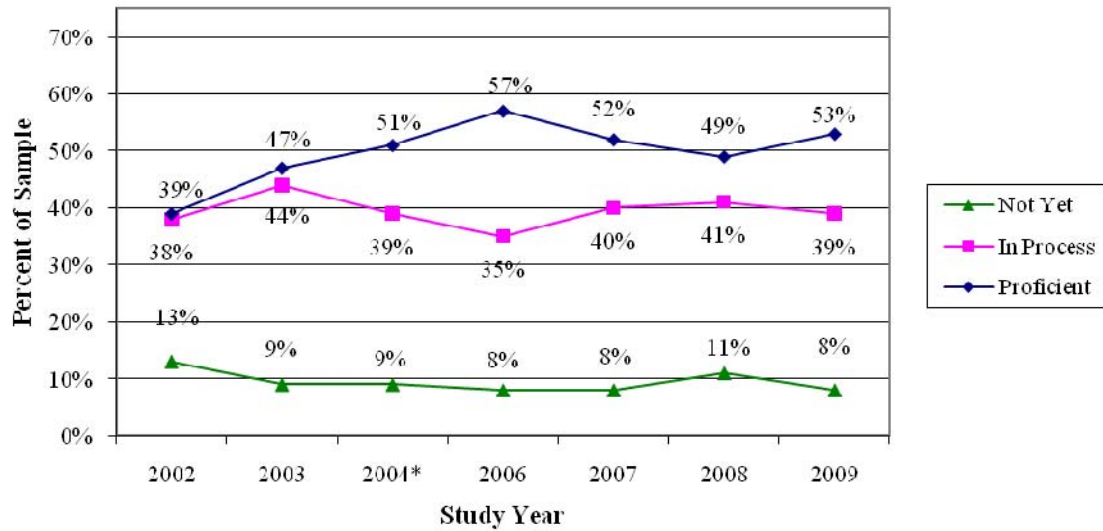
* Purposeful sample

Chart 2 - The Arts



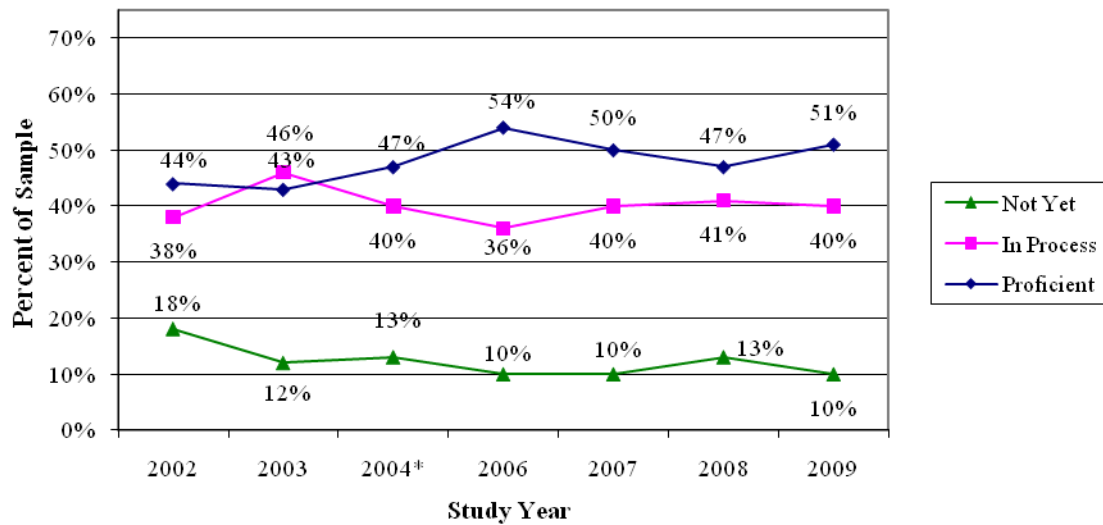
* Purposeful sample

Chart 3 - Personal and Social Development

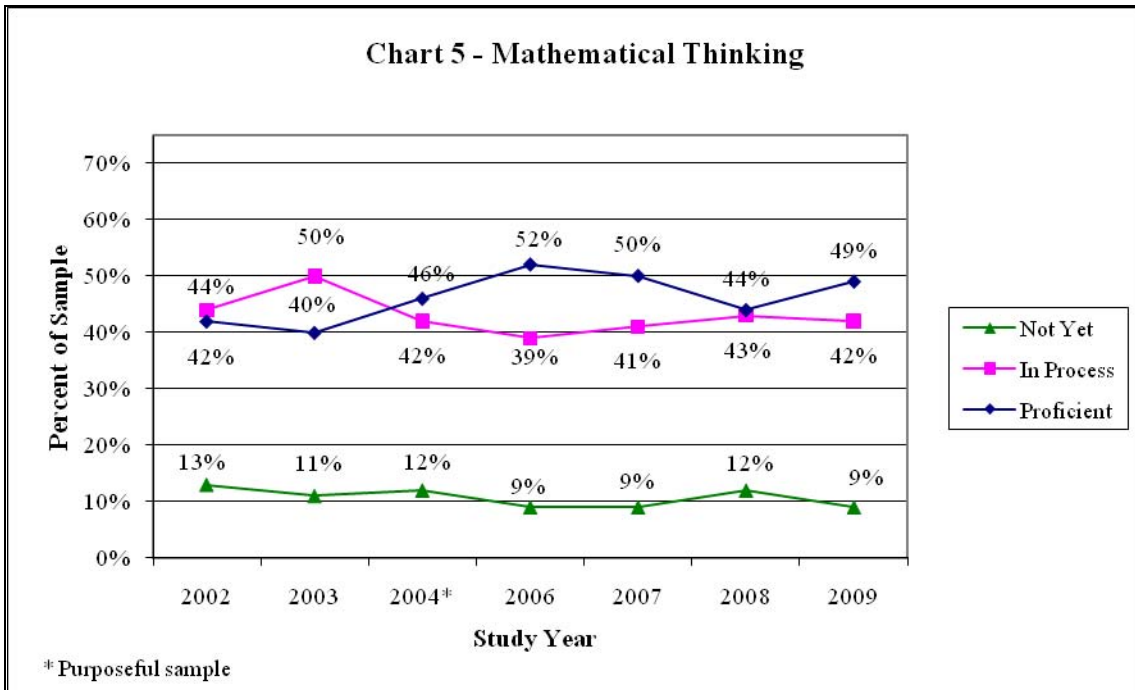


* Purposeful sample

Chart 4 - Language and Literacy



* Purposeful sample



Descriptive Results

The 2009 cohort was also analyzed for descriptive results based on single demographic categories. For example, to report under the income charts, all parents are included in the under 100 percent Federal Poverty Guidelines grouping without controlling for education status, home language or race/ethnicity. The family survey asks parents to select all race/ethnicity categories that are relevant for their child. If multiple categories are selected, the child will be represented in the appropriate categories. A similar process was followed for primary home languages.



After the results within a demographic category were identified, analysis of variance was used to test for mean differences among demographic subgroups. (Note: these tests are not adjusted for other, confounded demographic variables.) Where categories have a starred notation (*, ** or ***) there are differences within the demographic subgroup. These results are available in Appendix A. The At Risk analysis includes a student who

is indicated to have a household income under 250 percent of FPG, a home language other than English, and parent level of education at or below High School diploma/GED.

The At Risk analysis was conducted retroactively for the 2008 cohort for comparison. (See Appendix B.)

Family Survey Results

As part of the study process, families are asked to complete a voluntary survey. This information is combined with the Work Sampling System® checklist results (see Appendix C). In total, 5,019 parents (79 percent) completed the survey. Of this group, 3,621 responses (72 percent) were usable for analysis. (A parent survey may not be usable for analysis because it was incomplete, the student information strip was incomplete or the survey lacked coordinating information in Work Sampling Online (WSO).) After matching the family survey data with Work Sampling Online results, 2,959 records remained for regression analysis. This is 59 percent of all submitted parent surveys and 82 percent of those available to match.



The matched data set for 2009 has a smaller proportion of families reporting lower levels of income as measured by the Federal Poverty Guidelines (see Appendix D). This occurs at the same time school population data reports the 2009 cohort overrepresents students eligible for free and reduced-price lunch. It is possible that a disproportionate group of the family surveys submitted but not usable for analysis overrepresented low-income families. Efforts to increase family surveys available to match to WSO data will be implemented for the 2010 cohort.

Logistic Regression Results

The analysis of the data included examining how a particular child or family characteristic may affect that child's ratings while controlling for the effects of other demographic variables with which it may be confounded (e.g., a child from a family with a lower household income is more likely to have a parent with a lower education level). The result of *Not Yet* vs. *In Process* or *Proficient* for each domain was analyzed with respect to the demographic characteristics of gender, parent education level, household income, primary home language and race and ethnicity collected from parent surveys. (See Appendices E and F).

All 2009 analyses reported involved statistical estimation procedures that reflect the stratified cluster sampling design used (with school as the primary sampling unit), and include correction for finite population sampling. Observations within each stratum were weighted to reflect the statewide proportion of students in the stratum.

Household Income

The odds of being *In Process* or *Proficient* for a student whose household income was at or above 400 percent of the Federal Poverty Guidelines (FPG) were one and a half to three times as great as compared to a student whose household income was less than 250 percent FPG across the domains when holding all other variables constant.

Parent Education Level

Parent education level was found to be statistically significant in Physical Development and Health. Children with parents with graduate degrees had approximately five times the odds of being in process or proficient as compared to students with parents that had lower levels of education attainment when holding all other variables constant. There were no statistical differences by parent education level in the remaining domains of Language and Literacy, Mathematical Thinking, Personal and Social Development or The Arts. Work from the last federal Census (National Household Education Surveys Program 2005) continues to describe the impact of maternal education on school readiness. In that study, maternal education levels were positively associated with school readiness. Previous years of this study did show a relationship between parent education level and children’s results. This will continue to be analyzed.



Primary Home Language

Primary home language was not found to be statistically significant in any of the domains in the 2009 cohort when holding all other variables constant.

Race and Ethnicity

Students of color statistically had better odds of being *In Process* or *Proficient* as compared to White students in The Arts domain. There were no statistical differences by race/ethnicity in Physical Development and Health, Language and Literacy Development, Personal and Social Development, or Mathematical Thinking.

Gender

Gender continues to be a statistically significant factor in all domains. The odds of being *In Process* or *Proficient* for females were up to three times greater in the Personal and Social Development and Language and Literacy domains, as compared to males.

Principal and Teacher Surveys

As in previous years, the success of the study rested with the willingness of school principals and kindergarten teachers to participate. Participating school principals and kindergarten teachers were again given surveys to complete regarding their decision to

participate, barriers to participation, and the associated workload and benefits. The following information is based upon the response of 9 principals (105 responses or 9 percent) and 91 kindergarten teachers (292 responses or 31 percent).

Principal Perspectives

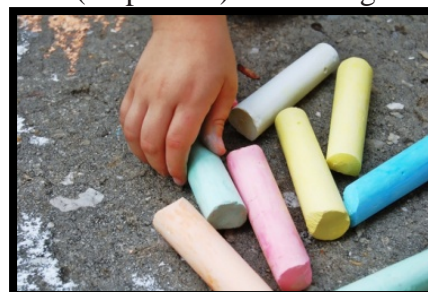
Principals reported two primary benefits of participating in the study: gaining information about where students are at the beginning of the school year (100 percent) and helping influence statewide policy (78 percent). Reported barriers for participation include adding more to existing teacher workloads (89 percent). Principals balanced the need of the project with competing needs by having more experienced teachers mentor newer teachers, paying teachers for their extra time and shifting staff development resources. Principals will use the information gained from the study to identify children’s needs earlier in the year (78 percent). Principals using Work Sampling Online (WSO) reported that the online training was easy to access. Principals report that the study orientation and online tutorials were useful to their work (78 percent and 75 percent). A majority of principals (88 percent) reported receiving the appropriate amount of information prior to and during their participation.

Teacher Perspectives

A vast majority of teachers (84 percent) responded that contributing to a study that will influence statewide early childhood policy was of benefit to them. The same percent reported receiving a \$200 stipend as a benefit. Others reported the benefit of gaining information about where students are at the beginning of the school year (64 percent). Teachers reported that collecting the parent surveys was a challenge for them (38 percent). On a follow-up question, 85 percent responded that they were able to implement the parent survey with great to moderate ease. Thirty percent had no challenges implementing the study. Teachers reported that the study took a minimal (13 percent) to average (76 percent) amount of work for a special project.

Teachers report planning to use the information to identify children’s needs earlier in the year (41 percent) and helping them target instruction (42 percent). Regarding the use of technology, approximately 97 percent report great to moderate ease in accessing WSO and the Web-based orientation. A number of respondents were interested in technologies that would allow for indexing of context in smaller segments.

Teachers report receiving adequate levels of information prior to (92 percent) and during the study (92 percent). They also report receiving adequate support from MDE (95 percent) throughout the study period. Currently, 41 percent of teachers use Work Sampling in their schools, 27 percent report planning to continue using WSO after the study period. Approximately one third of all teachers report using locally designed assessment tools in addition to the Work Sampling System ®.



Limitations

Because children develop and grow along a continuum but at varied rates, the goal of the study is to assess children's proficiency within and across these developmental domains over time and not establish whether or not children, individually or in small groups, are ready for school with the use of a "ready" or "not ready" score. Nor is the study's goal to provide information on the history or the future of an individual student.

Recent national reports have discussed the complexities in the development of state level accountability systems. Taking Stock: Assessing and Improving Early Childhood Learning and Program Quality (2007) and The National Academy of Science report *Early Childhood Assessment: Why, What and How?* (2008) details the necessary steps to use authentic assessment results, also referred to as instructional assessments, in accountability initiatives. The National Academy of Science reports that even in upper grades, extreme caution is needed in relying exclusively on child assessment and that for children birth to five "even more extreme caution is needed."

Discussion

Students in each demographic category were assessed *Not Yet*, *In Process* and *Proficient*. This report analyzes the relative risk of being assessed *Not Yet* both by demographic groups in isolation from each other as well as considered jointly. In line with national research, family household income was found to be a predictor across all domains for students with incomes under 250 percent of the Federal Poverty Guidelines. Race/ethnicity was found to be predictors only in The Arts domain. Across years, student's race/ethnicity status and primary home language have yielded mixed results. Gender is a predictor in Personal and Social Development and Language and Literacy. Future reports will continue to analyze these predictors in all domains.



Conclusions

The 2009 study again confirms that children enter kindergarten with a range of skills, knowledge, behaviors and accomplishments.

1. In all of the developmental domains assessed, a certain percentage of children entering kindergarten did not yet show the indicators of focus.
2. The results by household income are consistent with national research showing the impact of poverty on children's school readiness and school success.

3. The total percentage of students rated on average as "Not Yet" showing proficiency in each of the five developmental domains has remained consistent throughout the seven years of the study.
4. Schools with a higher percentage of entering kindergartners with disadvantaged backgrounds tend to have fewer children fully prepared for kindergarten at the beginning of the school year.
5. Using performance-based assessments such as the Work Sampling System® is appropriate when working with elementary school principals and kindergarten teachers to assess children's readiness as they enter kindergarten.

Recommendations

1. Continue to support parents in their role as children's first teachers. Early childhood and kindergarten teachers should communicate assessment data throughout the school year when discussing children's progress with parents.
2. Focus on improving children's early language and literacy and mathematical skills, but not to the neglect of their personal and social skills and development. Providing compensatory services in the area of literacy and mathematical thinking accelerates learning for young at-risk children.
3. Continue to examine the impact of parent education level on children's school readiness.
4. Target intervention strategies to children not yet demonstrating proficiency in at least one developmental domain.
5. Continue to work toward improving school readiness opportunities as there is a persistent percentage across the years of the study being assessed Not Yet in each domain.
6. Continue to work toward improving the quality of early childhood education and care programs in Minnesota by emphasizing the importance of teacher-child interactions and content-driven, intentional curriculum and instruction. The most successful prekindergarten programs provide instructional content through programming that is sufficient in length and intensity to address learning needs.
7. Promote use of school readiness information as school district and community leaders work together to identify best practices and support children's transition to kindergarten.



Early Childhood Advisory Council

The Early Childhood Advisory Council (ECAC) looks to the annual School Readiness study as one measure of state progress on early learning. ECAC makes recommendations to the Governor and Legislature on how to effectively create a high-quality early childhood system in Minnesota in order to improve the educational outcomes of children. The Council's goal is to ensure that all children are school-ready by 2020 and is responsible for fulfilling the duties required by federal and state statutes in the Governor's Executive Order 08-14. Duties of the Council required by federal law are described in the Improving Head Start for School Readiness Act of 2007 (PL 110-134). Additional duties are assigned to the Council by the Minnesota Legislature (M.S. 124D.141).



ECAC is currently awaiting funding through the American Recovery and Reinvestment Act (ARRA) for increasing activities including improving professional development, determining access and financing for early learning services and improving early learning program standards and state accountability efforts. The full ARRA application is available on the Council's Website at

http://education.state.mn.us/MDE/Learning_Support/Early_Learning_Services/Adv_Groups/Early_Child_Adv_Council/index.html.

For further reading

- Campbell, F. A., Ramey, C. T., Pungello, E., Sparling, J., & Miller-Johnson, S. (2002). Early childhood education: Young adult outcomes from the Abecedarian project. *Applied Developmental Science*, 6(1), 42-57.
- Coley, R. J. (2002). *An uneven start: Indicators of inequality in school readiness*. Princeton, NJ: Educational Testing Service.
- Dichtelmiller, M. L., Jablon, J. R., Marsden, D. B., & Meisels, S. J. (2001). *Preschool-4 developmental guidelines* (4th Ed.). New York: Rebus.
- Gershoff, E. (November 2003). *Living at the edge research brief no.4: Low income and the development of America's kindergartners*. New York: National Center for Children in Poverty.
- Meisels, S.J. & Atkins-Burnett, S. (2006). Evaluating early childhood assessments: A differential Analysis. In K. McCartney & D. Phillips (Eds.), *The Blackwell handbook of early childhood development* (pp. 533-549). Malden, MA: Blackwell Publishing.
- Minnesota Department of Education (2003). *Minnesota School Readiness Initiative: Developmental Assessment at Kindergarten Entrance*. Roseville: Minnesota Department of Education.
- Minnesota Department of Education. (2004). *Minnesota School Readiness Year Two Study: Developmental Assessment at Kindergarten Entrance Fall 2003*. Roseville: Minnesota Department of Education.
- Minnesota Department of Education. (2005). *Minnesota School Readiness Year Three Study: Developmental Assessment at Kindergarten Entrance Fall 2004*. Roseville: Minnesota Department of Education.
- Minnesota Department of Education (2007). *Minnesota School Readiness Study: Developmental Assessment at Kindergarten Entrance Fall 2006*. Roseville: Minnesota Department of Education.
- Minnesota Department of Education (2008). *Minnesota School Readiness Study: Developmental Assessment at Kindergarten Entrance Fall 2007*. Roseville: Minnesota Department of Education.
- Minnesota Department of Education and Minnesota Department of Human Services. (2005). *Early childhood indicators of progress: Minnesota's early learning standards*. Roseville: Minnesota Department of Education.
- National Early Childhood Accountability Task Force. (2007) *Taking Stock: Assessing and Improving Early Childhood Learning and Program Quality*. Washington DC: The Pew Charitable Trusts.
- National Research Council. (2008). *Early Childhood Assessment: Why, What, and How*. Committee on Developmental Outcomes and Assessments for Young Children, C.E. Snow and S.B. Van Hemel, *Editors*. Board on Children, Youth, and Families, Board on Testing and Assessment, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.
- National Research Council & Institute of Medicine. (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Academy Press.
- Reynolds, A. J., Temple, J. A., Robertson, D. L., & Mann, E. A. (2001). *Long-term effects of an early childhood intervention on educational achievement and juvenile arrest: A 15-year follow-up of low-income children in public schools*. *Journal of the American Medical Association*, 285(18), 2339-2346.

Schweinhart, L. J., Montie, J., Xiang, Z., Barnett, W. S., Belfield, C. R., & Nores, M. (2005). *Lifetime effects: The high/scope perry preschool study through age 40*. Ypsilanti, MI: High/Scope Press.

U.S. Department of Education, U.S. National Center for Education Statistics, Home Literacy Activities and Signs of Children's Emerging Literacy, 1993, NCES 2000-026, November 1999; and the Early Childhood Program Participation Survey, National Household Education Surveys Program, 2005, unpublished data. <http://www.census.gov/compendia/statab/tables/09s0229.xls>

U.S. Department of Health and Human Services. (2008). The 2008 HHS Poverty Guidelines. Retrieved January 8, 2010, from <http://aspe.hhs.gov/poverty/08Poverty.shtml>.

Wertheimer, R., & Croan, T. (December 2003). *Attending kindergarten and already behind: A statistical portrait of vulnerable young children*. Washington, DC: Child Trends.

Zill, N., & West, J. (2000). *Entering kindergarten: A portrait of American children when they begin school*. Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Appendices

- A. Estimated Percentage (and Standard Error) of Students Assessed *Not Yet Proficient* By Domain By Demographic Sub-groups**
- B. Estimated Percentage (and Standard Error) of Students Assessed *Not Yet Proficient* by Domain By At Risk Status - 2008**
- C. Sample Work Sampling System® Developmental Checklist (Minnesota P4) and Family Survey (English)**
- D. Child and Family Demographics – 2008-2009 Cohorts**
- E. Statistically Significant Factors from Logistic Regression – 2006-2009**
- F. Logistic Regression Results by Domain**

Appendix A

Estimated Percentage (and Standard Error) of Students *Not Yet in Process* or *Proficient* in Each WSS Domain by Gender for All Cases and for Cases with Matched Parent Survey

Gender	Work Sampling System® Domain				
	Personal & Social Development***	Language & Literacy***	Math. Thinking***	The Arts***	Physical Development & Health***
All Cases					
Female (n= 3103)	3.02% (0.49%)	5.03% (0.64%)	4.31% (0.51%)	1.88% (0.33%)	1.55% (0.33%)
Male (n= 3289)	7.12% (0.98%)	9.44% (1.19%)	7.64% (1.20%)	4.83% (0.74%)	3.47% (0.55%)
Cases with Parent Survey					
Female (n=1438)	2.27% (0.66%)	4.94% (0.93%)	3.99% (0.79%)	2.11% (0.67%)	2.19% (0.72%)
Male (n=1516)	6.60% (0.93%)	7.60% (1.06%)	6.48% (1.15%)	4.28% (0.73%)	3.27% (0.65%)

* $p < .05$ ** $p < .01$ *** $p < .001$

Estimated Percentage (and Standard Error) of Students *Not Yet in Process* or *Proficient* in Each WSS Domain by English Home Language Category (Matched Parent Survey Cases)

Home Language	Work Sampling System® Domain				
	Personal & Social Development	Language & Literacy***	Math. Thinking***	The Arts	Physical Development & Health
English Only (n= 2590)	3.99% (0.71%)	4.58% (0.68%)	3.83% (0.59%)	2.82% (0.60%)	2.24% (0.61%)
Non-English (n= 281)	5.42% (1.16%)	15.34% (2.54%)	11.56% (2.31%)	4.82% (1.24%)	4.91% (1.23%)

*** $p < .001$

Estimated Percentage (and Standard Error) of Students *Not Yet In Process* or *Proficient* in Each WSS Domain by Race/Ethnicity: 3 Categories (Matched Parent Survey Cases)

Race	Work Sampling System® Domain				
	Personal & Social Development	Language & Literacy**	Math. Thinking***	The Arts	Physical Development & Health
White Only (n= 2088)	3.27% (0.63%)	4.01% (0.67%)	3.14% (0.53%)	3.19% (0.67%)	2.33% (0.68%)
White Mixed (n= 214)	5.27% (1.64%)	4.62% (1.58%)	3.00% (1.12%)	2.46% (0.95%)	1.98% (0.96%)
Minority Only (n= 561)	6.19% (1.47%)	12.03% (2.14%)	10.31% (1.91%)	3.13% (0.84%)	3.38% (0.80%)

** $p < .01$ *** $p < .001$

Estimated Percentage (and Standard Error) of Students *Not Yet in Process* or *Proficient* in Each WSS Domain by Parent Respondent Education (Matched Parent Survey Cases)

Parent Respondent Education	Work Sampling System® Domain				
	Personal & Social Development*	Language & Literacy***	Math. Thinking***	The Arts	Physical Development & Health***
Less than HS Diploma (n= 154)	7.96% (2.78%)	14.89% (3.30%)	15.53% (3.46%)	4.38% (2.00%)	4.06% (1.50%)
HS Diploma or GED (n= 556)	5.58% (1.03%)	9.60% (1.60%)	7.13% (1.28%)	4.00% (0.95%)	3.73% (1.12%)
Some Post-HS (n= 770)	4.79% (1.53%)	6.09% (1.11%)	4.16% (0.89%)	2.61% (0.68%)	2.42% (0.83%)
Associate Degree (n= 429)	2.90% (0.88%)	3.61% (1.04%)	3.59% (1.07%)	4.03% (1.27%)	2.81% (1.18%)
Bachelors Degree (n= 634)	2.22% (0.72%)	1.95% (0.53%)	1.86% (0.61%)	2.02% (0.73%)	2.21% (0.75%)
Grad/Prof Degree (n= 303)	3.09% (1.17%)	2.71% (1.42%)	2.83% (1.45%)	2.17% (0.89%)	0.28% (0.27%)

* $p < .05$ *** $p < .001$

Estimated Percentage (and Standard Error) of Students *Not Yet in Process* or *Proficient* in Each WSS Domain by Family Percentage of Federal Poverty Guidelines (Matched Parent Survey Cases)

Family Percentage of FPG	Work Sampling System® Domain				
	Personal & Social Development**	Language & Literacy***	Math. Thinking***	The Arts*	Physical Development & Health**
0-250 (n= 763)	6.58% (1.19%)	10.97% (1.94%)	9.09% (1.73%)	4.32% (0.96%)	4.24% (1.00%)
>250-400 (n= 438)	3.94% (1.13%)	5.24% (1.12%)	4.07% (0.95%)	2.73% (0.73%)	1.28% (0.57%)
>400 (n= 1161)	2.60% (0.66%)	2.31% (0.49%)	1.92% (0.42%)	2.18% (0.68%)	1.57% (0.57%)

* $p < .05$ ** $p < .01$ *** $p < .001$

Estimated Percentage (and Standard Error) of Students *Not Yet In Process* or *Proficient* in Each WSS Domain by Geographic Region for All Cases and for Cases with Matched Parent Survey

Region	Work Sampling System® Domain				
	Personal & Social Development	Language & Literacy	Math. Thinking	The Arts	Physical Development & Health
All Cases					
Metro Area (n= 2353)	5.03% (1.11%)	7.22% (1.34%)	6.98% (1.30%)	2.56% (0.71%)	2.78% (0.58%)
Non-Metro (n= 4039)	5.29% (0.70%)	7.45% (0.96%)	4.91% (0.77%)	4.44% (0.68%)	2.26% (0.41%)
Cases with Parent Survey					
Metro Area (n= 1060)	4.98% (1.11%)	6.89% (1.32%)	6.45% (1.37%)	2.43% (0.65%)	2.82% (0.73%)
Non-Metro (n= 1894)	3.88% (0.72%)	5.58% (1.05%)	3.78% (0.73%)	4.21% (1.05%)	2.66% (0.94%)

Note. No significant geographic region effects were detected.

Risk Categories Defined by FPG, Family Education, Language

Estimated Percentage (and Standard Error) of Students *Not Yet In Process* or *Proficient* in Each WSS Domain by Risk Category (Matched Parent Survey Cases)

Risk Group	Work Sampling System® Domain				
	Personal & Social Development***	Language & Literacy***	Math. Thinking***	The Arts*	Physical Development & Health***
At Risk (n= 1198)	6.04% (0.93%)	10.53% (1.45%)	8.45% (1.35%)	4.18% (0.72%)	3.97% (0.74%)
Not At Risk (n= 1381)	2.86% (0.63%)	2.31% (0.44%)	2.04% (0.41%)	2.41% (0.61%)	1.43% (0.54%)

*p<.05 **p<.01 ***p<.001

Appendix B

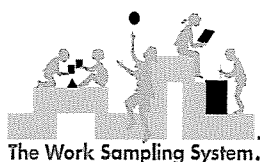
Risk Categories Defined by FPG, Family Education, Language

Estimated Percentage (and Standard Error) of Students *Not Yet In Process* or *Proficient* in Each WSS Domain by Risk Category (Matched Parent Survey Cases) - 2008

Risk Group	Work Sampling System® Domain				
	Personal & Social Development**	Language & Literacy***	Math. Thinking***	The Arts	Physical Development & Health*
At Risk (n= 1807)	8.03% (1.77%)	11.30% (2.10%)	10.31% (2.12%)	6.10% (2.60%)	4.37% (1.70%)
Not At Risk (n= 1245)	2.59% (0.48%)	2.15% (0.47%)	1.91% (0.43%)	1.19% (0.32%)	0.68% (0.23%)

*p<.05 **p<.01 ***p<.001

FOR TEACHER COMPLETION ONLY



The Minnesota Work Sampling System® Kindergarten Entry Developmental Checklist

INSTRUCTIONS

CORRECT: ●

USE A NO. 2 PENCIL ONLY

INCORRECT: ✓ ✗ ○ ●

Choose One

FEMALE MALE

Does this student have an IEP or III? yes no

BLDG CODE	MARSS CODE	DATE OF BIRTH	
		Month	Year
		19	
0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0	0 0
1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1	1 1
2 2	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2	2 2
3 3	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	3 3	3 3
4 4	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	4 4	4 4
5 5	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	5 5	5 5
6 6	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	6 6	6 6
7 7	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	7 7	7 7
8 8	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	8 8	8 8
9 9	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	9 9	9 9

LEGEND

- (N)** Not Yet—child cannot demonstrate indicator
- (I)** In Process—child demonstrates indicator intermittently
- (P)** Proficient—child can reliably demonstrate indicator

The Work Sampling System *Preschool-4 Developmental Guidelines* (4th edition) contains full descriptions of each performance indicator. (Number in parentheses indicates the page in the Guidelines where the indicator is described.)

I Personal and Social Development

A Self concept Fall

- 1 Shows some self-direction. (p. 1) (N I P)

B Self control Fall

- 1 Follows simple classroom rules and routines. (p. 1) (N I P)
 2 Manages transitions. (p. 2) (N I P)

C Approaches to learning Fall

- 1 Shows eagerness and curiosity as a learner. (p. 2) (N I P)
 2 Attends to tasks and seeks help when encountering a problem. (p. 2) (N I P)
 3 Approaches tasks with flexibility and inventiveness. (p. 3) (N I P)

D Interaction with others Fall

- 1 Interacts easily with one or more children. (p. 3) (N I P)
 2 Interacts easily with familiar adults. (p. 3) (N I P)
 3 Shows empathy and caring for others. (p. 4) (N I P)

E Social problem-solving Fall

- 1 Seeks adult help when needed to resolve conflicts. (p. 4) (N I P)

II Language and Literacy

A Listening Fall

- 1 Gains meaning by listening. (p. 5) (N I P)
 2 Follows two- or three-step directions. (p. 5) (N I P)
 3 Demonstrates phonological awareness. (p. 5) (N I P)

B Speaking Fall

- 1 Speaks clearly enough to be understood without contextual clues. (p. 6) (N I P)
 2 Uses expanded vocabulary and language for a variety of purposes. (p. 6) (N I P)

C Reading Fall

- 1 Shows appreciation for books and reading. (p. 6) (N I P)
 2 Shows beginning understanding of concepts about print. (p. 7) (N I P)
 3 Begins to develop knowledge about letters. (p. 7) (N I P)
 4 Comprehends and responds to stories read aloud. (p. 7) (N I P)

D Writing Fall

- 1 Represents ideas and stories through pictures, dictation, and play. (p. 8) (N I P)
 2 Uses letter-like shapes, symbols, and letters to convey meaning. (p. 8) (N I P)

III Mathematical Thinking

A Mathematical processes Fall

- 1 Begins to use simple strategies to solve mathematical problems. (p. 11) (N I P)

B Number and operations Fall

- 1 Shows beginning understanding of number and quantity. (p. 11) (N I P)

C Geometry and spatial relations Fall

- 1 Begins to recognize and describe the attributes of shapes. (p. 12) (N I P)
 2 Shows understanding of and uses several positional words. (p. 12) (N I P)

IV The Arts

A Expression and representation Fall

- 1 Participates in group music experiences. (p. 21) (N I P)
 2 Participates in creative movement, dance, and drama. (p. 21) (N I P)
 3 Uses a variety of art materials for tactile experience and exploration. (p. 21) (N I P)

B Understanding and appreciation Fall

- 1 Responds to artistic creations or events. (p. 22) (N I P)

V Physical Development and Health

A Gross motor development Fall

- 1 Coordinates movements to perform simple tasks. (p. 23) (N I P)

B Fine motor development Fall

- 1 Uses eye-hand coordination to perform tasks. (p. 24) (N I P)

C Personal health and safety Fall

- 1 Performs some self-care tasks independently. (p. 24) (N I P)

For teacher use only



Parent Survey - Minnesota School Readiness Study

Dear Kindergarten Parent,

Please help us learn about your kindergarten child and your family as part of a school readiness study. Neither you nor your child will be identified in the published study report. If you do not wish to participate in this parent survey, it will not prevent you or your child from participating in any programs or services.

If you choose to answer the voluntary questions, your information will be used by the Minnesota Department of Education for this study. The results of this study inform a number of different public policy discussions. Again, only aggregated information will be published. Thank you for your help!

1. Please indicate whether you are this child's:

Mother Father Other

2. Your highest level of school completed? Mark only one.

- Less than high school
- High school diploma/GED
- Trade school or some college beyond high school
- Associate degree
- Bachelor's degree
- Graduate or professional school degree

3. Your household's total yearly income before taxes from January-December last year? Round to the nearest thousand.

\$ _____

4. How many people are currently in your household?

1 2 3 4 5 6 7 8 Indicate: _____

5. Race/ethnicity of your kindergarten child? Mark all that apply.

- Black/African/African American
- American Indian/Alaskan Native
- Asian
- Native Hawaiian or other Pacific Islander
- Hispanic or Latino
- White/Caucasian
- Other

6. What language does your family speak most at home?

- English
- Spanish
- Hmong
- Somali
- Vietnamese
- Russian
- Other

Thank you for your time in working with us on this study.

For school use only:

Dist # _____ School # _____ Gender: M F DoB: ____/____/____ MARSS: _____
(include all 13 digits, including leading zeros)

Appendix C

Matched Child and Family Demographics (N=2,959)	Percent	Percent	N
	2008	2009	2009
Age of Child on 9/1/09 (Average 5 years, 8 months)			
4	1%	1%	33
5	90%	88%	2,606
6	9%	10%	287
Total	100%	100%	2,959
Gender			
Male	52%	51%	1,521
Female	48%	49%	1,438
Total	100%		2,959
IEP or IIP			
Yes	7%	6%	187
No	93%	94%	2,772
Total	100%		2,959
Parent Education Level			
Less than high school	7%	5%	154
High school diploma/GED	20%	19%	559
Trade school or some college beyond high school	26%	26%	772
Associate degree	12%	14%	428
Bachelor's degree	24%	21%	634
Graduate or professional school degree	12%	10%	302
Total	100%		2,849
Household Income Indexed to Federal Poverty Guidelines			
Less than 50% FPG	6%	3%	81
50% FPG to 100%	12%	5%	131
100-130 FPG	7%	5%	118
130-185 FPG	11%	6%	157
185-200 FPG	3%	2%	58
200-250 FPG	9%	10%	232
250-300 FPG	8%	9%	221
300+ FPG	43%	59%	1,429
Total	100%	100%	2,427

Matched Child and Family Demographics (N=2,959), continued	Percent	Percent	N
	2008	2009	2009
Race/Ethnicity of Child (2009 - 272 Multiple Responses)			
Black/African/African American	8%	7%	178
American Indian/Alaskan Native	5%	2%	63
Asian	6%	4%	116
Native Hawaiian or Other Pacific Islander	1%	<.05%	6
Hispanic or Latino	9%	8%	212
White/Caucasian	70%	87%	2,289
Other	1%	1%	27
Total Responses			2,891
Language Spoken Most Often at Home (2009 - No Multiple Responses)			
English	86%	90%	2,565
Spanish	6%	6%	158
Hmong	3%	2%	56
Somali	2%	1%	27
Vietnamese	1%	.4%	11
Russian	0.20%	.1%	4
Other	2%	1.4%	39
Total Responses			2,860

* Totals may not equal 100% due to rounding.

Appendix D

Statistically Significant Factors from Logistic Regression

Domain/Year	Parent Education	Percent of FPG*	Primary Home Language	Race and Ethnicity	Gender
Physical Development and Health					
2006	---	***	---	---	***
2007	---	***	---	---	***
2008	---	***	***	---	***
2009	***	***	---	---	---
The Arts					
2006	***	---	---	---	***
2007	---	***	---	---	***
2008	---	***	---	---	***
2009	---	***	---	***	---
Personal and Social Development					
2006	***	***	---	---	***
2007	---	***	---	---	***
2008	---	***	---	***	***
2009	---	***	---	---	***
Mathematical Thinking					
2006	***	***	---	---	---
2007	---	***	***	---	***
2008	---	***	***	---	***
2009	---	***	---	---	---
Language and Literacy					
2006	***	***	---	---	***
2007	***	***	***	---	***
2008	---	***	***	---	***
2009	---	***	---	---	***

*** Noted demographic is significant for specified domain and year.

* FPG is used from 2007 forward. 2006 income was asked categorically.

Appendix E
Logistic Regression Results

Probability *Not Yet*: Physical Development and Health Domain

Effect / Category	<i>b</i>	SE (<i>b</i>)	Wald	<i>df</i>	<i>p</i>	Odds Ratio
Parent Education			18.01	5	<.01	
Less than HS	1.54	.94	2.67	1	<i>ns</i>	4.68
HS or GED	1.69	.74	5.27	1	<.05	5.40
Some Post-HS	1.63	.80	4.18	1	<.05	5.09
Associate Deg.	1.83	.54	11.35	1	<.001	6.25
Bachelor Deg.	1.99	.89	5.05	1	<.05	7.33
Grad/Prof Deg.	*					
Percent of FPG			10.54	2	<.01	
0-250	1.15	.44	7.03	1	<.01	3.17
>250-400	-.35	.45	.61	1	<i>ns</i>	.70
>400	*					
Home Language			.44	1	<i>ns</i>	
Non-English	.46	.69	.44	1	<i>ns</i>	1.58
English Only	*					
Minority Status			.48	2	<i>ns</i>	
Minority Only	-.38	.67	.33	1	<i>ns</i>	.68
White-Mix	-.38	.56	.46	1	<i>ns</i>	.68
White Only	*					
Gender			.10	1	<i>ns</i>	
Male	.10	.33	.10	1	<i>ns</i>	1.11
Female	*					
Intercept	-5.88	1.16	25.84	1	<.001	

*Reference category.

Logistic Regression Results

Probability *Not Yet*: The Arts Domain

Effect / Category	b	SE (b)	Wald	df	p	Odds Ratio
Parent Education			4.55	5	<i>ns</i>	
Less than HS	.29	.86	.11	1	<i>ns</i>	1.33
HS or GED	.16	.45	.13	1	<i>ns</i>	1.18
Some Post-HS	-.22	.43	.27	1	<i>ns</i>	.80
Associate Deg.	.48	.59	.67	1	<i>ns</i>	1.61
Bachelor Deg.	-.01	.57	.00	1	<i>ns</i>	.99
Grad/Prof Deg.	*					
Percent of FPG			14.07	2	<.001	
0-250	.97	.27	12.96	1	<.001	2.64
>250-400	.20	.37	.29	1	<i>ns</i>	1.22
>400	*					
Home Language			1.49	1	<i>ns</i>	
Non-English	.66	.54	1.49	1	<i>ns</i>	
English Only	*					
Minority Status			9.98	2	<.01	
Minority Only	-1.14	.41	7.72	1	<.01	.32
White-Mix	-.63	.39	2.59	1	<i>ns</i>	.53
White Only	*					
Gender			3.69	1	<i>ns</i>	
Male	.77	.40	3.69	1	<i>ns</i>	
Female	*					
Intercept	-4.25	.62	46.93	1	<.001	

*Reference category.

Logistic Regression Results

Probability *Not Yet*: Personal and Social Development Domain

Effect / Category	<i>b</i>	SE (<i>b</i>)	Wald	<i>df</i>	<i>p</i>	Odds Ratio
Parent Education			6.27	5	<i>ns</i>	
Less than HS	.45	.62	.51	1	<i>ns</i>	1.56
HS or GED	-.10	.41	.06	1	<i>ns</i>	.91
Some Post-HS	-.03	.56	.00	1	<i>ns</i>	.97
Associate Deg.	-.52	.57	.84	1	<i>ns</i>	.60
Bachelor Deg.	-.51	.37	1.91	1	<i>ns</i>	.60
Grad/Prof Deg.	*					
Percent of FPG			10.55	2	<.01	
0-250	.75	.23	10.52	1	<.01	2.11
>250-400	.28	.39	.52	1	<i>ns</i>	1.33
>400	*					
Home Language			2.41	1	<i>ns</i>	
Non-English	-.59	.38	2.41	1	<i>ns</i>	.55
English Only	*					
Minority Status			1.97	2	<i>ns</i>	
Minority Only	.48	.34	1.92	1	<i>ns</i>	1.61
White-Mix	.22	.30	.51	1	<i>ns</i>	1.24
White Only	*					
Gender			12.10	1	<.001	
Male	1.13	.33	12.10	1	<.001	3.11
Female	*					
Intercept	-4.16	.50	69.89	1	<.001	

*Reference category.

Logistic Regression Results

Probability *Not Yet*: Language & Literacy Domain

Effect / Category	<i>b</i>	SE (<i>b</i>)	Wald	<i>df</i>	<i>p</i>	Odds Ratio
Parent Education			14.49	5	<.05	
Less than HS	.87	.69	1.59	1	<i>ns</i>	2.39
HS or GED	.39	.63	.39	1	<i>ns</i>	1.48
Some Post-HS	.24	.55	.19	1	<i>ns</i>	1.27
Associate Deg.	-.28	.63	.20	1	<i>ns</i>	.75
Bachelor Deg.	-.56	.57	.96	1	<i>ns</i>	.57
Grad/Prof Deg.	*					
Percent of FPG			10.84	2	<.01	
0-250	1.10	.34	10.62	1	<.01	3.02
>250-400	.46	.33	1.97	1	<i>ns</i>	1.58
>400	*					
Home Language			1.37	1	<i>ns</i>	
Non-English	.40	.34	1.37	1	<i>ns</i>	
English Only	*					
Minority Status			.53	2	<i>ns</i>	
Minority Only	.17	.38	.21	1	<i>ns</i>	1.19
White-Mix	-.24	.43	.31	1	<i>ns</i>	.79
White Only	*					
Gender			4.19	1	<.05	
Male	.51	.25	4.19	1	<.05	1.66
Female	*					
Intercept	- 3.96	.55	52.21	1	<.001	

*Reference category.

Logistic Regression Results

Probability *Not Yet*: Mathematical Thinking Domain

Effect / Category	<i>b</i>	SE (<i>b</i>)	Wald	<i>df</i>	<i>p</i>	Odds Ratio
Parent Education			9.07	5	<i>ns</i>	
Less than HS	.68	.62	1.21	1	<i>ns</i>	1.97
HS or GED	-.16	.64	.06	1	<i>ns</i>	.85
Some Post-HS	-.24	.55	.18	1	<i>ns</i>	.79
Associate Deg.	-.34	.62	.35	1	<i>ns</i>	.69
Bachelor Deg.	-.50	.58	.73	1	<i>ns</i>	.61
Grad/Prof Deg.	*					
Percent of FPG			10.21	2	<.01	
0-250	1.26	.40	10.05	1	<.01	3.51
>250-400	.48	.36	1.75	1	<i>ns</i>	1.61
>400	*					
Home Language			.03	1	<i>ns</i>	
Non-English	.07	.41	.03	1	<i>ns</i>	1.07
English Only	*					
Minority Status			3.52	2	<i>ns</i>	
Minority Only	.52	.36	2.12	1	<i>ns</i>	1.68
White-Mix	-.63	.50	1.57	1	<i>ns</i>	.53
White Only	*					
Gender			2.33	1	<i>ns</i>	
Male	.47	.31	2.33	1	<i>ns</i>	1.60
Female	*					
Intercept	-3.97	.55	51.54	1	<.001	

*Reference category.