

Minnesota School Readiness Study

Developmental Assessment
at Kindergarten Entrance
Fall 2008

Technical Report



Minnesota
Department
of Education

Acknowledgements

Minnesota School Readiness Study: Developmental Assessment at Kindergarten Entrance

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Special thanks to the 96 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.

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Background

Minnesota School Readiness Study: Developmental Assessment at Kindergarten Entrance - Fall 2008

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 2008. 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 6,310 kindergartners.

Given the complexities of assessing young children, the study is designed to ensure the assessment is appropriate, useful and is guided by best practices in the field of early childhood.

The study uses a developmentally appropriate observational assessment that allows children to demonstrate their knowledge and skills in various ways. The Work Sampling System (WSS®), a standards-based observational assessment system designed to provide information about individual student's learning and progress over time, is used for the assessment.

The assessment is aligned with the Minnesota Early Childhood Indicators of Progress and the K-12 Academic Standards and assesses all areas of child development including cognitive, social, emotional, physical and approaches to learning. These areas of development are represented by the five domains of the Work Sampling System Checklist — Personal and Social Development; Language and Literacy; Mathematical Thinking; The Arts; and Physical Development. Children's rate of development varies, therefore, the goal of the study is to assess a cohort of children's proficiency within and across these developmental domains and not establish whether or not children are ready for school with the use of a composite "ready" or "not ready" score.

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).

Rubrics for each rating level were distributed to teachers at the start of the study. The rubrics, provided by the publisher in 2008, provide additional detail for each indicator for a *Not Yet*, *In Process* or *Proficient* rating.

2008 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 six strata which accounts for proximity to population centers and population density. 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 2008, 65 percent (613/945) of all schools were invited to participate. Approximately 23 percent (138/613) of those invited responded positively to the initial invitation. In late spring, schools are randomly selected to be released from the cohort when numbers exceed the sample amount. In 2008, 39 schools were released in a way to maintain representation across the strata. By November, 10 percent of all schools (96/945) submitted data.

The 2008 cohort of schools varied in its representativeness of the full population of schools with kindergartners enrolled. (Note: comparisons are made to the previous year's kindergarten enrollment). The sample seeks to be representative of all public schools including charters. Charters are not required to submit population data. In 2008, data was reported by 92 of 96 schools in the study. This means from year to year the degree of representation is sensitive to the inclusion of specific schools that may be focused on particular languages or populations as well as those schools reporting of population data. See Table A.

Table A - Kindergarten Population Compared to the Sample

	State Kindergarten Enrollment	Study Sample	Ratio of Representation Sample to Population
American Indian	2.29%	4.03%	1.76
Asian	6.32%	6.36%	1.01
Hispanic	7.93%	11.15%	1.41
Black	9.85%	11.26%	1.14
White	73.64%	65.50%	0.89
Free	33.47%	26.28%	0.79
Reduced Price	7.56%	7.74%	1.02
Limited English Proficiency	11.06%	16.57%	1.50
Special Education	9.78%	9.34%	0.96

2008 Results

A total of 6,310 kindergartners from 96 randomly selected elementary schools across the state were included in the Fall 2008 cohort. This reflects just over 10 percent of the entering kindergartners for the 2008-2009 school year.

The domain rankings by proficiency for the 2008 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; Language and Literacy; and Mathematical Thinking.

Domain level results for 2006, 2007 and 2008 adjusted for stratified cluster sampling. Associated confidence level intervals are available in Appendix A. In 2008, there was more variation across sites and more sites with children reporting higher levels of *Not Yet* ratings which leads to higher estimates of standard errors. While there are trends towards

increases in estimates of *Not Yet* results, the estimates are not outside the margin of error. Also, the existing data set does not allow for examination of potential reasons for shifts in the overall results.

Table 1 - Results By Domain

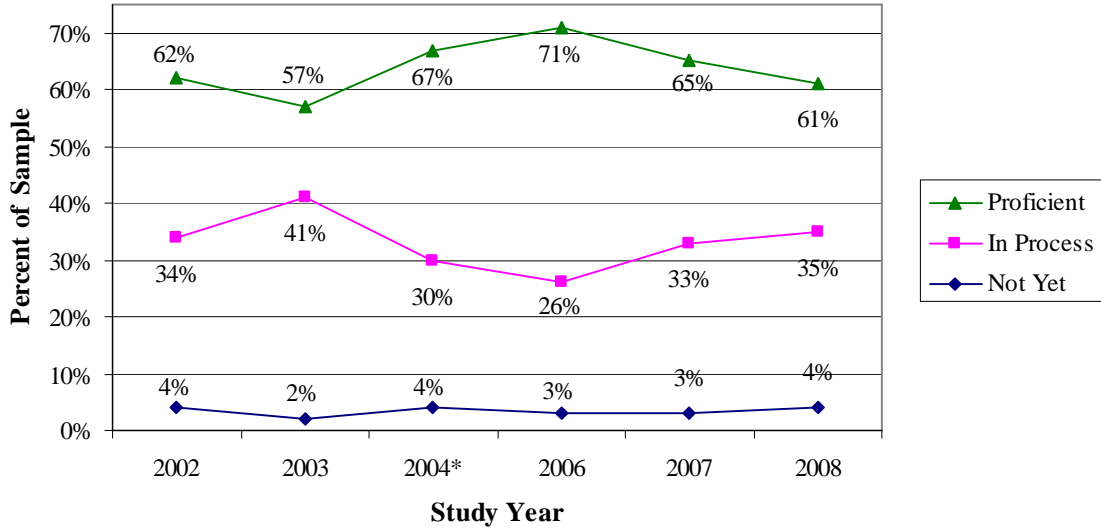
Domain/Result	Not Yet	In Process	Proficient
Physical Development	4% SE 1%	35% SE 2.3%	61% SE 2.7%
The Arts	8% SE 1.6%	43% SE 2.6%	49% SE 2.9%
Personal & Social Development	11% SE 1.2%	41% SE 1.9%	49% SE 2.4%
Mathematical Thinking	12% SE 1.6%	43% SE 2.0%	44% SE 2.6%
Language & Literacy	13% SE 1.5%	41% SE 1.8%	47% 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	
	Percent	N	Percent	N	Percent	N
Physical Development						
Physical Development Average Score Summary	4%	266	35%	2,231	61%	3,795
Performs some self-care tasks independently.	4%	224	32%	2,002	65%	4,061
Coordinates movements to perform simple tasks.	4%	231	35%	2,233	61%	3,833
Uses eye-hand coordination to perform tasks.	5%	342	39%	2,459	55%	3,491
The Arts						
The Arts Domain Average Score Summary	8%	490	44%	2,735	49%	3,069
Participates in group music experiences.	6%	357	41%	2,582	53%	3,367
Participates in creative movement, dance and drama.	8%	487	42%	2,637	50%	3,176
Uses a variety of art materials for tactile experience and exploration.	8%	490	44%	2,784	48%	3,018
Responds to artistic creations or events.	10%	624	47%	2,935	43%	2,714
Personal and Social Development						
Personal and Social Development Domain Average Score Summary	10%	652	41%	2,583	48%	3,043
Interacts easily with familiar adults.	8%	494	37%	2,344	55%	3,454
Shows eagerness and curiosity as a learner.	8%	482	38%	2,417	54%	3,401
Interacts easily with one or more children.	8%	526	38%	2,424	53%	3,354
Shows empathy and caring for others.	10%	613	40%	2,522	50%	3,154
Follows simple classroom rules and routines.	9%	588	42%	2,637	49%	3,079
Manages transitions.	11%	686	40%	2,545	49%	3,065
Shows some self-direction.	10%	650	43%	2,727	46%	2,917
Seeks adult help when needed to resolve conflicts.	11%	716	44%	2,771	44%	2,792
Attends to tasks and seeks help when encountering a problem.	13%	808	43%	2,730	44%	2,762
Approaches tasks with flexibility and inventiveness.	16%	955	44%	2,715	40%	2,454

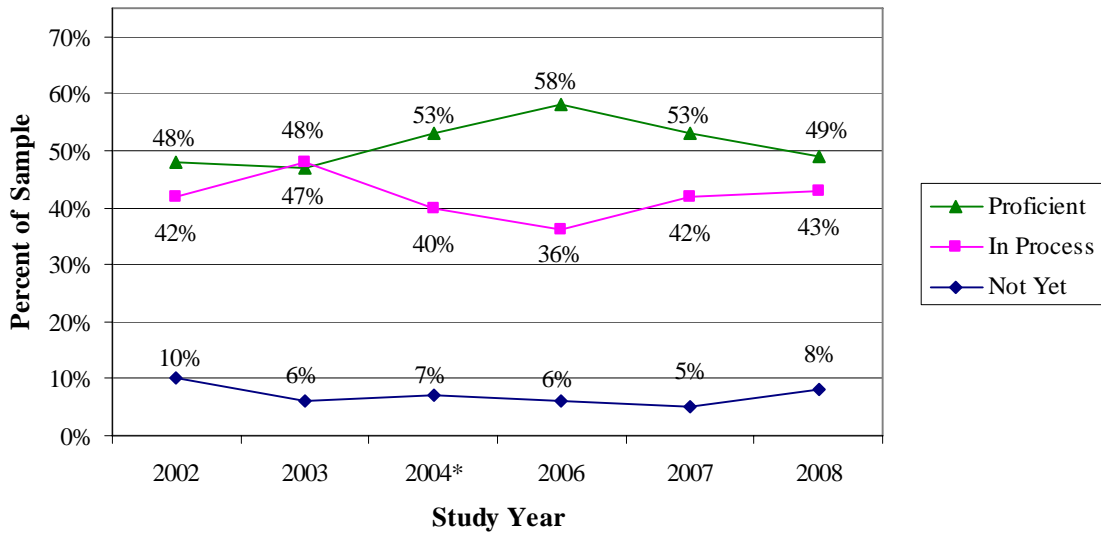
Table 2 Results by Domain Indicators Ranked by Proficiency Rating, continued						
	Not Yet		In Process		Proficient	
Mathematical Thinking						
Mathematical Thinking Domain Average Score Summary	12%	771	44%	2,753	44%	2,770
Begins to recognize and describe the attributes of shapes.	11%	676	42%	2,664	47%	2,961
Shows beginning understanding of number and quantity.	11%	670	45%	2,803	45%	2,824
Shows understanding of and uses several positional words.	13%	827	41%	2,603	45%	2,851
Begins to use simple strategies to solve mathematical problems.	14%	912	47%	2,942	39%	2,443
Language and Literacy						
Language and Literacy Domain Average Score Summary	13%	805	41%	2,582	46%	2,908
Shows appreciation for books and reading.	6%	391	38%	2,404	56%	3,502
Speaks clearly enough to be understood without contextual clues.	11%	705	33%	2,087	56%	3,508
Gains meaning by listening.	8%	535	43%	2,696	49%	3,065
Comprehends and responds to stories read aloud.	10%	651	41%	2,563	49%	3,082
Begins to develop knowledge about letters.	12%	747	41%	2,589	47%	2,961
Shows beginning understanding of concepts about print.	12%	777	42%	2,638	46%	2,889
Follows two- or three-step directions.	14%	910	40%	2,498	46%	2,890
Represents ideas and stories through pictures, dictation and play.	11%	719	46%	2,888	43%	2,688
Uses expanded vocabulary and language arts for a variety of purposes.	18%	1,127	40%	2,539	42%	2,619
Uses letter-like shapes, symbols and letters to convey meaning.	17%	1,081	44%	2,747	39%	2,464
Demonstrates phonological awareness.	19%	1,213	44%	2,751	37%	2,325

Chart 1 - Physical Development



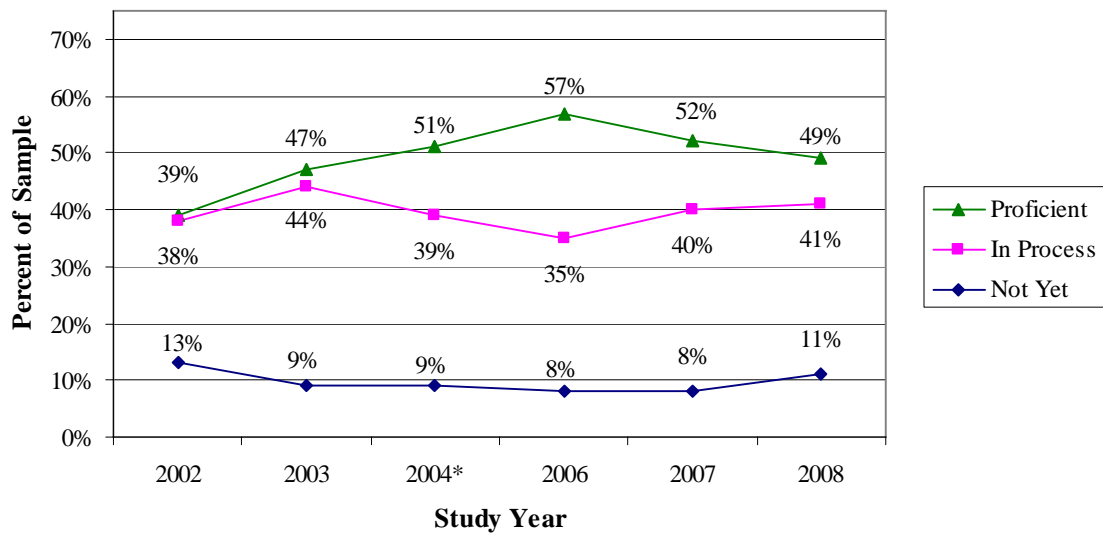
* Purposeful sample

Chart 2 - The Arts



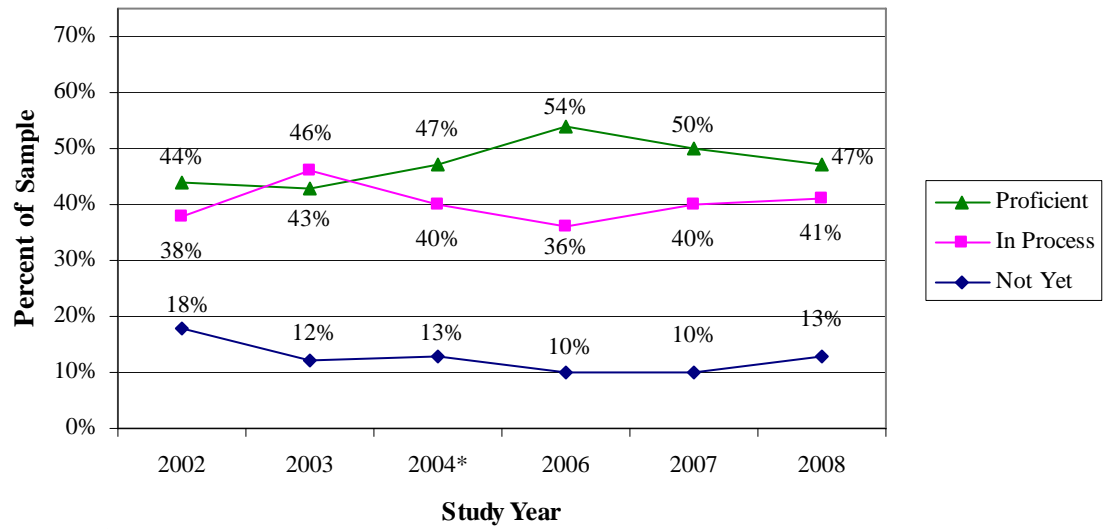
* Purposeful sample

Chart 3 - Personal and Social Development

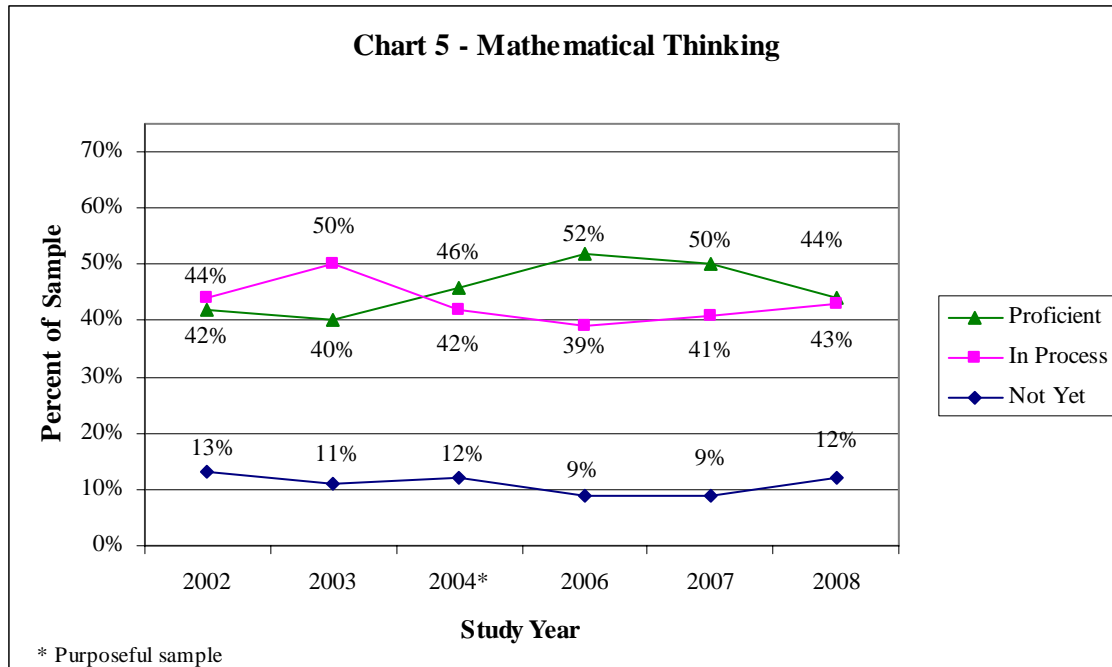


* Purposeful sample

Chart 4 - Language and Literacy



* Purposeful sample



Descriptive Results

The 2008 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 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 do not hold all other variables constant.) Where categories have a starred notation (*, ** or ***) there are differences within the demographic subgroup. These results are available in 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, 4,943 (78 percent) parents completed the survey. Of this group, 4,486 (91 percent) responses were usable for analysis. After the matching the family survey data with Work Sampling Online results, 3,498 records remained for regression analysis. This is 71 percent of all submitted parent surveys and 78 percent of those available to match.

The matched data set for 2008 has a larger proportion of families reporting lower levels of income as measured by the Federal Poverty Guidelines. (See Appendix D).

Appendix D also discusses differences in overall demographics between 2007 and 2008. Stability or minimal shifts are noted for levels of parent education, gender, IEP status and age of child at kindergarten entry. There are larger differences between 2007 and 2008 for the primary home language, race and ethnicity categories, which depending on the year, have been significant factors in domain results. (See Appendix E). In 2007, 11 percent of kindergartners statewide were accessing Limited English Proficiency services. This is more than in the 2007 sample reporting a primary language other than English and a smaller percent than those in the 2008 cohort.

In 2007, 74 percent of kindergartners enrolled on October 1 reported their race as White. The 2007 cohort had a larger percentage (81 percent) reporting in at least one category White as their race and the 2008 cohort had a smaller (70 percent) reporting the same. It is unknown to the degree the comparison to the October 1 counts is driven by the fact that family survey respondents can answer multiple categories for primary home language and race/ethnicity while the October 1 counts must select only one category. While these differences between 2007, 2008 cohorts and the full population are noted, it is important to keep in mind that the sampling procedures do not account for child demographics which are unknown in the spring recruitment phase for the fall study implementation. Also unknown is the degree to which the participation of charters and magnets each year may shift the overall sample and results due to their tendencies to target certain populations.

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 Appendix F).

All 2008 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 two to four times as

great than 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 not found to be statistically significant in any of the domains in the 2008 cohort when holding all other variables constant. Recent work from the Census (National Household Education Surveys Program, 2005) continues to describe the impact of maternal education on school readiness. Previous years of this study did show a relationship between parent education level and children's results.

Primary Home Language

The odds of being *In Process* or *Proficient* for students who speak English primarily at home were more than twice as likely in Language and Literacy and Mathematical Thinking as compared to students who spoke multiple languages or another primary language when all demographic variables were considered jointly. Speaking English primarily at home was not statistically related to the domains of Physical Development and Health, Personal and Social Development or The Arts after controlling for other demographic variables.

Race and Ethnicity

The odds of being *In Process* or *Proficient* for students who indicate their race/ethnicity was White and another race/ethnicity were twice as likely in Personal and Social Development domain for students whose race/ethnicity was White. Students who did not list White as a category were not found to be statistically different when controlling for all related variables. There were no statistical differences by race/ethnicity in Physical Development and Health, Language and Literacy Development, The Arts 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 twice as likely in the Personal and Social Development, Language and Literacy and The Arts 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 23 principals (96 total or 24 percent) and 93 kindergarten teachers (290 total or 32 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 (74 percent) and helping influence statewide policy. Reported barriers for participation include adding more to existing teacher workloads (78 percent). Principals balanced the need of the project with competing needs by having more experienced teachers mentor newer teachers, paying extra time for teachers and shifting staff development resources. Principals will use the information gained from the study to identify children's needs earlier in the year (52 percent). Principals accessing Work Sampling Online reported that the online training was easy to access. Principals report that the study orientation and online tutorials were useful to their work (60 percent and 93 percent). A majority of principals (68 percent) reported receiving the appropriate amount of information prior to and during their participation.

Teacher Perspectives

A vast majority of teachers (83 percent) responded that contributing to a study that will influence statewide early childhood policy was a benefit for them. Others reported the benefit of gaining information about where students are at the beginning of the school year (80 percent) and receiving a \$200 stipend (76 percent). Teachers reported that collecting the parent surveys was a challenge for them (41 percent). On a follow up question, 75 percent responded that they were able to implement the parent survey with great to moderate ease. Also, providing MARSS numbers in different formats may provide additional support. Thirty percent (30 percent) had no challenges implementing the study. Teachers reported that the study took a minimal (10 percent) to average (75 percent) amount of work for a special project.

Teachers report planning to use the information to identify children's needs earlier in the year (51 percent) and helping them target instruction (49 percent). Regarding the use of technology, 89 percent to 95 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 (93 percent) and during the study (99 percent). They also report receiving adequate support from MDE (93 percent) throughout the study period. Currently, 41 percent of teachers use Work Sampling in their schools, 48 percent report planning to continue using WSO after the study period. Half of all teachers report using locally designed assessment tools.

Limitations

Because children develop and grow along a continuum with great variability, 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.

The study is not designed to provide information on the history or the future of the individual student. The infrastructure to support such a process does not currently exist and would be a resource-intensive process if developed adequately to meet current demands. Any such system would need to have adequate supports for families and programs in place, detailed information on progress, data quality processes and privacy protections. 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 designing high stakes accountability and that for children birth to five “even more extreme caution is needed.”

The design of the study is sensitive to schools with concentrated populations which may impact the standard of error. For example, a school that is focused on a particular language or a specific demographic category may reliably demonstrate results substantially different from others in the sample. This difference in results increases the margin of error.

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 FPG. Race/ethnicity and primary home language were found to be predictors in a few domains, but not all. Across years, student’s race/ethnicity status and primary home language have had mixed results. Future reports will continue to analyze these predictors in all domains.

Kindergarten is the year with the greatest variability in a student’s history. Efforts across the state are underway to improve transitions into kindergarten. More communities are able to put into practice methods for treating the transition into kindergarten as the process that it is rather than a point-in-time event. This requires planning by schools and communities. Head Start and Early Childhood Special Education have specified protocols in place to help support smooth transitions.

Conclusions

The 2008 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" in each of the five developmental domains has remained consistent throughout the six years of the study. The 2008 report details the possible beginning of an increase in the percentage of students rated, on average, as "Not Yet."
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. 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 the quality of early childhood education and care programs in Minnesota by emphasizing the importance of the teacher-child interactions and content-driven curriculum and instruction. The most successful prekindergarten programs provide instructional content through programming that is sufficient in length and intensity to address learning needs.
6. 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.

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. (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 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. (2007). The 2007 HHS Poverty Guidelines. Retrieved December 3, 2008, from <http://aspe.hhs.gov/poverty/07poverty.shtm>.

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. 2006-2008 Results Adjusted for Stratified Cluster Sampling**
- B. Estimated Percentage (and Standard Error) of Students Assessed Not Yet By Domain By Demographic Sub-groups**
- C. Sample Work Sampling System® Developmental Checklist (Minnesota P4) and Family Survey (English)**
- D. Child and Family Demographics – 2007-2008 Cohort**
- E. Statistically Significant Factors from Logistic Regression – 2006-2008**
- F. Logistic Regression Results by Domain - 2008**

Appendix A

2006 Results by Domain - Adjusted for Stratified Cluster Sampling

Domain/Result	Source	Not Yet	In Process	Proficient
Physical Development	2006 Report	3%	26%	71%
	2009 Re-Analysis	3.1% SE=0.5% 95%CI: 2.2 - 4.1%	25.1% SE=3.2% 95%CI: 18.6 - 31.7%	71.7% SE=3.5% 95%CI: 64.6 - 78.9%
The Arts	2006 Report	6%	36%	58%
	2009 Re-Analysis	5.6% SE=1.2% 95%CI: 3.2 - 8.0%	34.0% SE=3.1% 95%CI: 27.7 - 40.2%	60.4% SE=3.6% 95%CI: 53.2 - 67.6%
Personal and Social Development	2006 Report	8%	35%	57%
	2009 Re-Analysis	7.6% SE=1.2% 95%CI: 5.2 - 9.9%	34.2% SE=2.6% 95%CI: 29.0 - 39.4%	58.2% SE=3.2% 95%CI: 51.7 - 64.8%
Language and Literacy	2006 Report	10%	36%	54%
	2009 Re-Analysis	9.7% SE=1.6% 95%CI: 6.5 - 12.9%	34.5% SE=2.7% 95%CI: 29.1 - 39.9%	55.8% SE=3.5% 95%CI: 48.7 - 62.9%
Mathematical Thinking	2006 Report	9%	39%	52%
	2009 Re-Analysis	9.2% SE=1.4% 95%CI: 6.4 - 11.9%	36.9% SE=2.9% 95%CI: 31.1 - 42.8%	53.9% SE=3.6% 95%CI: 46.7 - 61.1%

2007 Results by Domain -Adjusted for Stratified Cluster Sampling

Domain/Result	Source	Not Yet	In Process	Proficient
Physical Development	2007 Report	3%	33%	65%
	2009 Re-Analysis	2.7% SE=0.5% 95%CI: 1.7 - 3.8%	33.1% SE=2.6% 95%CI: 27.7 - 38.3%	64.2% SE=2.9% 95%CI: 58.4 - 69.9%
The Arts	2007 Report	5%	42%	53%
	2009 Re-Analysis	5.2% SE=0.7% 95%CI: 3.7 - 6.6%	42.9% SE=2.6% 95%CI: 37.6 - 48.1%	52.0% SE=2.9% 95%CI: 46.2 - 57.7%
Personal and Social Development	2007 Report	8%	40%	52%
	2009 Re-Analysis	8.5% SE=0.7% 95%CI: 7.0 - 9.9%	40.0% SE=2.0% 95%CI: 36.1 - 44.0%	51.5% SE=2.5% 95%CI: 46.6 - 56.4%
Language and Literacy	2007 Report	10%	40%	50%
	2009 Re-Analysis	10.0% SE=0.9% 95%CI: 8.2 - 11.8%	40.0% SE=2.1% 95%CI: 35.9 - 44.1%	49.9% SE=2.5% 95%CI: 45.0 - 54.9%
Mathematical Thinking	2007 Report	9%	41%	50%
	2009 Re-Analysis	9.0% SE=0.8% 95%CI: 7.3 - 10.8%	41.5% SE=2.2% 95%CI: 37.1 - 46.0%	49.4% SE=2.7% 95%CI: 44.2 - 54.7%

2008 Results by Domain - Adjusted for Stratified Cluster Sampling

Domain/Result	Source	Not Yet	In Process	Proficient
Physical Development	2008 Report	4%	35%	60%
	2009 Analysis	4.3% SE=1.0% 95%CI: 2.3 - 6.4%	35.1% SE=2.3% 95%CI: 30.5 - 39.7%	60.5% SE=2.7% 95%CI: 55.3 - 65.8%
The Arts	2008 Report	8%	43%	49%
	2009 Analysis	7.8% SE=1.6% 95%CI: 4.5 - 11.1%	42.8% SE=2.6% 95%CI: 37.7 - 47.9%	49.4% SE=2.9% 95%CI: 43.7 - 55.1%
Personal and Social Development	2008 Report	10%	41%	48%
	2009 Analysis	10.5% SE=1.2% 95%CI: 8.1 - 12.9%	40.6% SE=1.9% 95%CI: 36.7 - 44.4%	49.0% SE=2.4% 95%CI: 44.2 - 53.7%
Language and Literacy	2008 Report	13%	41%	46%
	2009 Analysis	12.9% SE=1.5% 95%CI: 9.9 - 15.8%	40.6% SE=1.8% 95%CI: 36.9 - 44.2%	46.6% SE=2.5% 95%CI: 41.7 - 51.5%
Mathematical Thinking	2008 Report	12%	44%	44%
	2009 Analysis	12.3% SE=1.6% 95%CI: 9.1 - 15.5%	43.3% SE=2.0% 95%CI: 39.4 - 47.3%	44.3% SE=2.6% 95%CI: 39.2 - 49.5%

Appendix B

Estimated Percentage (and Standard Error) of Students Assessed Not Yet in Each WSS Domain by Family Percent of Federal Poverty Guidelines (FPG)

Family Percentage of FPG	Work Sampling System® Domain				
	Personal and Social Development***	Language and Literacy***	Mathematical Thinking***	The Arts	Physical Development and Health
0-250 (n=1,380)	7.9% (1.5%)	10.7% (1.8%)	9.3% (1.7%)	5.2% (1.8%)	3.9% (1.5%)
>250-400 (n=660)	2.3% (0.7%)	2.2% (0.5%)	1.7% (0.6%)	0.8% (0.3%)	0.6% (0.3%)
>400 (n=780)	2.5% (0.5%)	2.2% (0.5%)	2.0% (0.6%)	1.2% (0.4%)	0.7% (0.2%)

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

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

Geographic Region	Work Sampling System® Domain				
	Personal and Social Development	Language and Literacy	Mathematical Thinking	The Arts	Physical Development and Health
All Cases					
Metro Area (n=3188)	7.8% (2%)	11.0% (2.3%)	9.9% (2.4%)	6.8% (3%)	4.3% (1.8%)
Non-Metro (n=3118)	6.5% (1.2%)	9.3% (1.6%)	8.1% (1.5%)	3.7% (0.7%)	2.9% (0.6%)
Cases with Parent Survey					
Metro Area (n=1525)	5.6% (1.8%)	6.6% (2%)	6.7% (2.1%)	4.6% (2.5%)	3.2% (1.7%)
Non-Metro (n=1949)	5.4% (0.6%)	8.1% (1.3%)	6.1% (1%)	3.1% (0.5%)	2.4% (0.4%)

Note. No significant geographic region effects were detected.

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

Gender	Work Sampling System® Domain				
	Personal and Social Development***	Language and Literacy***	Mathematical Thinking	The Arts***	Physical Development and Health***
All Cases					
Female (n=3075)	5.6% (1.2%)	8.5% (1.4%)	8.5% (1.5%)	4.1% (1.6%)	3.0% (1%)
Male (n=3231)	8.7% (1.4%)	11.9% (1.6%)	9.7% (1.5%)	6.6% (1.8%)	4.3% (1%)
Cases with Parent Survey					
Female (n=1676)	3.7% (0.9%)	5.4% (1.2%)	5.9% (1.3%)	2.6% (1.3%)	2.0% (0.9%)
Male (n=1798)	7.3% (1.2%)	9.0% (1.4%)	7.0% (1.3%)	5.2% (1.5%)	3.6% (1%)

*** $p < .001$

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

Language	Work Sampling System® Domain				
	Personal and Social Development	Language and Literacy*	Mathematical Thinking**	The Arts	Physical Development and Health
English Only (n=2856)	4.5% (0.6%)	4.9% (0.6%)	4.1% (0.6%)	2.4% (0.4%)	1.8% (0.3%)
English Mixed (n=139)	10.0% (4.4%)	15.4% (5.3%)	15.3% (6.2%)	10.1% (7.9%)	5.3% (3.7%)
Non-English Only (n=323)	12.9% (4.9%)	21.5% (5.7%)	20.6% (5.3%)	13.2% (7.8%)	9.9% (5.1%)

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

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

Race	Work Sampling System® Domain				
	Personal and Social Development**	Language and Literacy***	Mathematical Thinking**	The Arts	Physical Development and Health
White Only (n=2306)	3.6% (0.5%)	4.0% (0.5%)	3.1% (0.5%)	2.0% (0.3%)	1.6% (0.3%)
White Mixed (n=233)	9.3% (2%)	9.8% (1.9%)	7.2% (1.8%)	3.5% (1.5%)	3.1% (1.2%)
Minority Only (n=775)	10.3% (3.1%)	15.4% (3.7%)	15.3% (3.7%)	9.2% (4.9%)	6.3% (3.1%)

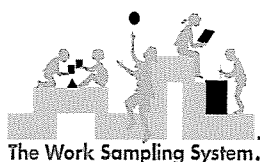
** $p < .01$ *** $p < .001$

**Estimated Percentage (and Standard Error) of Students Assessed Not Yet
in Each WSS Domain by Parent Respondent Education**

Parent Respondent Education	Work Sampling System® Domain				
	Personal and Social Development***	Language and Literacy***	Mathematical Thinking***	The Arts*	Physical Development and Health***
Less than HS Diploma (n=224)	13.5% (4%)	21.5% (5%)	18.5% (4.6%)	12.6% (7.2%)	9.7% (4.1%)
HS Diploma or GED (n=674)	8.1% (1.5%)	12.4% (2%)	11.0% (1.8%)	5.8% (1.9%)	3.5% (1.2%)
Some Post-HS (n=880)	5.9% (1%)	6.5% (1%)	5.4% (1.1%)	3.4% (1.1%)	3.1% (0.7%)
Associate Degree (n=414)	4.0% (0.9%)	3.3% (1.1%)	4.9% (1.0%)	2.9% (0.9%)	1.6% (0.6%)
Bachelors Degree (n=801)	2.9% (0.7%)	3.1% (0.8%)	2.6% (0.7%)	2.1% (0.6%)	1.5% (0.6%)
Grad/Prof Degree (n=390)	3.1% (0.9%)	3.0% (0.9%)	2.4% (1%)	1.6% (0.7%)	1.0% (0.6%)

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

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 ILLP? 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



Appendix D

Matched Child and Family Demographics (N=3,497)	Percent	Percent	N
	2007	2008	2008
Age of Child on 9/1/07 (Average 5 years, 7 months)			
4	1%	1%	28
5	89%	90%	3,138
6	10%	9%	329
Total	100%	100%	3,495
Gender			
Male	52%	52%	1,811
Female	48%	48%	1,686
Total	100%	100%	3,497
IEP or IIP			
Yes	7%	7%	235
No	93%	93%	3,262
Total	100%	100%	3,497
Parent Education Level			
Less than high school	5%	7%	227
High school diploma/GED	20%	20%	677
Trade school or some college beyond high school	30%	26%	888
Associate degree	12%	12%	415
Bachelor's degree	23%	24%	805
Graduate or professional school degree	10%	12%	395
Total	100%	100%	3,407

Matched Child and Family Demographics (N=3,497), continued	Percent	Percent	N
	2007	2008	2008
Household Income Indexed to Federal Poverty Guidelines			
Less than 50% FPG	4%	6%	166
50% FPG to 100%	9%	12%	332
100-130 FPG	7%	7%	212
130-185 FPG	13%	11%	316
185-200 FPG	4%	3%	96
200-250 FPG	14%	9%	260
250-300 FPG	11%	8%	230
300+ FPG	41%	43%	1,223
Total	100%	100%	2,835
Race/Ethnicity of Child (2008 - 331 Multiple Responses)			
Black/African/African American	5%	8%	317
American Indian/Alaskan Native	2%	5%	186
Asian	4%	6%	231
Native Hawaiian or Other Pacific Islander	0.30%	1%	22
Hispanic or Latino	7%	9%	348
White/Caucasian	81%	70%	2,624
Other	0.50%	1%	33
Total Responses		100%	3,761

Matched Child and Family Demographics (N=3,497), continued	Percent	Percent	N
Language Spoken Most Often at Home (2008 - 156 Multiple Responses)			
English	92%	86%	3,102
Spanish	4%	6%	229
Hmong	1%	3%	92
Somali	0.30%	2%	66
Vietnamese	0.30%	1%	25
Russian	0.20%	0.20%	6
Other	2%	2%	70
Total Responses		100%	3,590

* Totals may not equal 100% due to rounding.

Appendix E
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	---	***	***	---	***
The Arts					
2006	***	---	---	---	***
2007	---	***	---	---	***
2008		***	---	---	***
Personal and Social Development					
2006	***	***	---	---	***
2007	----	***	---	---	***
2008	---	***	---	***	***
Mathematical Thinking					
2006	***	***	---	---	---
2007	---	***	***	---	***
2008	---	***	***	---	***
Language and Literacy					
2006	***	***	---	---	***
2007	***	***	***	---	***
2008	---	***	***	---	***

* FPG is used from 07 forward. 2006 income was asked categorically.

Appendix F
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			4.363	5	ns	
Less than HS	0.449	0.879	0.261	1	ns	1.567
HS or GED	0.290	0.780	0.138	1	ns	1.336
Some Post-HS	0.607	0.813	0.557	1	ns	1.835
Associate Degree	0.625	0.861	0.526	1	ns	1.867
Bachelor Degree	0.612	0.512	1.425	1	ns	1.844
Grad/Prof Degree	*					
Percent of FPG			10.351	2	0.006	
0-250	1.438	0.489	8.657	1	0.003	4.212
>250-400	-0.101	0.529	0.037	1	ns	0.904
>400	*					
Home Language			12.571	2	0.002	
Non-English	1.527	0.446	11.711	1	<.001	4.604
English Mix	0.747	0.345	4.699	1	0.03	2.111
English Only	*					
Minority Status			2.493	2	ns	
Minority Only	0.008	0.472	0.000	1	ns	1.008
White-Mix	0.621	0.458	1.844	1	ns	1.861
White Only	*					
Gender			2.250	1	ns	
Male	0.395	0.263	2.250	1	ns	1.484
Female	*					
Intercept	-5.878	0.654	80.755	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			0.771	5	ns	
Less than HS	0.140	0.576	0.059	1	ns	1.151
HS or GED	0.067	0.350	0.037	1	ns	1.069
Some Post-HS	-0.042	0.273	0.024	1	ns	0.959
Associate Degree	-0.088	0.366	0.058	1	ns	0.916
Bachelor Degree	-0.109	0.318	0.117	1	ns	0.897
Grad/Prof Degree	*					
Percent of FPG			14.023	2	<.001	
0-250	0.804	0.284	8.005	1	0.005	2.234
>250-400	-0.229	0.369	0.383	1	ns	0.796
>400	*					
Home Language			0.995	2	ns	
Non-English	0.464	0.489	0.898	1	ns	1.590
English Mix	0.386	0.428	0.811	1	ns	1.471
English Only	*					
Minority Status			8.871	2	0.01	
Minority Only	0.385	0.283	1.854	1	ns	1.470
White-Mix	0.798	0.268	8.858	1	0.003	2.222
White Only	*					
Gender			12.305	1	<.001	
Male	0.730	0.208	12.305	1	<.001	2.075
Female	*					
Intercept	-4.099	0.324	160.040	1	<.001	

*Reference category.

Logistic Regression Results

Probability Not Yet: Language and Literacy Domain

Effect / Category	<i>b</i>	SE (<i>b</i>)	Wald	<i>df</i>	<i>p</i>	Odds Ratio
Parent Education			10.629	5	ns	
Less than HS	0.150	0.439	0.117	1	ns	1.162
HS or GED	0.373	0.388	0.927	1	ns	1.453
Some Post-HS	-0.121	0.326	0.137	1	ns	0.886
Associate Degree	-0.421	0.572	0.541	1	ns	0.657
Bachelor Degree	-0.176	0.342	0.264	1	ns	0.839
Grad/Prof Degree	*					
Percent of FPG			28.003	2	<.001	
0-250	1.179	0.298	15.696	1	<.001	3.251
>250-400	-0.216	0.309	0.488	1	ns	0.806
>400	*					
Home Language			7.991	2	0.02	
Non-English	1.003	0.424	5.582	1	0.02	2.726
English Mix	0.883	0.335	6.933	1	0.009	2.418
English Only	*					
Minority Status			1.590	2	ns	
Minority Only	0.068	0.330	0.043	1	ns	1.071
White-Mix	0.320	0.258	1.540	1	ns	1.376
White Only	*					
Gender			21.466	1	<.001	
Male	0.642	0.139	21.466	1	<.001	1.901
Female	*					
Intercept	-4.125	0.391	111.28	1	<.001	

*Reference category.

Logistic Regression Results

Probability Not Yet: The Arts Domain

Effect / Category	<i>b</i>	SE (<i>b</i>)	Wald	<i>df</i>	<i>p</i>	Odds Ratio
Parent Education			4.595	5	ns	
Less than HS	0.206	0.641	0.103	1	ns	1.228
HS or GED	0.712	0.566	1.585	1	ns	2.039
Some Post-HS	0.575	0.580	0.983	1	ns	1.777
Associate Degree	0.721	0.653	1.218	1	ns	2.056
Bachelor Degree	0.681	0.651	1.091	1	ns	1.975
Grad/Prof Degree	*					
Percent of FPG			11.557	2	0.003	
0-250	0.816	0.366	4.981	1	0.03	2.262
>250-400	-0.704	0.556	1.604	1	ns	0.495
>400	*					
Home Language			3.972	2	ns	
Non-English	0.998	0.649	2.366	1	ns	2.712
English Mix	0.461	0.681	0.458	1	ns	1.585
English Only	*					
Minority Status			3.730	2	ns	
Minority Only	0.647	0.360	3.231	1	ns	1.910
White-Mix	0.415	0.444	0.872	1	ns	1.514
White Only	*					
Gender			7.814	1	0.006	
Male	0.756	0.270	7.814	1	0.006	2.129
Female	*					
Intercept	-5.409	0.727	55.384	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			4.165	5	ns	
Less than HS	0.335	0.485	0.478	1	ns	1.398
HS or GED	0.544	0.425	1.638	1	ns	1.723
Some Post-HS	0.204	0.421	0.235	1	ns	1.226
Associate Degree	0.240	0.537	0.200	1	ns	1.271
Bachelor Degree	0.106	0.355	0.089	1	ns	1.111
Grad/Prof Degree	*					
Percent of FPG			29.287	2	<.001	
0-250	0.920	0.451	4.164	1	0.040	2.508
>250-400	-0.607	0.479	1.605	1	ns	0.545
>400	*					
Home Language			5.590	2	ns	
Non-English	0.846	0.379	5.000	1	0.03	2.331
English Mix	0.727	0.372	3.831	1	0.05	2.069
English Only	*					
Minority Status			4.879	2	ns	
Minority Only	0.487	0.273	3.177	1	ns	1.628
White-Mix	0.531	0.282	3.530	1	ns	1.700
White Only	*					
Gender			3.534	1	ns	
Male	0.264	0.140	3.534	1	ns	1.302
Female	*					
Intercept	-4.226	0.457	85.503	1	<.001	

*Reference category.