



**Minnesota  
Department of Education**

**Minnesota School Readiness  
Study:**

**Developmental Assessment at  
Kindergarten Entrance**

**Fall 2011**

## **Acknowledgements**

### **Minnesota School Readiness Study:**

#### **Developmental Assessment at Kindergarten Entrance**

The Minnesota School Readiness Study: Developmental Assessment at Kindergarten Entrance fall 2011 was planned, implemented and the report prepared by the Minnesota Department of Education (MDE).

Special thanks to the 96 elementary schools involved in the study, their principals, kindergarten teachers, support staff and superintendents. The observation and collection of developmental information by teachers on kindergarten children in the classroom was essential to the study and is much appreciated.

All analyses in this report were conducted by the Minnesota Department of Education. For more information, contact [Amanda Varley](#) at 651-582-8519 or [Eileen Nelson](#) at 651-582-8464.

**Date of Report: November 2013**

## **Background**

### **Minnesota School Readiness Study: Developmental**

#### **Assessment at Kindergarten Entrance - Fall 2011**

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 (MDE) in 2002 initiated a series of three yearly studies focused on obtaining a picture of the school readiness of a representative sample of Minnesota entering kindergartners. Also, the series of studies was 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, funding was appropriated for the study to be continued on an annual basis.

This report describes findings from the assessment of school readiness using a representative sample of children entering kindergarten in Minnesota in the fall of 2011. The data provide a picture of the ratings of entering kindergartners 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 should know and be able to do as they enter kindergarten in the following areas of child development: physical development; the arts; personal and social development; language and literacy; and mathematical thinking.

#### **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 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 children to demonstrate their knowledge and skills in various ways and across developmental domains.

WSS® is aligned with the state's early learning standards, Minnesota Early Childhood Indicators of Progress, and the K-12 Academic Standards. To obtain a copy of the WSS checklist, please contact [Amanda Varley](#).

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:

**Proficient** - indicating that the child can reliably and consistently demonstrate the skill, knowledge, behavior or accomplishment represented by the performance indicator.

**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.

**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.

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.

Minnesota also launched an analysis effort with the Human Capital Research Collaborative (HCRC) based at the University of Minnesota that was completed in 2010. Through an analysis of multi-year data, HCRC determined that proficiency on 75 percent of the total points possible on the School Readiness Checklist significantly and consistently predicted third grade reading and mathematics test scores on the MCA and the need for school remedial services (special education or grade retention) above and beyond the influence of child and family background characteristics. The strength of predication was consistent across a range of child and family characteristics (e.g., family income, gender and race/ethnicity). As a result of this analysis, a rating using this 75 percent standard is now reported. [View further information on the HCRC analysis.](#)

## **2011 Recruitment**

MDE contacted superintendents, principals and teachers beginning mid-winter to build the sample for the coming fall. A list of all public schools with kindergartners as of October 1 the previous year was compiled. The list was divided into eight strata which accounts for proximity to population centers and population density and separated charter and magnet schools. A representative sample of schools within each stratum was invited to participate via a mailed invitation to the superintendent and principal of each site. Follow-up calls were made to each site to answer questions.

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 1.)

	<b>State Kindergarten Enrollment</b>	<b>Matched Sample</b>
American Indian	2.3 percent	3.0 percent
Asian/Pacific Islanders	7.1 percent	3.5 percent
Hispanic	8.5 percent	3.1 percent
Black	10.9 percent	5.0 percent
White	71.1 percent	74.7 percent
Multiple Ethnicities as Reported by Parents (not included above)		10.7 percent
Limited English Proficiency	11.6 percent	NA
Special Education	10.3 percent	6.5 percent

## 2011 Results

A total of 5,725 kindergartners from 96 selected elementary schools across the state were included in the fall 2011 cohort. This reflects 9 percent of the entering kindergartners for the 2011-2012 school year. For the fall of 2011, 69 percent of Minnesota's kindergartners in the sample reached the 75 percent standard. For selected categories, see Chart 1. The selected categories in Chart 1 are based on the statistically significant categories from the regression. The regression is discussed in more detail on page 9.

The domain rankings by proficiency for the 2011 cohort are reordered with previous years of the study. (See Table 2 and Chart 2.) Physical Development had the highest percentage of children assessed Proficient on average, followed in order by The Arts, Personal and Social Development, Language & Literacy, and Mathematical Thinking. Indicator order within each domain changed only slightly from 2010 in The Arts, Personal and Social Development and Language and Literacy. (See Table 3.) Proficiency by domain is defined as the average percent proficient across indicators within each domain.

The existing data set does not allow for examination of any potential reasons for shifts in domain proficiency or ranking.

**Table 2 - Results by Domain**

<b>Domain/Result</b>	<b>Proficient</b>	<b>Margin of Error</b>
Physical Development	69 percent	3.2 percent
The Arts	58 percent	3.4 percent
Personal and Social Development	56 percent	3.02 percent
Language and Literacy	54 percent	3.09 percent
Mathematical Thinking	51 percent	3.38 percent
Note: categories are adjusted for stratified cluster sampling.		

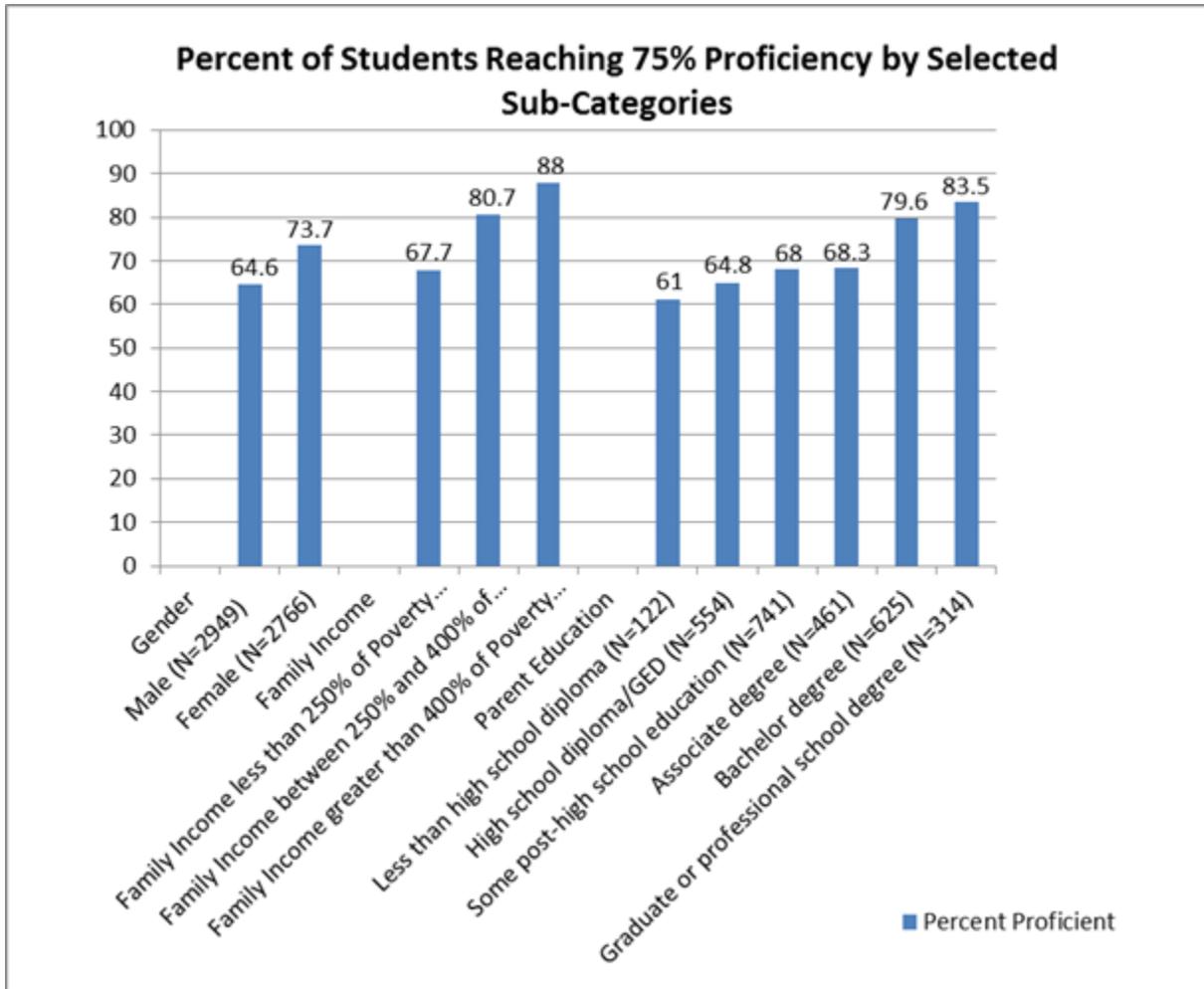
***The 75 percent standard is defined as the percent reaching at least 75 percent of the possible points on the checklist of all children, a predictor of grade 3 MCAs.***

***75 percent standard***

***69 percent proficient***

***0.06 percent***

**Chart 1 – Percent of Students Reaching 75 Percent Standard by Selected Sub-Categories**



### Table 3 - Domain & Indicator Results

#### Ranked by Proficiency Domains with Indicators

#### Percent Proficient

##### Physical Development

<b><i>Physical Development Summary</i></b>	69.0 percent
Performs some self-care tasks independently	73.4 percent
Coordinates movements to perform simple tasks	69.0 percent
Uses eye-hand coordination to perform tasks	65.8 percent

##### The Arts

<b><i>The Arts Domain Summary</i></b>	58.0 percent
Participates in group music experiences	61.9 percent
Participates in creative movement, dance, and drama	58.4 percent
Uses a variety of art materials for tactile experience and exploration	57.5 percent
Responds to artistic creations or events	54.4 percent

##### Personal and Social Development

<b><i>Personal and Social Development Domain Summary</i></b>	56.0 percent
Interacts easily with familiar adults	63.8 percent
Shows eagerness and curiosity as a learner	63.3 percent
Interacts easily with one or more children	61.1 percent
Shows empathy and caring for others	58.5 percent
Manages transitions	56.8 percent
Follows simple classroom rules and routines	56.1 percent
Shows some self-direction	53.6 percent
Attends to tasks and seeks help when encountering a problem	51.4 percent
Seeks adult help when needed to resolve conflicts	51.4 percent
Approaches tasks with flexibility and inventiveness	49.6 percent

##### Language and Literacy

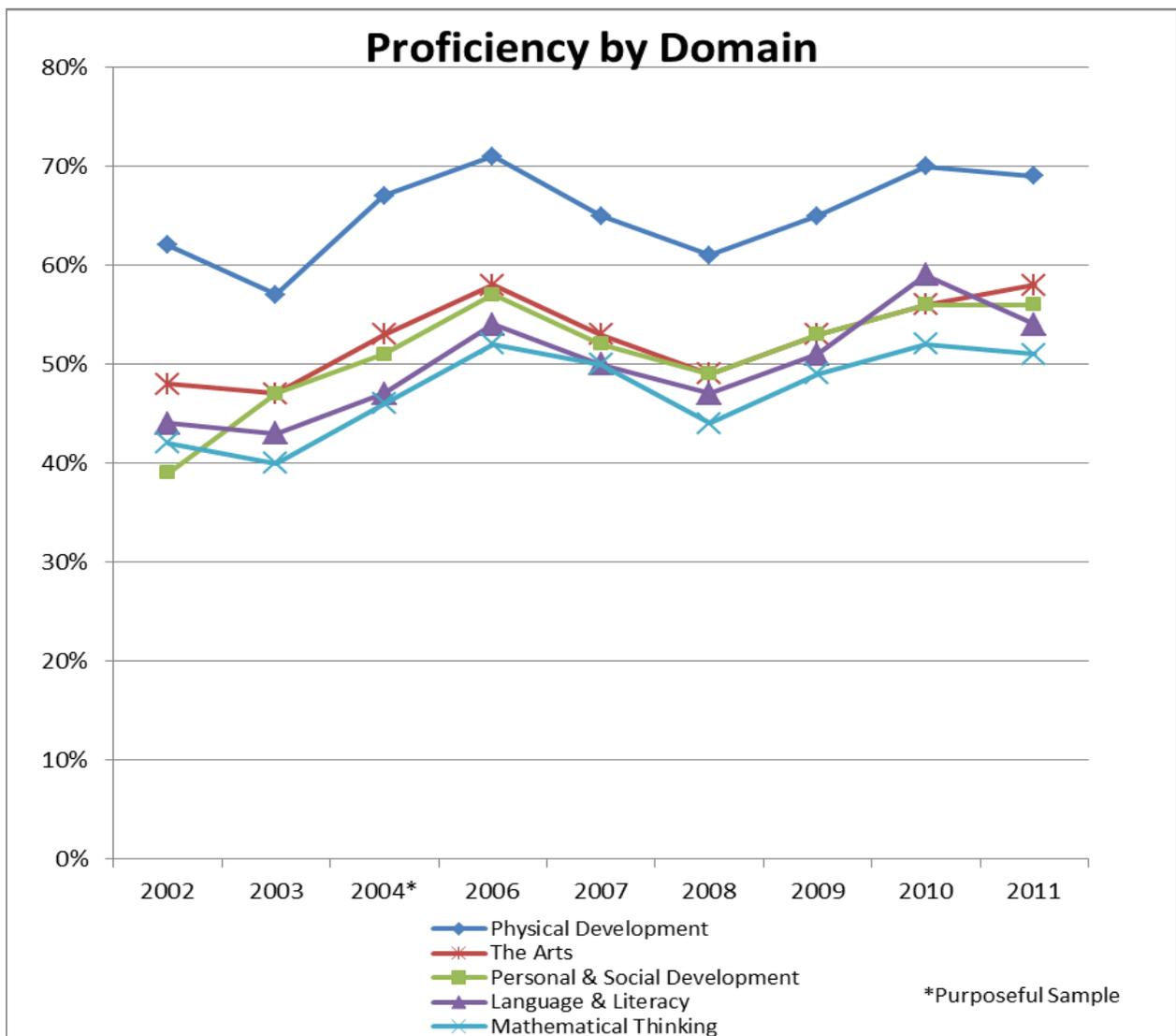
<b><i>Language and Literacy Domain Summary</i></b>	54.0 percent
Shows appreciation for books and reading	63.7 percent
Speaks clearly enough to be understood without contextual clues	61.1 percent
Begins to develop knowledge about letters	58.4 percent
Comprehends and responds to stories read aloud	56.7 percent
Shows beginning understanding of concepts about print	56.0 percent
Gains meaning by listening	55.9 percent
Follows two or three-step directions	54.6 percent
Represents ideas and stories through pictures, dictation and play	51.2 percent
Uses expanded vocabulary and language	49.2 percent

for a variety of purposes	
Demonstrates phonological awareness	48.2 percent
Uses letter-like shapes, symbols and letters to convey meaning	47.1 percent

**Mathematical Thinking**

<b><i>Mathematical Thinking Domain Summary</i></b>	51.0 percent
Begins to recognize and describe the attributes of shapes	55.3 percent
Shows understanding of and uses several positional words	53.6 percent
Shows beginning understanding of number and quantity	53.3 percent
Begins to use simple strategies to solve mathematical problems	44.8 percent

**Chart 2 – Proficiency Rates by Domain**



### **Descriptive Results**

The 2012 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. The percent within each demographic category reaching the 75 percent standard are reported in Appendix A.

## **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. In total, 4,163 parents (73 percent) completed the survey. (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, 2,817 records remained for regression analysis. This is 68 percent of all submitted parent surveys.

## **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 reaching the 75 percent proficiency standard across all domains 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. The statistically significant factors in reaching the 75 percent standard were: household income, parent education level and gender (Note: predictors significant at  $p < .05$ , see Appendix C. For comparison to previous years, see Appendix D.)

All 2011 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 reaching the 75 percent standard for a student whose household income was at or above 400 percent of the Federal Poverty Guidelines (FPG) were nearly two and a half times as great as compared to a student whose household income was less than 250 percent FPG when holding all other variables constant. The odds of reaching the 75 percent standard for a student whose household income was 250-400 percent FPG are one and half times as great as compared to a student whose household income is up to 250 percent FPG. These results are statistically significant.

## **Parent Education Level**

Parent education level was found to be statistically significant in reaching the 75 percent standard. Students with parents who have a Bachelor degree are more than one and a half times as likely to reach the 75 percent standard as compared to students whose parents have a high school diploma or GED. For students with parents with a graduate degree, they are twice as likely to reach the 75 percent standard as compared to students whose parents have a high school diploma or GED.

## **Primary Home Language**

Primary home language was not found to be statistically significant in reaching the 75 percent standard when holding all other variables constant.

## **Race and Ethnicity**

Parent-report of race and ethnicity was not a statistically significant factor in reaching the 75 percent standard when holding all other variables constant. Minority status as an overall category was marginally significant.

## **Gender**

Gender continues to be a statistically significant factor. The likelihood of reaching the 75 percent standard for females was up to one and a third times greater 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 35 principals and 165 kindergarten teachers.

### **Principal Perspectives**

Principals reported two primary benefits of participating in the study: helping influence statewide policy (85 percent) and gaining information about where students are at the beginning of the school year (70 percent). Reported barriers for participation included adding to existing teacher workloads (64 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 (58 percent). Principals using Work Sampling Online (WSO) reported that the online training was easy to access. A majority of principals (82 percent) reported receiving the appropriate amount of information prior to and during their participation.

### **Teacher Perspectives**

A vast majority of teachers (87 percent) responded that contributing to a study that will influence statewide early childhood policy was of benefit to them. Approximately 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 (68 percent). A little over one-third of the teachers reported that collecting the parent surveys was a challenge for them (38 percent). On a follow-up question, 78 percent responded that they were able to implement the parent survey with great to moderate ease. Thirty-one percent had no challenges

implementing the study. Teachers reported that the study took a minimal (14 percent) to average (68 percent) amount of work for a special project.

Teachers report planning to use the information to identify children's needs earlier in the year (45 percent) and helping them target instruction (44 percent). Regarding the use of technology, 89 percent report great to moderate ease in accessing WSO and the Web-based orientation.

Teachers report receiving adequate levels of information prior to (77 percent) and during the study (80 percent). They also report receiving adequate support from MDE (90 percent) throughout the study period. Currently, 28 percent of teachers use Work Sampling in their schools, 35 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.

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."

## For Further Reading

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## **Appendices**

- A. Work Sampling System Subgroup Analysis with Sampling Weight (2011)
- B. Family Survey (English)
- C. Logistic Regression Predicting Proficiency at the 75 Percent Standard (Weighted)
- D. Statistically Significant Factors from Logistic Regression

## Appendix A. Work Sampling System Subgroup Analysis with Sampling Weight (2011)

	<b>75 percent Overall Proficiency (Weighted)</b>
All students (N=5715)	69.0 percent
Students with Parent Survey (N=2718)	72.1 percent
<b>Race/ethnicity</b>	
White (N=2106)	72.8 percent
American Indian/Alaskan Native (N=86)	51.5 percent
Black/African/African American (N=349)	70.0 percent
Other (N=301)	71.0 percent
Asian/ Native Hawaiian/Pacific Islander (N=100)	77.0 percent
Hispanic/Latino (N=86 )	70.7 percent
<b>Gender (All Students)</b>	
Female (N=2766)	73.7 percent
Male (N=2949)	64.6 percent
<b>IEP Status (Special Education, All Students)</b>	
No (N=5344)	70.9 percent
Yes (N=398)	40.0 percent
<b>Family Income (Matched Cases)</b>	
Over 400 percent Federal Poverty Guideline (N=191)	88.0 percent

	<b>75 percent Overall Proficiency (Weighted)</b>
Between 250 and 400 percent of the Federal Poverty Guideline (N=490)	80.7 percent
250% Federal Poverty Guideline and under (N=2136)	67.7 percent
<b>Parent Education (Matched Cases)</b>	
Less than high school (N=122)	61.0 percent
High School Diploma/GED (N=554)	64.8 percent
Trade school or some college (N=741)	68.0 percent
Associate's degree (N=461)	68.3 percent
Bachelor's degree (N=625)	79.6 percent
Graduate or professional degree (N=314)	83.5 percent
<b>Strata (All Students)</b>	
1 – Minneapolis and St. Paul (N=671)	68.4 percent
2 – 7 country metro excluding MSP1 (N=1243)	74.8 percent
3 – Outstate enrollment 2,000+ (N=1573)	66.5 percent
4 – Outstate enrollment 1,000-1,999 (N=1165)	57.9 percent
5 - Outstate enrollment 500-999 (N=623)	61.5 percent

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<sup>1</sup> The seven county metro areas includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington Counties.

	<b>75 percent Overall Proficiency (Weighted)</b>
6 - Outstate enrollment <500 (N=440)	68.2 percent

\* Note, 250% FPG for a family of four for calendar year 2010 was \$22,050.

## Appendix B: Family Survey - Minnesota School Readiness Study

**Please indicate whether you are this child's:**

Mother          Father          Other

**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

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

**How many people are currently in your household?**

1    2    3    4    5    6    7    8    Indicate:

**Race/ethnicity of your kindergarten child? Mark all that applies.**

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

**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: Logistic Regression Predicting Proficiency at the 75 Percent Standard (Weighted)**

**Logistic Regression Predicting Proficiency at the 75 Percent Standard (Weighted)**

Effect / Category	<i>b</i>	SE ( <i>b</i> )	Wald	<i>df</i>	<i>p</i>	Odds Ratio
Parent Education			23.93	5	<.001	
Less than HS	-0.33	0.28	1.42	1	<i>ns</i>	0.72
HS or GED	#					
Some Post-HS	0.11	0.12	0.78	1	<i>ns</i>	1.11
Associate Deg.	0.12	0.17	0.49	1	<i>ns</i>	1.12
Bachelor Deg.	0.55	0.14	14.88	1	<.001	1.74
Grad/Prof Deg.	0.69	0.28	6.12	1	<.02	2
Percent of FPG			6.95	2	<.05	
0-250	#					
>250-400	0.45	0.18	6.33	1	<.02	1.57
>400	0.9	0.4	5.04	1	<.05	2.45
Home Language			1.84	1	<i>ns</i>	
Non-English	#					
English Only	-0.43	0.32	1.85	1	<i>ns</i>	0.65
Minority Status			0.09	2	<i>ns</i>	
Minority Only	0.05	0.17	0.09	1	<i>ns</i>	1.05
White & Minority	0.03	0.14	0.04	1	<i>ns</i>	1.03
White Only	#					
Gender			33.96	1	<.001	
Male	#					
Female	0.58	0.1	33.96	1	<.001	1.78
Intercept	0.7	0.36	3.78	1	<.06	
# indicates reference category						

**Appendix C 1**

## Appendix D: Statistically Significant Factors from Logistic Regression

### Domain/Year

	Parent Education	Percent of FPG*	Primary Home Language	Race and Ethnicity	Gender
<b>Physical Development and Health</b>					
2006	---	***	---	---	***
2007	---	***	---	---	***
2008	---	***	***	---	***
2009	***	***	---	---	---
<b>The Arts</b>					
2006	***	---	---	---	***
2007	---	***	---	---	***
2008	---	***	---	---	***
2009	---	***	---	***	---
<b>Personal and Social Development</b>					
2006	***	***	---	---	***
2007	----	***	---	---	***
2008	---	***	---	***	***
2009	---	***	---	---	***

	Parent Education	Percent of FPG*	Primary Home Language	Race and Ethnicity	Gender
<b>Mathematical Thinking</b>					
2006	***	***	---	---	---
2007	---	***	***	---	***
2008	---	***	***	---	***
2009	---	***	---	---	---
<b>Language and Literacy</b>					
2006	***	***	---	---	***
2007	***	***	***	---	***
2008	---	***	***	---	***
2009	---	***	---	---	***
<b>75 Percent Standard</b>					
2010	***	***	---	---	***
2011	***	***	---	---	***

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

\* *Federal Poverty Guideline is used from 2007 forward. 2006 income asked categorically.*

*Note – Analysis 2010 forward focused on 75 percent standard.*