



**Minnesota
Department of Education**

**Minnesota School Readiness
Study:**

**Developmental Assessment at
Kindergarten Entrance**

Fall 2012

Acknowledgements

Minnesota School Readiness Study: Developmental Assessment at Kindergarten Entrance

The Minnesota School Readiness Study: Developmental Assessment at Kindergarten Entrance Fall 2012 was planned, implemented, and the report prepared by the Minnesota Department of Education (MDE).

Special thanks to the 126 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 very much appreciated.

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

Date of Report: November 2013

Background

Minnesota School Readiness Study: Developmental

Assessment at Kindergarten Entrance - Fall 2012

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 2012. 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 conceptually aligned with the state's early learning standards, Minnesota Early Childhood Indicators of Progress, and the K-12 Academic Standards. For 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 prediction was consistent across a range of child and family characteristics (e.g., family income, gender and race/ethnicity). As a result of the results of this analysis, a rating using this 75 percent standard is now reported. [View further information on the HCRC analysis](#).

The Future of the Study: Minnesota School Readiness Pilot

In 2011, Minnesota received a federal Race to the Top Early Learning Challenge grant and is using that opportunity to identify how prepared for school success Minnesota children are as they enter kindergarten. As Minnesota expands access to high-quality early learning opportunities, a critical piece of that work is to ensure every single child begins school on a path for success.

The Minnesota School Readiness Pilot Study will take place from August 2013 through January 2014. The study seeks to gather information on an innovative way to collect data on children's skills, knowledge and abilities as they enter kindergarten. The intent of the pilot study is also to support districts and schools in the use of developmentally appropriate assessments for young children and appropriate use of the data gathered from those assessments.

The mission and intended outcome of the School Readiness Pilot is threefold:

1. Help teachers inform and differentiate their instruction for children in their classroom in order to support seamless transitions from preschool to kindergarten.
2. Identify both the kindergarten teacher and the system's readiness for incoming children; this includes using data to identify professional development for teachers and to provide an overall picture of how the program's curriculum is responsive to children's needs.
3. Provide parents with information on the status of their child's learning when they enter the K-12 system in order to facilitate complimentary learning experiences in the home.

To do this the study is designed to determine the degree of conceptual and statistical alignment between a menu of piloted assessment tools and Minnesota's Early Childhood Indicators of Progress (ECIPs) and Kindergarten Academic Standards. The pilot will also assess usability for teachers for each of the piloted assessment tools. The work in this first phase will not determine whether or not the assessment tools are equivalent to one another, only how well they relate to the standards. The Office of Early Learning will use the findings from this pilot study to provide recommendations for future iterations of the Minnesota School Readiness Study.

2012 Recruitment

Minnesota Department of Education (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 and staff was available to answer any questions or comments regarding the study.

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.)

Table 1 - Kindergarten Population Compared to the Sample

State Kindergarten Enrollment	Study Sample	
American Indian	2.5 percent	1.4 percent
Asian/Pacific Islanders	7.2 percent	6.5 percent
Hispanic	8.1 percent	4.2 percent
Black	12.1 percent	6.8 percent
White	70 percent	70.1 percent
Multiple Ethnicities as Reported by Parents (not included above)	11.0 percent	
Limited English Proficiency	10.7 percent	N/A
Special Education	10.2 percent	5.9 percent (in all WSS)

2012 Results

A total of 7,539 kindergartners from 126 selected elementary schools across the state were included in the fall, 2012 cohort. This reflects 11.7 percent of the entering kindergartners for the 2012-2013 school year. For the fall of 2012, 72.8 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 nine.

The domain rankings by proficiency for the 2012 cohort are ordered in 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 and literacy, and mathematical thinking. This order reflects no change from the 2011 study. 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

Domain/Result	Proficient	Margin of Error
Physical Development	73.3 percent	3.2 percent
The Arts	61.7 percent	3.41 percent
Personal and Social Development	60.3 percent	3.02 percent
Language and Literacy	60.2 percent	3.09 percent
Mathematical Thinking	57.6 percent	3.4 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	72.8 percent proficient	.07 percent
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Chart 1 – Percent of Students Reaching 75 Percent Standard by Selected Sub-Categories

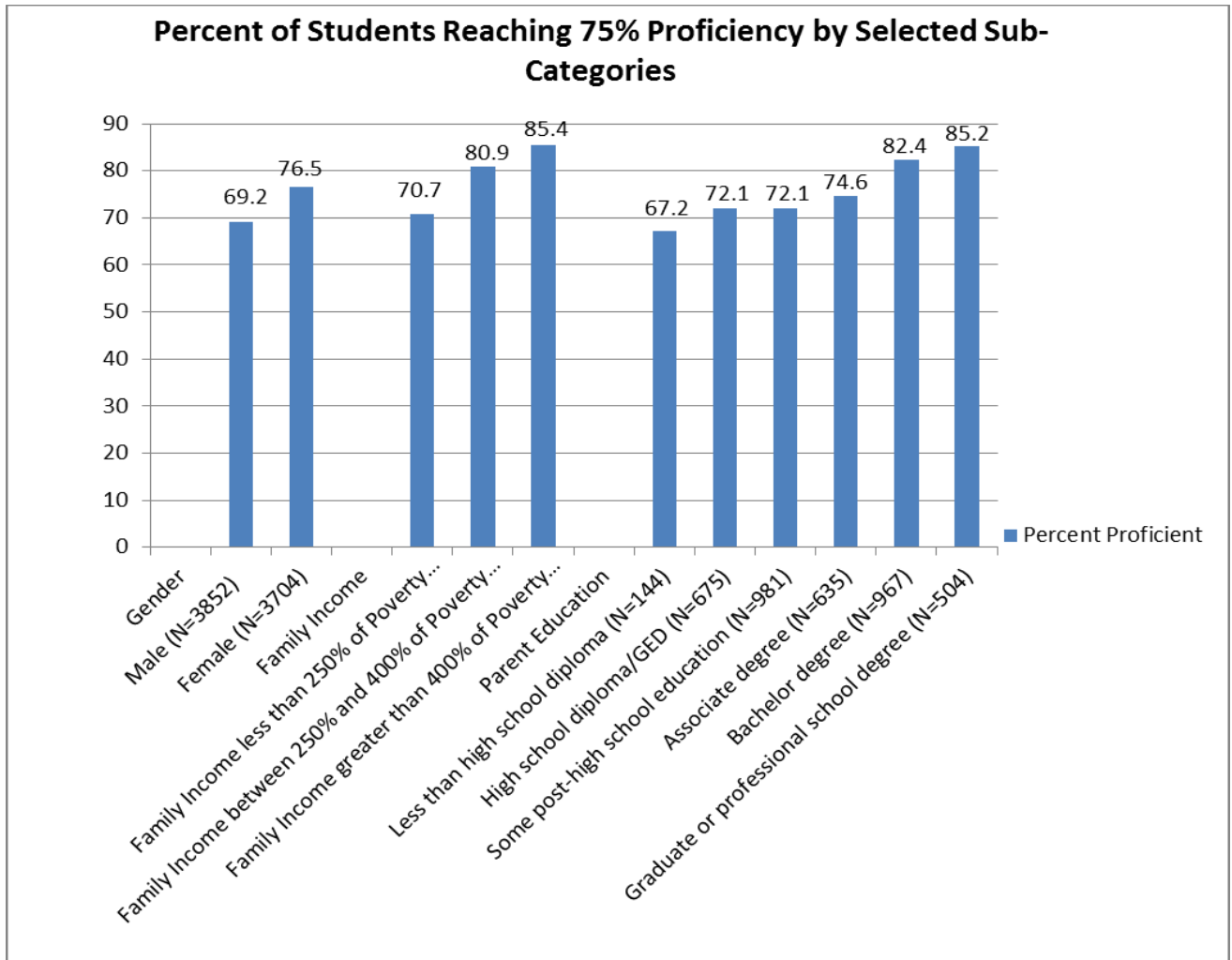


Table 3 Domain & Indicator Results - Ranked by Proficiency

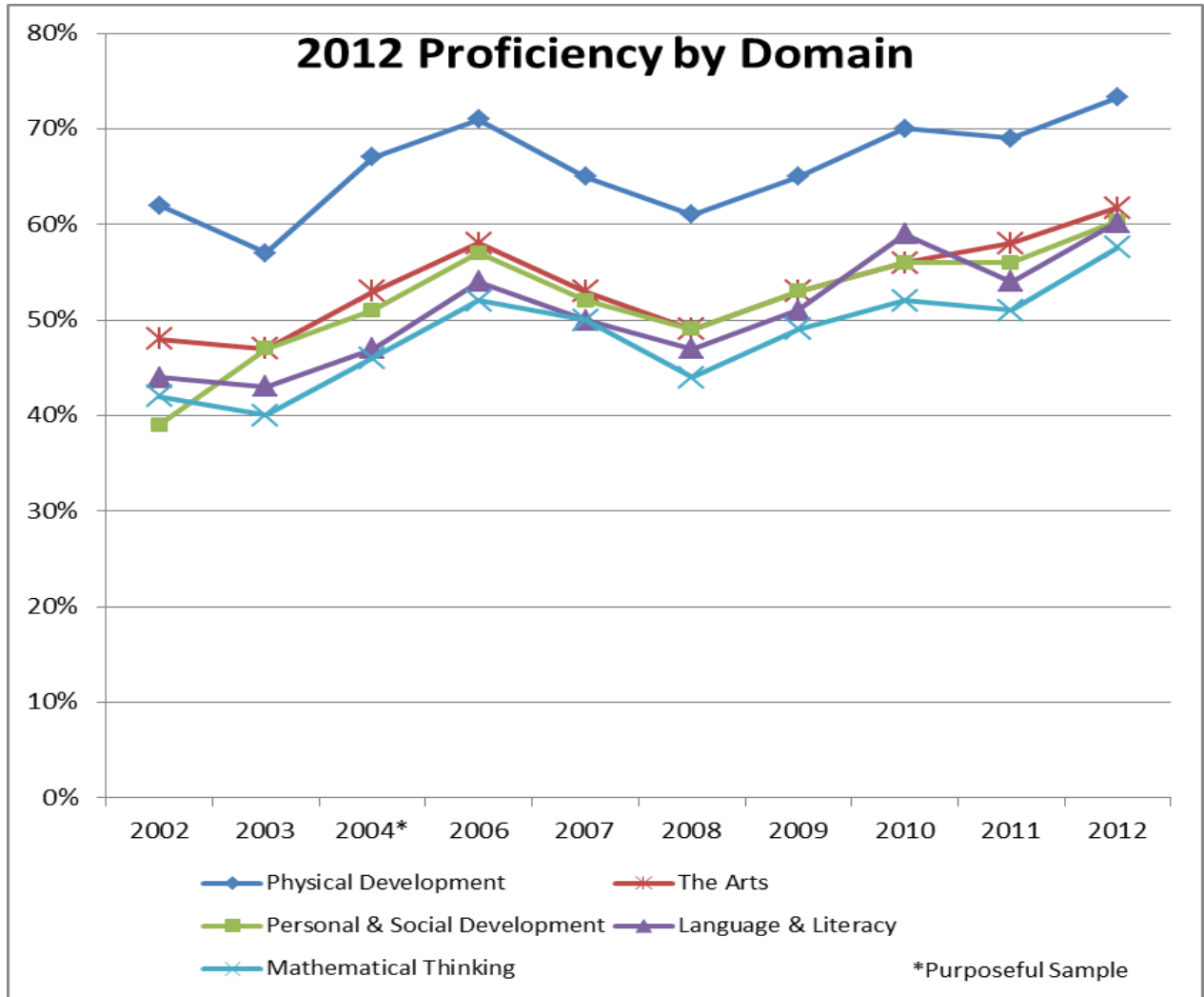
Domains with Indicators	Percent Proficient
Physical Development	
Physical Development Summary	73.3 percent
Uses eye-hand coordination to perform tasks	76.1 percent
Performs some self-care tasks independently	73.1 percent
Coordinates movements to perform simple tasks	70.7 percent
The Arts	
The Arts Domain Summary	61.7 percent
Participates in group music experiences	64.1 percent
Uses a variety of art materials for tactile experience and exploration	61.9 percent
Participates in creative movement, dance, and drama	61.7 percent
Responds to artistic creations or events	59.2 percent
Personal and Social Development	
Personal and Social Development Domain Summary	60.3 percent
Interacts easily with familiar adults	67.9 percent
Shows eagerness and curiosity as a learner	65.2 percent
Interacts easily with one or more children	64.9 percent
Shows empathy and caring for others	62.1 percent
Follows simple classroom rules and routines	60.0 percent
Manages transitions	59.7 percent
Shows some self-direction	58.2 percent
Seeks adult help when needed to resolve conflicts	56.9 percent
Attends to tasks and seeks help when encountering a problem	54.5 percent
Approaches tasks with flexibility and inventiveness	53.3 percent
Language and Literacy	
Language and Literacy Domain Summary	60.2 percent
Shows appreciation for books and reading	68.9 percent
Speaks clearly enough to be understood without contextual clues	66.1 percent
Shows beginning understanding of concepts about print	62.9 percent
Comprehends and responds to stories read aloud	62.1 percent
Gains meaning by listening	61.4 percent
Begins to develop knowledge about letters	61.4 percent
Represents ideas and stories through pictures, dictation and play	59.3 percent
Follows two or three-step directions	56.7 percent
Uses letter-like shapes, symbols and letters to convey meaning	55.7 percent
Uses expanded vocabulary and language for a variety of Purposes	55.6 percent
Demonstrates phonological awareness	52.0 percent

Mathematical Thinking

Mathematical Thinking Domain Summary

Begins to recognize and describe the attributes of shapes	57.6 percent
Shows beginning understanding of number and quantity	60.4 percent
Shows understanding of and uses several positional words	58.6 percent
Begins to use simple strategies to solve mathematical problems	53.0 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 (Appendix B). This information is combined with the Work Sampling System® checklist results. In total, 6386 parents (85 percent) completed the survey. (Sometimes 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, 3,906 records remained for regression analysis. This is 61 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 and gender (Note: predictors significant at $p < .01$, see Appendix C. For comparison to previous years, see Appendix D.)

All 2012 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) are two 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 more than 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 not found to be statistically significant in reaching the 75 percent standard when holding all other variables constant.

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.

Gender

Gender continues to be a statistically significant factor. The likelihood of reaching the 75 percent standard for females was more than one and a half 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 63 principals (126 possible responses or 49 percent) and 247 kindergarten teachers (372 potential responses or 66 percent).

Principal Perspectives

Principals reported two primary benefits of participating in the study: helping influence statewide policy (86 percent) and gaining information about where students are at the beginning of the school year (76 percent). Reported barriers for participation included adding to existing teacher workloads (6.13 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 (68 percent) and help teachers target instruction in their classes (68 percent). Principals using Work Sampling Online (WSO) reported that the online training was easy to access. A majority of principals (89 percent) reported receiving the appropriate amount of information prior to and during their participation.

Teacher Perspectives

A majority of teachers (91 percent) responded that receiving a \$200 stipend for this work was of benefit to them. A total of 81 percent reported that contributing to a study that will influence statewide early childhood policy was of benefit to them. Others reported the benefit of gaining information about where students are at the beginning of the school year (70 percent). A little

over one-third of the teachers reported that collecting the parent surveys was a challenge for them (33 percent). Twenty-eight percent had no challenges implementing the study. Teachers reported that the study took a minimal (17 percent) to average (67.5 percent) amount of work for a special project.

Teachers report planning to use the information to identify children's needs earlier in the year (49 percent) and helping them target instruction (38 percent).

Teachers report receiving adequate levels of information prior to (79 percent) and during (88 percent) the study. They also report receiving adequate support from MDE (93 percent) throughout the study period. Currently, 31 percent of teachers use Work Sampling in their schools, 25 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. Sample Work Sampling System® Developmental Checklist (Minnesota P4)
- B. Work Sampling System Subgroup Analysis with Sampling Weight (2011)
- C. Family Survey (English)
- D. Logistic Regression Predicting Proficiency at the 75 Percent Standard (Weighted)
- E. Statistically Significant Factors from Logistic Regression

Appendix A

Work Sampling System Subgroup Analysis with Sampling Weight (2012)

Demographic Subgroups	75 Percent Overall
Proficiency - weighted	
All students (N=7536)	72.8 percent
Students with Parent Survey (N=3906)	77.1 percent
Race/Ethnicity	
White (N=2841)	78.1 percent
Asian/ Native Hawaiian/Pacific Islander (N=221)	82.0 percent
Black/African/African American (N=349)	73.7 percent
Other (N=64)	75.1 percent
American Indian/Alaskan Native (N=203)	61.9 percent
Hispanic/Latino (N=278)	67.5 percent
Gender (All Students)	
Female (N=3704)	76.5 percent
Male (N=3852)	69.2 percent
IEP Status (Special Education, All Students)	
No (N=7030)	74.5 percent
Yes (N=526)	45.1 percent
Family Income (Matched Cases)	
Over 400 percent Federal Poverty Guideline (N=793)	85.4 percent
Between 250 and 400 percent of the Federal Poverty Guideline (N=1062)	80.9 percent
250 Percent Federal Poverty Guideline and under (N=2051)	70.7 percent
Parent Education (Matched Cases)	
Less than high school (N=144)	67.2 percent
High School Diploma/GED (N=675)	72.1 percent
Trade school or some college (N=981)	72.1 percent
Associate's degree (N=635)	74.6 percent
Bachelor's degree (N=967)	82.4 percent
Graduate or professional degree (N=504)	85.2 percent
Strata (All Students)	
1 - Minneapolis and St. Paul (N=823)	70.1 percent
2 - 7 country metro excluding MSP (N=1889)	80.4 percent
3 - Outstate enrollment 2,000+ (N=1659)	58.8 percent
4 - Outstate enrollment 1,000-1,999 (N=1375)	65.9 percent
5 - Outstate enrollment 500-999 (N=1142)	74.3 percent
6 - Outstate enrollment <500 (N=668)	72.6 percent

¹ The seven count metro area includes Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington Counties.

*** Note, 250 percent FPG for a family of four for calendar year 2011 was \$22,350.**

Appendix B

Parent 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 apply.

- 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 Vietnamese
- Spanish Russian
- Hmong Other
- Somali

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 (N=3906)
(Weighted)**

Effect / Category	<i>b</i>	SE (<i>b</i>)	Wald	<i>df</i>	<i>p</i>	Odds Ratio
Parent Education						
Less than HS	-0.27	0.46	0.36	1	<i>ns</i>	0.76
HS or GED	#					
Some Post-HS	-0.23	0.26	0.01	1	<i>ns</i>	0.98
Associate Deg.	0.01	0.3	0	1	<i>ns</i>	1.01
Bachelor Deg.	0.33	0.29	1.27	1	<i>ns</i>	1.39
Grad/Prof Deg.	0.48	0.35	1.82	1	<i>ns</i>	1.61
Percent of FPG						
0-250	#					
>250-400	0.48	0.23	4.41	1	<.04	1.61
>400	0.72	0.27	7.43	1	<.01	2.06
Home Language						
Non-English	#					
English Only	0.02	0.4	0	1	<i>ns</i>	1.02
Minority Status						
Minority Only	0.18	0.24	0.55	1	<i>ns</i>	1.2
White & Minority	0.01	0.29	0	1	<i>ns</i>	1.01
White Only	#					
Gender						
Male	#					
Female	0.51	0.17	8.61	1	<.01	1.67
Intercept	0.52	0.45	1.32	1	<i>ns</i>	

Appendix D
Statistically Significant Factors from Logistic Regression

Domain/Year	Parent Education	Percent of Federal Poverty Guidelines (PFG*)	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		***			***

Domain/Year	Parent Education	Percent of Federal Poverty Guidelines (PFPG*)	Primary Home Language	Race and Ethnicity	Gender
Mathematical Thinking					
2007		***	***		***
2008		***	***		***
2009		***			
Language and Literacy					
2006	***	***			***
2007	***	***	***		***
2008		***	***		***
2009		***			***
75 Percent Standard					
2010	***	***			***
2011	***	***			***
2012		***			***

*** Demographic is significant for specified domain and year.

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

Note – Analysis 2010 and later uses the 75 percent standard.